

Environmental education, rights, and duties as a contribution to achieving environmental peace in Siachoque-Boyacá, Colombia within the framework of the SDGs

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Abstract

This proposal has sought to contribute to education on environmental rights and duties through the study of Sustainable Development Goals (SDG) 6: "Clean Water and Sanitation", 13: "Climate Action" and 15: "Life of Terrestrial Ecosystems", in 8th-grade students of the Ignacio Gil Sanabria Educational Institution, Siachoque, Boyacá, to contribute to the construction of environmental peace in the "Cortadera" wasteland. The methodology used was Action Research, along with Nature-based Solutions, through which we sought to increase actions for eco-care and commitment to the "Cortadera". The lack of knowledge of a large number of the 8th-grade students about the Cortadera wasteland was identified, as well as the factors that constantly affect the ecosystem; gaps were identified in terms of environmental rights and duties, what are the SDGs that seek to care for the planet. Through the development of the project, it was recognized what the SDGs are and the importance of applying SDGs 6, 13, and 15 for the care and conservation of the Páramo; the relationship of these SDGs with environmental rights and duties was established; and it was concluded that it is essential to increase the visits of students to the wasteland, as well as to provide them with tools to identify the factors that negatively affect the environment and their level of involvement. Joint work between the school, families, and the community will be essential.

Keywords: Environmental education; Rights; Duties; Care; Environment; Wasteland; Environmental peace; SDGs.

Educación, derechos y deberes ambientales como aporte para lograr una paz ambiental en Siachoque-Boyacá, Colombia en el marco de los ODS

Resumen

La presente propuesta ha buscado contribuir en la educación sobre derechos y deberes ambientales a través del estudio de los Objetivos de Desarrollo Sostenible (ODS) 6: "Agua limpia y saneamiento", el 13: "Acción por el Clima" y, el 15: "Vida de ecosistemas terrestres", en los estudiantes de 8° de la Institución Educativa Ignacio Gil Sanabria, Siachoque, Boyacá, con el fin de aportar a la construcción de una paz ambiental en el páramo "Cortadera". La metodología empleada fue la Investigación Acción, junto con las Soluciones basadas en la Naturaleza a través de las cuales se buscó incrementar acciones para el ecocuidado y compromiso con la "Cortadera". Se identificó el desconocimiento de gran parte de los estudiantes de 8° del páramo Cortadera, así como los factores que afectan constantemente al ecosistema; se evidenció vacíos en tema de derechos y deberes ambientales, qué son y cuáles son los ODS que buscan el cuidado del planeta. A través del desarrollo del proyecto, se reconoció lo que son los ODS y la importancia de aplicar los 6, 13 y 15 para el cuidado y la conservación del páramo; se logró establecer la relación de dichos ODS con los derechos y deberes ambientales; y se pudo concluir que es fundamental incrementar las visitas de los estudiantes al páramo, así como el brindarles herramientas para que identifiquen los factores que afectan negativamente el entorno y su nivel afectación. Será fundamental un trabajo articulado entre el Colegio, las familias y la comunidad.

Palabras clave: Educación ambiental; Derechos; Deberes; Cuidado; Medio ambiente; Páramo; Paz ambiental; ODS.

Summary: 1. Introduction, 2. Methodology, 3. Findings, 4. Conclusions, 5. Bibliographic references.

1. Introduction

The Cortadera páramo is a high mountain ecosystem that belongs to the Tota-Bijagual-Mamapacha páramo complex in the department of Boyacá, which regulates the water resources of 29 municipalities (27 in Boyacá and 2 in the department of Casanare). Unfortunately, in the high areas of the páramo, the agricultural frontier has continued to expand (Anzoátegui *et al.*, 2023), and the anthropic intervention and livestock activity remain constant. Additionally, mining explorations are being developed near Cortadera to exploit phosphate rock (Agencia Nacional de Minería [ANM], 2021). All of the above also contribute to the gradual loss of the *Espeletia tibamoensis* species, known in the region as *frailejón*.

Thanks to Cortadera – and the rest of the Tota-Bijagual-Mamapacha páramo ecosystem – the region's communities can have a constant water supply to maintain their livelihoods and economic activities. Their lives and economies fundamentally depend on the ecosystem services that the páramo provides (Parra-La Rotta & Ordóñez-Noriega, 2020).

As Parra-La Rotta and Ordóñez-Noriega (2020) state, “the loss of the vegetation cover, the change in land uses, and the decrease in the area of the Cortadera páramo have been predominant threats to this ecosystem” (15). However, those are not the only hazards: A year ago, the National Mining Agency (ANM) held a meeting with the Municipal Mayor’s Office of Siachoque, an area also covered by Cortadera, to continue the exploration process of conducting mining exploitation in that region (ANM, 2021). The meeting left many doubts and questions among community members about the collateral environmental damage that such activity could cause since mining will also affect the environmental and territorial peace of the region.

