

Article

Mobilizing Pro-Environmental Values and Environmental Peace Culture Through Place-Based Education in the Colombian Amazon

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Abstract

In schools located in the Colombian Amazon, there is still limited empirical evidence on how students connect pro-environmental values with emotions and environmental peace culture. In this article, environmental peace culture is understood as a way of learning to care for nature, live with it, and assume shared responsibility for its protection. The study investigated “Sembrando Paz Ambiental”, a place-based pedagogical proposal implemented among secondary school students through experiential, playful, and participatory activities. A convergent mixed-methods design was employed, integrating a quasi-experimental pretest–posttest component with a qualitative analysis of students’ perceptions and pedagogical productions. The quantitative component included 66 paired cases assessed through a 24-item Likert scale, with data analyzed using the Wilcoxon signed-rank test. The qualitative component included open-ended responses, drawings, and written productions analyzed through thematic coding and co-occurrence analysis in ATLAS.ti. The findings revealed statistically significant increases across all pro-environmental values, with the hedonic value showing the largest effect size. Qualitative findings associated environmental peace culture with emotional well-being, cooperation, care for nature, and territorial belonging. The study contributes to the literature by showing that the mobilization of pro-environmental values depends not only on normative conservation discourses, but also on pedagogical experiences that connect emotion, territory, and environmental care.

Keywords: environmental peace culture; pro-environmental values; environmental education; sustainability education; place-based education; Colombian Amazon



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1. Introduction

The contemporary socio-environmental crisis has revealed that environmental education cannot be limited to the transmission of ecological knowledge alone. Although scientific information is necessary, it does not by itself guarantee transformations in the ways students understand, experience, and relate to nature. In this regard, educational research has shown that school-based environmental experiences can influence cognitive, attitudinal, and behavioral outcomes when they successfully integrate knowledge, participation, and engagement with the surrounding environment [1].

In recent years, the literature has increasingly emphasized connectedness to nature as a relevant dimension for understanding the development of pro-environmental attitudes

and behaviors. This connection extends beyond the rational recognition of environmental problems; it also involves emotions, a sense of belonging, well-being, and meaningful experiences in contact with the natural environment. Several studies have shown that closeness to nature may be associated with sustainable behaviors, happiness, and favorable dispositions toward environmental care among children and adolescents [2,3].

From this perspective, pro-environmental values provide a more precise framework for analyzing the motivations that shape students' relationships with the environment. Biospheric values express concern for nature and ecosystems; altruistic values are oriented toward the well-being of others; egoistic values relate to personal benefits derived from environmental care; and hedonic values are associated with enjoyment, well-being, and positive experiences in contact with nature [4]. This distinction is important because pro-environmental behavior does not respond to a single motivation, but rather to the interaction of multiple value orientations that may be activated differently depending on the educational context [5,6].

However, much of the environmental education research continues to focus on knowledge acquisition, general attitudes, or self-reported behaviors, while the affective dimension of environmental learning still requires further empirical development. This gap is particularly relevant because experiences that foster enjoyment, emotional connection, and a sense of belonging may mediate the mobilization of pro-environmental values, especially among school-aged populations. In this regard, recent studies have highlighted the importance of broadening understandings of children's and adolescents' connectedness to nature by recognizing that environmental learning is also constructed through embodied, emotional, social, and territorial experiences [7,8].

In the Colombian Amazon, these debates are not abstract; they are closely tied to everyday life in territories where biodiversity, culture, land use, and social inequality constantly intersect. In this region, deforestation, biodiversity loss, land-use conflicts, and sociopolitical change make it difficult to frame environmental education only as the teaching of good environmental practices. It also needs to be approached as a critical engagement with territory and as a way of building relationships of care. From this perspective, schools become privileged spaces for connecting sustainability, coexistence, and environmental responsibility with students' everyday lives [9–11].

Within this framework, environmental peace culture is understood as an educational framework that articulates values, attitudes, and practices aimed at fostering harmonious coexistence between human beings and nature. This perspective recognizes that environmental conflicts emerge not only from scarcity or environmental degradation, but also from the ways communities understand, value, and negotiate their relationships with territory. Consequently, educating for an environmental peace culture involves promoting pedagogical experiences that strengthen care, co-responsibility, ecological sensitivity, and the prevention of socio-environmental conflicts [12,13].

Despite these advances, empirical studies integrating place-based environmental education, pro-environmental values, and environmental peace culture through mixed-methods designs in Amazonian school contexts remain scarce [14]. This gap is important because it limits understanding not only of whether an educational intervention is associated with attitudinal changes, but also of how students interpret and re-signify their relationship with nature throughout the pedagogical process. Consequently, further research is needed that combines quantitative measurement with qualitative analyses capable of explaining the meanings, emotions, and experiences accompanying the mobilization of pro-environmental values [15].

In addition, few studies have simultaneously examined pro-environmental values, environmental peace culture, and place-based education through an integrated mixed-

methods approach [14]. Addressing these dimensions together offers a more comprehensive understanding of how pedagogical experiences influence not only measurable changes in students' values but also the meanings they construct throughout the learning process. This integrated perspective represents the main contribution of the present study.

In response to this gap, the present study analyzes the changes associated with the implementation of a methodological proposal aimed at mobilizing pro-environmental values and strengthening environmental peace culture among secondary school students in the Colombian Amazon. To address this objective, the study employs a convergent mixed-methods design that integrates pretest–posttest quantitative findings with qualitative evidence from open-ended responses and student productions. This integration makes it possible to explore how place-based pedagogical experiences helped students build affective, ethical, and territorial bonds with the environment. By integrating quantitative and qualitative evidence within a place-based educational framework, the study offers a contextualized contribution to environmental education research in Amazonian school settings.

2. Methodology

2.1. Research Design

This study was conducted using a convergent mixed-methods approach, integrating quantitative and qualitative data to understand the changes associated with the mobilization of pro-environmental values and environmental peace culture among secondary school students [16]. This design was suitable because the study required both a measurement of change and an interpretation of how students gave meaning to the pedagogical experience. This design made it possible, on the one hand, to analyze variations in scores obtained before and after the intervention and, on the other, to explore the perceptions, meanings, and productions developed by students throughout the process.

The quantitative component followed a quasi-experimental pretest–posttest design with a single group [17]. A control group was not included due to ethical and contextual conditions inherent to the school setting, since the methodological proposal was implemented with complete classroom groups to ensure equitable access to the pedagogical experience. For this reason, the design does not allow the results to be interpreted as definitive causal evidence. Instead, it supports an analysis of changes associated with the intervention in a real educational setting. This distinction is important because the proposal was implemented in a school context with its own ethical, pedagogical, and contextual conditions.

