United Nations Development Programme
Government of Ecuador

Project Title:	Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources
UNDAF Outcome(s):	By 2018, support has been provided to strengthening institutional and citizen capacities to promote the rights of nature, create conditions for a sustainable low-emission development, and improve the resilience and risk management facing the impacts of climate change and natural and man-made disasters
UNDP Strategic Plan Environment and Sustainable Development Primary Outcome: Inclusive and sustainable growth and development incorporating production capacities that generate employment and lifestyles for the poor and excluded. **UNDP Strategic Plan Secondary Outcome:** National capacities to reduce conflict likelihoods and reduce natural risks, including those arising for climate change.	
Expected CP Outcome(s): By 2018, support has been provided to strengthening institutional and citizen capacities to promote the rights of nature, create conditions for a sustainable low-emission development, and improve the resilience and risk management facing the impacts of climate change and natural and man-made disasters *(Those linked to the project and extracted from the country programme document)*	
Expected CPAP Output (s) Strategies, plans and management and budget instruments are formulated and applied with a focus on prioritized identified groups and special emphasis on gender inequalities for: conservation and sustainable management of natural resources, ecosystem goods and services, climate change, resilience promotion, sustainable energy solutions promotion and the adequate management of chemical products and pollutants. *Those that will result from the project and extracted from the CPAP)*	
Executing Entity/Implementing Partner: Ministry of Environment (MAE);	

Brief description:
The Government of Ecuador is requesting assistance from GEF and UNDP to remove barriers to securing the long-term conservation of the country's biological diversity. The ***project goal*** is to safeguard globally significant biodiversity of Ecuador through building capacity on access to genetic resources and benefit sharing while improving the sustainability of the protected area system through strengthening of Decentralized Autonomous Government (GAD) reserves. The ***project objective*** is Ecuador implements integrated emergency actions to conserve the diversity of amphibians of Ecuador and use its genetic resources in a sustainable way. The three main ***outcomes*** of the project are: 1. Emergency actions to ensure the survival of highly endangered amphibian species of Ecuador for conservation and bioprospecting purposes; 2. Discovery of active compounds derived from the skin secretion of Ecuadorian amphibians with potential applications in biomedicine; 3. Institutional strengthening for the implementation of biodiversity conservation measures and sustainable use of its genetic resources in Ecuador, using amphibians as a pilot case study.

Programme Period:	2015 - 2018
Atlas Award ID:	00086955
Project ID:	00094106
PIMS #	5314
Start date:	June 2015
End Date	May 2020
Project Duration:	5 years
Management Arrangements:	NIM
PAC Meeting Date:	4 June 2015

Total resources required	**US$ 16,943,032**
Total allocated (CASH) resources US$:	
• GEF	2,726,908
• UNDP	54,538
• Otonga Foundation	1,708,000
• Amaru Amphibian Rescue Center	108,350
• Government	
• MAE	3,454,119
• Ikiam Regional Amazonic University	1,937,325
• GAD Carchi	10,000
• GAD Guayas	18,471
• ETAPA	2,892,535
In-kind contributions US$:	
• UNDP	166,462
• Government	
• MAE	499,479
• GAD Carchi	42,628
• GAD Guayas	41,473
• ETAPA	264,350
• Queen's University Molecular Therapeutics Laboratory	2,000,000
• Otonga Foundation	1,000,000
• Amaru Center	18,394

