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Impact of the Sustainable Environmental Investment Fund in the Insular Region of Ecuador. Case Study: Fund for the Control of Invasive Species of Galapagos (FEIG). Period 2021-2023

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When he asked heaven: "Lord! What shall I do with fear?"
I found answers in those who understood that just being there is purer.
To my father, because the sea of your love flooded my sight
when I stopped believing in myself.
To my great friends, who saved me without knowing it.

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My sincere thanks to my parents for their unconditional support,
to my grandmothers for giving me their tenderness,
to my teachers for their guidance and guidance,
and to my dear friends for supporting me and accompanying me in every step.
This is possible thanks to all of you.

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Glossary of Abbreviations

Abbreviations	Meaning
IDB	Inter-American Development Bank
BM	World Bank
BMD	Multilateral Development Banks
UNFCCC	United Nations Framework Convention on Climate Change
CO2	Carbon Dioxide
FAN	National Environmental Fund
FEIG	Galapagos Invasive Species Control Fund
FIAS	Sustainable Environmental Investment Fund
GEI	Greenhouse Gases
GIZ	German Society for International Cooperation
IKI	International Climate Initiative
KfW	State Development Bank of the Federal Republic of Germany
NDC	Nationally Determined Contribution
NASEM	National Academies of Sciences, Engineering, and Medicine
UN	United Nations
USAID	U.S. Agency for International Development

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ABSTRACT

This research work analyzed the impact of the Sustainable Environmental Investment Fund (FIAS) on biodiversity conservation in the insular region of Ecuador, taking as a case study the Fund for the Control of Invasive Species of Galapagos (FEIG) during the period 2021-2023. In a global context marked by the climate crisis and the accelerated loss of biodiversity, climate finance is positioned as a key instrument for the implementation of concrete mitigation and adaptation actions. The methodology used was the triangulation of data, integrating the literature review, case analysis and interviews with key actors, allowing an evaluation of the fund's operability. The results show that the FIAS has managed to channel resources efficiently, generating significant impacts on the projects analyzed, with immediate responses to biological threats, and, on the other hand, long-term scientific processes aimed at ecological restoration. In conclusion, this research demonstrates that environmental financing mechanisms are strategic tools to strengthen environmental governance and ensure the sustainability of fragile ecosystems such as the Galapagos Islands.

Keywords: biodiversity conservation, international cooperation, fragile ecosystems, climate finance, Galapagos.

Impacto del Fondo de Inversión Ambiental Sostenible en la Región Insular del Ecuador. Caso de Estudio: Fondo para el Control de Especies Invasoras de Galápagos (FEIG). Periodo 2021-2023

RESUMEN

El presente trabajo de investigación analizó el impacto del Fondo de Inversión Ambiental Sostenible (FIAS) en la conservación de la biodiversidad en la región insular del Ecuador, tomando como caso de estudio el Fondo para el Control de Especies Invasoras de Galápagos (FEIG) durante el período 2021-2023. Bajo un contexto global marcado por la crisis climática y la pérdida acelerada de biodiversidad, el financiamiento climático se posiciona como un instrumento clave para la implementación de acciones concretas de mitigación y adaptación. La metodología empleada fue la triangulación de datos, integrando la revisión literaria, análisis de caso y entrevistas a actores clave, permitiendo una evaluación de la operatividad del fondo. Los resultados evidencian que el FIAS, ha logrado canalizar recursos de manera eficiente, generando impactos significativos en los proyectos analizados, con respuestas inmediatas a amenazas biológicas, y, por otro lado, procesos científicos de largo plazo orientados a la restauración ecológica. En conclusión, la presente investigación demuestra que los mecanismos de financiamiento ambiental son herramientas estratégicas para fortalecer la gobernanza ambiental y garantizar la sostenibilidad de ecosistemas frágiles como las Islas Galápagos.

Palabras clave: conservación de la biodiversidad, cooperación internacional, ecosistemas frágiles, financiamiento climático, Galápagos.

INTRODUCTION

The ecological footprint that human beings have left on planet Earth has caused a significant impact that affects ecosystems and biomes globally, which has positioned the conservation of biodiversity, as well as the mitigation and adaptation to climate change, on the agenda of international cooperation forums, in search of collective solutions that curb a cross-cutting problem. In view of this, the international community has developed, for decades, norms, commitments and mechanisms that allow coordinated action between States and other actors, where climate finance is consolidated as a key tool to materialize such actions in strategic territories for conservation.(Connell et al., 2020)

This thesis analyzes the concrete actions that must be taken to guarantee the effective and transparent use of resources, considering that Ecuador, committed to its Nationally Determined Contributions (NDCs), has developed plans to channel environmental funds aimed at biodiversity conservation. In this context, the Sustainable Environmental Investment Fund (FIAS) takes center stage as a strategic financing mechanism, whose evolution responds to the need of the Ecuadorian State to consolidate an efficient and transparent structure aligned with international standards. Its creation, formalized by Executive Decree No. 146 in 2017, arose as a response to the dissolution of the National Environmental Fund (FAN) and is protected by the legal framework that articulated international cooperation, environmental public policy and private resource management, allowing the continuity of conservation projects and the strengthening of environmental governance in the country (Sustainable Environmental Investment Fund, 2021).

In this way, the ISAF not only acts as a resource manager, but also as a key articulator within the climate finance architecture, channeling funds from international cooperation towards specific interventions. This is crucial for a megadiverse country like Ecuador, where the protection of strategic ecosystems, such as the Galapagos Islands, is a global priority. Likewise, the existence of these funds is essential to guarantee the sustainability of projects, which, otherwise, could not be executed only with national resources, evidencing the importance of intergovernmental cooperation with respect to environmental management (Renteria et al., 2021). (Pedersen & Von Essen, 2025).

To measure the impact of the FIAS, the Fund for the Control of Invasive Species of Galapagos (FEIG) was taken as a case study, a specialized trust that operates under the umbrella of the FIAS, whose objective is to prevent, control and eradicate invasive species

in the archipelago, promoting the restoration of the affected ecosystems and guaranteeing the conservation of the island's biodiversity. This fund carries out its processes through the articulation of public actors, private and international cooperation, as well as the active participation of the community and co-executing entities, which makes it a model of collaborative governance. (Sustainable Environmental Investment Fund, 2021).

Within this research, two specific projects were analysed that allowed the action model and operation of the FEIG to be examined. On the one hand, the project for the control and early eradication of the opossum (Didelphis marsupialis), which was born as a response to an emergency derived from a direct threat to the island's biodiversity; and, on the other hand, the development of a biological control agent for invasive blackberry (Rubus niveus), which represents a long-term scientific approach oriented to research Both projects reflect different intervention strategies, one of an immediate nature and the other sustainable over time, so they are managed under different evaluation logics, with both qualitative and quantitative indicators. (Sustainable Environmental Investment Fund, 2019).

Methodologically, the present analysis is supported by data triangulation, which integrated the literature review, the case study and interviews, allowing the contrast of information from different angles, this allowed a more complete analysis according to the complexity of the study objective. This is because the impact analysis of the fund requires complex information, which transcends the quantitative approach, incorporating the examination of institutional dynamics, decision-making processes and integration among the actors involved. And, therefore, data triangulation makes it possible to validate information, reduce biases and generate more solid conclusions about the impact of the financial mechanisms analysed (Babbie , 2013).

Based on the above, the research analyzed how the FIAS, through the FEIG, affects the conservation of biodiversity in the Ecuadorian island region, evaluating its management capacity, the allocation of resources and the results achieved in the projects executed. The analysis of the case studies showed differences in the intervention approaches of both projects and for their evaluation, matrices were constructed with specific indicators applied to both cases, developing an analysis based on measurable results. In this way, both the advances and the limitations and threats in the execution of the financing were identified, evidencing the role of the FIAS in the management of resources and its impact on the protection of Ecuadorian ecosystems.

CHAPTER 1
THEORETICAL AND CONCEPTUAL FRAMEWORK

1.1 Climate Change and Biodiversity Conservation

The change in the earth's temperature is a process to which the planet has been subjected naturally throughout its existence. Although there are internal biological and oceanic processes that naturally regulate the concentration of greenhouse gases (GHG) in the atmosphere, the contemporary trend presents a dramatic acceleration due to human intervention Since the First Industrial Revolution, the increase in temperature, together with the problems inherently linked to this phenomenon, has manifested itself drastically as a consequence of the increase in GHG, mainly generated by human activities such as the burning of fossil fuels, livestock, agriculture, indiscriminate felling of trees, waste management, among others (Wang et al ., 2023). (Ministry of the Environment, 2021).

Such activities involve alterations in the energy fluxes associated with GHGs, which is known as *radiative forcing*. This phenomenon can be both positive, causing the earth's surface to warm, and negative, causing it to cool. According to the , the largest contribution to radiative forcing has been caused by the massive concentrations of carbon dioxide (CO2) accumulated since 1750, a period that boosted population growth thanks to technological advances that improve the quality of life, which highlights the direct relationship between climate change and the destruction of natural ecosystems as a result of human action. Ministry of the Environment , Water and Ecological Transition (2021)

Since the First Industrial Revolution, civilization has experienced accelerated progress driven by technological development. Currently, human beings are at a point of unprecedented synergy with machines, which has given rise to the historical stage called the Anthropocene, in which human activity is the main transforming force on the planet. However, this domain, supported by the advancement of applied sciences, has generated an erroneous perception of nature and its resources, assuming that they are inexhaustible, when in reality biomes and habitats are unique and impossible to replicate. This vision has led to massive resource extraction and the indiscriminate destruction of natural territories in the name of progress, regardless of the damage that, despite global efforts, is difficult to reverse.

The challenges to counteract the consequences of ecological deterioration have intensified, becoming increasingly difficult to face. Currently, several of its effects are increasingly complex to reverse, so humanity must adapt by implementing climate change

mitigation and adaptation strategies (. For this reason, the relationship between the climate crisis and the degradation of endemic ecosystems requires a technical response that has state support based on the principles of sovereignty and conservation. In this way, the protection of natural heritage transcends the strictly biological or tangible field and is consolidated as a multidimensional praxis that integrates political decisions, regulatory frameworks and the execution of strategic projects designed to achieve concrete results in the territory Paricahua , 2021) (Medina & Aguilar, 2024).

In coherence with this approach of state intervention and action, the conservation of biodiversity in the Galapagos Islands is crucial to maintain an environmental balance. In the island region, climate change and biodiversity loss are not an abstract threat, but a measurable reality through alterations in the oceanographic balance, such as temperature increase in the eastern sector and variations in salinity. Such disturbances, by interacting with ecosystems that operate in close symbiosis, require conservation to evolve from passive protection to adaptive and resilient management. Therefore, the sustainability of this heritage depends on international cooperation that prioritizes ecological shielding projects, capable of mitigating climate pressures and strengthening the resilience of its endemic species in the face of a constantly changing global environment (United Nations Development Program, 2019).

1.1.1 Fragile Ecosystems and Invasive Species

Ecuador has an exceptional ecosystem diversity, in which environments classified as fragile ecosystems stand out. Although the term may be ambiguous, it is disputed because of its low resistance to disturbances and its slow recovery from environmental changes. This vulnerability emanates from the dynamic complexity of its flora and fauna communities, which interact as a functional unit where processes such as predation and nutrient cycles maintain a delicate biological balance. As these are entities that operate in close deep biotic interdependence, any alteration, whether of natural or anthropological origin, can destabilize their intrinsic characteristics, turning them into territories that require prolonged periods for their restoration Nilsson and Grelsson (1995) (Silvana et al., 2019).

Fragile ecosystems provide essential services to guarantee the development of life; for example, the páramos act as water regulators and carbon sinks that absorb and store CO2 from the atmosphere. In the case of Galapagos, in addition to being a sanctuary that is home to more than 9,000 species of flora and fauna, its main function for environmental balance lies in climate regulation and the flow of ocean nutrients. This dynamic is possible thanks to

its strategic location at the convergence of the Humboldt and Cromwell marine currents, which drive the upwelling of nutrients from the seabed to the surface, allowing its food webs to be among the most productive in the world (Silvana et al., 2019).

One of the most recent crises in the Galapagos Islands is the introduction of invasive species, driven mainly by anthropogenic action linked to activities such as transport, trade and agriculture, which has generated high costs for human and animal health, in addition to impacting the social, economic and ecological spheres. It is estimated that, since the 17th century, invasive species have contributed to 40% of all mass wildlife extinctions due to habitat degradation and loss of ecosystem services. Although there are cases where the migration of species has been forced by natural events such as hurricanes or tsunamis, the problem lies in the fact that, lacking natural regulators, these species alter the structure of native communities. (Azuero et al., 2022) (Alulema et al., 2024),

Due to the relevance of these biological environments, it is essential to implement actions that protect them from factors that threaten their conservation, such as the crises of introduction of invasive species, whose impact is linked to their biological attributes, their interactions with native communities and characteristics of the invaded ecosystem. Critical cases include the invasion of the blackberry (Renteria et al., 2021) *Rubus Niveus*, or the spread of phytopathogens such as *Taphrina betulina* and *Moniliophthora perniciosa.*

In terms of fauna, several invasive species reduce native populations through competition and predation; cases such as the fire ant *Solenopsis Geminata*, the black rat *Rattus Rattus*, the wild cat *Felis Silvestris* and the opossum *Didelphis marsupialis (Alulema et al., 2024)* . stand outThese biological pressures highlight the vulnerability faced by island ecosystems and underscore that the proper management of these threats not only implies control and eradication, but also the integration of prevention, monitoring and early response strategies that guarantee resilience to future threats.