The qualitative component focused on how students understood nature, coexistence, and environmental care in their written answers and drawings. These qualitative data were used to contextualize and deepen the interpretation of the quantitative changes, rather than to function as a separate or secondary source of evidence. Later, both strands of information were brought together through methodological triangulation.

2.2. Context and Participants

The study took place at Antonio Ricaurte Educational Institution in Florencia, Caquetá, a city in the Colombian Amazon. The school is part of a region where land-use change, environmental pressures on local ecosystems, and social inequalities are closely connected to everyday community and school life. These territorial conditions provided a relevant context for examining how environmental peace culture and pro-environmental values can be strengthened through school-based educational practices.

Initially, 68 students participated in the quantitative component. Of these, 66 completed both the pretest and the posttest; thus, inferential analyses were conducted using

the 66 participants with complete paired observations to ensure paired comparisons. The qualitative component involved 60 students, who completed the open-ended survey and produced written and graphic materials during the implementation of the proposal.

Participants were selected through purposive sampling, as they belonged to the school groups in which the intervention was implemented. This sampling strategy was appropriate because the study sought to evaluate a pedagogical proposal under authentic school conditions, where the intervention was delivered to intact classroom groups rather than to randomly assigned participants. The sociodemographic characterization made it possible to identify relevant contextual and territorial conditions affecting the participants, as presented in Table 1.

Table 1. Sociodemographic characterization of participants (N = 66).

Variable	Category	<i>n</i>	%
Age	13 years	1	1.5
	14 years	27	40.9
	15 years	21	31.8
	16 years	9	13.6
	17 years	6	9.1
	18 years	1	1.5
	20 years	1	1.5
Gender	Female	38	57.6
	Male	27	40.9
	Other	1	1.5
Lives with both parents	Yes	34	51.5
	No	32	48.5
Youth employment	Yes	13	19.7
	No	53	80.3
Change of place of residence	Yes	26	39.4
	No	40	60.6
Has siblings	Yes	63	95.5
	No	3	4.5
Special population group	None	34	51.5
	Displaced population	24	36.4
	Indigenous	6	9.1
	Disability	2	3.0
Participation in youth organizations	Yes	19	28.8
	No	47	71.2
School difficulties	Yes	26	39.4
	No	40	60.6
Family income	Between 0 and 1 legal monthly minimum wage	48	72.7
	Between 1 and 2 legal monthly minimum wages	12	18.2
	More than 2 legal monthly minimum wages	6	9.1

Note. Source: Authors' own elaboration based on the characterization questionnaire administered to students.

The analytical sample consisted primarily of students between 14 and 15 years of age, with a predominance of female participants. Several contextual conditions were also relevant for interpreting the findings: 72.7% of participants reported family incomes between zero and one legal monthly minimum wage, 36.4% identified as a displaced population, and 9.1% identified as an Indigenous population. These characteristics provide important contextual information for interpreting the findings, as the intervention was implemented in a school setting marked by socioeconomic vulnerability and territorial diversity.

As shown in Figure 1, the methodological design integrated the quantitative and qualitative components through a convergent mixed-methods approach, followed by the triangulation of findings to obtain a more comprehensive interpretation of the results.

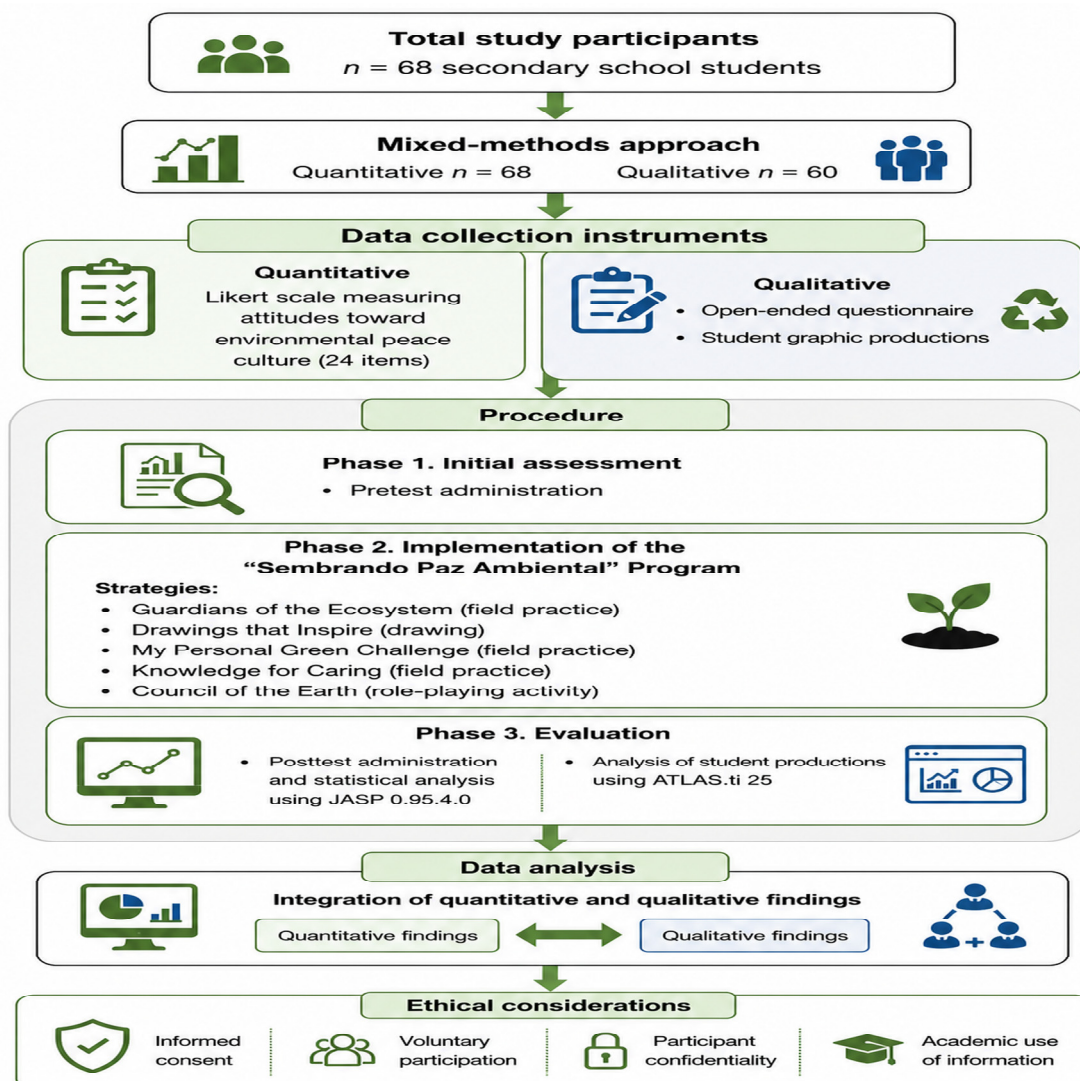


Figure 1. Methodological design of the “Sembrando Paz Ambiental” proposal. Source: Authors’ own elaboration based on the methodological design of the study.