Agreed by: _____ Date: _____

Lorena Tapia, Minister of Environment

10 JUL 2015

Agreed by: _____ Date: _____

Diego Zorrilla, Resident Representative

Table of Contents

LIST OF ACRONYMS 4
SECTION 1: ELABORATION OF THE NARRATIVE 5
Part I.A. Context 5
1.1. Context and global significance 5
1.2. Socio-economic context 9
1.3. Institutional context 10
1.4. Legal, Policy and Planning Context 12
Part I.B. Baseline Course of Action 15
1.5. Threats to biodiversity 15
1.6. Baseline Analysis 17
1.7. Long-term solution 20
1.8. Barrier Analysis 20
1.9. Stakeholder analysis 23
PART II: Strategy 26
2.1. Project Rationale 26
2.2. Project Objective, Outcomes and Outputs/activities 32
2.3. Project Indicators, Risks and Assumptions 50
2.4. Incremental Reasoning and Expected Global, National and Local Benefits 52
2.5. Policy Conformity and Country Ownership: Eligibility and Country Drivenness 53
2.6. Sustainability 56
2.7. Replicability 58
2.8. Financial Modality and Cost-Effectiveness 59
PART III: Management Arrangements 60
PART V: Legal Context 73
SECTION II: STRATEGIC RESULTS FRAMEWORK AND GEF INCREMENT 75
SECTION III: TOTAL BUDGET AND WORKPLAN 80
SECTION IV: ADDITIONAL INFORMATION 85
PART I. Amphibian Biodiversity and Target Site Interventions 85
PART II. Bioprospection and Biobanking in Ecuador 103
PART III. Institutional Framework & Capacity Analysis 109
PART IV. Stakeholder Analysis and Participation Plan 123
PART V. Terms of References for key project staff and main sub-contracts 138
PART VI. Direct Project Costs and Letter of Agreement (Signed version in separate file) 142
PART VII. ABS Capacity Scorecard 145
PART VIII. UNDP Social and Environmental Screening Tool 150
PART IV. Management Effectiveness Tracking Tool (See separate file) 161
PART X. CoFinancing Letters (See separate file) 161
PART XI. UNDP Risk Matrix 161
PART XII. Cash Transfer Modality Workflow 164
PART XIII. References 165

LIST OF ACRONYMS

ABS	Access and Benefit Sharing
ACAP	Amphibian Conservation Action Plan
AWP	Annual Work Plan
BD	Biodiversity
CBD	Convention of Biological Diversity
CC	Climate Change
CI	Conservation International
CITES	Convention on International Trade in Endangered Species
COA	Organic Environmental Code
EAGB	Ecuadorian Amphibian Genome Bank
FACE	Funding Authorization and Certification of Expenses
GAD	Decentralized Autonomous Government
GEF	Global Environment Facility
GIS	Geographic Information System
HACT	Harmonized Approach to Cash Transfer
IA	Implementing Agency
IEPI	Ecuadorian Institute of Intellectual Property
INB	National Institute of Biodiversity
IUCN	International Union of Conservancy Nature
MAE	Ministry of Environment
M&E	Monitoring & Evaluation
METT	Management Effectiveness Tracking Tools
MICSE	Coordination Ministry of Strategic Sectors
MTE	Mid-term Evaluation
MRNNR	Ministry of Non-Renewable Natural Resources
NBSAP	National Biodiversity Strategy Action Plan
NGO	Non-government Organization
NIM	National Implementation Modality
NP	National Park
NPAS	National Protected Area System
NPC	National Project Coordinator
NPD	National Project Director
PA	Protected Area
PANE	Natural Protected Areas Heritage of Ecuador
PES	Payment for Environmental Services
PIRs	Annual Project Implementation Reviews
PPG	Project Preparation Grant
RCU	Regional Coordinating Unit
SENESCYT	National Secretariat of Science and Technology
SENPLADES	National Secretariat of Planning and Development
SIB	Biodiversity Information System
SNAP	National Protected Area System
SUIA	Unified Environmental Information System
TNC	The Nature Conservancy
UNDAF	United Nations Development Assistance Framework
UNEP	United Nations Environment Program

SECTION 1: ELABORATION OF THE NARRATIVE

Part I.A. Context

1.1. Context and global significance

1. Ecuador straddles the Equator on the Pacific Coast of South America. It is bordered to the north by Colombia and to the south and east by Peru. It has a surface area of 256,370 square kilometers (0.19% of the world's surface), making it the smallest Andean country. In spite of its small size, Ecuador is ranked 8th in the list of 17 "megadiverse" countries of the world. It has the highest biodiversity per unit area for the South American continent and houses 2 of the 34 hot spots of the world, Tumbes-Chocó-Madgalena and Tropical Andes.

2. In addition to the Galapagos Islands, considered as the fourth natural region of Ecuador, the mainland is divided into three primary areas: the Pacific Coastal Area (rich in dry forest and mangrove biomes), the mountainous region of the Andes (rich in Andean forests and 'paramos'), and the Amazon Jungle (rich in tropical forest biome). The wide ranges of latitude and altitude along the Equator, together with marine features such as the Humboldt Current along the coast have given rise to a large variety of climatic zones even within these four main regions. In turn this supports significant habitat and species diversity both across and within each region.