1.2 Evolution of the International Climate Regime

The evolution of the international climate regime finds its foundation in 1992 in the United Nations Framework Convention on Climate Change (UNFCCC). This instrument established the principle of common but differentiated responsibilities, recognizing that, although climate change represents a global problem, the response capacity and historical responsibility differs between countries. Therefore, the implementation of mitigation and adaptation strategies requires concrete projects that guarantee conservation, which must have

climate financing mechanisms, defined as the resources mobilized to address both the causes and effects of global warming. (United Nations, 1992). (Connell et al., 2020)

Faced with this scenario, the international community finalized the Kyoto Protocol, which set binding goals for developed economies and support mechanisms for developing nations. Subsequently, the Paris Agreement put Nationally Determined Contributions (NDCs) on the table, so that each State can define and implement its climate ambitions by adapting them to their different contexts. According to this new financing architecture, this new financing architecture aims to mobilize massive financial flows from countries of the North to nations that are in the global South, this process is not a mere act of cooperation, but represents a fundamental tool for common global well-being and the resilience of fragile ecosystems. Watson et al. (2018)

Despite the great advances in recent decades in climate matters, the architecture of international cooperation faces critical geopolitical challenges that slow down negotiations. An example of this was the COP 25 held in Madrid, where denialist positions and political tensions, particularly the temporary withdrawal of the United States under the administration of Donald Trump, compromised the integrity of the Paris Agreement. These diplomatic ups and downs show that the climate regime is not linear, but is conditioned by the internal agendas of world powers and the sovereign interests of each State. which generates a significant gap in the financing needed for effective climate action. (Abellán, 2021).

1.2.1 United Nations Framework Convention on Climate Change UNFCCC

In recent decades, the United Nations (UN) has shown great interest and concern about climate change. Since the 1970s, the scientific community has emphasized the need for immediate action to prevent irreversible damage to the earth. In 1979, the National Academies of Sciences, Engineering, and Medicine (NASEM) published a report explaining how CO2 emissions directly affected the climate and underscoring human responsibility for this increase (Perry, 1979).

However, the climate change research that revolutionized the scientific landscape was the work of Syukuro Manaba and Klaus Hasselmann, winners of the Nobel Prize in Physics in 2021. Their research provided the first quantitative estimate of global warming; this research allowed to project that, if CO2 concentrations double, the temperature would increase by approximately 2.36 °C. A figure that is closely related to contemporary climate estimates. (Forster , 2021)

Despite the concern of academia and the significant contributions generated on climate change, its solution depends on the willingness of the international community to cooperate. Fortunately, global mechanisms to mitigate the crisis were explored; one of the most important occurred in 1992 during the Earth Summit in Rio de Janeiro. At the United Nations Conference on Environment and Development, the UNFCCC was approved, which would enter into force in 1994. This legally binding document for States Parties establishes the Conference of the Parties (COP) as the highest authority responsible for adopting the resolutions necessary to ensure that the Convention is effectively implemented. Its main objective is the stabilization of GHG concentrations, under the principle of common but differentiated responsibilities between developed and developing countries. (United Nations, 1992)

It is important to note that there is an asymmetry of commitments between industrialized countries and developing countries, since on the one hand developed nations such as Germany, Belgium, Canada, the United States, Switzerland, Japan, France, among others, commit to reduce their emissions, present periodic reports on their progress and support developing nations through the transfer of technology and the creation of mechanisms that finance mitigation. Meanwhile, those developing nations, located mainly in Africa, Latin America and Asia, assume the responsibility of preparing national inventories of emissions, implementing adaptation and mitigation plans, participating in scientific cooperation and promoting national policies aimed at environmental conservation and sustainable development. (United Nations, 1992)

1.2.2 Kyoto Protocol

In 1997, the international sphere adopted the Kyoto Protocol after a long ratification that would lead to its entry into force in 2005. This agreement, which had the scientific endorsement of the Intergovernmental Panel on Climate Change (IPCC), built a legally binding instrument that committed industrialized countries to reduce their GHG emissions. The central objective was to prevent dangerous anthropogenic interference that compromises the climate system, establishing deadlines that would not compromise food sovereignty or the economic development of nations. (United Nations, 1998)

The Protocol focused the structure of its climate action on the principle of common but differentiated responsibilities, through which the signatory industrialized countries recognized their historical responsibility in the generation of emissions. In this regard, Article 10 formalizes that, while all Parties must contribute to the fight against climate

change, the priorities, capacities and specific development conditions of each State must be considered (United Nations, 1998).

To meet the targets, flexibility mechanisms were incorporated as tools to reduce emissions in a cost-effective manner. The first flexibility mechanism refers to Emissions Trading, based on the *Cap and Trade model*, a market system that establishes a maximum emission limit (*cap*) for each nation, translating this margin into transferable emission allowances. In this way, states that manage to reduce their emissions below the legal threshold generate a surplus of units that can be sold (*traded*) to countries that exceeded their maximum allowable quota. (United Nations, 1998).

Another flexibility mechanism, addressed in the document, is the Clean Development Mechanism (CDM), which fosters international cooperation through the implementation of mitigation and adaptation projects in developing countries, financed by industrialized nations in exchange for carbon credits. In this way, the fulfillment of international commitments is facilitated through the transfer of technology and economic incentives that promote environmental conservation and sustainable development of the recipient regions, marking a milestone in climate governance. Finally, according to Article 6 of the Kyoto Protocol, the Joint Implementation mechanism allows industrialized countries to invest in emission reduction projects in other states of the same category. This modality shifts mitigation to economies in transition, where lower operating costs are required. (Esteve Pardo, 2023) , United Nations (1998)

1.2.3 Paris Agreement

This Agreement was adopted in 2015 during COP 21 held in Paris, and entered into force in 2016 as a legally binding instrument under the UNFCCC. This document aims to limit the increase in the earth's temperature to below 2°C, promoting international cooperation efforts to restrict the increase to 1.5°C from pre-industrial levels. In addition, it establishes reviews every five years of national commitments through Nationally Determined Contributions (NDCs), these are defined as the sovereign climate commitments established within the framework of the Paris Agreement, which detail actions to limit the global temperature increase to 1.5°C, adapt to climate impacts and ensure sufficient financing for the ecological transition. (United Nations, 2015) (UNDP, 2023)

In a context of delegated responsibilities and progressive commitments, NDCs constitute a mechanism for each nation to define policies and plans that will lead them to

meet their GHG emission reduction goals. Ecuador presented its first NDC in 2019, aligned with the UNFCCC guidelines, which established goals aimed at reducing emissions in the industry, agriculture, land use and waste sectors. Subsequently, in 2025, its commitment was updated and strengthened through its second NDC, which focused on transparency and progressiveness. The Ecuadorian State adopted a comprehensive perspective that links sustainable development, the protection of biodiversity and social justice; fundamental elements for a megadiverse country that is highly vulnerable to the effects of climate change (Peterson et al., 2023) (Lechón, 2020) .

The Paris Agreement is built in such a way that every country, regardless of its socioeconomic status or structural limitations, can cooperate with environmental care, either through the mobilization of resources or the implementation of mitigation and adaptation projects. Consistent with this, Article 9 formalized international cooperation through the mobilization of climate finance resources by developed countries. Likewise, Article 10 promotes the transfer and development of technology, complementarily, Article 11 shows the approach for the promotion of development capacities, especially in small island States, so that they can adapt resilience measures, generating a transparent control framework with respect to climate objectives during the coming decades (United Nations, 2015).

Ecuador, as a signatory country of the Paris Agreement, committed to implement its own NDC, formalized through Executive Decree No. 840, signed on August 5, 2019. In this instrument, the national government proposed the creation of favorable conditions for the implementation of measures to reduce GHG emissions. The process of drafting the NDC was led by MAATE through a participatory process that included actors from the public, private and academic sectors, as well as civil society organizations and international organizations. through workshops, technical meetings and multisectoral dialogues. (Ministry of Environment and Water, 2019).

However, the commitments established need drivers of viability, and for this they need financing. Since, a part of the defined actions was classified into two categories, on the one hand, the non-conditional, financed with national resources; and on the other, conditional actions, which depend on access to external financing. This categorization of actions demonstrates that compliance with the NDC in Ecuadorian territory is inherently related to access to foreign financial cooperation, reinforcing the importance of financing mechanisms to materialize commitments to the international community (Lechón , 2020).

1.2.4 COP 29: United Nations Climate Change Conference 2024

The path towards sustainable development capable of facing the climate crisis, without compromising the advancement of civilization, is not the exclusive responsibility of a single nation, but represents a multidimensional challenge that encompasses economic, political and social needs that must be addressed by all international actors. In this regard, the executive secretary of the UNFCCC, Simon Stiell, stated during COP29, held in Baku, Azerbaijan, that "this new financial target is an insurance policy for humanity". This statement alludes to the establishment of the New Quantified Collective Goal (NCQG), which seeks to mobilize at least $300,000 million dollars annually for climate action in developing countries. This agreement will allow countries to enjoy the benefits of bold climate action, and its results will be visible only if, as with any insurance policy, premiums are paid on time and in full.

The annual COP summits are held with the aim of negotiating, consolidating and evaluating binding actions aimed at complying with the Paris Agreement. Based on the indicators and benchmarks established by the UNFCCC, the performance of Parties and progress towards meeting the fundamental objectives of the Convention are analysed. In this context, the first conference, held in Berlin in 1995, marked a milestone in the institutionalization of climate cooperation. His choice was no coincidence, as it symbolized the passage from an ideologically divided humanity to one that recognizes the need to act together in the face of a global challenge. Since then, COPs have pushed for measures to strengthen Annex I countries' commitments, with an emphasis on reducing greenhouse gases and protecting carbon sinks (United Nations, 2025).

Based on the above, COP29 reaffirmed that international cooperation and climate finance are not only support mechanisms, but must promote the articulation of multilevel efforts that implement the commitments assumed within the framework of the Paris Agreement, promoting dynamics of transformative change based on co-responsibility and mutual strengthening that guarantees global climate resilience.

1.3 Climate Finance Instruments

To achieve the goals of environmental conservation and GHG reduction through mitigation and adaptation projects, it is essential to effectively channel resources, technical capacities and various sources of financing. This process involves the coordinated participation of public, private, hybrid, and multilateral actors, as well as the existence of

regulatory frameworks and mechanisms that guarantee transparency and facilitate access to these resources. In this sense, climate finance is defined as the set of funds, both national and international, from the public or private sectors, aimed at promoting actions to address climate change through adaptation and mitigation strategies (GIZ Ecuador, 2021)

According to the UNFCCC, climate finance resources are intended to decrease emissions, strengthen carbon sinks, and increase the resilience of human and ecological systems to climate impacts. Among the main mechanisms are multilateral banking institutions, which, through loans, donations and technical assistance, channel investments towards sustainable development and environmental conservation projects. Thus, for these resources to generate tangible results, the interaction between international funds, bilateral schemes, public budgets and contributions from the private sector must be managed under enabling structures and frameworks that guarantee the transparency, accountability and long-term efficiency. (Watson et al., 2018).

1.3.1 Financial Architecture and Mechanisms under the UNFCCC

The global climate finance architecture is defined as the set of channels, institutions, and financial flows mobilized to pay for mitigation and adaptation actions to the impacts of climate change. To understand the operability of environmental conservation, it is important to identify the sources that make up the UNFCCC financial mechanism, which constitute the core of the Paris Agreement architecture. Under this structure, resources are managed by operational entities that respond to the guidelines of the Convention, highlighting the Green Climate Fund (GCF), as the largest pillar, the Global Environment Facility (GEF); the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). The Adaptation Fund (AF) also plays a critical role in financing projects in particularly vulnerable countries, under the supervision of the Adaptation Fund Board (Watson et al., 2022). (Watson et al., 2022).

1.3.2 Complementary Channels and Financing outside the UNFCCC

Unlike funds under formal UN governance, a significant portion of climate finance flows through channels that do not rely on UNFCCC guidelines, operating in a complementary manner. This category includes bilateral funds such as the International Climate Initiative (IKI), the German Society for International Cooperation (GIZ) or the United States Agency for International Development (USAID) and Multilateral Development Banks (MDBs), such as the World Bank (WB) and the Inter-American

Development Bank (IDB), which mobilize capital on a large scale through loans and grants. proprietary conditionality frameworks, allowing greater agility and the integration of non-conventional mechanisms (Ministry of Economy and Finance, 2025). (Watson et al., 2022).

In this decentralized scenario, the participation of the private sector acquires a strategic role through mechanisms such as the voluntary carbon market and the issuance of thematic bonds. From these dynamics, innovative instruments emerge such as biodiversity credits and blue carbon credits, which encourage the conservation of fragile ecosystems, especially island mangroves and marine habitats, under positive net gain standards verifiable by independent entities. These resources are key to closing the financing gap in megadiverse countries, by reducing exclusive dependence on state budgets and diversifying sources of financing (United Nations, 2023).