Despite such threats, the páramo population hopes that legislative tools at their disposal – such as article 79 of the Political Constitution of Colombia (Const, 1991), which defines community participation regarding procedures that may directly affect them – will allow them to prevent any intervention that harms them and their ecosystem (Cámara de Representantes, 2020).

The páramo ecosystem, as well as the environment in general, can be affected by the harmful activities described above. Still, it also can be affected by threats and menacing activities occurring in other ecosystems. This general chained impact type is climate change (Santoto Tunja, 2021). However, much of the damage caused to the páramo ecosystem and the environment, in general, may be counteracted by implementing environmental education (Santiago-Rivera, 2008), promoting the recognition of rights, and, even more so, enacting ecological duties. These actions are crucial to improving the interrelationship of communities with their environments. They can be considered principles that could guarantee better treatment and a better use of water resources

for the common good. These principles and actions are essential to avoid socio-environmental conflicts and can, in turn, contribute to the construction of environmental and territorial peace.

The alarming situation described above is only worsened if we consider the negligent attitude and abandonment of Corpoboyacá (Corporación Autónoma de Boyacá, which is the institution that leads the environmental planning in the department) towards this part of the region, also by the lack of governance and coordination among the Municipal Mayor's Office, the Municipal Council, the water boards, the community, and the Ignacio Gil Sanabria Technical Educational Institution. Such articulation would allow the assessment and combination of the efforts provided by each institution so that they can be optimized and enhanced to achieve a common goal. At the same time, this articulation will only be possible if it is mediated by the Comité Interinstitucional de Educación Ambiental (Interinstitutional Committee for Environmental Education, CIDEABOY). Although Cideaboy has begun to convene the different stakeholders, it must regain the trust of the community, which has become skeptical and pessimistic after verifying that there was no coherence between the agreements reached in different meetings and what happened in the other rural districts in the end, especially in Cortadera.

This situation reveals the need to promote education about environmental rights and duties in the youngest generations so that they can begin to change the community practices that affect the páramo. Only in this way will it be possible to achieve environmental and territorial peace. The benefits that can be achieved can be many if ecological education focuses on promoting the three SDGs that are aimed at protecting the planet: 6 (Clean water and sanitation), 13 (Climate action), and 15 (Life on land).

It is worth highlighting the importance of implementing environmental education in schools. Unfortunately, adults in the communities tend to ignore the concern about the deterioration of the environment. That is why environmental education in schools can be considered a powerful formative movement that can help promote the social trends that encourage the recognition of the páramo ecosystems. It is in schools where the need to study it to understand better it must be installed. Only by having a better understanding of the ecosystem will communities be able to identify the associated problems and implement a commitment to preserve the páramo through social actions (Sáuve, 2010). From the above, we can state that "environmental education is the fundamental tool for all people to become aware of the importance of preserving their environment so that they can make changes in their values, behavior and lifestyles" (Espejel-Rodríguez & Flores-Hernández, 2012).

Now, the numerous problems that can result from the variation of an environment have already been raised by many human communities, because they are interested in the prevention or mitigation of environmental damage. This has opened an environmental debate regarding the

need to avoid future losses, in the short or long term, in the face of natural disasters caused by climate change (Novo, 1996).

The proposal we present here aims to direct education toward acknowledging and promoting environmental rights and duties. Such duties and rights, although they are framed within regulations, are understood as a “set of knowledge that comes from other non-legal environmental sciences such as biology, geology, etc.” (CEAR-Euskadi, 2014, para, 2). That is why it is essential to highlight their preventive nature, rather than their punitive one because environmental rights and duties are universal and transversal to what is established in the legal order (CEAR-Euskadi, 2014).

Both environmental rights and duties regulate human life and allow a peaceful and harmonious coexistence with ecosystems and environments. Environmental rights and duties have been the subject of reflection for the last half a century. This situation has resulted in different agreements, conventions, and regulatory bodies, the first of which was the United Nations Conference on the Human Environment in Stockholm (Naciones Unidas, 1972).

That conference resulted in the acknowledgment that, invariably, human beings have the fundamental right to freedom and equality and to enjoy adequate living conditions in environments of such quality that allow them to lead a dignified life and enjoy well-being. However, human beings also have obligations. The most solemn of them is to protect and improve the environment for present and future generations.

Later, in 1992, the United Nations emphasized the idea of sustainable development in Rio de Janeiro, Brazil. This concept materialized in the Rio Declaration on Environment and Development (Naciones Unidas, 1992), which refers to the following rights: to development, to access information about the environment, to participate in environmental management, to environmental justice, to enjoy a healthy environment, and to an environmental education.

