



El vínculo entre cascadas y biodiversidad como elemento clave para el desarrollo sostenible y el turismo en comunidades amazónicas

The link between waterfalls and biodiversity as a key element for sustainable development and tourism in Amazonian communities

A ligação entre cachoeiras e biodiversidade como elemento-chave para o desenvolvimento sustentável e o turismo nas comunidades amazônicas

Carlos Mestanza-Ramón ^I

cmestanza@ug.uchile.cl

<https://orcid.org/0000-0003-2401-4151>

José Luis Jiménez-Caballero ^{II}

jjimenez@us.es

<https://orcid.org/0000-0003-3456-2960>

Correspondencia: cmestanza@ug.uchile.cl

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- I. Departamento Economía Financiera y Dirección de Operaciones, Universidad de Sevilla, 41018 Sevilla, España. Instituto Superior Tecnológico Universitario Oriente, La Joya de los Sachas 220101, Ecuador. Research Group YASUNI-SDC, Escuela Superior Politécnica de Chimborazo. Sede Orellana, Ecuador.
- II. Departamento Economía Financiera y Dirección de Operaciones, Universidad de Sevilla, 41018 Sevilla, España.

Resumen

Se destaca la importancia de las cascadas en la Amazonía ecuatoriana como un componente fundamental para promover el desarrollo sostenible e impulsar el turismo en las comunidades locales. De hecho, se destaca que estos espacios naturales no sólo deslumbran por su imponente belleza escénica, sino que también juegan un papel vital en la preservación del equilibrio ecológico y la riqueza biológica de la zona. En consecuencia, su protección y cuidado debe ser una prioridad en las políticas de desarrollo turístico. También se observa que el turismo de naturaleza centrado en cascadas tiene un enorme potencial para generar importantes beneficios económicos para las poblaciones amazónicas. Sin embargo, cabe señalar que para que estos beneficios sean verdaderamente sostenibles en el tiempo, es fundamental implementar iniciativas turísticas conscientes y responsables que prevengan el deterioro de los ecosistemas y aseguren una distribución justa y equitativa de los ingresos generados. Esta investigación destaca la necesidad imperativa de adoptar un enfoque holístico y multidisciplinario para proteger y gestionar de manera sostenible las cascadas de la Amazonía ecuatoriana, armonizando la optimización de los beneficios económicos para las comunidades locales, la aplicación de prácticas de turismo responsable y la mejora de su importancia ecológica y cultural. Sólo a través de este enfoque holístico será posible garantizar la preservación de estos tesoros naturales para las generaciones futuras, promoviendo al mismo tiempo un desarrollo socioeconómico equitativo y respetuoso con el medio ambiente.

Palabras clave: Cascadas; Biodiversidad; Desarrollo sostenible; Comunidades amazónicas.

Abstract

The importance of waterfalls in the Ecuadorian Amazon is highlighted as a fundamental component for promoting sustainable development and boosting tourism in local communities. Indeed, it is emphasized that these natural spaces not only dazzle with their imposing scenic beauty, but also play a vital role in preserving the ecological balance and biological richness of the area. Consequently, their protection and care should be a priority in tourism development policies. It is also noted that nature tourism centered on waterfalls has enormous potential to generate significant economic benefits for the Amazonian populations. However, it should be noted that for these benefits to be truly sustainable over time, it is essential to implement conscious and responsible tourism initiatives that prevent the deterioration of ecosystems and ensure a fair and equitable distribution of the income generated. This research highlights the imperative need to embrace a

holistic and multidisciplinary approach to protect and sustainably manage the waterfalls of the Ecuadorian Amazon, harmonising the optimisation of economic benefits for local communities, the application of responsible tourism practices and the enhancement of their ecological and cultural significance. Only through this holistic approach will it be possible to ensure the preservation of these natural treasures for future generations, while promoting equitable and environmentally friendly socio-economic development.

Keywords: Waterfalls; Biodiversity; Sustainable development; Amazon communities.