National environmental funds are consolidated as strategic instruments for translating international financial flows into concrete interventions at the territorial level. Thanks to its ability to link local priorities with global resources, it allows a more agile and adaptive response to emerging threats, strengthening operational management in specific contexts. By operating with greater flexibility, these mechanisms foster decentralized financial governance and promote the resilience of ecosystems and reinforce the role of national institutions in the stewardship and protection of their natural heritage.

1.4 Biodiversity Finance

Areas with high biological diversity are fundamental pillars of the global systemic balance and represent, at the same time, an economic base that requires sustainable management models. However, a critical financing gap, known as the biodiversity finance gap, persists, reflecting the disparity between the resources needed to halt nature loss and the funds currently available. Faced with this limitation, it is imperative to move beyond the exclusive dependence on public spending, incorporating innovative mechanisms for mobilizing resources that integrate multiple actors and sectors. In the case of Ecuador, the Sustainable Environmental Investment Fund (FIAS) and its specialized account, the Fund for the Control of Invasive Species (FEIG), are positioned as strategic institutional vehicles. These organizations are capable of channeling financial flows towards the mitigation of threats in highly fragile ecosystems, supporting the conservation of the ecological integrity of the Galapagos archipelago. (Pedersen & Von Essen, 2025).

According to the effective mobilization of resources for biodiversity, it is based on three main pillars: first, payments for environmental services (PES), which generate direct incentives for conservation; second, debt-for-nature swaps, which link sustainability with macroeconomic instruments; and third, specialized environmental funds, which operate under results-based schemes and allow private equity participation in exchange for certified environmental assets. This architecture not only diversifies sources of financing, but also introduces logics of efficiency, sustainability and co-responsibility between public and private actors. Pedersen & Von Essen (2025),

In this framework, the FIAS is understood as a specialized environmental fund of a financial nature that articulates resources of international, public and private origin, under results-oriented management schemes. Its structure, which combines equity, extinguishable and revolving funds, allows it to operate flexibly in the face of different conservation needs, while channelling investments towards strategic projects such as the EIGF. In this way, it is evident that climate finance instruments not only facilitate the execution of specific actions in the territory, but also configure a financial governance architecture capable of closing structural gaps and sustaining long-term conservation processes. (Sustainable Environmental Investment Fund, 2023).

1.4.1 Biodiversity Credits

Climate finance has evolved into biodiversity credits, defined as units of measurement that incentivize private investment with a net gain approach. Unlike traditional offsets, these credits pursue a cumulative positive impact through forest restoration, the protection of endangered species, and the restoration of degraded ecosystems. Their operability requires standardized measurement through metrics that classify biodiversity units, habitat condition, and water resources, ensuring a mandatory net gain of at least 10% in certain frameworks. regulatory. (Schwerdtner Manez & Clifton, 2025).

To meet these standards, a hierarchy of profit options is established that assesses the size, condition, and strategic significance of the habitat:

- **Absolute priority:** On-site *improvement*.
- **Second instance:** Off-site *improvements* through the private market of units.
- **Last resort:** Purchase of statutory biodiversity credits to finance national projects administered by the State (Pedersen & Von Essen, 2025).

1.4.2 Carbon Credits and Blue Carbon

Carbon credits are financial instruments that represent the reduction of one metric ton of CO2 from the atmosphere, functioning as an economic incentive to mitigate climate change. When this process occurs in marine and coastal ecosystems, then they are called blue carbon credits. These ecosystems, such as mangroves, seagrass meadows, and ocean archipelagos act as critical sinks, as they can capture and store carbon in their sediments much more efficiently and for a longer period than terrestrial forests. (Müller et al., 2025) (Schwerdtner Manez & Clifton, 2025b)

To ensure the integrity of these bonds, their implementation must follow a mitigation hierarchy and be based on rigorous metrics of biomass and organic carbon in sediments. The process works in a transparent way: conservation projects, such as those managed by the International Conservation Agency, are used by specialized organizations, which generate measurable results and are certified by entities under international standards, such as *Verra* or *Gold Standard*. These credits are acquired by private entities to neutralize their environmental footprint, allowing capital to be reinvested directly in the resilience of the islands. Thus, conservation ceases to depend exclusively on public funds to become an economically sustainable activity (Schwerdtner Manez & Clifton, 2025b)

CHAPTER 2
NATIONAL INSTRUMENTS AND CLIMATE FINANCE IN ECUADOR

2.1 National Policy Instruments for Climate Change Management

Environmental conservation is an issue that involves all nations, which needs immediate attention and response to meet the objectives of mitigation and adaptation to climate change. For this reason, international cooperation tools have been generated, such as the United Nations Framework Convention on Climate Change (UNFCCC), in which Ecuador, in 2019, presented its Nationally Determined Contribution (NDC), with clear goals and strategies that seek to reduce Greenhouse Gas (GHG) emissions and guarantee compliance with the Sustainable Development Goals (SDGs) for the period 2020-2025. in the areas established in the National Climate Change Strategy (ENCC). According to the provisions of Article 701 of the Regulations to the Organic Environmental Code, climate finance is defined as the set of financial resources and technical assistance with the aim of managing climate change (Presidency of the Republic of Ecuador, 2019) .

The United Nations Framework Convention on Climate Change establishes that financing for sustainability includes local, national and international resources, from public, private and alternative sources, aimed at promoting mitigation and adaptation measures against climate change. In this sense, climate finance encompasses both investment and technical assistance aimed at managing this phenomenon. For Ecuador to meet the goals established in its National Plan, it is essential to have the financial support of international cooperation, which guarantees the continuity of economic and technological resources. In turn, the public sector plays a key role in defining policies that ensure the efficient use of these funds, through adequate budgetary and economic planning. For this reason, the Ecuadorian government has established strategic climate finance actors in charge of managing and channeling these investments effectively (Presidency of the Republic of Ecuador, 2019).

The key entities for Ecuadorian climate financing are the Inter-Institutional Committee on Climate Change (CICC), in charge of the management and planning of intersectoral public policies for climate change through government and private sector axes, which works together with the Ministry of Environment and Water, responsible for developing and implementing environmental policy. Likewise, the Ministry of Economy and Finance

develops and implements economic policies for the management of public finances aimed at the sustainability and equity of the economy for its growth. The Technical Secretariat Planifica Ecuador designs planning and public investment systems, which are presented to the National Council to promote new public policies. Meanwhile, the Ministry of Foreign Affairs and Human Mobility, better known as the Ministry of Foreign Affairs, is responsible for implementing Ecuador's foreign policy and human mobility, maintaining national sovereignty abroad. Finally, there is the Sustainable Finance Working Group, which is a space that seeks to align measures and actions for the sustainability of financial resources (Ministry of Environment and Water; Ministry of Economy and Finance, 2021).

Each of these regulatory entities reflects what is established in the legal framework of Ecuador, thanks to its birth in the Constitution of the Republic, from which decrees, laws and policies are derived with the aim of implementing environmental projects and monitoring them for their effective management. This shows that the role of the public sector is not only focused on proposing guidelines, but also on including climate resilience criteria. Therefore, the Decentralized Autonomous Governments (GAD) fulfill the function of channeling and directing funds, both national and international, within their respective territories, in addition to keeping a record of financing and interventions that contribute to the construction of an information and accountability system of the country (Presidency of the Republic of Ecuador, 2019).

Ecuador has national climate finance instruments that have the necessary strength for the effective application of environmental policies. These instruments make it possible to coordinate the action of international organizations with public institutions and subnational governments, facilitating the management of projects aimed at sustainability, development and conservation of biodiversity. In addition, the State has institutions that are responsible for controlling the entities in the financial sector that manage financing. Within the executive sector, these are the Monetary and Financial Policy and Regulation Board; and on the side of the transparency and social control function, these regulatory entities are known as the Superintendence of Banks, the Superintendence of Companies, Securities and Insurance, the Superintendence of Popular and Solidarity Economy, the Deposit Insurance Corporation, the Liquidity Fund and the Private Insurance Fund. This commitment reflects a positive vision towards a future in which the country consolidates itself as a regional example in the construction of a sustainable and resilient economy in the face of climate change (Ministry of Environment and Water; Ministry of Economy and Finance, 2021).

2.1.1 National Climate Change Strategy ENNC

The National Climate Change Strategy, published in 2013 through Ministerial Agreement No. 95, seeks to ensure that financial and technological resources, both national and international, are used efficiently in the fight against climate change, through actions, measures and projects that promote economic, social and environmental sustainability. Likewise, monitoring resources is essential to know how much has been mobilized in recent years, considering that global climate investment has increased by 17% since 2013, reaching approximately 680. 000 million dollars. This amount has been contributed mainly by private investment entities and multilateral banks (Ministry of Environment and Water; Ministry of Economy and Finance, 2021).

To identify the amounts invested in the fight against climate change, mobilize resources effectively, and detect existing gaps to meet climate goals, Ecuador developed the Catalog of Climate Change Activities (CACC). This catalogue is made up of a list of 240 activities related to climate change, organised into 12 sectors and 41 sub-sectors. These activities are classified according to their scope of impact on climate change, to keep a clear and structured record of existing categories, and serves as a basis for creating future lines of monitoring of available climate finance. (Ministry of Economy and Finance of Ecuador, 2024)

2.1.2 National Climate Finance Strategy EFIC

The National Climate Finance Strategy (IFC) is a tool designed to promote the efficient use of resources allocated to the fulfillment of international commitments on climate change adaptation and mitigation. It aims to strengthen coordination between the public sector, the private sector and international aid partners, aligning their efforts with national development objectives and taking advantage of available climate finance opportunities. This instrument collects the perspectives of the different actors, as well as the gaps and challenges that need to be addressed in the document, in order to compile recommendations to drive more effective resource mobilization. To this end, a participatory process was created that included two main stages: the mapping of key actors and the holding of sectoral dialogues (Ministry of Environment and Water; Ministry of Economy and Finance, 2021).

In the mapping of actors, the entities involved in the mobilization of climate resources in the country were identified, as well as those that, due to their technical

knowledge, interest or capacity for advocacy, should be included in the process. This made it possible to establish a total of eight groups relevant to climate investment decisions: the central public sector, the subnational public sector, the financial sector, the private sector, multilateral organizations and cooperation agencies, civil society organizations, academia, and indigenous communities, nationalities, and peoples. Subsequently, sectoral dialogues were organized coordinated by the Ministry of the Environment, Water and Ecological Transition (MAATE) and the Ministry of Economy and Finance (MEF), with the support of GIZ, GFLAC and the Alliance for Sustainable Urban Development (ADUS), an entity that also acted as an overseer of the process (Ministry of Environment and Water; Ministry of Economy and Finance, 2021).

Subnational governments face significant financial gaps when trying to address the causes and consequences of climate change, as these actions often require additional investments not contemplated in their budgets. An alternative to cover these costs is to access climate finance, although this process presents several difficulties. To achieve this successfully, local governments must generate detailed information on their climate investments and efforts, assess their financial needs, strengthen their capacities in project formulation, identify potential sources of financing, and maintain constant communication with these institutions.

In addition, they must comply with the requirements set by the climate funds, such as transparent information management, the inclusion of environmental, social and gender safeguards, and continuous evaluation of results. One of the most important requirements to access these funds is to clearly demonstrate alignment with the country's climate and development goals, as well as commitment to increasingly ambitious impacts. This not only facilitates access to international resources, but also strengthens the resilience of communities and promotes climate-friendly sustainable development (Ministry of Economy and Finance, 2019).

2.1.3 Ecuador's Climate Change Adaptation and Mitigation Plan

In 2015, the UN established the Sustainable Development Goals (SDGs), which seek common well-being, hand in hand with environmental protection, poverty eradication, and ensuring equal opportunities, security and peace for all people by 2030. To this end, it is vital that each nation is committed, and that it integrates climate change mitigation and adaptation plans that take into account both regional and urban planning, with the aim of reducing GHGs, which are directly associated with the increase in temperature on the earth's

surface, in addition to increasing resilience to biodiversity loss through mitigation and adaptation programs and projects (United Cities and Local Governments, 2015)

Mitigation is understood as a set of actions aimed at reducing or, failing that, stabilizing the emission of greenhouse gases (GHG) in the atmosphere, as well as conserving and increasing natural carbon sinks, such as forests, oceans and soils vulnerable to climate change, in accordance with the country's emitting sectors. On the other hand, adaptation is defined as the measures adopted to reduce the vulnerability of human groups, flora and fauna to the impacts derived from the degradation of ecosystems.

In this context, Ecuador developed the National Plan for Adaptation to Climate Change (PLANACC), which came into force in 2019. Its main objective is to minimize the risk of climate disasters at the national level through capacity building, the implementation of sectoral and local actions, and the generation of information that facilitates the design of adaptation strategies. On the other hand, Ecuador's Climate Change Mitigation Plan (PLANMICC), in force since 2024, establishes goals related to clean and renewable energy, waste management, industrial processes, agriculture and land use, with the purpose of contributing to the reduction of greenhouse gases. (Ministry of the Environment , Water and Ecological Transition, 2021)

The sectors that receive a direct approach for the development of national mitigation and adaptation plans are: Food Sovereignty, Agriculture, Livestock, Aquaculture and Fisheries; Productive and Strategic Sectors; Health; Water Heritage; Natural Heritage; Priority Attention and Risk Management Groups. As for the mitigation line of action, it focuses on the sectors of Agriculture, Land Use and Forestry, Energy, Solid and Liquid Waste Management and Industrial Processes. Having well-defined sectors allows efforts to be directed towards the protection of natural resources, human settlements, the conservation of flora and fauna, and the promotion of sustainable development with low carbon emissions in Ecuadorian territory (Ministry of Economy and Finance of Ecuador, 2024).