Subsequently, in 2011, because in the 21st century, there are still communities that do not have access to drinking water, the United Nations declared access to this resource as a human right. Access to water is essential so that populations can live without their health and integrity being affected (Naciones Unidas, 2011).

Environmental duties, which arose from the recognition of the rights mentioned earlier, can be understood, in general, as the obligation that all people have to protect the environment, not only for their benefit but for the enjoyment of future generations. The Rio de Janeiro Declaration stated the commitments the states must adopt to conserve and protect ecosystems and the importance of involving communities in decision-making. However, this commitment must also

be fulfilled equally by individuals. The following are fundamental duties that each person must fulfill:

- Conserve and protect the environment for the achievement of peace.
- Cooperate in compliance with the environmental principles established in the Rio de Janeiro Declaration (Naciones Unidas, 1992).
- Protect the natural resources and guarantee the conservation of a healthy environment (Const, 1991, art. 95).

Participation in environmental management is not only a right; individuals must get involved in such an area due to the responsibility that this right brings to the individuals and their communities. Although the state indeed must guarantee the participation of communities in environmental management, the most consistent thing that citizens should do is seek participation and collaboration in it guided by the public institutions in charge.

Representatives of many countries have expressed concern about the future of the human species through the United Nations. That is why it has become essential to work intensely for the implementation of the SDGs, especially those three that focus on caring for the planet. Within the framework of the project *Educación, derechos y deberes ambientales como aporte para lograr una paz ambiental en Siachoque, Boyacá* [Environmental Education, Rights and Duties as a Contribution to Achieving Environmental Peace in Siachoque, Boyacá], which we are describing in this article, we consider that the three SDGs mentioned can be regarded as a successful solution to the environmental problems presented in Cortadera, since they are focused on promoting the care and conservation of the páramo. For this, it is necessary to acknowledge Colombia's commitment to comply with the 17 SDGs, with its fellow citizens and with the rest of the nations (Rodríguez-Sierra & Córdoba-Cuaran, 2019).

Making the environmental rights and duties included in SDGs 6, 13, and 15 the core of environmental education is a strategy that seeks to complement the commitment we have as human beings to caring for the planet. This commitment is essential when we consider the Colombian territory's ecosystem and environmental wealth and its contribution to the rest of the earth. Regarding the level of compliance with the SDGs in Latin America, according to the 2019 SDG index, Colombia has a higher level of compliance with SDGs 6 and 13 than other countries in the region. However, the situation is different with SDG 15, in which the country is "well below the regional average" (Sánchez-Gómez, 2020, p. 4). Indeed, there is still a long way to go before the country recognizes the importance of protecting each of the terrestrial ecosystems as a contribution to the restoration that the planet demands.

It is paradoxical that in Colombia, SDGs 6 and 13 have a higher percentage of compliance than in other nations, considering the interrelationship between SDGs 6, 13, and 15. The positive assessment of SDG 6 is also questionable since studying in depth the reality of some Colombian



departments, such as Chocó and La Guajira, reveals that access to drinking water remains unresolved (IngeAguas, s.f.; Linde, 2018).

Within this context, a proposal like ours – focused on education that promotes environmental rights and duties to prevent the destruction of ecosystems from the classroom – is beneficial and positive for Cortadera and for achieving environmental peace. This proposal is based on the fact that the community is generally unaware of what environmental peace means, which largely explains different regions' difficulty in achieving it.

Within the framework of our proposal, we understand the concept of environmental peace as the actions that are aimed at providing solutions to environmental conflicts and environmental damage. In their social aspect, these actions focus on rural development and territorial planning. The objective of these actions is to achieve a social reconstruction that is aligned with the natural order of the environment and that can provide economic benefits to the surrounding populations. In this way, it is attractive for communities to implement projects aimed at achieving environmental peace and, through them, reduce their impact on nature (González-Cuenca *et al.*, 2001).

Additionally, we understand environmental peace as developing projects that promote harmony between communities and the ecosystem and as training citizens to respect Mother Nature. Through education, people will become involved and amplify the efficiency of ecosystem preservation processes. However, it is essential to remember that all actions or interventions that communities conduct in their environments must follow the standards and guidance of environmental institutions since they will be the ones who will allow them to strengthen environmental development to a greater extent (Molina-Orjuela & Rojas, 2019).

In 2017, UNAD students, Carlos Barrera and Jéssica Quintana, implemented a project called *Implementación de la metodología cambio integral ecologista 'CIE' para 35 jóvenes de cada municipio de Tunja, Sogamoso, Güicán de la Sierra, Belén, Chiscas, Nobsa, Siachoque, Sta. Rosa de Viterbo y Paipa del Departamento de Boyacá* [Implementation of the comprehensive ecological change (CIE) methodology for 35 young people from each municipality of Tunja, Sogamoso, Güicán de la Sierra, Belén, Chiscas, Nobsa, Siachoque, Sta. Rosa de Viterbo and Paipa of the Department of Boyacá]. In it, they stated that environmental education is the ideal means to establish certain principles that influence human action, which is why they conceive it as a transformative approach. In addition, they highlighted that in the municipality of Siachoque, the population had the will to work for the ecosystem. The university students recognized the relevance of environmental education for the conservation and care of the environment (Barrera-Orduz & Quintana-Lagos, 2017).