Resumo

A importância das cachoeiras na Amazônia equatoriana é destacada como componente fundamental para promover o desenvolvimento sustentável e impulsionar o turismo nas comunidades locais. Com efeito, sublinha-se que estes espaços naturais não só deslumbram pela sua imponente beleza paisagística, mas também desempenham um papel vital na preservação do equilíbrio ecológico e da riqueza biológica da zona. Consequentemente, a sua protecção e cuidado devem ser uma prioridade nas políticas de desenvolvimento do turismo. Nota-se também que o turismo de natureza centrado nas cachoeiras tem enorme potencial para gerar benefícios económicos significativos para as populações amazónicas. No entanto, importa referir que para que estes benefícios sejam verdadeiramente sustentáveis ao longo do tempo, é essencial implementar iniciativas turísticas conscientes e responsáveis que evitem a deterioração dos ecossistemas e garantam uma distribuição justa e equitativa dos rendimentos gerados. Esta pesquisa destaca a necessidade imperiosa de adotar uma abordagem holística e multidisciplinar para proteger e gerir de forma sustentável as cachoeiras da Amazônia equatoriana, harmonizando a otimização dos benefícios económicos para as comunidades locais, a aplicação de práticas de turismo responsável e a melhoria do seu significado ecológico e cultural. . Só através desta abordagem holística será possível garantir a preservação destes tesouros naturais para as gerações futuras, promovendo ao mesmo tempo um desenvolvimento socioeconómico equitativo e amigo do ambiente.

Palavras-chave: Cachoeiras; Biodiversidade; Desenvolvimento sustentável; Comunidades amazónicas.

Introduction

Tourism has become an important economic factor over the years. With increased global mobility and communication, it has assumed an important role in the global economy. It is not only a source of income for individuals but also contributes to the economic development of nations. [1,2] This industry has experienced a global boom in recent years. Until the outbreak of the coronavirus pandemic, the volume of international tourism increased significantly: around 1.5 billion cross-border travel arrivals were accounted for worldwide in 2019. This represents a new record in international tourism. By comparison, in 1950 the number of international border crossings was still 25 million tourist arrivals [3]. Tourism plays a central role in the economies of many countries and has become an important source of employment and income [4].

Tourism benefits from biological diversity: travelers enjoy beautiful, untouched nature, varied landscapes and culinary diversity. But tourism also contributes to the decline of biodiversity and suffers the consequences. For example, plastic waste in the sea endangers underwater and above-water biodiversity, and littered beaches are also unattractive to tourists [5,6]. The tourism industry therefore has a special interest in preventing damage to nature and proactively protecting biodiversity. A variety of direct and indirect influencing options exist to advance biodiversity protection and reduce negative impacts on biological diversity. To combine tourism and nature conservation, close cooperation between destination management organizations, tourism companies, public administration, nature conservation organizations and visitors is necessary. Through goal-oriented cooperation, all stakeholders in this network can benefit together [7,8].

Nature and landscape in their diversity and beauty allow for sport, recreation, experience and experience of nature and shape regional identity. Tourism, sport and recreation do not have a significant impact on nature and landscape [9,10]. Together with nature conservation, they work to preserve cultural and natural landscapes. A key objective within the framework of the "National Biodiversity Strategy" is to build more and more recreational and tourism offers and infrastructures in Germany in the future on environmentally and nature-friendly principles [11,12].

Nature-oriented tourism is in vogue and is an important economic pillar and an opportunity for sustainable value creation, especially in rural regions. For these regions to be long-term destinations for nature-based tourism, it is important to preserve biological diversity and, associated with it, attractive recreational landscapes as a basis. However, tourism use in the regions

can have a negative impact on nature and the landscape and lead to climate-damaging emissions [13,14].