2.3. Data Collection Instruments

2.3.1. Pro-Environmental Values Scale

For the quantitative component, a 24-item Likert-type scale was used to assess attitudes related to environmental peace culture. The scale included four pro-environmental value dimensions: biospheric, altruistic, egoistic, and hedonic. Each dimension was represented by six items, and students responded on a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The items were organized to capture different motivational

orientations toward environmental care, including concern for ecosystems, concern for other people, personal well-being, and enjoyment associated with nature. The full set of items is provided as Supplementary Material to improve transparency and reproducibility.

Internal consistency was examined using McDonald's omega. The scale obtained a value of $\omega = 0.914$, indicating high reliability for the study sample.

2.3.2. Open-Ended Survey and Student Productions

For the qualitative component, students answered an open-ended survey designed to explore their perceptions and representations of environmental peace culture. The questions invited them to reflect on nature, coexistence, sustainability, and environmental care from their own school experiences, allowing participants to express ideas in their own words rather than through predefined response options.

The analysis also included graphic and written productions created during the pedagogical activities, such as drawings, mind maps, reflections, and other classroom materials. These productions complemented the survey responses by providing additional evidence of how students represented their relationship with nature and interpreted the learning experiences developed during the intervention. They also revealed emotional, symbolic, and territorial dimensions that were not always expressed in written responses.

2.3.3. Instrument Validation

The instruments and the "Sembrando Paz Ambiental" proposal were reviewed by doctoral-level scholars with experience in education, pedagogy, and environmental education. In their review, they considered whether each instrument was theoretically relevant, clearly worded, coherent with the study objectives, and appropriate for students in the Amazonian school context.

To complement this expert review, the adapted Content Validity Ratio proposed by Tristán-López was calculated. This procedure estimates the degree of agreement among experts regarding the essentiality and relevance of each item or component, providing quantitative support for content validity. The open-ended survey obtained an overall score of 0.94, the methodological proposal reached 0.98, and the Likert scale achieved 95.8% total favorability. These results supported the relevance and adequacy of the instruments used in the study [18].

2.4. Pedagogical Intervention

The intervention was implemented through "Sembrando Paz Ambiental", a pedagogical proposal designed to mobilize pro-environmental values and strengthen environmental peace culture among secondary school students. The proposal combined experiential, playful, collaborative, and place-based learning activities adapted to the Amazonian school context.

It was organized around five complementary pedagogical strategies: Guardians of the Ecosystem, Drawings that Inspire, My Personal Green Challenge, Knowledge that Cares, and Council of the Earth. Each strategy addressed various dimensions of environmental learning by combining observation, artistic expression, personal reflection, dialogue between scientific and local knowledge, collaborative work, and the analysis of environmental conflict situations. A summary of the pedagogical strategies is presented in Table 2.

Table 2. Summary of the pedagogical strategies implemented in “Sembrando Paz Ambiental”.

Pedagogical Strategy	Main Purpose	Core Pedagogical Process	Primary Pro-Environmental Value Targeted
Guardians of the Ecosystem	To strengthen students’ recognition of their immediate environment and promote concrete environmental stewardship actions.	Students identify environmental issues within the school, design and implement conservation actions, and collectively reflect on their contribution to improving the school environment.	Biospheric
Drawings that Inspire	To foster emotional connectedness with nature through sensory experience and artistic expression.	Through guided sensory activation (e.g., imagining, remembering, listening to, or emotionally recreating natural environments), students create drawings and personal reflections that express their relationship with nature and environmental peace culture.	Hedonic
My Personal Green Challenge	To encourage personal environmental habits that benefit both individual well-being and the environment.	Each student voluntarily adopts an environmental commitment in everyday life (e.g., saving water or energy) and reflects on how these actions generate personal benefits while simultaneously contributing to environmental conservation.	Egoistic
Knowledge that Cares	To integrate scientific knowledge with local and ancestral knowledge in caring for the territory.	Students engage in dialogue with local knowledge holders (e.g., Indigenous community members, farmers, or other territorial experts), compare different ways of understanding nature, and subsequently share these learnings with other members of the school community.	Altruistic
Council of the Earth	To strengthen dialogue, cooperation, and decision-making in response to socio-environmental conflicts.	Through role-playing, students represent different stakeholders involved in environmental conflicts, defend diverse perspectives, negotiate possible solutions, and collectively construct agreements that balance environmental protection, community well-being, and social interests.	Integration of biospheric, altruistic, egoistic, and hedonic values

Note. Source: Authors’ own elaboration based on the pedagogical design of “Sembrando Paz Ambiental”.

The intervention was organized into three phases. During the first phase, the sociodemographic questionnaire and the pretest Likert scale were administered. During the second phase, the five pedagogical strategies were implemented. Finally, the posttest was administered, and the written and graphic productions generated throughout the intervention were collected for qualitative analysis.

2.5. Data Analysis

Quantitative analyses were conducted using JASP software (Version 0.95.4.0; <https://jasp-stats.org/>). Initially, descriptive statistics were calculated for the pro-environmental values in both the pretest and posttest stages. Subsequently, the Shapiro–Wilk normality test was applied. Since the data did not meet the assumption of normality, the Wilcoxon signed-rank test for related samples was used. Effect size (r) was also calculated to estimate the magnitude of the observed changes. Following common interpretation criteria, values around 0.10 were considered small, around 0.30 moderate, and 0.50 or higher large effects, allowing the practical relevance of the observed differences to be interpreted beyond statistical significance.

Qualitative analysis was conducted using ATLAS.ti 25 (ATLAS.ti Scientific Software Development GmbH, Berlin, Germany; <https://atlasti.com>) through thematic coding and co-occurrence analysis [19,20]. The qualitative dataset, consisting of students' open-ended responses and pedagogical productions, was first reviewed to identify recurring meanings related to nature, coexistence, sustainability, environmental care, and the pedagogical experience. Initial codes were then grouped into broader thematic patterns. Through this iterative process, three analytical categories were defined: Peace with Nature, Sustainability and Prevention of Conflicts over Natural Resources, and Methodologies for Environmental Peace Culture. These categories were subsequently related to the four pro-environmental values to examine how these values were reflected in students' narratives and pedagogical productions.