The teacher Alexánder Mojica-Ruiz (2019), in his article *Cuidando el planeta desde la escuela* [Caring for the Planet from School], also stated that thanks to environmental education, he was

able to implement the curricular sustainability proposal for planetary citizenship training titled *Tras las huellas del agua: conservamos nuestro territorio* [Behind the Traces of water: we conserve our territory] at the Ignacio Gil Sanabria institution (p. 20). Thanks to this type of education, the teacher achieved a more significant commitment from his students to the ecosystem.

For his part, Flórez-Restrepo (2012), in his proposal developed in Boyacá, called *La educación ambiental: una apuesta hacia la integración escuela-comunidad* [Environmental education: a bet towards school-community integration], highlighted the importance of environmental education as a tool capable of contributing to addressing ecological crises. Likewise, he mentioned that environmental education is a strategy that can link the school with the community. In his reflection, Flórez-Restrepo (2012) also emphasized the need for environmental education as a means to optimize the relationship between human beings and the environment to lead to the achievement of ecological peace.

Based on the indissoluble relationship between environmental education, environmental rights and duties, and environmental peace, lawyers Albino Segura-Penagos and Jaime Cubides-Cárdenas, in a research conducted in Puerto Boyacá, affirmed that the environment exists not only as a right but also as a duty. The authors also stated that the environment needs communities to exercise the responsibility of respecting it to protect ecosystem resources. The proposal of these authors focused on “environmental participation” as an element of environmental rights that allows people to take ownership of the territory and exercise good governance (Segura-Penagos and Cubides-Cárdenas, 2016).

Ariza-Velasco (2014), a graduate of Universidad Santo Tomás, points out that water is a human right that is violated when an economic benefit is prioritized over human and environmental life. The author makes this statement based on her research on mining in the Santurbán páramo. With this research, the author has shown the negative effect of mining on the community and the long road that the region still has to go before achieving environmental peace.

Reyes-Bonilla (2018), when referring to the greater basin of the Coello River in Tolima, highlighted the relevance of water and insisted that water is a fundamental right to sustain life and domestic and economic activity and guarantee human survival.

Another fundamental contribution to this topic is that of Cuervo-Barahona *et al.* (2016), who, when researching Cortadera, concluded that the páramo is vulnerable due to its high anthropic presence. For this reason, Cortadera must be an object of more excellent care and commitment to its conservation. If not, the soil will be affected, and the vegetation cover will be lost. This loss will add to the effects that accelerate the impact of climate change. This contribution from Cuervo-Barahona is significant since, although it does not directly refer to environmental rights and duties, it does warn that the transformation of the land of Cortadera will have an

impact on the population of the páramo. This impact violates the community's right to live in a healthy environment, implying a greater distance from environmental peace.

Although many authors have highlighted the importance of environmental education as a means to achieve environmental peace, it should not be the only solution to the issues presented. Ecological education is an alternative to "promote the care and conservation of nature" (Espejel-Rodríguez & Flores-Hernández, 2012).

Environmental education serves to promote environmental culture, environmental awareness, knowledge of the surrounding ecosystems, community formation, and schools for parents. Environmental education works as a means for communities to participate in the conservation of ecosystems, which will help promote positive ecological practices such as the production of organic fertilizers, solid waste management, reforestation, water preservation, and reduction of the production of CO₂, among others. In this regard, environmental education is a strategy that can help mitigate the damage that ecosystems have suffered and are still receiving (Espejel-Rodríguez & Flores-Hernández, 2012).

Finally, the Koinonía research hotbed, from the Universidad Santo Tomás, in its article *La paz ambiental, una oportunidad para disminuir el cambio climático* [Environmental peace, an opportunity to reduce climate change], result of a process of interaction with sixth-grade students from the Ignacio Gil Sanabria Educational Institution in Siachoque, Boyacá, highlighted the need to understand that there will only be comprehensive peace to the extent that there is territorial peace, and that there will only be territorial peace if there is environmental peace. Furthermore, there will only be ecological peace if communities reach ecosystem balance, which will only be achieved if they attain comprehensive environmental repair and if they manage to implement accurate restoration processes. The latter is essential to accomplish the recognition of environmental rights and duties (Ciza-Núñez *et al.*, 2022).