3. Despite its relatively small size, Ecuador holds approximately 10% of the world's biodiversity. Indeed, it is considered to have amongst the highest biodiversity of animal and plant species in the world by surface area, reaching 9.2 species per square kilometer (excluding all the marine species and habitats). Its geographical location, the influence of a complex of marine currents and the presence of the Andes, influence the occurrence of a wide variety of ecosystems and microclimates, from the Amazonian and northwestern rainforests to the southern dry ecosystems; from the warm beaches of the Pacific Ocean, including montane forests and paramos to the perennial snows at the volcanoes. In addition to the vast biological richness of Ecuador, it has a substantial percentage of species found only in this region of the world. Among the groups with higher number of endemic species stand vascular plants (17,058 species and 23% endemism), reptiles (431 species, 30% endemism) and 546 species of amphibians[1], among which 43% are found only in this region of the world.

4. However, this biodiversity is under increasing pressure from threats driven by economic activities, and amphibians, in particular, are highly vulnerable. The main threats are habitat loss and fragmentation caused principally by deforestation and desertification related to extractive industries (petroleum, mining and timber), livestock and agriculture. These are exacerbated by climate change, which is expected to increase the abovementioned pressures as well as create more favorable conditions for the development of pathogens (*See Section 1.5 Threats*).

Amphibians: Target and Driver for Conservation

5. This project will focus on *in situ* and *ex situ* conservation of Ecuadorian amphibians as well as the ABS conditions related to their bioprospecting potential. The diversity of Ecuadorian amphibians is a strategic resource for the country because it accounts for a significant 9% of the global diversity and because its genetic resources have a high potential for application in industries such as cosmetics,

[1] As of January 2015, 546 amphibian species have been recorded in Ecuador, distributed across three groups: Anuros (represented by frogs and toads) comprise 514 species, Salamanders (Caudata order) comprise 8 species, and Caecilians (Gymnophiona order) comprise 24 species.

therapeutics, biomedicine, agroindustry, among others. Amphibian skin contains granular glands that produce an arsenal of chemical compounds which constitute a defense mechanism against pathogens microorganism and predators. These glands secrete a variety of peptides, biogenic amines, and alkaloids with a wide spectrum of biological activities. Recent studies demonstrate the incredible variety of peptides found in a single species, >200 with different characteristics and biological activities. In this way, the analysis of new species provides promising opportunities to find new and unique compounds.

6. *Bioprospecting Potential:* Indeed, the skin of amphibians is a rich source of chemicals that make up its defense system against microorganisms and predators. The toxins and other substances from some frogs' skins have a long history of use by indigenous communities in Ecuador in their diet, rituals, and also in traditional medicine. These compounds have a high potential for application in therapeutics, cosmetics, pharmaceutical, biomedicine, among other industries. Peptides from amphibian skins have been tested and proved as antibiotic agents against multi-resistant bacteria. Over 20 years ago, the isolation of magainins (peptides) obtained from the skin of the African clawed frog (*Xenopus laevis*) marked the first amphibian peptides with antimicrobial activity to be fully characterized. A derived molecule from magainins, the pexiganan, has been tested as a topical agent against infected foot ulcers in diabetic patients by the University of Washington School of Medicine (USA). Work in the National Institute of Health (USA) identified hundreds of different alkaloids, including Epibatidine which has an analgesic effect 200 times more potent than morphine acting under a non-opiod mechanism. Epibatidin was isolated from 750 skins from the frog *Epipedobates anthonyi* (former *E. tricolor* in original publications) collected in Ecuador. At present, analogs of this molecule are tested as treatment for rheumatoid arthritis, Alzheimer's and epilepsy. As explained in further detail in Section IV, Part III, the Ecuadorian state has a pending claim on royalties from commercial use of Epibatidine or its derivatives, from countries that are Signatory Parties to the Convention on Biological Diversity. Current databases for amphibian peptides around the world register a total of 2571 peptides characterized from 167 species and there is great interest in its antimicrobial, antifungal, tumoricidal, antiviral and anti-protozoa activity.