Waterfalls are stunning natural features that not only provide visual beauty, but also play a crucial role in the balance of the ecosystem and the well-being of society. In this article, we will explore the benefits of conserving waterfalls, both for the environment and for the people who enjoy them. We will discover how these natural wonders contribute to the water cycle, biodiversity, protection of sensitive habitats, tourism and psychological well-being. In addition, we will provide practical advice on how to preserve these areas and answer some frequently asked questions related to waterfalls [15,16]. Waterfalls have long been popular tourist attractions, and some prominent waterfalls have become tourist destinations. This article discusses the historical role of waterfalls in tourism and the impact of their development on the landscape. In addition to providing aesthetic pleasure, waterfalls also provide opportunities for a wide range of sometimes incompatible outdoor leisure activities. These resources have long been popular tourist attractions, and some prominent waterfalls have become tourist destinations. This article discusses the historical role of waterfalls in tourism and the impact of their development on the landscape. In addition to providing aesthetic pleasure, waterfalls also provide opportunities for a wide range of sometimes incompatible outdoor leisure activities [17,18].

The main motivation of nature tourism is to carry out recreational and recreational activities in the natural environment without altering its balance. It promotes the conservation of nature and existing ecosystems, carrying out re-creative activities of appreciation and knowledge through interaction [19]. This type of tourism provides the receiving communities with the means to improve their quality of life, seeking to encourage sustainable development. This tourism segment can be grouped according to the tourist's interest in four modalities: adventure tourism, ecotourism, geotourism and wildlife tourism (flora and fauna) [20].

Waterfalls, which are usually located in difficult, even dangerous terrain, are often made easier to reach and enjoy by the construction of trails and other amenities. These developments and the increased number of visitors they encourage can ruin the aesthetic enjoyment of waterfalls. Harnessing waterfalls for power generation also detracts from their aesthetic qualities and their value as a tourist attraction. Many tourists dislike the commercial development of some waterfalls and are therefore encouraged to go to other, less developed waterfalls. This, in turn, contributes to

the development and degradation of more remote and pristine waterfall sites, leading to the further spread of tourism deterioration [21,22].

In recent years, there have not been enough studies to know the reality of the connection between waterfalls, biodiversity and sustainable tourism. In this sense, this study initially focused on describing the relationship between waterfall resources and biodiversity, followed by an analysis of the economic impact of nature tourism and its sustainable development. In order to respond to these objectives, techniques such as literature review and semi-structured interviews were used.

Methodology

Methods

In order to clarify the sustainability approach, three methodological sections are presented that will respond to the specific objectives of this study. The first segment is expressed under an analysis based on semi-structured interviews with experienced experts in sustainability and natural water environments [23]. The second segment emphasises oriented information under literature review [24]. Finally, the third segment analyses waterfalls as an element of sustainable development through expert judgement [25].

Interviews

This segment focuses on field trips to the binational Amazonian border in the Department of Putumayo (Colombia) and the province of Sucumbíos (Ecuador), where the existence of waterfalls is evident. During the visit to the different waterfalls, interviews were conducted with the service providers of the tourist centres (table 2), using a questionnaire of semi-structured questions focused on different topics such as: nature tourism, waterfall management, tourism management, tourism governance, economic income, opportunities and challenges of tourist destinations (table 1).

Table 1: Questions set to ascertain the perception of cascade service providers

Participant	Aspect	Questions
Waterfall service providers	Waterfall and biodiversity	- What is the greatest benefit of managing a waterfall with a view to environmental protection, emphasising the conservation of the area and its surroundings?

	<ul style="list-style-type: none"> - What type of tourists visit the waterfalls, what type of activity do they prefer, and how does this encompass all aspects of the sustainability of the natural area? - What changes should be made so that the tourist area better encompasses the natural environment, complementing the artificial sites?
Adaptations and Sustainability Strategies	<ul style="list-style-type: none"> - What is the most complex issue involved in conserving a waterfall for sustainability? - Did you implement promotional strategies or discounts to encourage waterfall tourism in conjunction with other exploration activities? Exemplify. - How has the demand for waterfall nature tourism evolved?
Current Challenges	<ul style="list-style-type: none"> - What are the most significant challenges you are currently facing in terms of sustainability? - What affordable proposals would be put in place for a sustainable approach to waterfalls? - What obstacles have had the greatest weight in relation to bi-national cooperation and coordination between Colombia and Ecuador in the tourism context?
Future Perspectives	<ul style="list-style-type: none"> - What opportunities do you see to boost the recovery and sustainable growth of this form of tourism in the region? - What are your plans to strengthen the resilience of your resort to possible future shocks or disturbances? - Do you see the implications between tourism and nature conservation as an opportunity to revive waterfall-focused nature tourism?