2.1.4 Main Climate Funders in Ecuador

In Ecuador, climate financial instruments are in a process of constant evolution and development, characterized by relatively recent regulatory frameworks and a still evolving institutional structure. This condition has limited the existence of a large number of specialized funds; however, relevant mechanisms have been configured that operate as strategic tools for the channeling of resources destined for environmental sustainability. Among these is the Italian-

Ecuadorian Fund for Sustainable Development (FIEDS), which arises within the framework of bilateral cooperation between Ecuador and Italy as a result of debt conversion agreements aimed at financing sustainable development projects.

The FIEDS is structured as a financial mechanism that allows external obligations to be transformed into direct investment for initiatives that promote poverty reduction, productive sustainability and environmental resilience, aligned with the Sustainable Development Goals and national development priorities. Its management model prioritizes the articulation between public and private actors, as well as the implementation of projects in strategic sectors such as rural development, environmental management and productive innovation. . Through this logic, it not only channels financial resources, but also builds institutional capacities and energizes local economies through the generation of employment and the strengthening of sustainable production systems. (Italian-Ecuadorian Fund for Sustainable Development, 2018)

At the subnational level , municipal initiatives such as the Quito Environmental Fund (FAQ) stand out, aimed at promoting the environmental transformation of the Metropolitan District of Quito. This entity operates with administrative and financial autonomy, focusing on the sustainable management of natural resources, conservation, and climate action. Its work focuses on the mobilization and management of both national and international resources for the financing of environmental projects, programs and plans under participatory, gender and intergenerational approaches, incorporating social and environmental safeguards that guarantee the protection of the environment and the well-being of the communities involved. Since its creation in 2005, through Metropolitan Ordinance 0146, the Fund has financed initiatives that position it as a benchmark in biodiversity, sustainable mobility, responsible production and consumption, as well as in climate change mitigation and adaptation actions (Municipality of the Metropolitan District of Quito, 2018).

Considering the existence of these financial mechanisms, this research focuses on the analysis of the Sustainable Environmental Investment Fund (FIAS) as an investment instrument within the climate finance architecture in Ecuador. This approach involves examining their alignment with international standards, the degree of participation of local actors, and the levels of transparency and accountability in their management. The review of these elements allows us to understand how financial instruments not only channel resources, but also configure operational schemes that articulate economic, social and

environmental objectives, contributing to a more diversified climate financing structure adapted to the needs of the national context.

2.2. FIAS Sustainable Environmental Investment Fund

The FIAS is an environmental fund constituted under private law that acts as a key financial mechanism to address different environmental challenges in Ecuador. Its main objective is to support the financing of environmental management, with actions such as the reception, administration, mobilization, investment and execution of resources for the protection, conservation and sustainable use of natural resources, protection of biodiversity, mitigation and adaptation to climate change, in accordance with the Sustainable Development Goals (SDGs) of the 2030 Agenda that constitute a commitment to global harmony and development (Sustainable Environmental Investment Fund, 2020).

The fund is the result of the institutional and legal transition of the State in terms of environmental resource management. Its antecedents date back to 1996 with the creation of the National Environmental Fund (FAN), under Executive Decree No. 3409, published in Official Gazette No. 865 of January 18, 1996, this was an instrument focused on the channeling and administration of resources for the protection of the environment, which had the support of civil society, which was active between 2001 and 2016. After the provision of its capitalization in 1998 by the Ministry of Economy and Finance (MEF) and the Ministry of the Environment (MAE). The FAN was activated in 2001 with a government seed capital of 1 million dollars, combined with contributions from international funds from non-reimbursable cooperation, debt swaps (German Government), donations from international or national organizations and allocations from the State (Sustainable Environmental Investment Fund, 2021).

However, after 15 years of activity of the FAN, it was dissolved by Executive Decree No. 998 under the argument that its structure did not fully adhere to the current legal framework. Faced with the risk of losing the capital contributed by private international cooperators, the Ecuadorian government found it necessary to create a new mechanism that would guarantee the continuity of national conservation policies and implementation projects. Finally giving way to the consolidation of the FIAS under Executive Decree No. 146 in September 2017, giving it the status of Mercantile Trust, after receiving the approval of the evaluation commission of the German cooperation agency (Vallejo et al., 2017) *Kreditanstalt für Wiederaufbau* (KFW), which would make it officially begin its operations in 2018 with the due reforms (Resolution No. SCVS-INMV-DNNF-2018-00008344, 2018).

This leads to the financial strength reported by the FIAS, until 2021, a total equity of 126 was reported. 722.38 dollars, from traditional sources such as banks and multilateral funds, as well as bilateral assistance agencies, international non-profit organizations, public financing, and private sector financing, where the German Cooperation (KFW) is the largest contributor with 57% of the capital, followed by funds from Norway with 14%, the World Bank GEF with 10% of contributions and the Ecuadorian State with 9%. In addition, contributions made by organizations such as the Walton Family Foundation and the French Development Agency, among others (Sustainable Environmental Investment Fund, 2020)

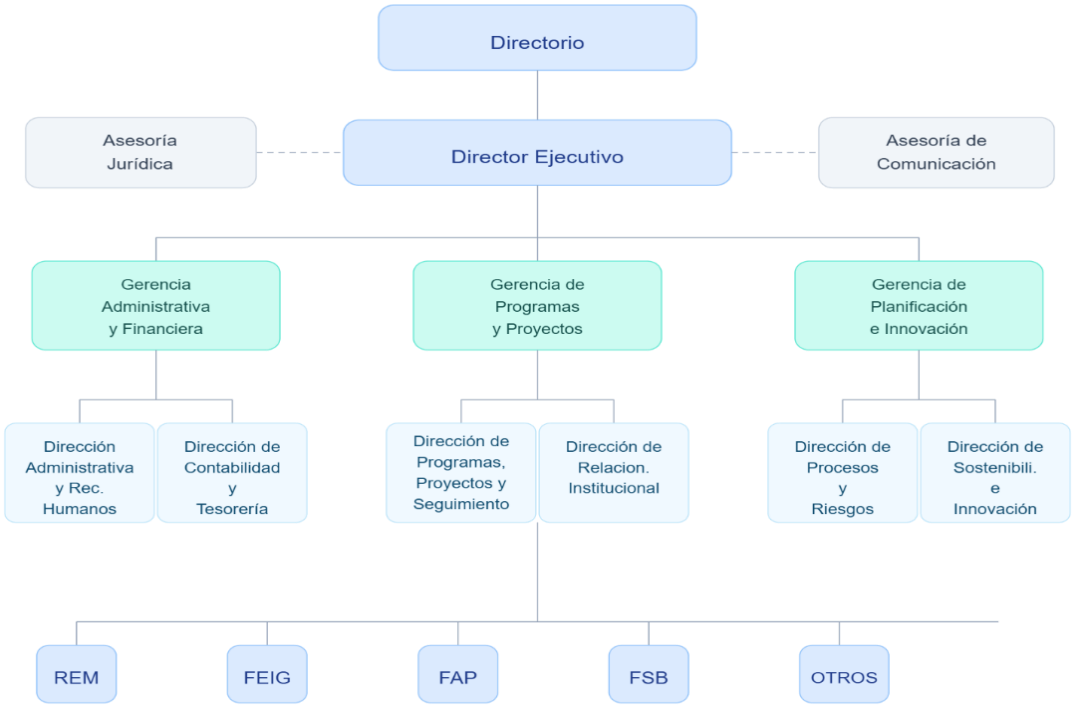
These resources are managed through three main types of funds: first, equity funds, which are contributions in perpetuity where only the returns generated are used to finance projects, so as not to affect the base capital; second, extinguishable funds, resources assigned to specific objectives with a defined schedule, where both the initial contribution and its returns are executed during the life of the project; and, finally, revolving funds, which consist of a reimbursable cash contribution for the fulfilment of objectives previously defined in an intervention. It is replaced every time 80% of it is used (Sustainable Environmental Investment Fund, 2023).

In its Strategic Plan, the ISAF identified a number of factors underpinning its institutional capacity. Among its strengths are its experience in the management of sustainable financing and the efficient management of resources, elements that give it a competitive advantage in attracting new funds from global donors and addressing priority issues such as sustainable development, adaptation to climate change and poverty reduction. On the other hand, the institutional diagnosis recognizes weaknesses that require the strengthening and innovation of communication strategies, in addition to the development of technical-administrative and financial capacities. These aspects can be optimized through the specialization of the technical team and the implementation of processes that strengthen the articulation with public and private actors, academia and international cooperation. Finally, it is proposed that internal strengths allow mitigating the threats of the environment through the innovation of the organizational structure, establishing value processes consistent with the institutional mission and vision. (Sustainable Environmental Investment Fund, 2020)

2.2.1 Structure and Functions of the FIAS

The FIAS has a structure established in its institutional action plan, which is regulated by an investment policy that allows decision-making as an efficient and transparent financial mechanism in the management of resources for environmental conservation in Ecuador. The structure designed to delegate strategic decision-making for operational execution is composed as follows:

Figure 1
FIAS Structural Organizational Chart



Note: Organizational chart generated in Claude IA, from the following prompt: "create a clean, modern organization chart" (2026). With information from the Financial Mechanism for Environmental Matters, by Sustainable Environmental Investment Fund, 2021, p. 15.

The executive management and leadership of the institution are the responsibility of the Executive Directorate, which is responsible for coordinating various operational areas and executing decisions approved by the Board of Directors. To fulfill its functions, this directorate has the strategic support of two direct advisory units: Legal Advice and Communication Advice, in charge of providing legal support and the management of the entity's image and public relations. At the highest hierarchical level, the Institutional Board of Directors is the highest governance authority, made up of delegates from state institutions, including the Ministry of the Environment, Water and Ecological Transition (MAATE) and the Ministry of Foreign Affairs and Human Mobility (MREMH), and they have voice and vote.

Within this body there is a differentiation of powers: the scientific advisor has voice and vote, while the representative of civil society and the observer of the international investment committee participate only with voice. This configuration is articulated with the internal audit function, which guarantees transparency, legality and technical rigor in institutional processes (Sustainable Environmental Investment Fund, 2021).

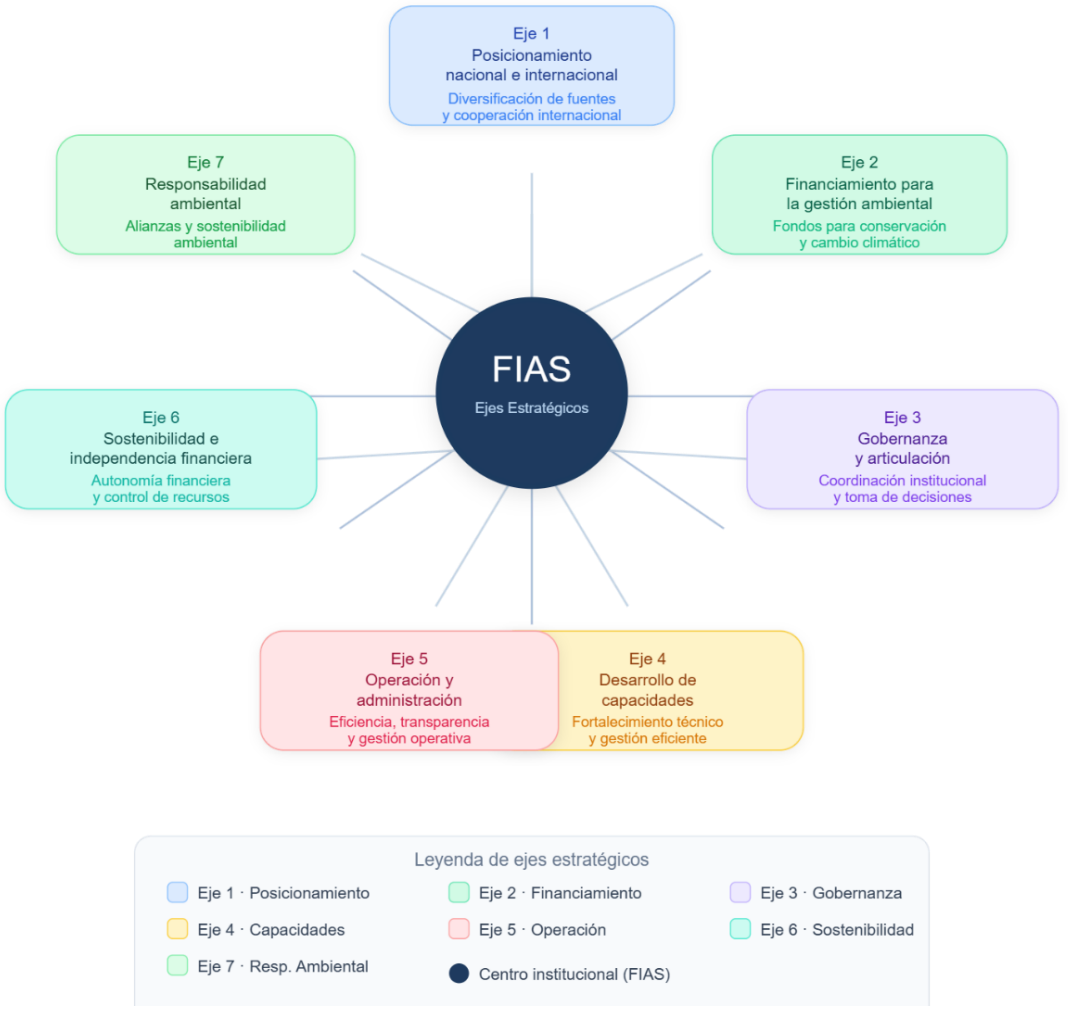
Continuing with the hierarchy, the structure is deployed in three fundamental operational pillars: first, the Administrative and Financial Management, which is responsible for the management of the human resources area, accounting and treasury, ensuring efficient administration of resources and compliance with internal regulations; second, the Programs and Projects Management, responsible for the technical direction and monitoring of its different projects, and for directing the institutional relationship; and third, the Planning and Innovation Management, which focuses on process management, risk assessment and the design of sustainability strategies, seeking innovative solutions for present and future challenges. Finally, under this institutional umbrella, the specific programs and funds administered by the FIAS are articulated, (Sustainable Environmental Investment Fund, 2021)

2.2.2 Strategic Axes and Implemented Actions

For the construction and organization of its planning processes, the FIAS took as a reference the Planning Guide for Environmental Funds of Latin America and the Caribbean and the Institutional Planning Guide of the Technical Secretariat Planifica Ecuador, technical documents that standardize the practices that environmental funds must adopt in order to structure their strategic axes. objectives, goals and indicators to have a harmony between transparency and efficiency. In order to meet the standards of efficiency and transparency, the FIAS constantly audits all its funds and projects. These reviews not only verify compliance with the operating rules, but also take into account the impact of other actors and factors on the institution's operations, which is why FIAS considers it vital to have results of indicators linked to the objectives of the interventions it develops and that determine its progress (Sustainable Environmental Investment Fund, 2020).