7. Favourable conditions exist for developing bioprospecting in Ecuador. First, the Ecuadorian government has stated in the National Plan for Good Living that bio-knowledge –including bioprospecting - is a strategic tool for national development in medium and long terms. With this in mind, the Ecuadorian government is investing in higher education and scientific research through the creation of new Universities and research centres, including the city of knowledge Yachay and Ikiam Regional Amazonic University, that will develop scientific research focussed on the sustainable use of Ecuadorian biodiversity and technological research. Second, the Ecuadorian government is also investing in human resources through a scholarship program. Hundreds of Ecuadorian students are pursuing postgraduate studies in the best Universities around the world, acquiring experience and knowledge in a whole range of different areas, including bioprospecting, with the expectation that this will drive the development of higher education and scientific research towards a sustainable use of Ecuadorian biodiversity. Third, the National Environmental Authority (MAE) is aware of the legal requirements associated with conducting this level of research, in particular the need to ensure an agreement for benefit sharing with the Ecuadorian state in accordance with guidelines set out under the Convention of Biological Diversity (CBD). Aside from the current project, another project that will study an endophytic fungus able to degrade polyester polyurethane supported by Yale University and the Pontificia Universidad Catolica del Ecuador is close to signing a contract to access genetic resources with the ABS rule. This is a clear sign of the commitment of the MAE to develop and legally support bioprospecting in Ecuador. This aspect is further developed in Outcome 3 of this project.

8. To complement these efforts, Ecuador has initiated efforts to establish a Genome Bank. The Amphibian Conservation Action Plan (ACAP), created by the 2005 IUCN/SSC Amphibian Conservation Summit, established as one of its nine priority areas of action the establishment of a genome bank to safeguard genetic resources of amphibians. This includes cryopreserved blood, cell cultures, tissues,

sperm, oocytes, stem cells, embryos and DNA to preserve their genetic, proteomic and transcriptomic information in the form of viable cells. The objective of this Genome Bank is to safeguard genetic diversity of endangered species to allow use of assisted reproduction techniques -in vitro fertilization, molecular cloning, using sperm generation of germ cells, etc., - in order to ensure the viability of the species retaining at least 90% of their genetic diversity[2]. Since the establishment of ACAP in 2005, few groups have begun work on this topic. The most advanced are: the Frozen Zoo which is part of the Center for Endangered Species Conservation in the San Diego Zoo, Ca. USA, the Memphis Zoo and the Zoological Society of London[3]. Within Ecuador, Museums and conservation Centers, such as Centro Jambatu (CJ), PUCE Museum of Zoology (QCAZ), and Ecuadorian Museum of Natural Sciences (MECN) have implemented the preservation of tissue (muscle and liver) in 95% ethanol at -20°C or -80°C for its zoological collections, including amphibians. This technique preserves genetic information as DNA for genetics, phylogenetic or taxonomic studies (including barcode). The quality of DNA obtained from these tissues is enough for such studies, but it is known that the quality of DNA, RNA, proteins and lipids in these tissues preserved at -20 ° C decreases with time, so this material is not recommended for research involving modern techniques such as next-generation sequencing or other high-throughput technologies. As such, there is a recognized need to develop more long-term preservation techniques to establish a viable Genome Bank in Ecuador, as proposed in Outcome 2.

9. However, amphibians are confronting an unprecedented extinction crisis, the impact of which could be devastating when considering their inherent wealth of genetic and molecular resources. With every extinct species the possibility of finding new molecules that could lead to the development of new bio-products/medicines vanishes. In light of this crisis and the growing interest in bioprospecting of amphibian skin secretions, the Ecuadorian government in cooperation with Centro Jambatu performed a prioritization exercise to determine priority species to be targeted for conservation interventions:

Table 1: Prioritization of Ecuadorian Amphibians

Species Group	Common Name	Endemism[4]	Weighted Endemism	Vulnerability[5]	Weighted Vulnerability	Total Score
Bufonidae/Atelopus	Andean toads, Harlequin frogs	59%	3	71%	6	9
Centrolenidae	Glass frogs	29%	2	31%	4	6
Ceratophryidae	Common horned frog	33%	2	33%	4	6
Craugastoridae	Rain frogs	54%	3	37%	2	5
Dendrobatidae	Poison, rocket frogs	62%	3	48%	4	7
Eleutherodactylidae	Hammer frogs	05	1	0%	2	3
Hemiphractidae	Marsupial frogs	22%	1	59%	6	7
Hylidae	Tree frogs	20%	1	14%	2	3

[2] Gascon et al 2007

[3] Kouba et al., 2013

[4] Endemism: Indicates that the distribution of a species is limited to a small geographic region that does not occur naturally in another part of the world, so it is an important feature for understanding the conservation priority because if a disturbance affects the species drastically, it could disappear without the possibility of persisting in other places that are free of disturbance.