Co-occurrence analysis was then used to examine the relationships between the analytical categories and the pro-environmental values. This procedure made it possible to identify the values most frequently associated with each category and to support the qualitative interpretation with systematic coding evidence. Finally, findings from the quantitative and qualitative components were integrated through methodological triangulation by contrasting changes in pro-environmental values with the categories, co-occurrences, and narrative evidence emerging from the qualitative analysis. This process enabled the identification of convergences, tensions, and complementary findings across both strands of data.

2.6. Ethical Considerations

The study was conducted with underage participants and received institutional authorization as well as informed consent from parents or legal guardians. Student participation was voluntary.

Confidentiality and anonymity were guaranteed through the assignment of identification codes for data management. All collected information was used exclusively for academic and research purposes.

3. Results

3.1. Quantitative Results: Changes in Pro-Environmental Values

To analyze the changes associated with the implementation of the “Sembrando Paz Ambiental” methodological proposal, students' pretest and posttest scores on the pro-environmental values scale were compared. To determine the appropriate statistical procedure, the assumption of normality was first evaluated using the Shapiro–Wilk test. As shown in Table 3, the results indicated that the data did not follow a normal distribution ($p \leq 0.05$) for any of the pro-environmental values assessed; therefore, the nonparametric Wilcoxon signed-rank test for related samples was applied.

Table 3. Shapiro–Wilk normality test for pro-environmental values.

Pro-Environmental Value (PV)	Shapiro–Wilk Pretest	<i>p</i>	Shapiro–Wilk Posttest	<i>p</i>
Altruistic	0.917	<0.001	0.935	0.002
Biospheric	0.883	<0.001	0.853	<0.001
Hedonic	0.915	<0.001	0.848	<0.001
Egoistic	0.946	0.005	0.905	<0.001

Source: Authors' own elaboration based on results obtained using JASP software.

As shown in Table 4, higher mean scores were observed in the posttest across all four pro-environmental values following the implementation of the pedagogical proposal.

Table 4. Descriptive statistics of pro-environmental values in the pretest and posttest (N = 66).

VP	Pretest		Posttest	
	Mean	SD	Mean	SD
Hedonic	22.85	3.739	24.84	3.655
Altruistic	22.50	3.462	24.16	3.079
Biospheric	23.96	3.475	25.00	3.274
Egoistic	22.57	3.487	23.63	3.394

Source: Authors' own elaboration based on the analysis conducted using JASP software (2026).

To determine whether these differences were statistically significant, the Wilcoxon signed-rank test for related samples was conducted. As shown in Table 5, significant differences were identified across all pro-environmental values.

Table 5. Comparison between pretest and posttest using the Wilcoxon signed-rank test.

VP	<i>z</i>	<i>p</i>	Effect Size (<i>r</i>)
Altruistic	−4.058	<0.001	0.49
Biospheric	−3.180	0.001	0.47
Hedonic	−4.488	<0.001	0.65
Egoistic	−2.607	0.009	0.38

Source: Authors' own elaboration based on the results obtained using JASP software (2026).

The hedonic value showed the largest observed effect size, followed by the altruistic and biospheric values. This result suggests that the proposal was particularly associated with affective, relational, and experiential dimensions of environmental learning.

3.2. Qualitative Results: Perceptions of Environmental Peace Culture

The qualitative analysis was based on students' open-ended responses and graphic productions created during the implementation of the "Sembrando Paz Ambiental" proposal. Thematic coding enabled the identification of recurring patterns of meaning within students' narratives and representations, while co-occurrence analysis facilitated the examination of relationships between analytical categories and pro-environmental values [19,20]. Through this process, three central categories were identified: Peace with Nature, Sustainability and Prevention of Conflicts over Natural Resources, and Methodologies for Environmental Peace Culture.

As presented in Table 6, the category with the highest frequency was Peace with Nature, followed by Methodologies for Environmental Peace Culture and, to a lesser extent,

Sustainability and Prevention of Conflicts over Natural Resources. The responses were not evenly distributed across the three categories. Most of them pointed to students' affective relationship with nature and to the meaning they gave to the outdoor and participatory activities developed during the proposal.

Table 6. Presence of analytical categories in students' responses.

Category	Description	Citations (n)	Percentage
C1. Peace with nature	Harmonious relationship between human beings and nature	313	46.7%
C2. Sustainability and prevention of conflicts over natural resources	Responsible use of resources and prevention of environmental conflicts	96	14.3%
C3. Methodologies for environmental peace culture	Experiential and participatory pedagogical strategies	261	39.0%
Total		670	100%

Source: Authors' own elaboration based on the qualitative coding process carried out in ATLAS.ti.

3.2.1. Peace with Nature

In "Peace with Nature", students moved beyond a purely utilitarian view of the environment. Their responses described nature as something close to daily life: a place that can bring calm, balance, and a sense of well-being. Environmental care, in this category, appeared together with peaceful coexistence and concern for the Amazonian ecosystems that surround their school experience.

This meaning appeared clearly in several student voices. For example, one student wrote that "being at peace with nature means being in complete harmony with the environment and one's surroundings" (St. 001). Another related environmental care to everyday health, explaining that "caring for the environment is beneficial because it improves health by providing clean air and water" (St. 018). In these responses, care for nature was connected both with living together and with personal well-being.

The drawing by student 039 made this affective reading more visible (Figure 2). In the image, a smiling planet Earth appears beside a boy and a girl who offer it a heart and say, "we will take care of you." The Earth answers, "thank you." More than a simple environmental message, the scene shows care as a reciprocal bond with nature.

Feelings also appeared strongly in this category. For one student, "the forest brings tranquility and peace through the sounds of animals" (St. 036). Another wrote that "nature makes me feel peaceful and calm because of its beauty and atmosphere" (St. 018). The statement "the jungle made me feel free, as if everything bad stayed behind" (St. 044) gives this finding a more situated meaning: the natural environment was experienced not only as a topic of study, but also as a place of relief, sensory contact, and emotional connection.

The co-occurrence analysis helps clarify this interpretation. Within "Peace with Nature", the highest links appeared with egoistic (82) and biospheric (73) values. Students were therefore connecting environmental care with two ideas that were not separate for them: protecting nature and recognizing how a healthy environment supports their own daily well-being. In this category, nature appeared as a space for coexistence, care, and shared responsibility.



Figure 2. Student drawing representing care for nature as a reciprocal relationship.

3.2.2. Sustainability and Prevention of Conflicts over Natural Resources

In the category “Sustainability and Prevention of Conflicts over Natural Resources”, students referred to the careful use of water, energy, and other resources, as well as to the damage caused by environmental deterioration. This category appeared less often than the others. Even so, several responses showed that students were beginning to connect sustainability with collective well-being and the prevention of conflicts in daily life.