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2. Methodology

The methodology used in this research was action research due to the dynamics generated between the researchers and the community participating in the study (Balcázar, 2003). Solutions based on nature (SbN) were also included since all output and reflection on the eco-care and well-being of ecosystems were based on what the ecosystems are and on what they provide us (Unión Internacional para la Conservación de la Naturaleza [UICN], 2017).

The methodology implemented allowed us to work jointly with eighth-grade students from the Ignacio Gil Sanabria Educational Institution in the municipality of Siachoque and the department of Boyacá. The objective of the work conducted with them was to establish their knowledge about Cortadera and the effects it has suffered due to the anthropic intervention it



receives daily (Vargas-Terranova *et al.*, 2022). Additionally, surveys and workshops were applied for the same purpose. Likewise, a visit to Cortadera was conducted with the students to identify their behavior, their capacity for wonder, and their environmental solidarity inside the ecosystem, and to make them aware of the ecological services that this high mountain ecosystem provides to the entire region, to the country and the rest of the planet (Ropero-Portillo, 2020).

The study was carried out with a sample population of 40 students from groups 8.1 and 8.2. They were chosen for this work because they have been in contact for two years with the Koinonía research hotbed, from Universidad Santo Tomás. The research hotbed leads the current project, which allows the process that has been conducted with said population to continue (Ciza-Núñez *et al.*, 2022).

Initially, students answered a question about their prior knowledge of the SDGs. Subsequently, they were asked to make a drawing that represented these SDGs. Next, the students had a second session in which the importance of the SDGs was contextualized and explained (Cabezudo, 2021), especially the SDGs 6, 13, and 15 mentioned above, which are dedicated to the protection of the planet. The activity was focused on the context of Cortadera.

In another session, the environmental rights and duties related to the aforementioned SDGs to promote the care of Cortadera and the building of peace in Colombia were explained to the students. The information provided also included, but was not only limited to, actions and regulations derived from the law in order to overcome the punitive approach entailed in the application of the law when it is breached. Subsequently, the students had another session dedicated to determining the factors that could affect the páramo and the level of damage caused to it due to anthropic interventions and the omissions of citizens. For this, the students were presented with an Excel table that contained an environmental impact matrix (Polanía-Gualdrón, 2023) so that they could identify what type of factor was affecting the páramo, whether said factor was positive or negative, and the magnitude of the impact.

Another crucial moment with the students was when the Climate Action Superheroes activity was implemented with them. The Climate Action Superheroes is a strategy designed by the United Nations, within the ActNow campaign, in order to commit educational institutions to achieving the SDGs (Naciones Unidas, 2018a). It should be noted that, in general, all activities were adapted to the preservation needs of Cortadera.

The activity presented students with three fictional characters with specific abilities. The characters represented the three SDGs whose objective is protecting the planet. The superhero of SDG 6 was the Water Wizard, the superhero of SDG 13 was the Recycle Ranger and, finally, the Green Guide was responsible for SDG 15 (Naciones Unidas, 2018a).

Each of the superheroes has their own abilities. The tasks that each one had to perform were described to the students. Additionally, the students were presented with a challenge that they had to take on with the character. The activity included questions about the impact that the tasks conducted had achieved and whether they considered that such actions had contributed to the protection of the ecosystem. In the end, they were invited to practice these actions constantly. Finally, to close the activity, the students received a certificate in recognition of the work they conducted during the session.

Another session was the eco-pedagogical visit to Cortadera through the San José rural district, in the municipality of Siachoque. During the visit, the students were instructed to observe the entire ecosystem and its current state and to notice any situation or irregularity in accordance with what they had already learned in the classroom. This meeting was held with the support of the teachers of the main headquarters of the Ignacio Gil Sanabria Educational Institution, the support of the San José educational institution teachers, and the páramo guards from the Municipal Mayor's Office.

The day after visiting Cortadera, the students were asked to answer the following questions: 1) What was the experience of going out to the páramo like? 2) From what you saw in the páramo, what was good and what was not? 3) What should be improved? and 4) What do you propose to improve the state of the páramo?

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To conclude this section, the development of the study was framed in three stages. The first consisted of the collection of primary sources. In the second, workshops were held with eighth-grade students from the Ignacio Gil Sanabria Educational Institution. In the third stage, the information was systematized, and the results were socialized.

3. Findings

The Ignacio Gil Sanabria Technical Educational Institution in Siachoque, Boyacá, has eight branches, six of which are located in the rural sector. Each of its facilities offers an educational service by the institution's mission statement that, as established by Secretaría de Educación de Boyacá (2021), "promotes the comprehensive development of the community by fostering an environment of affection, understanding, dignity and competitiveness to perform effectively in life" (para. 4). This mission is in line with what the director of this institution, Doris Socorro Archila Arenas, mentioned in an interview carried out by the research group on June 20th, 2023. In said interview, the institution's director emphasized that they have a particular interest in the environment and a concern for taking care of the planet. Furthermore, in this case, the institution is committed to environmental peace in its surroundings Cortadera. In this way, they generate with the students what is specified in their missional statement: the comprehensive development of the community (Universidad Santo Tomás, 2023).