Table 2: Interviewees

Service provider	Age	Nationality	Experience
Angie Martínez	36	Colombian	5
Laura Diaz	41	Colombian	8
Alberto Gomez	45	Ecuadorian	8

Felipe Lozada	43	Ecuadorian	7
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Literature review

This segment was divided into parts through two scientific review methods. Firstly, an in-depth review focused on a comprehensive analysis of different academic databases stored in renowned scientific platforms such as Scopus and Web of Science. This search took into account the inclusion of papers published during the last 20 years, in which specific search criteria, i.e. keywords, were defined (Table 3). In order to obtain better results, a manual filter was applied based on the reading of titles, related terms and abstracts of each publication, with the aim of obtaining quality documentation with respect to the topic of study. In total, we managed to compile a set of XX documents that address issues related to nature tourism in the study area, emphasising relevant elements such as the main waterfalls with a view towards tourist attractions, percentage of tourist demand and economic income corresponding to recent years.

Table 3: Methodological process for the literature review.

Subject	Keywords	Scopus/web of science
Nature tourism focused on married women	"waterfalls", "nature tourism", "waterfall tourism".	[18,26–37]
Nature tourism in the Amazonian frontier	"waterfall tourism", "waterfall tourism"	[3,38–48]
Opportunities and challenges	"border waterfalls", "waterfall tourism", "waterfall tourism"	[28,49–59]

To develop the second methodological approach, the gray literature was examined and evaluated (Table 4). This term "gray literature" refers to a compilation of documents from different information sources, which have not been subjected to conventional review or editing procedures, are generally not disseminated through traditional publication channels, but are transmitted through restricted and unconventional channels.

Table 4: Methodological process of the gray literature

Gray literature	Year of publication
Tourism Sector Plan	2018
Macroeconomic Report of Colombia	2019
Macroeconomic Report of Colombia	2020
Dynamics of the Colombian economy in 2023 Report - June 2023.	2023
Economic profile of the department of putumayo	2023

Expert judgment

Finally, we proceeded to establish the political, socioeconomic and environmental challenges present in the cascades, under a sustainable development approach. For this purpose, an expert judgment validation method was used, which consists of a set of opinions provided by professional experts on a subject, in order to verify the reliability of an investigation [25].

Tabla 5: Consideraciones del juicio de expertos

Expert	Nationality	Degree of education	Experience
Expert 1	Colombian	Master's	9
Expert 2	Colombian	Master's	7
Expert 3	Ecuadorian	Grade	11
Expert 4	Ecuadorian	Doctorate	18

Results and Discussion

Waterfalls and biodiversity

Among those who enjoy outdoor recreation and revel in the beauty of the landscape, there are some who can be described as waterfall lovers, waterfall aficionados or waterfall fanatics. There are even waterfall collectors. What follows, therefore, is an analysis of waterfalls as resources for recreation and tourism, particularly their role as an attraction. No attempt is made to analyze in detail the aesthetic pleasures derived from waterfalls. The mechanisms that drive the success or failure of nature-based tourism as a conservation and development strategy can be illustrated through a simple model. Consider a community that depends on a forested area for its livelihood. This

community may extract products from the forest or may cultivate part of the area for agriculture, both of which are consumptive uses. They say that their use of the forest area is leading to forest degradation.

Let's say the national government decides to conserve this forest area for its rich biodiversity and declares the land a protected area. The question is what mechanisms are needed to achieve this conservation objective? With perfect enforcement and no cost, the government could restrict access to the area through, for example, "fences and fines" to preserve the forest and its biodiversity. Under this scenario, conservation could be achieved, however, at the expense of worsening the situation of the community.