Some responses showed that students were already thinking about scarcity in social terms. One participant stated that “if everyone uses them carefully, there will be enough for everyone and we can live in peace” (St. 005). Another warned that “if water ever runs out, everyone becomes desperate and conflicts begin” (St. 035). Here, sustainability was not described only as an ecological practice; it was also linked to coexistence, shared access, and social balance.

The drawings brought these concerns into concrete school scenes. Student 039 showed a faucet wasting water, a light bulb left on, and trash scattered around the school. In the same drawing, one student asks another to pick up the waste “for the good of the planet,” but the other refuses. The conflict is small, but meaningful: it shows how environmental responsibility can appear in everyday interactions. Student 027 offered a darker image, with a deforested forest, a polluted river, and dead fish, making ecological loss visible through the territory itself.

In this category, the biospheric value had the strongest co-occurrence (30). Students were therefore speaking mainly from concern for nature conservation and the careful use of resources. The hedonic value was much less frequent. When they referred to pollution, scarcity, or environmental damage, their attention shifted toward responsibility, prevention, and the need to avoid future conflicts.

Seen in this way, sustainability began to appear as more than an environmental rule. For students, it was also a way to protect the living conditions of their community and the territory they inhabit.

3.2.3. Methodologies for Environmental Peace Culture

The category “Methodologies for Environmental Peace Culture” brought together students’ reflections about the activities developed through “Sembrando Paz Ambiental”. Many of their responses suggested that the experiential and participatory strategies were not perceived as ordinary classroom tasks. Instead, they became spaces where students

could think differently about nature, coexistence, and their relationship with the territory around them.

Several students placed particular value on leaving the regular classroom. One participant wrote that “learning outdoors helps me value nature more and understand why it is important to protect it” (St. 051). Another said that “outdoor classes would be more relaxing” (St. 016). These comments show that the activities worked not only because they taught environmental content, but because they made learning feel more participatory, enjoyable, and emotionally close to nature.

Student 018’s drawing gave this idea a concrete school setting. It showed students picking up trash, caring for plants, and participating in environmental activities in the forest area of the Juan XXIII campus, part of Antonio Ricaurte Educational Institution. In that scene, environmental care was not shown as an individual task. It appeared as something students do together, in contact with a real place that is part of their school life.

Emotions were present here as well. One student wrote that “this landscape brings me happiness and tranquility because of the freshness of the environment” (St. 014). That response shows that the activities were not experienced only as school assignments. For some students, they also opened a sensory and affective way of relating to nature.

In this category, the strongest co-occurrences appeared between methodologies and the hedonic value, followed by the altruistic value (see Table 7). This pattern indicates that the pedagogical strategies particularly promoted experiences associated with enjoyment, emotional well-being, and collective interaction. Likewise, it suggests that participatory methodologies facilitated processes of cooperation, dialogue, and environmental co-responsibility among students.

Table 7. Co-occurrences between analytical categories and pro-environmental values.

VP	Peace with Nature	Sustainability	Methodologies
Altruistic	44	15	71
Biospheric	73	30	43
Egoistic	82	20	37
Hedonic	41	5	77

Source: Authors’ own elaboration based on co-occurrence frequencies identified through semantic proximity analysis conducted in ATLAS.ti.

Table 7 shows relevant differences in the ways pro-environmental values were associated with the identified qualitative categories. In the category “Peace with Nature”, the strongest co-occurrences appeared with egoistic and biospheric values, suggesting that students associated environmental care both with nature protection and with personal well-being and tranquility. In “Sustainability and Prevention of Conflicts over Natural Resources”, the biospheric value showed the highest presence, indicating an understanding mainly oriented toward conservation and the responsible use of resources. In contrast, within the category “Methodologies for Environmental Peace Culture”, the hedonic value showed the highest frequency, followed by the altruistic value, suggesting that the pedagogical strategies promoted experiences related to enjoyment, participation, cooperation, and emotional connection with the natural environment. Figure 3 provides a visual synthesis of these co-occurrence patterns.

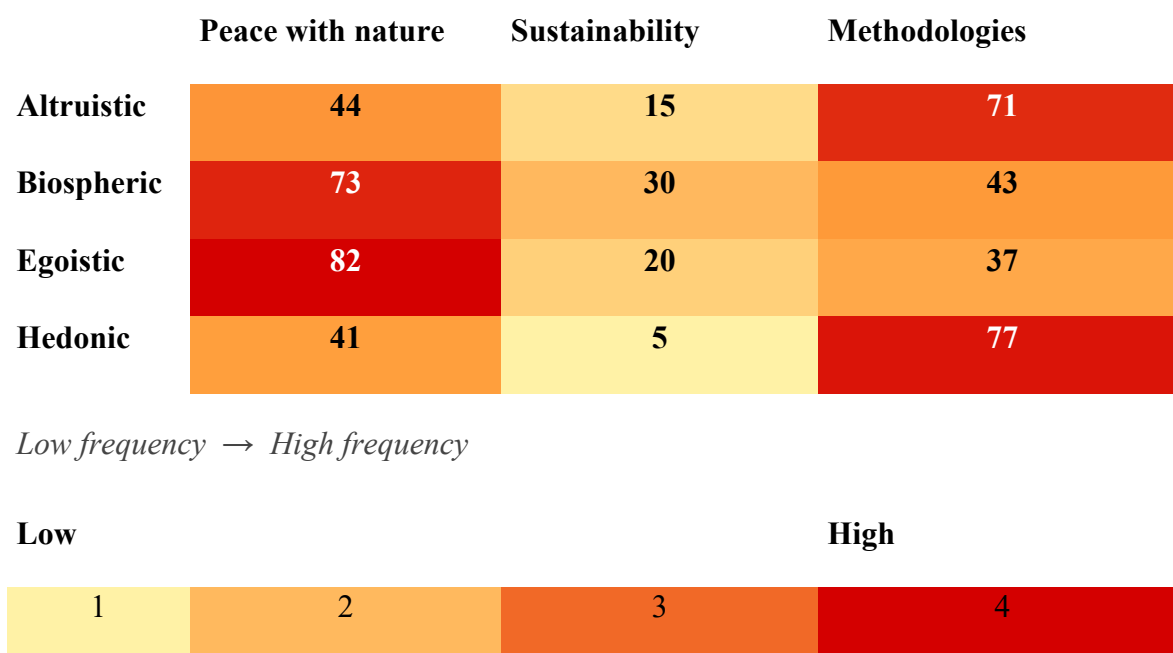


Figure 3. Heat map of co-occurrences between pro-environmental values and analytical categories.