The seven lines of action that the entity developed, in coherence with its functions, are the following:

Figure 2
ISAF Main Lines of Action



Note: Graph generated in Claude IA from the following prompt: "Create a clean, modern strategic diagram that visually represents the seven strategic axes of FIAS" (2026). With information extracted from . (Sustainable Environmental Investment Fund, 2020, p. 18-22)

- **Axis 1. National and international positioning**: Diversify sources of national and international financing in the short and medium term through the use of patrimonial, extinguishable and revolving mechanisms, projecting their certification to new global, multilateral and bilateral sources. This goal is supported by the implementation of a relationship strategy for the mobilization of resources and the realization of new international cooperation agreements aimed at priority environmental interventions.
- **Axis 2. Financing for Environmental Management**: The FIAS seeks to manage financing complementary to that of the Ecuadorian State to combat climate change and promote the conservation of ecosystems. To this end, it is planned to increase its

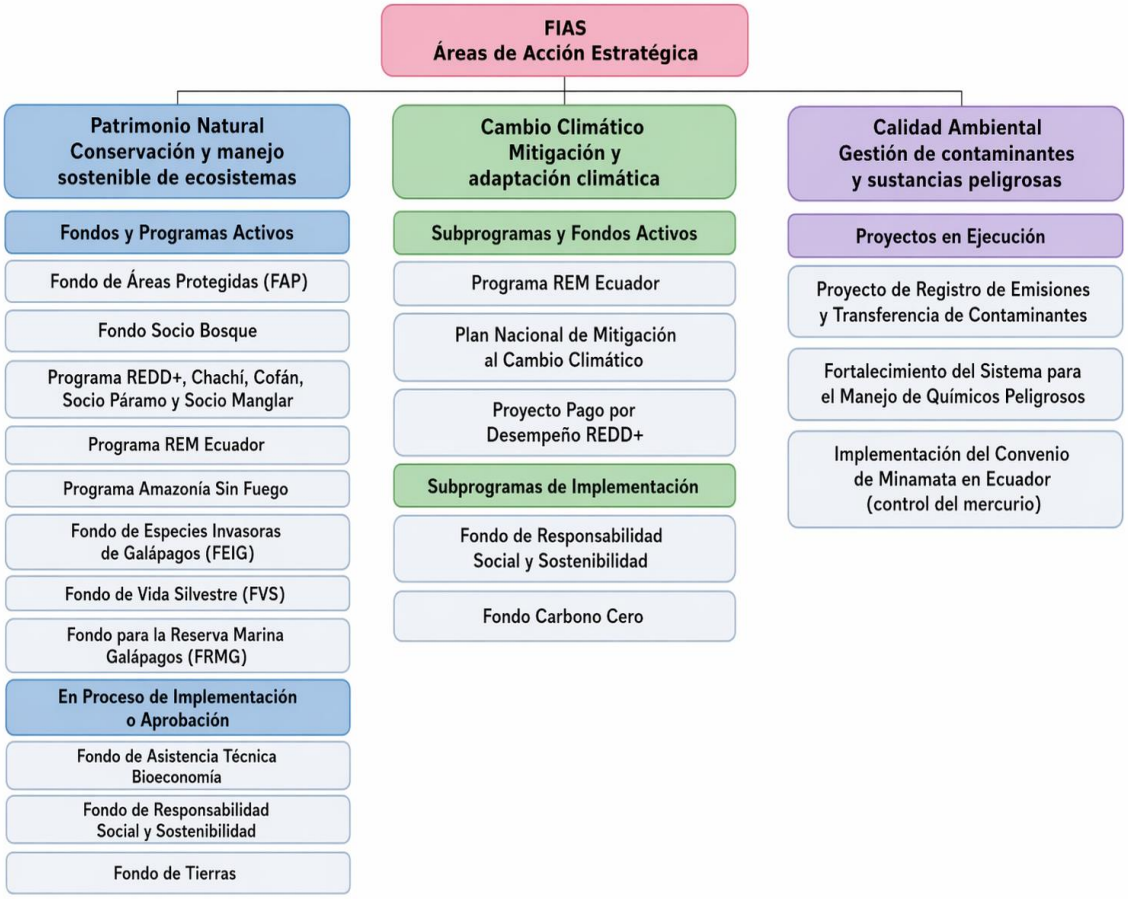
patrimonial funds and channel extinguishable resources towards prioritized interventions. Likewise, it is planned to administer three new initiatives that have innovative mechanisms, increasing protected areas and the restoration of their flora and fauna through sustainable financial incentives.

- **Axis 3. Governance and articulation**: seeks to consolidate the FIAS as a key articulator in the management of financing for national environmental priorities. To this end, the institution is committed to maintaining a solid governance that ensures at least 80% participation in the quorum of the Board of Directors. In addition, compliance with agreements and decisions taken by the said body, as well as by the control entities of the funds, programs and projects it administers, is guaranteed.
- **Axis 4. Capacity building and continuous improvement**: It focuses on strengthening institutional competitiveness to achieve sustainable financial management. The FIAS seeks to have technical and administrative teams specialized in negotiation, resource gathering and international standards. It also seeks to optimize its operation through a modern technological infrastructure and a regulatory framework composed of updated manuals and protocols. Finally, the institution prioritizes the mitigation of financial risks through prevention processes applied to investment and the management of the capital raised.
- **Axis 5. Operation and administration**: The FIAS seeks to position itself as a private entity of excellence in the management of environmental resources. The institution plans to improve its efficiency through computer tools for fundraising and project monitoring. In addition, it guarantees ethical and technical management by applying social, environmental and gender safeguards, along with an investment policy aligned with the market and supported by the cooperators. Finally, it ensures the transparency of its operations by complying with anti-corruption standards and conducting external audits whose results are public.
- **Axis 6. Sustainability and financial independence**: in order to ensure institutional viability in the maintenance of its operations and projects, the FIAS implements and reviews its financial plans every year, with rigorous control of the cash flow of both institutional resources and each project. In addition, it seeks to create financial mechanisms that allow it to autonomously cover at least 15% of its operating expenses.
- **Axis 7. Environmental Responsibility:** focuses on promoting social and environmental responsibility through collaboration with the private sector, academia

and civil society by consolidating alliances that promote green financing and environmental management. In addition, it is committed to promoting sustainable practices in the stock market, incorporating environmental criteria into its investment policy.

The FIAS has three areas of intervention, with actions through programs, funds and specific projects, which seek the conservation of natural resources within Ecuadorian territory, adaptation and mitigation to climate change and sustainable environmental management. (Sustainable Environmental Investment Fund, 2021)

Figure 3
ISAF Areas of Action



Note: Graph prepared with Claude AI, based on information taken from (Sustainable Environmental Investment Fund, 2020, p. 12).

- **Natural Heritage**: focused on the conservation and sustainable management of ecosystems, including the Protected Areas Fund (FAP), the Socio Bosque Fund, the REDD+ Programs, Chachi Cofán, Socio Páramo and Socio Manglar), the REM Ecuador Program, the Amazonia Sin Fuego Program, the Galapagos Invasive Species Fund (FEIG), the Wildlife Fund (FVS) and the Fund for the Galapagos

Marine Reserve (FRMG). Along with these, there are other funds in the process of implementation or approval, such as the Bioeconomy Technical Assistance Fund, the Social Responsibility and Sustainability Fund, and the Land Fund.

- **Climate Change**: This pillar promotes actions that support climate mitigation and adaptation through the REM Ecuador Program, the National Climate Change Mitigation Plan, the REDD+ Pay-for-Performance Project, the Social Responsibility and Sustainability Fund, and the Zero Carbon Fund, which are still pending implementation.
- **Environmental Quality**: This area executes projects aimed at improving the management of pollutants and hazardous substances, such as the Pollutant Emissions and Transfer Registration Project, the Strengthening of the System for the Management of Hazardous Chemicals, and the implementation of the Minamata Convention in Ecuador, aimed at controlling mercury.

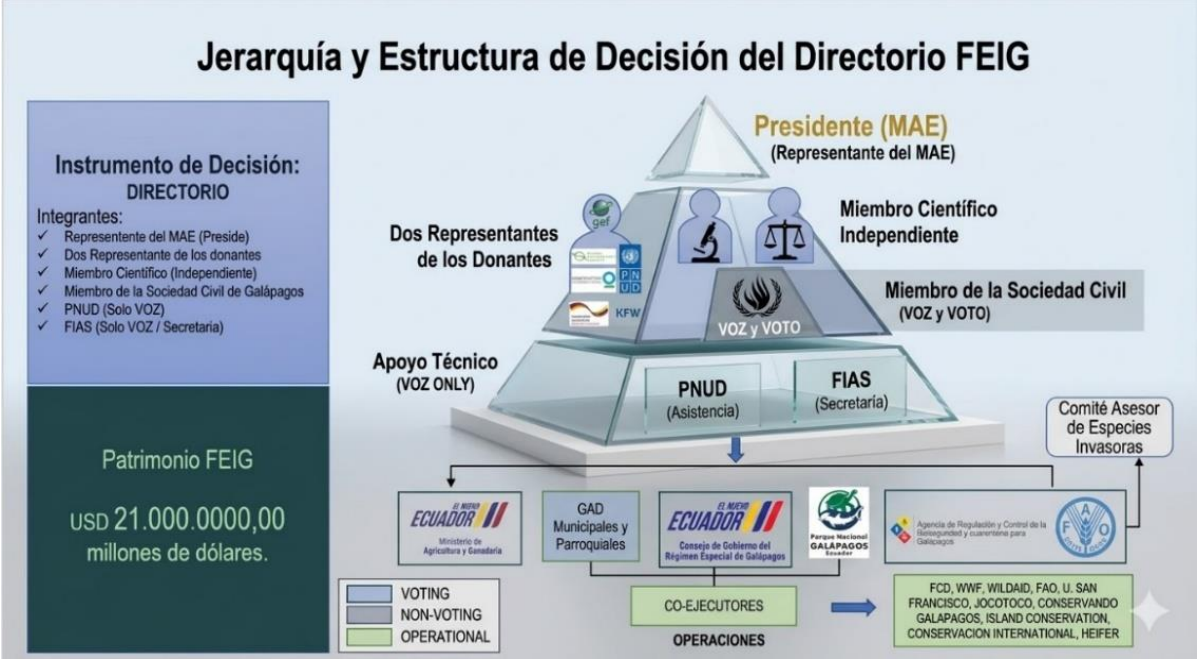
2.3 Fund for the Control of Invasive Species of Galapagos FEIG

The Galapagos Invasive Species Control Fund (FEIG) is a financial mechanism created to prevent, control and eradicate introduced species in the Ecuadorian island region. In addition, it promotes the restoration of affected ecosystems and encourages environmental education and communication, with the purpose of conserving biodiversity and guaranteeing the environmental and economic viability of local productive activities. This heritage fund was created in 2007, in response to the declaration of the Galapagos archipelago to UNESCO's list of World Heritage in Danger, and came into force in 2012. Since then, the EIGF has been a key tool for the protection and sustainable management of island ecosystems, ensuring the technical and financial coordination of actions aimed at maintaining the ecological balance of the islands. (Sustainable Environmental Investment Fund, 2021)

2.3.1 Objectives and Structure of the EGIF

The Invasive Species Management Plan for Galapagos (PMEIG) is the tool that establishes the guidelines of public policy in relation to invasive species. Its purpose is to conserve the ecosystems of the island region, promoting food sovereignty, health and sustainable development through inter-institutional planning that guides control actions. This strategy includes the coordinated participation of all actors involved in guaranteeing biosecurity and has the co-responsibility of civil society (Sustainable Environmental Investment Fund, 2020).