In the more realistic case where perfect enforcement is not feasible because of its high cost or the difficulty of monitoring resource extraction, the conservation goal can only be achieved if the community continues to derive some benefit from the forest area, but now no longer through consumptive use. Say, for example, that the forest area supports nature-based tourism, so that the economic benefits derived from the forest area depend on the abundance of the natural resource in question (e.g., the amount of wildlife or the amount of wilderness). The community will then have an incentive to cease its consumptive use practices if part of the income from tourism is shared with the community. Benefit sharing can take place through revenue sharing agreements or through employment in tourism-related activities or other arrangements. In this scenario, conservation would only be achieved if the community does not worsen.

As shown in the analytical model and as expected, the community's incentive to cease consumptive use practices is greater the greater its share of total income from nature-based tourism activities. However, other things being equal, their incentive also increases in the total revenue generated by the tourism enterprise. What this implies is that it is important not only to divide the pie but also to ensure that the pie is as large as possible while maintaining the ecological quality of the protected area. This, in turn, has implications for the benefit distribution mechanism used to divide the pie. Let's say that economic income from the forest area can be maximized through high-end tourism that requires high skills and large capital investments.

However, if the benefit sharing mechanism limits tourism operators to being local or hiring locals, then the revenue generated may be limited and not provide sufficient incentive to the community to limit their practices. A tax on the tourism industry that is used to support local community development activities may be a more efficient way to achieve conservation and development

objectives. However, it is important that economic benefits are maximized while ensuring that economic activity does not lead to resource degradation.

Within this simple framework, it is clear that the ability of nature-based tourism to achieve conservation and development will depend on specific conditions. First, if the tourism enterprise is not productive, particularly in relation to the benefits of resource extraction, the community will have little incentive to stop extraction. Second, the tourism enterprise may generate large revenues, but the community's incentive to protect the resource may be weakened by limited revenue sharing. Third, tourism visits and economic activity may exceed the carrying capacity of the natural area, resulting in resource degradation and defeating the conservation objective. It should be noted that the trade-off between economic gain from tourism and conservation is less acute in the long term, as the long-term viability of nature-based tourism and the condition of the natural area are closely related. Policies that allow for long-term planning, such as contract security and property rights, will incentivize stakeholders to take a longer view. Overall, these scenarios illustrate that the ability of nature-based tourism to generate economic and conservation benefits will depend on the particular conditions and, ultimately, it is an empirical question how quickly those conditions will be met.

Economic impact of nature tourism

The case study literature on nature-based tourism indicates that economic benefits due to nature-based tourism can be significant sources of income for local communities (Almeyda et al. 2010, Lepper and Schroenn 2010, Lindberg et al. 1996, Sandbrook 2010, Sheppard et al. 2010), even when their magnitude is relatively small. Nature-based tourism projects are often located in poor rural areas where even marginal gains can be significant relative to the scarcity of other available income-earning opportunities (Lepper and Schroenn 2010, Mbaiwa and Stronza 2010). For example, wages at a tourism project in Ngamiland, Botswana for locals employed in positions such as waiters, cooks, and drivers were found to be more than double the average rural wage of \$60 per month.

One direct means of receiving benefits from nature-based tourism is through the employment of a household member in the tourism sector. Annex Table 1 discusses the economic impacts of nature-based tourism drawn from a set of recent case studies. Employment is often in tourism-related activities, such as providing accommodation, restaurants, transportation, handicraft sales and park services. Employment opportunities for local communities tend to be in lower-skilled and lower-

paid positions, such as park guides, domestic workers, cooks, and service personnel. However, wages for those who can obtain positions in tourism can be substantially higher than opportunities outside of tourism, which are often found in agricultural positions in areas near protected areas. Working on Mount Kilimanjaro, guides earned on average \$1830 per year, porters \$842, and cooks \$771 in the context of a rural agricultural wage of \$2 per day (Spenceley 2010). Furthermore, as these figures indicate, among jobs within tourism, positions that leverage specialized skills or local knowledge, such as guides, interpreters, or park rangers, may be higher paying jobs accessible to locals.