The perceptions and meanings constructed by the students show that the pedagogical experiences developed during the intervention promoted not only learning related to environmental care, but also affective, territorial, and relational bonds with nature. The qualitative findings suggest that environmental peace culture was understood through dimensions associated with well-being, coexistence, co-responsibility, and sustainability, aspects that are consistent with the changes identified in the pro-environmental values of the quantitative component.

3.3. Integration of Findings

Looking at the quantitative and qualitative findings together made it possible to better understand the scope of the changes associated with “Sembrando Paz Ambiental” in a broader way. The triangulation did more than simply confirm similar results across methods. It also revealed points of convergence, some tensions between the findings, and different ways in which pro-environmental values appeared throughout the students’ experiences.

The clearest point of convergence was observed in the hedonic value. It was also the value with the largest effect size in the quantitative analysis. Qualitatively, the experiential methodologies appeared in students’ accounts as moments of enjoyment, tranquility, well-being, and emotional connection with nature. This relationship suggests that place-based pedagogical experiences were associated with a form of environmental learning mediated by affective bonds with the environment.

Convergence was also identified in altruistic and biospheric values. The quantitative increase in these values dialogued with students’ narratives about cooperation, co-responsibility, nature protection, and collective care. The activities implemented not only mobilized an ecological appreciation of the environment, but also promoted shared forms of participation around territorial care.

However, the integration also revealed an important tension. The category “Sustainability and Prevention of Conflicts over Natural Resources” had a lower presence in the qualitative analysis, despite being an important component of environmental peace culture. This indicates that students more readily mobilized affective, symbolic, and care-oriented experiences than more critical analyses of socio-environmental conflicts, resource distribu-

tion, or territorial tensions. This finding suggests that understanding environmental conflict requires longer and more conceptually explicit pedagogical processes. These qualitative patterns are summarized in Table 8, which illustrates how the three analytical categories were associated with the four pro-environmental values.

Table 8. Integration of quantitative and qualitative findings.

Integrated Dimension	Quantitative Finding	Qualitative Evidence	Type of Integration	Interpretation
Hedonic value	Largest effect size among pro-environmental values	Strong presence in methodologies; quotations associated with tranquility, happiness, enjoyment, and outdoor learning	Strong convergence	Experiential activities promoted affective connections with nature
Altruistic value	Significant increase with moderate effect size	Associated with cooperation, collective work, and environmental co-responsibility	Convergence	The intervention promoted shared forms of environmental care
Biospheric value	Significant increase with moderate effect size	Associated with nature protection, conservation, and responsible use of resources	Convergence	Students strengthened an ecological appreciation of the environment
Egoistic value	Significant increase with smaller relative effect size	Associated with health, well-being, survival, and quality of life	Emergent finding	Personal benefit functioned as an initial pathway for understanding environmental care
Conflicts over natural resources	Not directly measured as an independent value	Lower qualitative presence in C2	Tension	The intervention more easily mobilized care and affectivity than critical analysis of environmental conflict
Scope of the design	Significant pretest–posttest changes	Qualitative evidence consistent with the observed changes	Interpretive limitation	The findings show changes associated with the intervention rather than definitive causality

Source: Authors' own elaboration based on the quantitative and qualitative analyses conducted in this study.

An emergent finding was related to the egoistic value. Although this value showed the smallest effect size in the quantitative analysis, in the qualitative component it appeared linked to health, well-being, survival, and quality of life. Therefore, it should not be interpreted solely as an individualistic orientation, but rather as an initial pathway through which students connect environmental care with their own everyday experience.

The integrated findings show that the intervention supported the mobilization of pro-environmental values, particularly in affective and relational dimensions. At the same time, they show that environmental peace culture did not develop uniformly across all its dimensions. While enjoyment, care, and cooperation emerged strongly, a more critical understanding of conflicts over natural resources appeared less developed. These findings help clarify the pedagogical scope of the proposal and point to dimensions that future place-based environmental education initiatives could strengthen.

4. Discussion

The results indicate positive changes in students' pro-environmental values after the implementation of "Sembrando Paz Ambiental". The most visible change appeared in the hedonic value, followed by the altruistic and biospheric values. This finding is particularly relevant because the proposal did not simply encourage students to care for nature; it also created opportunities for enjoyment, tranquility, and emotional connectedness with the environment. This result is in line with studies that connect children's and adolescents' relationship with nature to well-being and sustainable behaviors [2,3].

The prominence of the hedonic value also challenges traditional environmental education approaches centered mainly on rules, duties, or conservation messages. In this study, outdoor work, drawings, and participatory activities did more than support instruction. They helped students approach nature through calm, enjoyment, and personal meaning. This reading agrees with studies that argue for broader ways of understanding children's and adolescents' connectedness to nature, especially when bodily, emotional, and experiential dimensions are part of environmental learning [7,8].

The qualitative evidence provides further insight into this quantitative result. Students did not speak of nature only as something to protect; they described it as a place of tranquility, freedom, and harmony. The experiential activities were also remembered as relaxing and meaningful moments. From this angle, enjoyment is not a minor or decorative aspect of environmental education. It can become a pedagogical route for building affective bonds with nature and strengthening pro-environmental dispositions over time [6,21].

The altruistic and biospheric values further clarify the educational scope of the intervention. Altruistic responses were closely related to cooperation, participation, and shared responsibility. Biospheric responses, in contrast, pointed more directly to nature protection and careful resource use. Together, these findings suggest that participatory methodologies can move environmental care beyond personal benefit and connect it with other people, ecosystems, and common life [12,15].

These findings also suggest that place-based environmental education can move beyond highly normative approaches centered only on telling students what they should or should not do. In this study, environmental learning became particularly meaningful when students connected experience, emotion, cooperation, and care within their own context. From that perspective, the proposal aligns with approaches that understand sustainability education as a broader formative process, not simply as the transmission of environmental information [22].

An important tension also emerged from the findings. Sustainability and the Prevention of Conflicts over Natural Resources appeared less frequently in the qualitative material, even though this dimension is central to environmental peace culture. This suggests that the proposal more easily activated care, emotion, and symbolic bonds with nature than a deeper discussion of territorial disputes, environmental inequality, or conflicts over resources.

This tension matters in the Colombian Amazon, where environmental education cannot be separated from deforestation, land-use change, armed conflict, and disputes over territorial governance [23]. Research on the Colombian Amazon has shown that deforestation and socio-environmental conflict tend to intensify in contexts marked by political transition, weak institutional presence, and post-conflict territorial reconfiguration. For this reason, environmental education in this region needs to include a more critical reading of the relationships among nature, power, and territory [9–11].