Figure 4
FEIG Hierarchy and Structure



Note: Graph prepared using AI (Google Gemini, 2026), based on a prompt aimed at representing the governance structure of the EIGF, based on the data collected based on data provided by the Sustainable Environmental Investment Fund, 2020.

The governance structure of the EIGF is organized through a Board of Directors as the highest decision-making body, made up of representatives of the Ministry of the Environment, Water and Ecological Transition (MAATE), who chairs it through a ministerial delegate, from the United Nations Development Program (UNDP); the Galapagos Conservancy; of an independent scientific member; a representative of Galapagos civil society, and FIAS, which acts as the technical secretariat. This composition reflects a collaborative governance model that articulates the leadership of the State with international cooperation, science and citizen participation, guaranteeing transparent and technical management in decision-making. (Sustainable Environmental Investment Fund, 2021).

The direct beneficiaries of the FEIG comprise key institutions in the environmental and territorial management of Galapagos, including the Galapagos National Park Directorate, the Agency for the Regulation and Control of Biosecurity and Quarantine for Galapagos (ABG), the Ministry of Agriculture and Livestock (MAG), the Galapagos Governing Council, and the municipal and parish Decentralized Autonomous Governments. Scientific and conservation organizations such as the Charles Darwin Foundation, Galapagos Science Center, Universidad San Francisco de Quito, Heifer Ecuador Foundation, Wolfs Company, World Wildlife Fund (WWF), Conservation International, Ecology Project International, WildAid, and Island Conservation, among others, also participate as co-executors, contributing technical knowledge and experience in the management of island ecosystems. (Sustainable Environmental Investment Fund, 2019).

Within the operational framework of the EIGF, various multi-year projects and small initiatives aimed at the management of invasive species and ecosystem restoration are implemented. Among the most relevant projects are: the development of an agent for the biological control of invasive blackberry (Rubus niveus), education for sustainability focused on invasive species, and the ecological restoration of Floreana Island through biosecurity measures and institutional strengthening. Likewise, integrated management programs of the parasite Philornis downsi, urban fauna control and empowerment of local farmers in invasive species control strategies are implemented.

Among the small initiatives are pilot plans for the control and monitoring of the algae Caulerpa chemnitzia, rodents in urban and rural areas, and the black fly (Simulium ochraceum) on the island of San Cristóbal. Together, these actions respond to the strategic objectives of the FEIG, which seek to provide a technical and operational instrument that facilitates the identification, formulation, execution, monitoring and evaluation of invasive species management projects, in coherence with the provisions of the Tripartite Agreement, its regulations and the Operational Manual of the FIAS, in its capacity as an administrative entity (Sustainable Environmental Investment Fund, 2019).

2.3.2 Case Study I: Action Plan for the Prevention, Management, Control, Early Eradication and Rescue of *Didelphis marsupilais* (Opossum).

The origin of the Action Plan for the Opsum (Didelphis *marsupilais*) arose as an emergency response to the detection of this marsupial that represents a severe threat to the island's biodiversity. The origin of this plan dates back to the need to articulate a biosecurity

strategy that prevents the definitive establishment of the species, which was introduced through logistical transport routes from the continent.

As background, the opossum is recognized for being a generalist and opportunistic predator that directly affects populations of marine and terrestrial birds, as well as endemic reptiles, through the predation of eggs and nests. Their presence in Galapagos is critical due to their high reproductive rate and ability to adapt to diverse habitats, which could destabilize the local food web. From a financial perspective, the funds for the implementation of this plan come from a mixed structure.

The FEIG allocated an initial budget of $118,818.48, which is complemented by a counterpart from the Agency for the Regulation and Control of Biosecurity and Quarantine for Galapagos (ABG) valued at $51,366.65, reaching a total investment of $170,185.13. The main objective is to establish a robust system of prevention, management, control and early eradication that guarantees the elimination of detected individuals and prevents new admissions. To date, the project has managed to structure a monitoring network and immediate response protocols. Projections indicate that, with an execution period of 36 months, it is expected to reach a detection rate close to zero in risk areas. The importance of this case lies in the fact that it demonstrates the effectiveness of environmental funds to mobilize resources quickly in the face of emerging biological threats, protecting the ecological integrity that underpins the islands' tourism economy.

2.3.3 Case Study II: Development of an Agent for the Biological Control of the Invasive Blackberry Rubus *Niveus* in the Galapagos Islands

The project for the biological control of the invasive blackberry (Rubus niveus) represents one of the most complex scientific challenges in the history of ecological restoration in Galapagos. This plant, native to South Asia, was introduced to the archipelago for agricultural purposes in the 1980s and, due to the lack of natural competitors, has become a pest covering more than 30,000 hectares, displacing emblematic species such as Scalesia pedunculata. The project was created in response to the failure of physical and chemical control methods, which are costly, laborious and environmentally aggressive in the long term. In this context, the search for a biological control agent, specifically a pathogenic fungus such as Puccinia sp, constitutes the main current line of research.

This initiative emerged as the only sustainable alternative to reduce blackberry density naturally and permanently. The financial architecture of this study is an example of multilateral international cooperation. The financing is channeled by the FEIG/FIAS, with a

significant investment that exceeds $433,000.00 for the research and specialized consulting phases. The objectives focus on identifying a pathogen that is highly specific, conducting safety testing in high-security laboratories in the United Kingdom (CABI) and field experiments in China to ensure that there are no risks to native species or economic crops.

So far, the project has made progress in molecular sequencing and in identifying promising strains of the fungus in its place of origin. It is expected that, after complying with rigorous regulatory frameworks, the agent can be released, achieving a systematic reduction in blackberries and allowing the regeneration of native forests. This case is central to the thesis, as it illustrates the transition towards market mechanisms and biodiversity credits, where investment in disruptive science and technology generates a cumulative positive impact on the resilience of the island ecosystem.

CHAPTER 3
METHODOLOGY

This chapter details the methodology used for the development of this work, closely linked to the research question: What is the impact that the Sustainable Environmental Investment Fund (FIAS) has generated in the Galapagos Islands during the years 2021-2023? This question will be addressed through the data triangulation technique, which integrates various sources and methods of information collection necessary for the analysis that includes literature review. Likewise, the case study will be used, which will allow the results of the impact of the funds in the island region to be pointed out. Finally, semi-structured interviews with the authorities responsible for the FIAS and the FEIG will be included, with the purpose of obtaining direct, truthful and substantial information for this research. In this way, it seeks to offer a deeper and more reflective vision of the dynamics, limitations and opportunities presented by climate finance in the management of local projects.

3.1Data Triangulation

Data triangulation is a methodological axis based on this research, since it allows integrating and contrasting information from various sources in order to strengthen the validity and rigor of the analysis. Three complementary dimensions were taken into account in the research: literature review, which provides theoretical and conceptual support; case studies, which take data from the operational reality of projects carried out in the island territory; and semi-structured interviews, which incorporate the perspective of people involved with the FIAS and FEIG. In this way, the convergence of these edges not only reduces the biases inherent in each method, but also allows for the construction of a comprehensive and critical understanding of environmental backgrounds (Babbie , 2013).

3.1.1 Literature Review

The literature review constitutes an essential component to understand the origin of the topic and the state of available academic knowledge. In this phase, the main objective is to deepen previous research related to international cooperation, local environmental governance and climate finance, both globally and in Ecuador. To this end, a large volume of information from scientific articles, institutional documents, reports of the Ministry of the Environment, publications of international organizations such as the United Nations Development Program (UNDP) and technical reports issued by the FIAS were analyzed. This work is not limited to the collection of data or theories, but involves a critical evaluation

of existing studies to identify knowledge gaps and justify the relevance of the research. . (Babbie , 2013)

Most research on climate finance is carried out at global or national scales, which has made it possible to consolidate regulatory frameworks and agreements that last over time and transcend borders. A rigorous review also facilitates the conceptual organization of the study by allowing the articulation of theories, approaches, and categories of analysis. In this case, this process was decisive in building the theoretical framework that guides the research, integrating perspectives of environmental governance, climate finance and sustainable development. It also made it possible to clearly define the analytical categories and select the most pertinent information to address the study problem. (Robson, 2016)

3.1.2 Case Study

The case study is adopted as the main methodological axis due to its ability to gather and analyze information from different sources such as institutional reports, regulations, interviews and technical data, allowing a deep and contextualized understanding of the phenomenon under investigation. This approach is especially appropriate when studying complex and situated processes, such as the management of climate finance in highly vulnerable ecosystems. Within the framework of this thesis, the case study offers a pertinent way to examine in detail how the financing destined to the FEIG is administered and executed, to identify the institutional dynamics, management mechanisms and challenges that condition its operation in the archipelago. (Robson, 2016).

Likewise, this methodology makes it possible to analyse the operation of the EIG within its real environment, allowing us to observe how financial resources, the actors involved and the environmental particularities of the island territory converge. Through the triangulation of information, it is possible to compare and contrast evidence that reveals the way in which the projects are implemented, the degree of inter-institutional articulation and the results achieved in terms of control and management of invasive species. In this way, the case study approach not only describes the performance of the fund, but also incorporates a critical perspective that allows evaluating its effectiveness and its contribution to the conservation of biodiversity in Galapagos, offering inputs to understand its advances, limitations and opportunities for improvement.

3.1.3 Interviews

The interview can be understood as a conversation oriented to a specific purpose that goes beyond the simple verbal exchange. It is a fundamental tool within qualitative research, as it allows direct and detailed information to be obtained from key actors. This type of technique includes various modalities, among which the semi-structured interview stands out due to its flexibility, dynamism and non-directive nature. Its application involves a careful elaboration of questions and requires an interpretative process that allows the answers to be understood and contextualized. Given its versatility, this technique is widely used in fields such as medicine and education, demonstrating its effectiveness for the collection of information and data (Laura et al., 2013).

Interviews with the authorities of the FIAS and the EIGF are essential within this research because they allow access to direct, updated and contextualized information on the management of climate finance in Galapagos, something that cannot be obtained only through official documents. As it is a study focused on understanding the institutional functioning, the mechanisms of resource allocation and the real progress achieved between 2021-2023, the semi-structured interview becomes the most appropriate tool, as it offers flexibility to delve into key issues and clarify aspects that only those who administer the fund can explain. Through these purpose-driven conversations, it is possible to interpret decisions, identify operational challenges, and learn about the internal logic that guides the implementation of the EIGF. In this way, the interviews not only complement the documentary review and the case study, but also provide an indispensable qualitative perspective to evaluate the effectiveness of both funds in the conservation of island biodiversity.

CHAPTER 4
ANALYSIS AND DISCUSSION OF RESULTS

4.1 FIAS Analysis

The following section analyzes the results obtained through data triangulation, in which sources of bibliographic review and official documentation of the FIAS were contrasted with information related to the organization and case studies of the FEIG addressed in this research. Likewise, these findings were contrasted with interviews conducted with three FEIG technicians and two FIAS administrative officials, adding up to a total of five interviewees, allowing a balanced analysis and objective contrast.

4.1.1 Structure, Role and Functions of the FIAS-FEIG

Within the framework of climate finance, the FIAS and the EIF compose an institutional model that allows international financial flows to be translated into concrete conservation, adaptation and mitigation interventions within highly vulnerable Ecuadorian territories such as the island region. Far from operating as an executing entity, the FIAS fulfills a role of financial channeling, oriented to the capture and administration of resources from international cooperation, public and private entities, to this an informant affirms that: "we (FIAS) have a structure of private law, but with a Board of Directors that is chaired by the Ministry of the Environment (...) this ensures that the funds are aligned with national policy" (E2). This articulates a space of convergence that generates sustainability, innovation and capacity building for environmental management, taking into account Ecuador's environmental objectives and commitments. (Sustainable Environmental Investment Fund, 2021)

As one of the operational actors points out: "the FIAS is the one that administers the resources of the FEIG fund, those resources are taken and channeled to make it work (...) we are the operational unit of the FEIG (...) we have to land the decisions of the board of directors in the territory" (E1). This statement allows us to understand that the FEIG does not constitute an autonomous entity with respect to decision-making, to which another operational technician adds that: "many of the tools (...) they have to be approved by the board, and that will obviously depend on how quickly (...) the board has" (E3). Demonstrating that there is a structural separation between financing, in which FIAS administers the resources and its board defines the guidelines, and, on the other hand, the FEIG corresponds to an operational unit in charge of landing these guidelines in the island

territory, channeling resources towards the management of invasive species in coherence with its guidelines established in its action plan (Sustainable Environmental Investment Fund, 2021)

Based on the evidence collected in the interviews, the role of channel and financial administrator of the FIAS is also materialized in its ability to generate trust among cooperating partners through transparent control and management of the use of resources, which guarantees the continuity of financing beyond political cycles. According to one interviewee, he says that: "German cooperation (KfW) has been one of the most important contributors, due to its stable commitment to conservation within Ecuador (...) because the FIAS offers that structure of transparency that donors are looking for" (E1), raising awareness of the importance of cooperation with European countries.