[5] Vulnerability: Based on the classification of the IUCN Red List, vulnerability evaluates the extinction risk of a species based on 5 criteria. The criterion of Endemism was considered particularly relevant and therefore a double weighting was assigned.

Species Group	Common Name	Endemism[4]	Weighted Endemism	Vulnerability[5]	Weighted Vulnerability	Total Score
Leiuperidae	Weeping dwarf frog	62%	3	0%	2	5
Leptodactylidae	Southern, Jungle frog	5%	1	11%	2	3
Microhylidae	Narrow-mouthed frog	22%	1	22%	2	3
Pipidae	Clawed frog	0%	1	0%	2	3
Ranidae	True frog	0%	1	0%	2	3
Telmatobiidae	Water frog	100	3	100%	6	9

10. The groups that received the highest scores are: Bufonidae (9); Telmatobiidae (9) [6], Dendrobatidae (7); Hemiphractidae (7), Centrolenidae (6) and Ceratophryidae (6).

11. Based on the above, both the Bufonidae/Atelopus and Dendrobatidae groups are chosen as priority species for targeted comprehensive conservation actions. Specifically, the project will focus on the following species and interventions to address the urgency surrounding highly endangered amphibian species in Ecuador and their genetic resources:

Table 2: Target species and intervention sites

Species	Origin/Location/Local council	In Situ	Ex Situ	Bioprospecting
Dendrobates (Excidobates) condor	Alto Machinaza – Cóndor Mountain Range, Zamora Chinchipe Province		x	
Atelopus sp. *nov. (aff. palmatus)*	Alto Nangaritza – Cóndor Mountain Range, Zamora Chinchipe Province		x	
*Atelopus nanay**	Cajas National Park, Azuay Province	x	x	x
Atelopus sp. *nov. (aff. longirostris)***	Ecuador's Northwestern Tropical Ground – Carchi Province. Source of the Chinambí Chico River	x		
*Atelopus coynei***	Ecuador's Northwestern Tropical Ground – Carchi Province. Source of the Chinambí Chico River	x		
*Atelopus balios***	Ecuador's Southwestern Tropical Ground – Cañar, Azuay and Guayas Provincial borders.	x		
Agalychnis spurelli	Specimens for the study of peptides contained in their skins			x
Cruziohyla calcarifer				x
Hypsiboas picturatus				x
Sample of 50% of Eeuadorian amphibian species	This will focus on a representative sample of the range of amphibians in the country. However, since most endangered species are located in the Andes, sample collection will have a bias towards Andean species. These will be stored in the Amphibian Genome Bank		x	
Skins of 40% of the species of amphibians on the IUCN Ecuadorian Red List (with chemicals) and sperm from two species of amphibians included on the IUCN Red List			x	

[6] While *Telmatobiidae* received a high score (9), the species appear to have disappeared from nature and are possibly extinct (Merino-Viteri *et al.*, 2005), and are thus deemed unviable for project intervention.

* Species currently handled in the Amaru Amphibian Rescue Center's *ex situ* program.
**Species currently handled in the ex situ *Arca de los Sapos* Program (Toad Ark) at the Jambatu Research and Conservation Center.

1.2. Socio-economic context

12. In order to understand the pressures put on critical habitat of highly endangered amphibians, as well as the potential for beneficiaries from their conservation and bioprospecting, it is important to understand the socioeconomic context of Ecuador. According to data from the last census, Ecuador had a population in 2010 of 14,483,500 people[7] (56.5/km2). This is one of the highest densities in Latin America but the annual population growth rate has declined from 1.8% in the 1990-2000 period, to 1.4% in the 2001-2008 period, suggesting that the country is in a process of demographic transition. There has also been an increase in the median age of the population, from 22.5 to 31.4 years, and a reduction in the number of children per woman[8]. Overall, men make up 49.6% of the population and women 50.4% (although men predominate in the <15 year sector and women in the >65 year sector).