From this perspective, environmental peace culture cannot be reduced to the promotion of positive attitudes toward nature [24]. It also requires territorial pedagogies capable of questioning the social, economic, and political conditions that produce envi-

ronmental degradation and conflicts over resources. This is especially relevant in regions where biodiversity coexists with inequality, extractivism, and disputes over territorial control. The present study shows progress in affective and relational dimensions, but it also points to the need for stronger pedagogical work around ecological citizenship and critical understanding of socio-environmental conflicts [12,25].

The egoistic value adds another layer to the interpretation. It had the smallest effect size in the quantitative results, but students still connected environmental care with health, well-being, survival, and quality of life. In this context, personal benefit should not be read too quickly as the opposite of environmental commitment. For these students, it appeared to function as a first bridge between their own lives and the condition of the natural environment [6,21].

These findings need to be read with caution. The single-group pretest–posttest design allowed changes associated with the intervention to be identified, but it cannot support definitive causal claims. This does not make the results less useful; it simply marks the limits of what can be stated. The interpretation, therefore, should remain centered on the links between the pedagogical experience, the mobilization of values, and the meanings students built during the process.

It is also important to note that environmental peace culture did not emerge with the same strength in all its dimensions. The intervention particularly favored affective bonds with nature, cooperation, and care-oriented practices, while critical readings of conflicts over natural resources appeared more limited. This finding provides an important direction for future interventions, which could incorporate deeper discussions on environmental justice, territorial governance, ecological citizenship, and Amazonian conflictivity [26].

These findings also have implications for environmental education policy in Colombia. They are consistent with Law 1549 of 2012 [27], which strengthened the institutionalization of the National Environmental Education Policy (PNEA) and its incorporation into territorial development processes. The findings are also consistent with the principles embodied in Law 2273 of 2022 [28], through which Colombia approved the Escazú Agreement, especially regarding environmental participation, access to information, and the prevention of socio-environmental conflicts. From this perspective, school-based environmental peace culture can support public policy goals related to environmental citizenship, territorial responsibility, and democratic participation in environmental decision-making.

Beyond the empirical findings, the main contribution of this study lies in showing that the mobilization of pro-environmental values in Amazonian school contexts does not occur exclusively through environmental knowledge or ecological norms. The findings suggest that situated, experiential, and participatory experiences can activate affective bonds with nature that foster dispositions of care, cooperation, and co-responsibility. At the same time, these results highlight that environmental peace culture requires articulating ecological sensitivity with a critical understanding of territory, so that environmental education can contribute not only to protecting nature, but also to forming students capable of reading, feeling, and transforming the socio-environmental relationships of their context.

5. Conclusions

The findings of this study indicate that the “Sembrando Paz Ambiental” proposal was associated with positive changes in the mobilization of pro-environmental values among secondary school students in the Colombian Amazon. The greatest change was observed in the hedonic value, followed by the altruistic and biospheric values, showing that place-based pedagogical experiences strengthened not only dispositions toward environmental care, but also affective, cooperative, and territorial bonds with nature.

The main conceptual contribution of this article lies in showing that environmental peace culture can be understood as a formative process that articulates pro-environmental values, affective experiences, and practices of coexistence with territory. In this sense, the study expands traditional approaches to environmental education focused mainly on knowledge, norms, or behavior by demonstrating that enjoyment, tranquility, and emotional connection with nature can function as relevant pedagogical mediators in the formation of pro-environmental attitudes.

The article contributes to the fields of environmental education and education for sustainability by integrating the mobilization of pro-environmental values with a situated reading of the Colombian Amazon. Unlike studies that approach environmental education from generalized or decontextualized perspectives, this study shows that school experiences become more meaningful when they are connected to students' territorial, affective, and socio-environmental conditions.

However, the findings also reveal an important limitation: the intervention more strongly mobilized affective dimensions and care-oriented practices than critical analyses of socio-environmental conflict and disputes over natural resources. This finding opens an important avenue for future research and pedagogical interventions aimed at strengthening the relationship among environmental peace culture, ecological citizenship, environmental justice, and critical understanding of territory.

Methodologically, the mixed-methods design made it possible to integrate measurable changes in pro-environmental values with the perceptions and meanings constructed by students throughout the pedagogical experience. Nevertheless, because the study employed a single-group pretest–posttest design, the findings should be interpreted as changes associated with the intervention rather than as definitive causal evidence. Future research could incorporate comparison groups, longitudinal follow-up, and deeper analyses of whether these changes persist over time. Furthermore, because the study was conducted in a single educational institution within a specific Amazonian context, the findings should not be generalized to other educational settings without considering their territorial and sociocultural characteristics. Replication in diverse educational contexts would strengthen the transferability of the proposed methodological approach.

In Amazonian school contexts, pro-environmental values are unlikely to develop through ecological content or conservation rules alone. The findings underscore the importance of pedagogical experiences that connect emotion, territory, care, and critical reflection. From this perspective, environmental peace culture emerges as a situated educational approach that helps explain how students develop relationships of coexistence, co-responsibility, and ecological sensitivity while engaging critically with the socio-environmental realities of their territories.