For its part, the FEIG as an operational and thematic trust is not only limited to executing resources, but also to the coordination of the technical and operational area of the projects supported by the authorized co-executors, as one of the participants points out: "we (FEIG) are beneficiaries of that fund (FIAS) (...) for the management of invasive species (...) we are in charge of delegating co-executors so that the projects approved by the board of directors so that the initiatives are carried out in the best way" (E4). Thus, its effective action depends on joint and coordinated work to guarantee the success of the project in the benefited territories.

The functions of both the FIAS and the FEIG focus on three major fields of institutional action: natural heritage, climate change and environmental quality. In the specific case of the FEIG, its action is mainly concentrated on the natural heritage axis, although it maintains a transversal relationship with the other areas by contributing to ecosystem resilience and climate adaptation. According to the Strategic Plan of the , this vision is supported by the interviewees, who agree that the fund has evolved towards a more strategic model: "it is no longer just financing, but ensuring that the projects have impact and continuity in the territory" (E5), similarly, another interviewee states that: "the FIAS not only executes a project that is from start to finish and that lasts from 3 to 5 years, but as here we have patrimonial funds that is in perpetuity and is very long-term (...) very few organizations or implementing agencies offer you the same, which is to implement a project with the sustainability component that FIAS has" (E4), demonstrating that the organization allows articulating different levels of duration, types of trusts, intervention, and involving

different local actors, scientists and public entities in the same work scheme. Sustainable Environmental Investment Fund (2020)

However, although the governance model of FIAS and FEIG shows a solid and defined structure, its operability is conditioned by factors such as the agility of the board of directors to make decisions and the internal institutional dynamics and that of the public sector as mentioned by one interviewee: "decisions are affected by changes of authorities and institutional restructuring (...) in fact, we just had the last crisis a little while ago with the change of the Executive Board" (E5), to which another participant added that: "many of the tools (...) they have to be approved by the board, and that will obviously depend on how quickly and willing the board is to meet" (E4). Making it clear that, despite the fact that these institutions have planning, parameters and contingency plans, the projects will always be at the mercy of internal agility and that of the public sector.

In reference to the scenario of the merger by absorption of the Ministry of the Environment, Water and Ecological Transition to the Ministry of Energy and Mines, decreed in August 2025 by the administration of Daniel Noboa, an informant stated that: "it is still a bottleneck, the fact that there is so much rotation in the Ministry (...) its merger has generated complexity in operation, both in terms of time and attention (...) the team has taken the initiative to generate a Board of Directors that already commits an approximate budget for the following year, to generate disbursements and calls" (E4), this shows an operational obstruction since the Ministry of the Environment presides over the Board of Directors. And despite this, they have been able to develop a contingency plan for this situation, and although the model faces structural limitations due to instability of institutions and public bureaucracy, they have been able to demonstrate resilience in the face of these political and administrative changes.

4.2 Lines of Action Implemented for the Conservation of Biodiversity

Table 1

Indicator Comparison: Possum Project and Mora Project

Indicators	Possum Project	Mora Project
Geographical Scope	Santa Cruz Island, with emphasis on intervention areas identified as agricultural areas and critical points of entry and dispersion of invasive species.	Santa Cruz, San Cristobal and Isabela Islands, in areas invaded by blackberries within the Galapagos archipelago.
Type of entity handling the project	Entities in charge: • Agency for the Regulation and Control of Biosecurity and Quarantine for Galapagos (ABG). • Galapagos National Park Directorate (GNPD). • Governing Council of the Special Regime of Galapagos (CGREG). Type of entity: National Executing Entities (Public).	Technical assistance entities: • Centre for Agriculture and Bioscience International (CABI). Con sede en UK. • Co-executing entity: Charles Darwin Foundation CDF (Belgium). National Public Executing Entity: MAATE/DPNG.
Beneficiary	• 3,000 hectares were covered. • A total of 311 individuals were identified.	• Charles Darwin Organization Technical Group: approximately 40 people trained. • 5,000 hectares were studied.
Type of financial/technological resource	• Non-reimbursable financing. • From bilateral cooperation (mainly Germany – KfW). • Channelled through the FEIG.	• Non-reimbursable financing. • From multilateral cooperation (United Kingdom, Belgium) → Technology Transfer (China, Pakistan). • Channelled through the FEIG.
Capital Contributed (Allocated Budget)	Initial FEIG budget: $119,985.80 • Year 2021: $0 (project planning). • Year 2022: $114,740.63. • Year 2023: $4,017.44.	Initial FEIG budget: $750,000.00• Year 2021: $169,597.16. • Year 2022: $161,774.27. • Year 2023: $149,020.36.
Capital Used/Spent (Execution)	Estimated execution (2023 Reports): Total, execution: $118,758.07 % of execution: 99% FEIG Balance: $1,227.73	Estimated execution (2023 Reports): Total, execution: $610,598.17 % of execution: 81% FEIG balance: $139,401.83
Proposed Objectives	1. Implement a monitoring and early capture network. 2. To determine the population density in Santa Cruz. 3. Establish biosecurity protocols to prevent the spread of the species.	1. Identify a specific pathogen (Puccinia sp.). 2. Validate environmental safety (verify that it does not affect native species). 3. Replace chemical control with biological control.
Objectives Met	1. 100% execution of planned sampling hours. 2. 100% morphometric characterization of captured individuals. 3. 75% capacity building of the ABG.	1. 100% strain identification in China. 2. 80% in molecular specificity tests. 3. Active field phase in international quarantine (in process).
Technology Transfer: Soft, Hard and Disruptive Type	Mixed: Soft: Strengthening the capacities of human talent, implementation of technical eradication protocols and biosecurity logistics management. Hard: Deployment of technical infrastructure, field monitoring equipment, and physical control tools. This combination ensures that the ABG not only receives inputs, but also develops the institutional technical capacity to sustain long-term control of the species.	Mixed and Disruptive: Dura: Laboratory equipment and materials for molecular studies. Soft: Protocols for biological control, plant pathology and transfer of scientific knowledge from CABI to local staff. Disruptive: Development of a biological pathogen (natural bio-

	herbicide) to replace the use of chemicals.

Note: Prepared by the authors with the support of artificial intelligence (Claude), based on data from official reports of the FIAS and the FEIG, 2020–2023.
The traffic light in "Capital Used" and "Objectives Met" reflects the level of progress: green = met/high, yellow = in progress/medium, red = slope/low. Prepared by the author based on 2023 FEIG reports.

The comparison of both FEIG projects, presented in Table 1, shows that each responds to different approaches; on the one hand, the Zarigüeya project is focused on an immediate response intervention to an emerging threat in the territory, which can be measured thanks to the number of individuals captured and hectares covered, and, on the other hand, the Mora project that focuses on long-term scientific research, which measures its level of success through the cooperation of national and international actors in the discovery of a biological agent that combats the propagation of the species. This differentiation highlights the ability of the EIF to prioritise and classify initiatives, managing funds and resources from international, private sector and public sector cooperation with the necessary agility to guarantee the success of the projects.

In this sense, according to a respondent, the fund operates under a clear distribution rule: "80% of the FEIG's budget is allocated to projects and 20% to administrative expenses and monitoring" (E2), which reinforces the evidence of the strategic allocation of resources in order to maximize their impact on the territory. From the point of view of the literature, this duality of addressing the conditions of each project responds to what has been proposed by , who argue that the architecture of international climate finance must be adapted to the different levels of intervention, combining immediate actions in the face of emerging threats with long-term solutions. Watson et al. (2022)

Regarding the financing of each, an administrative official of the FIAS asserted that the transition of the Zaposüeya project from a category of emergency initiative to a heritage project does not respond to a unilateral decision of the FIAS, but to an evaluation process created by the EIG, in which both its Board of Directors and its Scientific Technical Committee intervene: "After having all the diagnosis clear, the decision of the Fund is defined and consulted if it is worth modifying its financing (...), we accompany, but really there is one more management of the Fund and of the people who make it up, who are the ones who implement it and also of the beneficiary institutions. There is a lot of respect for what they have been consulting and postulating" (E5).

Regarding how the emergency trust was managed, one interviewee pointed out that: "when a possible threat was identified (...) the minister can activate 30,000 dollars without any restriction (...) in two days we already have the money" (E2). This mechanism made it

possible to finance monitoring, capture and control actions that resulted in the elimination of approximately 300 individuals, with no recent records of new sightings.

With respect to the Mora project, a completely different dynamic is being handled. As it is an invasive species consolidated in more than 30. 000 hectares and introduced decades ago, control strategies require long-term research processes. A project technician points out that: "arrears are a problem that has been going on for decades (...) there is no institutional framework that has the resources to control the entire territory" (E2). In view of this, the interviewee commented that: "the FEIG has funded research aimed at the development of a biological control agent, in collaboration with international institutions" (E1).

Unlike the Zarigüeya project, whose impact is measured through specific operational indicators such as: number of individuals captured or hectares intervened, the Mora project has a completely different evaluation logic, based on the progressive advancement of scientific knowledge and experimental validation. In this case, the results are not expressed in terms of immediate eradication, but in research milestones such as the identification of strains, the discarding of genetic hypotheses and the consolidation of international cooperation networks.

As pointed out in one of the interviews, the biological complexity of the blackberry, its high capacity for regeneration and dispersion, as well as the lack of natural control mechanisms in the island ecosystem, make its management unfeasible by traditional methods, which forces us to look for structural solutions from science. In this context, the research process has involved missions in China, Pakistan and India, comparative molecular analyses and experimental tests that, although they have not yet led to the definitive identification of a biological agent, constitute fundamental advances within the scientific logic of the project.

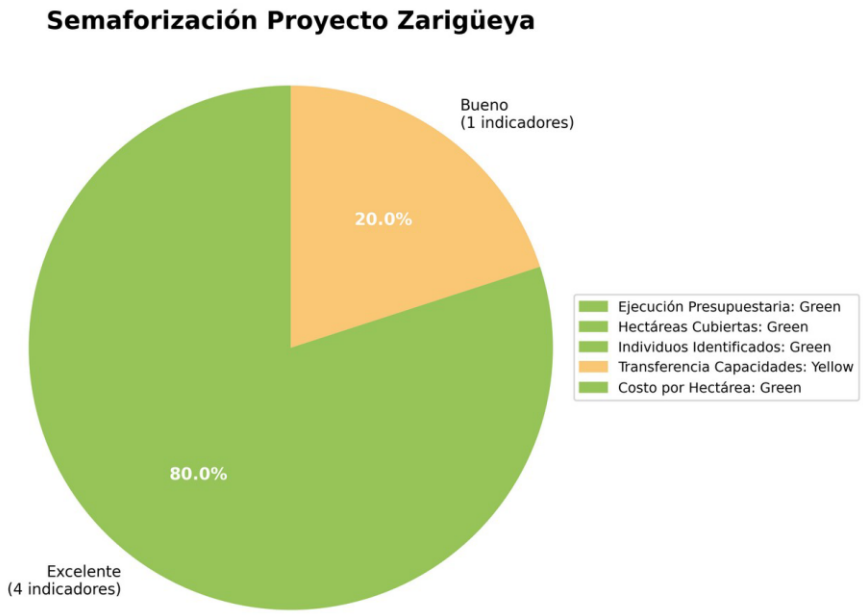
From this perspective, an FEIG technician emphasized that "although they have not found the biological agent, everything done is an advance for knowledge" (E1). This shows that the value of the project does not lie only in its final result, but in the cumulative process of generating evidence. In turn, this approach was supported by another interviewee who points out that: "the EIF has evolved towards a model that prioritizes projects with high potential for learning and transfer of skills, beyond immediate results" (E3). Consequently, the project of the arrears reflects a different financing logic within the FEIG, where success is not measured by the speed of execution or territorial control, but by the ability to sustain

complex scientific processes over time. This shows that the fund not only finances operational interventions, but also high-risk technical commitments that seek structural solutions to persistent ecological problems, consolidating its role as a climate financing mechanism aimed at innovation and long-term sustainability.

4.2.1 Impact of the FIAS on Biodiversity Conservation in the Galapagos Islands

The impact of the FEIG, a trust that is under the umbrella of the FIAS, within the period 2021 to 2023, has been measured in two types of projects, which manifest their results in a differentiated but complementary way at two levels. On the one hand, a tangible, immediate and quantifiable impact is identified; on the other, a structural impact associated with the generation of knowledge and technical capacities that sustain future interventions.

Figure *5*
Traffic lights Project Zapossum



Note. Traffic light of the Zapossum Project based on performance indicators (budget execution, coverage, identification of individuals, transfer of capacities and cost per hectare) during the period 2021–2023. Elaboration with the support of artificial intelligence (Claude) based on the analysis of data obtained from FEIG reports and research results.