The Interinstitutional Technical Committee for Environmental Education of Boyacá (CIDEABOY, 2016) prepared the Departmental Plan for Environmental Education of Boyacá for 2016-2025. It is mentioned that "environmental education has had an incipient development" (p. 23). Despite this, it is evident that institutions have begun to develop different actions focused on environmental education and management. The Ignacio Gil Sanabria institution is currently no exception.

The instruments that the research group implemented to achieve environmental education and the creation of critical and participatory thinking in the eighth-grade students of the San José campus of this institution were the following. First, an explanatory methodology of the SDGs and the environmental rights and duties that Colombians must keep in mind. Second, an activity developed from the ActNow campaign, proposed by the United Nations (2018a), aims to motivate people so that the SDG framework guides their actions. Based on this, Climate Action Superheroes were implemented, an activity that, as the United Nations (2018a) states, is crucial to "empower girls and boys to believe in the impact they can achieve on the planet and become heroic leaders of change" (para. 2). For this reason, said multilateral organization published a series of booklets with different superheroes, whose roles try to resolve situations using their knowledge and skills. However, the research group modified them and adapted these booklets to the context in which the children of this institution operate. That is, the activities focused on Cortadera. Third, the research group presented an environmental impact matrix, followed by a visit by the students to the páramo, which included a socialization workshop.

Now, the first instrument - the explanatory methodology that was conducted - was applied, taking into account that "environmental education is called to produce a citizen who is knowledgeable about the environment and its associated problems, aware of how to help and motivated to participate in its solutions" (Meinardi, 2010, cited in Flórez-Restrepo, 2012, p. 86). For this reason, if the primary objective is to generate awareness and develop environmental peace for each of the students in this group, they must understand what rights and duties they have as citizens and that, once they know them, they can take action through the guidelines established in the SDGs. The environmental rights and responsibilities that were explained and described to students about education can be found in paragraph 2 of article 67 of the Political Constitution of Colombia (Const., 1991), which states that:

Education will train Colombians to respect human rights, peace and democracy; and in the practice of work and recreation, for cultural, scientific, technological improvement and for the protection of the environment.

Likewise, article 79 of the Political Constitution of Colombia (Const., 1991), mentions that:

All people have the right to enjoy a healthy environment. The law will guarantee the participation of the community in decisions that may affect it. It is the duty of the state to

protect the diversity and integrity of the environment, conserve areas of special ecological importance and promote education to achieve these goals (p. 14).

Now, regarding the duties and responsibilities of citizens, paragraph 8 of article 95 of the Political Constitution of Colombia (Const., 1991) mentions that each citizen has to “protect the cultural and natural resources of the country and ensure the conservation of a healthy environment” (p. 17).

To complement the information provided by the cited articles, the students know that to achieve environmental peace, it is also necessary to contribute to a healthy and pollution-free environment, care for and guarantee the conservation of the environment, and have a spirit of solidarity to mitigate negative impacts on ecosystems.

After explaining environmental rights and duties, the SDGs were taught, since, as Gómez-Gil (2018) mentions, they are relevant to sensitize and raise awareness among students:

They propose systemic responses to a global and interrelated vision of sustainable development that addresses such vital issues as inequality and extreme poverty, unsustainable consumption patterns and environmental degradation, strengthening institutional capacities, and innovative global solidarity processes that the MDGs neglected (p.2).

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Now, despite the SDGs being fundamental to solving current problems, the research group realized that the children needed to gain prior knowledge of this topic. For this reason, a general explanation of the SDGs was given, and after that, based on what the UN has described on its main page, SDGs 6, 13, and 15 were explained in depth (which were previously selected by the research group due to its relationship with some aspects of the páramo). These SDGs refer to the following:

1. *Goal 6: Clean water and sanitation.* This objective seeks to “guarantee the availability of water free of impurities and its sustainable management and sanitation for all” (Naciones Unidas, 2018b), something that will be achieved through the actions proposed by the United Nations for the goals of this aim. These actions are: Reduction of pollution, increase in recycling and reuse of goods and services, decrease in the emission of chemical products, increase the efficient use of water resources, increase the protection of different ecosystems that are related to water, and finally, in the case of institutions, support and strengthen local communities to improve water and sanitation management.
2. *Goal 13: Climate action.* This SDG seeks to adopt measures that allow people to combat climate change and, therefore, the effects that it entails. The objective of deepening this knowledge with students comes from the fact that, as stated in objective 3 of this SDG,

we must "improve education, awareness and human and institutional capacity regarding climate change mitigation, adaptation to it, the reduction of its effects and early warning" (Naciones Unidas, 2018b). This goal follows the methodologies, objectives and instruments of the research group.