While employment benefits can be significant, surveys indicate that the proportion of the local working-age population employed in nature-based tourism near protected areas is often marginal. Proportions of working-age adults employed in nature-based tourism may be less than 6 percent of the total working-age population (Saayman et al. 2009, Bookbinder et al. 1998, Karanth and DeFries 2010). Successful cases of island tourism such as Taquile Island in Peru are exceptions where the vast majority of the population is employed in tourism (Mitchell and Reid 2001). It should be noted that any assessment of employment generated due to a nature-based tourism enterprise must take into account the stage of the life cycle of the tourism product. Jobs are more likely to grow throughout the life cycle.

A consistent theme in the literature is the uneven distribution of economic benefits both within and between villages and towns. Between villages, case studies in the literature consistently draw attention to significant "income leakage" from the local economy to nearby urban centers that often serve as the origin of the natural destination's tourism package or supply inputs to villages near the tourism destination (Lacher and Nepal 2010, Campbell 1999). Evidence of leakage is also reflected in the recent case studies discussed in Table 2. In a case study of the island of Taquile, Mitchell and Reid (2001) estimate a 91 percent leakage of tourism revenues. In general, the most highly skilled jobs tend to be filled by outsiders, and lodging and transportation services are often owned by non-locals. The disproportionate benefit received by non-locals has led authors to conclude that nature-based tourism is not a successful strategy for rural development (Mowforth and Munt 2003). However, other authors caution against the conclusion by pointing out that even despite high leakage, tourism revenues may be among the largest sources of income in the local community.

Waterfalls as an element of sustainable development in the Colombian-Ecuadorian Amazon

Sustainability is currently trending throughout the world. However, few are responsible for meeting this demand. That is why we must focus our efforts on keeping the meaning of sustainability alive, especially in natural environments, where biodiversity is present in every corner. In these places of interest, such as waterfalls, it is possible to share pleasant moments in company or to go on adventures alone, with the aim of discovering new personal frontiers and awakening the desire to love nature. In the last 12 years in the binational border of Colombia and Ecuador, visits to waterfalls have increased gradually, as people are looking for natural, pleasant and peaceful places where they can spend quality time. [60].

Increasing the number of visitors to a tourism site enhances the economic development of local communities involved in waterfall tourism. This progressive increase provides employment and affordable growth opportunities, as more manpower is required to protect and be aware of the needs of the site and the people attending the tourist area. However, impressive scenery is often not enough to make a destination interesting for nature tourists [61]. That is to say, the area must have places to eat, recreate, rest, etc. The tourist offer is necessary to attract travelers. This includes a good variety of activities, e.g. well-developed and signposted hiking trails. A gastronomic offer in the vicinity is a great advantage to make the destination more attractive for tourists. Interesting learning opportunities, such as a nature trail with information and dynamic and imperative information centers, which add value to a destination. All of these factors highlight the standards of the tourism area, it must be taken into account that every activity must be comfortable for the tourist, as good service will make them want to visit the place again at future opportunities, resulting in a higher economic income. However, it is essential that activities in natural environments are carried out in a sustainable manner.

Sustainable tourism describes policies, practices and programmes that consider the expectations of tourists in terms of responsible management of natural resources. Promoting sustainable tourism involves ensuring the conservation of surrounding ecosystems, respecting established standards and educating visitors about the importance of keeping these sites of interest safe for as long as possible, while protecting natural areas such as waterfalls. For this reason, it is important to encourage conscious tourism practices that preserve the natural beauty of waterfalls and promote long-term sustainability [62]. Among these activities, environmental education should be promoted among the majority of visitors, through introductory talks, welcome posters, leaflets, brochures,

giant posters, triptychs, etc. Each of these elements helps to protect the tourist site, as each of the rules that must be followed when entering the site are made known. In addition, it is important to remember the good management of waste in the area, to have adequate waste collectors that classify waste, as some of it can be recycled, such as cardboard, plastic bottles and glass that can be reused. The use of the "R's" is a fundamental rule for sustainable environmental protection. Therefore, it is necessary to implement this action within waterfall resorts. Many times visitors buy bottled drinks that often end up in the waters of the natural environment, for this reason, it should be made known all the harms involved in this action. The more visitors know about the benefits of the "R", the more attractive the natural environment will be, as no waste will be reflected in the areas of interest. In addition to being a natural wonder that captivates the eye, waterfalls play a crucial role in the sustainability of the planet [18]. Their existence contributes to maintaining the ecological balance of aquatic and terrestrial ecosystems. Additionally, waterfalls act as natural filters that purify water and promote biodiversity by providing habitats for diverse species. It is essential to protect and conserve these natural beauties in order to preserve environmental sustainability.