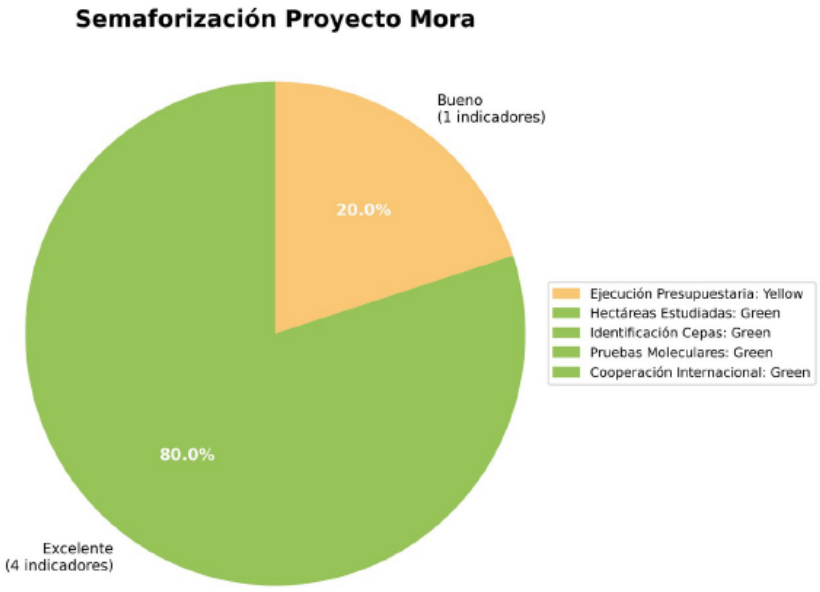
Table 2
Indicators of the Possum Project

Indicator	Value	Goal	Status
Budget Execution	99%	≥95%	EXCELLENT
Hectares Covered	3,000 ha	2,500 ha	ACHIEVED
Identified Individuals	311	250	OVERCOME
Capacity Transfer	75%	80%	GOOD
Cost per Hectare	$39.59	≤$50	EFFICIENT

Note. Table of indicators generated with the support of artificial intelligence (Claude), based on official documents of the Galapagos Invasive Species Fund (FEIG).

In the case of the opossum, the impact is evidenced through robust quantitative indicators that allow the effectiveness of the intervention to be directly measured. Budget execution reached optimal levels (99%), exceeding key operational goals such as territorial coverage, with more than 3,000 hectares intervened, and the number of individuals identified, which reflects not only efficiency in the use of resources, but also a high capacity to respond to an immediate biological threat. Therefore, the operational logic of the project is aligned with traditional impact assessment schemes, where the cost-effectiveness relationship and the fulfillment of goals allow for concrete results to be evidenced in the short term, avoiding the consolidation of an invasive species with the potential to generate irreversible effects in a highly vulnerable ecosystem such as the Galapagos.

Figure 6
Mora project traffic lights



Note. Traffic lights of the Mora Project based on performance indicators (budget execution, coverage, identification of individuals, transfer of capacities and cost per hectare) during the period 2021–2023. Elaboration with the support of artificial intelligence (Claude) based on the analysis of data obtained from FEIG reports and research results

Table 3
Indicators of the Mora Project

Indicator	Value	Goal	Status
Budget Execution	81%	≥85%	GOOD
Hectares studied	5,000 ha	4,000 ha	OVERCOME
Strain Identification	100%	90%	EXCELLENT
Molecular Testing	80%	75%	ACHIEVED
International Cooperation	4 countries	3 countries	OVERCOME

Note. Table of indicators generated with the support of artificial intelligence (Claude), based on official documents of the Galapagos Invasive Species Fund (FEIG).

In contrast, the impact of the Mora project is related to the generation of knowledge and the strengthening of technical capacities. Although effective control of the species has not yet been achieved, advances in research represent a fundamental basis for future interventions. As explained in one of the interviews: "even if the agent has not been found, everything done is an advance in knowledge" (E1). From a climate finance perspective, these types of outcomes are consistent with the goals of the Paris Agreement, which promotes not only the implementation of immediate solutions, but also capacity building and technology transfer to developing countries.

Table 4

Analysis of Both Projects by Scope

Dimension	Possum	Blackberry	Observations
Execution	99%	81%	Possum: optimal financial control
Coverage	3,000 ha	5,000 ha	Mora: greater territorial scope
Innovation	Traditional	Disruptive	Blackberry: revolutionary bio-herbicide
Transfer	75%	100%	Blackberry: 4 countries, 40 specialists
Sustainability	high	high	Both projects ensure continuity

Note. Table of indicators generated with the support of artificial intelligence (Claude), based on official documents of the Galapagos Invasive Species Fund (FEIG).

The comparison of both projects shows clear differences in their approach and type of impact: while Zarigüeya stands out for its high operational efficiency and the achievement of immediate and measurable results, Mora presents a more moderate performance in budgetary terms, but with a relevant contribution in the generation of knowledge and the strengthening of technical capacities. Similarly, the divergence between the two does not imply a weakness; on the contrary, it reflects an inherent tension in the evaluation of conservation projects, where quantifiable short-term results tend to be prioritized over long-term structural impacts, less visible, but equally decisive for the sustainability of the ecosystem.

Thus, although Zarigüeya optimizes the use of resources and shows a superior cost-effectiveness ratio, its scope is concentrated in specific interventions; in contrast, Mora, despite certain limitations in execution, expands the territorial scope and consolidates a key scientific base for sustainable solutions. Therefore, the results suggest that an evaluation focused exclusively on efficiency may underestimate the value of scientific projects, so rather than establishing hierarchical comparisons, it is essential to recognize the complementarity of both approaches as a necessary condition for comprehensive and sustainable conservation.

CONCLUSIONS AND RECOMMENDATIONS

The extraordinary biodiversity that Ecuadorian territory is home to is a fundamental pillar for global environmental balance; However, in the face of the pressures derived from climate change and, especially, from human action, it is imperative to adopt concrete, articulated and sustained responses over time that allow its degradation to be halted and mitigated. In this context, the evolution of the international climate regime and cooperation spaces have given rise to legally binding instruments and financial mechanisms that channel resources towards conservation, among which the FIAS is positioned as a key actor, since it not only mobilizes and manages funds, but also guarantees their sustainability and adaptability to territorial realities. consolidating itself as an effective bridge between international cooperation and local action.

Similarly, the research shows that the effectiveness of these initiatives depends on the articulation and synergy between multiple actors such as international cooperators, public institutions, the private sector, the scientific community and civil society, which reflects the inherently transnational nature of climate finance and its close link with international studies; Therefore, cooperation is not limited to the provision of resources, but involves the construction of governance, capacity transfer, and co-responsibility in conservation. Therefore, it is essential that the Ecuadorian State maintains coherence and continuity in its environmental commitments, regardless of political changes, strengthening a stable institutional framework that supports the effective implementation of conservation policies.

However, the results also allow us to identify structural limitations that condition the scope of these interventions. Particularly noteworthy are the bottlenecks derived from state bureaucracy, institutional rotation and administrative reconfigurations, such as the merger of ministries, which have a direct impact on the agility of processes and decision-making; despite this, the adaptation capacity of the FIAS has made it possible to sustain the operation of the funds, even in adverse contexts marked by geopolitical changes and fluctuations in international financing, which reaffirms its relevance as a resilient mechanism within the country's climate architecture.

This research allowed us to understand that behind each conservation intervention there is a complex institutional and financial architecture built over decades of international cooperation, which translates into concrete actions within the Ecuadorian territory. However, the findings also underscore the need to maintain a critical stance towards environmental

management, considering that Ecuador, being a pioneer in recognizing nature as a subject of rights, assumes an even greater responsibility for its protection; especially in a context where human actions continue to be the main factor of pressure on highly vulnerable ecosystems.

Climate finance is an academic field that has gained strength in recent decades, driven by the urgency of facing the global environmental crisis and the need to conserve strategic ecosystems through mitigation and adaptation plans. However, this field still has significant gaps in terms of systematization and measurement of tangible results within protected territories. In particular, there is evidence of a limited generation of empirical evidence that allows the differentiated evaluation of the results of projects with operational approaches versus those of a scientific nature, which restricts the construction of robust and replicable comparative frameworks.

Under this premise, future research should be aimed at strengthening the regulatory and methodological framework of climate finance in the country. It is imperative to develop hybrid methodologies that transcend traditional financial evaluation, integrating quantitative performance indicators with qualitative impact metrics. This approach would allow the creation of standardized monitoring systems capable of measuring critical dimensions such as the generation of scientific knowledge, technology transfer and the strengthening of local capacities. By consolidating these parameters, climate finance will be able to evolve from a purely normative field to a discipline fully supported by verifiable and comparable results, ensuring that international commitments are translated into robust and long-term environmental governance.

Likewise, a vast potential for study is identified in the diversified portfolio of the FIAS, whose management extends to multiple provinces and ecosystems of Ecuador with approaches that transcend the conservation of flora and fauna. It is pertinent to analyze initiatives such as Conserva Aves, which seeks the protection of more than 100 protected areas through the integration of local communities in a harmonious synergy between humans and nature, or the REDD+ Early Movers (REM) Program, focused on mitigating climate change through reforestation and forest conservation. The multiplicity of these projects offers a unique opportunity to investigate international cooperation not only as a provider of resources, but as a catalyst for social and scientific innovation. Deepening these models would make it possible to close the current evidence gap and understand how financial mechanisms can adapt to diverse territorial realities, promoting comprehensive and multidimensional sustainability

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APPENDICES

Appendix A

Extract from the Non-Disclosure Agreement

1. Objeto del acuerdo

El DIVULGADOR tiene la intención de revelar información (Información Confidencial) al RECEPTOR con el propósito de **realizar un trabajo de titulación previo a la obtención del título de Licenciado en Estudios Internacionales.**

El previamente mencionado trabajo de titulación tiene como objetivos:

Objetivo General

Identificar el impacto que ha generado el Fondo para el Control Especies Invasoras Galápagos (FEIG), adscrito al Fondo Inversión Ambiental Sostenible (FIAS), en las Islas Galápagos durante un periodo de tres años consecutivos.

Objetivos Específicos

1. Analizar la normativa internacional y nacional sobre el financiamiento climático
2. Analizar la estructura, funciones y rol del Fondo de Inversión Ambiental Sostenible (FIAS) en el financiamiento y la gestión de iniciativas de conservación ambiental, con énfasis en su apoyo a proyectos en la región insular.
3. Analizar los avances y resultados reportados por el Fondo para el Control Especies Invasoras Galápagos (FEIG), durante un periodo de tres años consecutivos con base en información sobre financiamiento y control de especies.

2. Información confidencial

La Información Confidencial a la que se refiere el presente Acuerdo comprende todos los datos, documentos, avances, reportes, comunicaciones y demás insumos proporcionados por el DIVULGADOR al RECEPTOR en el marco del desarrollo del trabajo de titulación, cuyo análisis incluye específicamente la medición del impacto de los proyectos administrados por el Fondo de Inversión Ambiental Sostenible.

Esta Información Confidencial incluye, pero no se limita a:

a) Información técnica, administrativa o de reporte relacionada con el desarrollo, ejecución y avance de los proyectos financiados por el Fondo de Inversión Ambiental Sostenible;

b) Documentos de trabajo, reportes internos, matrices de seguimiento no sensibles, así como datos cuantitativos y cualitativos necesarios para que el RECEPTOR pueda elaborar la matriz de evaluación de impacto requerida para su investigación académica;

c) Cualquier otra información que el DIVULGADOR proporcione y que sirva de sustento para el análisis metodológico y la construcción de resultados del trabajo de titulación del RECEPTOR.

Note. Extract from the Confidentiality Agreement used for the development of the degree project. Adapted from the model of the United Nations Non-Disclosure Agreement.

Appendix B

Guide to Interview Questions Linked to Research Objectives

Interview	Question asked	Question Type	Objective to which it responds
E1	How is climate finance structured within the ISAF and how does it relate to international frameworks such as the UNFCCC or the Paris Agreement?	Open	Specific Objective 1 (Analyse international and national regulations on climate finance)
E1	What are the main sources of international funding that FIAS receives?	Open	Specific Objective 1 (Analyse international and national regulations on climate finance)
E2	What is the operational role of the EIG within the management of invasive species in Galapagos?	Open	Specific Objective 2 (Analyze the structure, functions and role of the FIAS in the management of conservation initiatives)
E2	How is the FEIG articulated with the local executing institutions?	Open	Specific Objective 2 (Analyze the structure, functions and role of the FIAS in the management of conservation initiatives)
E3	What factors affect decision-making within the FIAS board?	Open	Specific Objective 2 (Analyze the structure, functions and role of the FIAS in the management of conservation initiatives)
E3	Are there institutional or political constraints that hinder project implementation?	Open	Specific Objective 2 (Analyze the structure, functions and role of the FIAS in the management of conservation initiatives)
E4	How do you decide that a project goes from being an emergency response to a long-term investment?	Open	Specific Objective 3 (Analyze the progress and results reported by the EYF during the period 2021–2023)
E4	What technical and financial criteria are used to prioritize projects within the EIGF?	Open	Specific Objective 3 (Analyze the progress and results reported by the EYF during the period 2021–2023)
E5	How has the management model of the EIGF evolved in recent years?	Open	Specific Objective 3 (Analyze the progress and results reported by the EYF during the period 2021–2023)
E5	What concrete results have the projects funded between 2021 and 2023 generated?	Open	Specific Objective 3 (Analyze the progress and results reported by the EYF during the period 2021–2023)
E1–E5	What do you consider to be the impact of the FIAS on the conservation of biodiversity in Galapagos?	Open	General objective (To identify the impact of the FIAS in the Galapagos Islands during the period 2021–2023)

Note. The table presents the alignment between qualitative data collection instruments and research objectives. Interviews coded E1 to E5 correspond to key informants from the Sustainable Environmental Investment Fund (FIAS) and the Galapagos Invasive Species Control Fund (IGEF). The E1–E5 coding in the last row indicates that the question was applied cross-sectionally to all interviewees. The period of analysis covers the years 2021–2023, with interviews that were conducted in 2026.