3. *Objective 15: Life on land.* This objective ensures the conservation of terrestrial ecosystems and their biodiversity, such as the páramos. It is relevant to make this known to children so that from their position, they can take care of their environment and be involved in the environmental peace that this ecosystem needs (Naciones Unidas, 2018b).

After establishing relationships among environmental duties, rights, and the SDGs, the research group noticed that some students associated the themes with their own daily lives. Claudia Boyacá, one of the students interviewed from the chosen group, provided the research group with some actions that she or people around her can conduct to comply with SDGs 6, 13 and 15. These actions are the following:

1. Water can be saved and reused in each person's home and school.
2. Burning is an activity that can be avoided: It results in the greenhouse effect and, therefore, increases global warming.
3. Habits such as deforestation and the eradication of invasive species, which affect the páramo, can be discouraged.
4. Actions such as the felling of trees and the invasion of the páramo can be avoided for agricultural or livestock purposes (Universidad Santo Tomás, 2023).

The actions that student Claudia Boyacá described are focused on her environment, Cortadera, which is an essential high mountain ecosystem for the community and, as Hofstede (1997) emphasizes, it has three fundamental functions: The first is its ecological (due to its endemic flora and unique landscape); the second is its agricultural (for food production); and the third is hydrological (because it is a source of drinking water). The students of this institution were encouraged to internalize these functions directly or indirectly through the instruments applied by the research group. Likewise, based on this awareness, they were encouraged to identify environmental peace to preserve their ecosystem.

After implementing the first workshop, the research group assigned the roles of superheroes to each student in another classroom activity. Thus, 13 of them were Water Wizards, 12 were Recycle Rangers, and 6 were Green Guides. Each booklet proposed actions so that each student fulfilled their proper role. In addition, the following reflection questions were asked to the students as part of the activity: Do you think that you helped the páramo with this action? Why? Did any of the people around you help you fulfill your role?

Table 1 includes the actions that each of the eighth-grade students stated that they had implemented as part of the climate action:

Table 1. Climate actions implemented by eighth-grade students.

Climate actions	Number of students who implemented the action
Collecting garbage	19
Ecological bricks	6
Sorting garbage	6
Reusing plastic bottles	2
Reducing the use of plastic	3
Recycling of plastic bottles, glass, and papers	7
Water sources cleaning	10
Saving and reusing water	5
Reafforestation	5
Organic waste use	1

Source: prepared by the authors.

To put into practice the actions they mentioned, the students had the support or help of their families for the most part. In two specific cases, from friends and neighbors. In response to the question that referred to how to protect the páramo, 20 students highlighted avoiding contaminating it, six mentioned taking care of water sources and three suggested avoiding cutting down trees.

When comparing the actions mentioned by the students with those they applied (table 1), it was found that, although 31 students developed the booklet and 20 of them emphasized avoiding pollution, only seven recycled plastic bottles, glass, and papers, and only six sorted the garbage. As the Observatorio Ambiental de Bogotá (2021) emphasizes, these activities are essential to reduce the emission of greenhouse gases or the pollution of air, soil, and water. Furthermore, it is particularly striking that, even though students recognize the care of water sources as fundamental – even more so having a páramo as a provider of their water resources – only 6 students highlighted this aspect. Additionally, of the other 31 students who put the acquired knowledge into practice, only 32.26 % (less than 50 %) cleaned the water sources. Even more alarming is that only 16.13 % saved and reused water. These activities, as explained by SDG 6 and its goals, imply a responsibility for everyone because everyone uses and takes advantage of limited natural resources.

The third instrument used was the environmental impact matrix, developed to recognize the advancement of knowledge and the student's level of awareness. The activity consisted of having each of the working groups (14 in total) identify the impacts that were present in

Cortadera and also classifying them by their environment (abiotic, biotic, and socioeconomic), by their type (positive or negative) and by their magnitude (moderate, critical and severe). The results achieved with this instrument are shown in Tables 2 and 3.

Table 2. Environmental impact matrix on damages suffered by the paramo Cortadera.

Negative impacts	Forest fires	Deforestation/felling of trees	Solid waste	Impact on fauna
The frequency with which it was highlighted	5	10	10	4

Source: prepared by the authors.

Table 3. Environmental impact matrix of actions that can favor the care of Cortadera.

Positive impacts	Recycling	Fertilizing	Tree planting
The frequency with which it was highlighted	2	5	4

Source: prepared by the authors.

Specific observations are useful to understand and complement the students' responses. For example, Some groups covered very general impacts, such as soil pollution, air pollution, and noise pollution; the students did not focus on the effects on the environment of Cortadera; in specific cases, students named employment options and circular economy strategies as positive impacts; there was a lack of clarity in the concepts of environment (biotic, abiotic, socioeconomic) and magnitude (moderate, critical, severe).