Waterfalls are habitats with unique ecosystem conditions. One of them is the "rock shelter" behind the waterfall, which is protected from the environment by the rushing water. This shelter is often inhabited by various species that find safety in these places that are difficult to access for their predators. One example is the waterfall swift (*Cypseloides senex*) in Iguazú. These skilful birds have evolved to the point of nesting under one of the mightiest waterfalls in the world. Under their shelter the only danger is the waterfall itself, as predators have no way of accessing their nests. Also, the waterfalls are home to a number of plant species, such as ferns, which participate in the water balance and nutrient cycle by storing water and organic material, are excellent colonisers of disturbed habitats, intervene in the nitrogen and phosphorous cycle, etc. Above all, they interact with animals and herbivorous insects, which are of importance within the entomofauna. [63].

Similarly, waterfalls have deep cultural significance in many regions of the world. They are often revered as sacred sites that play a vital role in folklore, traditions and beliefs. These magnificent waterfalls have served as pilgrimage destinations, sources of inspiration for art, poetry, symbols of power and spirituality in diverse cultures throughout history. Waterfalls not only amaze and captivate our eyes, but also play a crucial role in the sustainability of the planet [64]. Their existence is embodied within the trophic pyramid, it helps to maintain the ecological balance within the environment, they provide us with great benefits for the health of human beings, it helps us to stay

active when we visit them, we reduce cortisol, they provide us with vital liquid, economy, etc. Waterfalls are a marvel within the natural environment, which is why it is essential to protect, conserve and preserve them through environmental sustainability.

Conclusions

Firstly, the waterfalls of the Ecuadorian Amazon represent a fundamental element for sustainable development and tourism in local communities. These majestic natural environments are not only captivating for their scenic beauty, but also play a crucial role in maintaining the ecological balance and biodiversity of the region. Their conservation and preservation must therefore be a top priority in tourism development strategies, thus ensuring a sustainable future for these valuable resources and the communities that depend on them. The protection of waterfalls not only ensures the continuity of the ecosystem services they provide, but also safeguards the natural and cultural heritage of the Ecuadorian Amazon.

The research also showed that waterfall-based nature tourism has the potential to generate significant economic benefits for Amazonian communities. However, for these benefits to be truly sustainable in the long term, it is essential to implement conscious and responsible tourism practices that avoid the degradation of ecosystems and promote a fair and equitable distribution of the income generated. This implies the development of a diversified and attractive tourism offer, including recreational activities, education, environmental awareness, as well as the active participation and empowerment of local communities in the management and benefits of tourism. Only through an inclusive and participatory approach will it be possible to ensure that nature tourism in the waterfalls contributes to the social, economic and environmental well-being of the Amazonian populations.

Furthermore, the preservation of waterfalls transcends their ecological and economic importance, as these sacred sites also hold deep cultural significance for the communities of the region. Waterfalls have been silent witnesses to the history, traditions and beliefs of the Amazonian peoples, and have served as inexhaustible sources of inspiration for local art, spirituality and folklore. The conservation of these natural environments not only contributes to environmental sustainability, but also ensures the preservation of the rich cultural heritage of the Ecuadorian Amazon. It is essential to recognize the relationship between nature and culture in these communities, so that we can work together to save this legacy for future generations.

In short, the waterfalls of the Ecuadorian Amazon constitute an invaluable natural and cultural resource that must be protected and used in a sustainable manner. To achieve this goal, it is necessary to adopt an integrated and multidisciplinary approach that combines the maximization of economic benefits for local communities, the implementation of responsible tourism practices and the valuation of their ecological and cultural significance. Only through participatory, inclusive management based on principles of sustainability.

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