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References

1. Ardoin, N.M.; Bowers, A.W.; Roth, N.W.; Holthuis, N. Environmental Education and K–12 Student Outcomes: A Review and Analysis of Research. *J. Environ. Educ.* **2018**, *49*, 1–17. [\[CrossRef\]](#)
2. Barrera-Hernández, L.F.; Sotelo-Castillo, M.A.; Echeverría-Castro, S.B.; Tapia-Fonllem, C.O. Connectedness to Nature: Its Impact on Sustainable Behaviors and Happiness in Children. *Front. Psychol.* **2020**, *11*, 276. [\[CrossRef\]](#) [\[PubMed\]](#)
3. Anderson, D.J.; Krettenauer, T. Connectedness to Nature and Pro-Environmental Behaviour from Early Adolescence to Adulthood: A Comparison of Urban and Rural Canada. *Sustainability* **2021**, *13*, 3655. [\[CrossRef\]](#)
4. Steg, L.; De Groot, J.I.M. Environmental Values. In *The Oxford Handbook of Environmental and Conservation Psychology*; Clayton, S.D., Ed.; Oxford University Press: Oxford, UK, 2012; pp. 81–92.
5. Bouman, T.; Steg, L.; Kiers, H.A.L. Measuring Values in Environmental Research: A Test of an Environmental Portrait Value Questionnaire. *Front. Psychol.* **2018**, *9*, 564. [\[CrossRef\]](#) [\[PubMed\]](#)
6. Zainuri, N.A.; Abd-Rahman, N.; Halim, L.; Chan, M.Y.; Mohd Bazari, N.N. Measuring Pro-Environmental Behavior Triggered by Environmental Values. *Int. J. Environ. Res. Public Health* **2022**, *19*, 16013. [\[CrossRef\]](#) [\[PubMed\]](#)
7. Beery, T.; Djerf, H.; Wünsche, T.U.; Fridberg, M. Broadening the Foundation for the Study of Childhood Connectedness to Nature. *Front. Environ. Sci.* **2023**, *11*, 1225044. [\[CrossRef\]](#)
8. van de Wetering, J.; Leijten, P.; Spitzer, J.; Thomaes, S. Does Environmental Education Benefit Environmental Outcomes in Children and Adolescents? A Meta-Analysis. *J. Environ. Psychol.* **2022**, *81*, 101782. [\[CrossRef\]](#)
9. Clerici, N.; Armenteras, D.; Kareiva, P.; Botero, R.; Ramírez-Delgado, J.P.; Forero-Medina, G.; Ochoa, J.; Pedraza, C.; Schneider, L.; Lora, C.; et al. Deforestation in Colombian Protected Areas Increased during Post-Conflict Periods. *Sci. Rep.* **2020**, *10*, 4971. [\[CrossRef\]](#) [\[PubMed\]](#)
10. Krause, T.; Clerici, N.; López, J.M.; Sánchez, P.A.; Valencia, S.; Esguerra-Rezk, J.; Van Dexter, K. A New War on Nature and People: Taking Stock of the Colombian Peace Agreement. *Glob. Sustain.* **2022**, *5*, e15. [\[CrossRef\]](#)
11. Ganzenmüller, R.; Sylvester, J.M.; Castro-Nunez, A. What Peace Means for Deforestation: An Analysis of Local Deforestation Dynamics in Times of Conflict and Peace in Colombia. *Front. Environ. Sci.* **2022**, *10*, 803368. [\[CrossRef\]](#)
12. Yanniris, C. Education for Sustainability, Peace, and Global Citizenship: An Integrative Approach. *Educ. Sci.* **2021**, *11*, 430. [\[CrossRef\]](#)
13. Jurado Mejía, A.G.; Hernández Londoño, C.E. Educación Ambiental y Producción Agropecuaria Sostenible: Una Estrategia para la Seguridad Alimentaria [Environmental Education and Sustainable Agricultural Production: A Strategy for Food Security]. *Ánfora* **2023**, *30*, 105–141. [\[CrossRef\]](#)
14. Mancilla-Rodríguez, N.T.; Pascuas-Rengifo, Y. Cultura de Paz Ambiental: Evolución y Vacíos Investigativos Identificados en un Mapeo Sistemático de Literatura [Environmental Peace Culture: Evolution and Research Gaps Identified through a Systematic Literature Mapping]. *Rev. Investig. Desarro. Innov.* **2026**, *16*, 83–102. [\[CrossRef\]](#)
15. Wu, Y.; Wan, J.; Yu, W. Impact of Environmental Education on Environmental Quality under the Background of Low-Carbon Economy. *Front. Public Health* **2023**, *11*, 1128791. [\[CrossRef\]](#) [\[PubMed\]](#)
16. Creswell, J.W.; Inoue, M. A Process for Conducting Mixed Methods Data Analysis. *J. Gen. Fam. Med.* **2025**, *26*, 4–11. [\[CrossRef\]](#) [\[PubMed\]](#)
17. Shadish, W.R.; Cook, T.D.; Campbell, D.T. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*; Houghton Mifflin: Boston, MA, USA, 2002.
18. Tristán-López, A. Modificación al Modelo de Lawshe para el Dictamen Cuantitativo de la Validez de Contenido de un Instrumento Objetivo [Modification of Lawshe’s Model for the Quantitative Assessment of Content Validity in an Objective Instrument]. *Av. Med.* **2008**, *6*, 37–48. Available online: <https://dialnet.unirioja.es/servlet/articulo?codigo=2981185> (accessed on 27 June 2026).
19. Braun, V.; Clarke, V. One Size Fits All? What Counts as Quality Practice in (Reflexive) Thematic Analysis? *Qual. Res. Psychol.* **2021**, *18*, 328–352. [\[CrossRef\]](#)
20. Nowell, L.S.; Norris, J.M.; White, D.E.; Moules, N.J. Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *Int. J. Qual. Methods* **2017**, *16*, 1609406917733847. [\[CrossRef\]](#)
21. Bouman, T.; van der Werff, E.; Perlaviciute, G.; Steg, L. Environmental Values and Identities at the Personal and Group Level. *Curr. Opin. Behav. Sci.* **2021**, *42*, 47–53. [\[CrossRef\]](#)

22. UNESCO. *Reimaginar Juntos Nuestros Futuros: Un Nuevo Contrato Social para la Educación [Reimagining Our Futures Together: A New Social Contract for Education]*; UNESCO: Paris, France, 2022. Available online: <https://unesdoc.unesco.org/ark:/48223/pf0000381560> (accessed on 27 June 2026).
23. González-Rodríguez, C.E.; Buitrago-Bermúdez, O.; Gonzalez, C.; Castillo-Rivera, J.M.; Le Coq, J.-F. Navigating the Map of Environmental-Policy Narratives and Its Influence within the Conservation Network of the Colombian-Peruvian Amazon. *Environ. Manag.* **2026**, *76*, 55. [[CrossRef](#)] [[PubMed](#)]
24. Leff, E. *Political Ecology: Deconstructing Capital and Territorializing Life*; Springer: Cham, Switzerland, 2021. [[CrossRef](#)]
25. López-Camacho, A. La Liberación de la Madre Tierra: Más que la Toma de un Territorio [The Liberation of Mother Earth: More Than the Occupation of a Territory]. *Ánfora* **2021**, *28*, 93–114. [[CrossRef](#)]
26. Martínez-Alier, J. Mapping Ecological Distribution Conflicts: The EJAtlas. *Extr. Ind. Soc.* **2021**, *8*, 100883. [[CrossRef](#)]
27. Congreso de la República de Colombia. Ley 1549 de 2012, por Medio de la Cual se Fortalece la Institucionalización de la Política Nacional de Educación Ambiental y su Incorporación Efectiva en el Desarrollo Territorial. Diario Oficial No. 48.482. 5 July 2012. Available online: <https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=48262> (accessed on 27 June 2026).
28. Congreso de Colombia. Ley 2273 de 2022, por Medio de la Cual se Aprueba el Acuerdo Regional Sobre el Acceso a la Información, la Participación Pública y el Acceso a la Justicia en Asuntos Ambientales en América Latina y el Caribe, Adoptado en Escazú, Costa Rica, el 4 de Marzo de 2018. Diario Oficial No. 52.178. 5 November 2022. Available online: <https://natlex.ilo.org/dyn/natlex2/natlex2/files/download/116837/L%202273%20COL.pdf> (accessed on 27 June 2026).

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