As already mentioned, the purpose of the theoretical instruction was to generate an impact on the students, so that they would genuinely take ownership of their environment and the practice of environmental peace. That is why the next step was subsequently taken: The research group, working with teachers from the institution, visited Cortadera with the students. There, each of them observed (some for the first time) what was happening with the ecosystem.

The researchers observed that the students demonstrated little environmental solidarity. It was possible to perceive that some showed indifferent behavior towards the garbage collection that they witnessed during the tour of Cortadera. Some of the students even left their garbage in the place. Another aspect worth noting is that during the sessions explaining environmental rights and duties, it was mentioned that taking care of the plants was necessary. Although they had already learned about it, some students took alternative paths to the main trail, which affected water beds and damaged some of the native plants of the ecosystem.

After the eco-pedagogical visit, the students developed a socialization workshop in which they were asked the following questions: What did you see in Cortadera? What was good? What was not good? What should be improved? and ¿What can be done to improve it? The responses obtained are listed in Table 4.

Table 4. Responses to the workshop held after the visit to Cortadera.

Questions	Answers	Frequency in which the response was given
	They discovered the páramo	6
What did you see in Cortadera?	They discovered new plants	11
	They discovered <i>frailejones</i>	3
	Learned about caring for water sources	2
What was good?	Learned about caring for water sources	3
	Lots of garbage	11
	Cattle raising	7
What was not good?	Agriculture	6
	Heavy machinery	2
	(Regarding the eco-pedagogical visit) many people at the same time in the páramo	3
	Garbage collection	10
	No livestock	5
What should be improved?	No agriculture	6
	No heavy machinery	1
	Decrease in the number of people visiting the páramo	5
	Sensitize people	6
	Garbage collection	5
What can be done to improve it?	More controlled eco-pedagogical visits	1
	Fauna and flora conservation plans	2
	Taking care of <i>frailejones</i>	2
	Páramo delimitation	1
	Avoid cultivation and livestock in páramo areas	1
	Reforestation	2

Source: prepared by the authors.

The results that the research group obtained from the process of raising awareness and recognition of the páramo can be compared with what Vargas and Estupiñán (2012) presented in their article *Estrategias para la educación ambiental con escolares pobladores del páramo Rabanal* [Strategies for environmental education with schoolchildren residents of the Rabanal páramo], because, in both researches, the children identified mining or heavy machinery activities that, of course, damage ecosystems such as the páramos. Additionally, compared to the students of the Ignacio Gil Sanabria Technical Educational Institution of Siachoque, Boyacá, the seventh-grade students of the Salamanca Technical Educational Institution did find a páramo with a lot of vegetation, animals, little pollution, without cutting down trees and, even, with an atmosphere that they described as calm. Something similar was expected in Cortadera, but unfortunately, as the findings show, it did not happen.

4. Conclusions

From this project, the research group concluded that, although the students were sensitized and acquired new knowledge, implementing practical actions is an even more significant challenge because even though many students showed some interest in taking care of the environment when putting it into practice in terms of recycling, cleaning, saving, and conserving water sources, their intentions were limited.

Additionally, it is necessary to highlight that it is essential to make a more significant effort so that students put into practice all the knowledge acquired. The objective of raising awareness is to translate all actions into contributions to achieving environmental peace and conservation of the páramo. That is why it is vital to continue promoting the connection between theoretical knowledge, environmental awareness, and various sustainable practices in students' daily lives.

Promoting permanent and articulated work among the educational institution, the Municipal Mayor's Office, and the community remains indispensable. The work done in the classroom must transcend the rural districts and the municipality. It is also critical to continue working on the concept of environmental peace in order to contribute to the already present efforts to achieve territorial, national, and comprehensive peace. It is also crucial to put SDGs 6, 13, and 15 into practice to acknowledge environmental rights, which can only be understood with compliance with the duties that each person must undertake.

It is essential to remember that actual change and transformation will be achieved by generating an environmental awareness in students that permeates their communities and their relationships, as well as those of the inhabitants of the páramo. They have been living in the midst of community conflicts between those who wish to preserve the páramo and those who believe that tradition and family practices should prevail over any law or intention of care and

preservation. However, it is the latter that can guarantee that ecosystem services and ecosystem interrelation lead to environmental peace.

Lastly, although the students did what was asked of them in each activity, the workshops' objectives and awareness-raising processes will likely materialize if the entire community takes care of Cortadera, climate action, and planetary well-being seriously. True transformation demands orderly and joint work guided by a spirit of environmental governance.

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Authors' Contribution statement

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The authors unequivocally state that there is no conflict of interest in the writing or publishing of this article, reinforcing the integrity and impartiality of the research.

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