13. In addition to its natural wealth, Ecuador is a multi-ethnic country with recognized cultural and archaeological wealth. Ecuador is ethnically diverse, but dominated by mixed-race people (mestizos). In 2010, 7% of the population identified themselves as indigenous and 18.4% as Afroecuadorian (of African descent). There are major differences in (income-related) poverty levels between ethnic groups: 81.5% of indigenous people, 67.6% of afroecuadorians, 50.7% of mestizos and 46.2% of whites were classified as poor in 2006[9].

14. The urban population is growing at an annual rate of 2.3%, and currently constitutes 75% of the total, reflecting a progressive abandonment of the countryside, which has resulted in negative population growth in some rural areas. This is motivated in large part by perceptions of superior access to work, education, access to basic services and physical infrastructure in urban areas. There has also been significant international migration, dating in large part from the financial crisis of 1998-2000. By 2007, between 1.4 and 1.6 million people had emigrated, with the main target countries being the USA (34%), Peru (17.1%), Colombia (12%) and Spain (11%). In the last inter-censual period, and apparently as a result of the global financial crisis, there were indications of a return flow of migrants.

15. In 2012, between 25.3% and 28.6% of the population were estimated to be below the income poverty line (US$2.47/day). There is a sharp urban/rural divide: the income poverty rate in urban areas is 24.9% and that in rural areas is 61.5%. The Amazon and the coastal region are among the areas with highest poverty levels in the country.

16. The Amazon region has been a pole of attraction of population, due to a combination of *agrarian* reform initiatives and the *petroleum* boom; by the end of the 1980s, this region had one of the highest deforestation rates of the whole Amazon basin, at around 2%/year[10], due largely to clearance for subsistence agriculture by non-indigenous colonists. The coastal region has been subject to internal immigration due to the availability of colonizable land and the development of commercial *agriculture*; while many other parts of the country have been affected by emigration, either from rural areas to urban centers or internationally. The tropical Andes are cultural landscapes with a long history of human occupation, but have been particularly affected by *agricultural* frontier advance in the last century: the

[7] INEC, 2010
[8] CEPAR, 2010
[9] EVC, 2006
[10] FAO, 1993; Pichón, 1997a

Agrarian Reform[11] of the 1960s resulted in the subdivision of large landholdings into smallholdings, principally located on steep slopes (up to 70%), where deforestation, overgrazing and fires have led to severe soil erosion. It is estimated that between 80 and 85% native Andean habitats have disappeared to date[12], resulting in a "hotspot" of threat and extinction affecting the endemic biota of the region. This is further exacerbated by mining and other extractive activities, which are major contributors to the national economy. However, as explained in more detail in Section 1, Part 1.4, under the National Plan for Good Living's strategy to transition to an economy based on knowledge and social and technological innovation, Genetic Resources have begun to attract attention as a potentially powerful sector to be developed and prioritized within the national production matrix. The following Table shows that many poor communities coincide with amphibians' habitats, making them prime candidates for benefitting from an institutionalized ABS framework and the strategic positioning of Genetic Resources within the national production matrix.

Table 3: Communities near known amphibian habitats

Community	Poverty level[13]	Productive Activities[14]	Species
Cajas National Park (population info for Cuenca Canton, Azuay Province)	38.2% live in poverty, 13.2% in extreme poverty	National Park, nearby activities include agriculture, livestock, manufacturing, commerce	*Atelopus nanay*
Canton Paquisha, Zamora Chinchipe Province	73.8% live in poverty, 31.7% in extreme poverty	Agriculture, livestock, mining	*Dendrobates (Excidobates) condor*
Nangaritza Canton , Zamora Chinchipe Province	73.8% live in poverty, 31.7% in extreme poverty	Agriculture, livestock, mining	*Atelopus* sp. nov. (aff. *palmatus)*
San Jacinto de Chinambí and Chinambí, Parish of Jijón and Camaño, Carchi Province	93.9% live in poverty, 49.8% in extreme poverty	Subsistence Agriculture and livestock	*Atelopus coynei*
San Jacinto de Chinambí and Chinambí, Parish of Jijón and Camaño, Carchi Province	93.9% live in poverty, 49.8% in extreme poverty	Subsistence Agriculture and livestock	*Atelopus* sp. (*aff. longirostris*)
Agua caliente, Granmalotal, la Delicia, Guayas Province	87.1% live in poverty, 27.8% in extreme poverty	Agriculture, livestock, illicit timber and mining	*Atelopus balios*
Esmeraldas Province	78.3% live in poverty, 37.3% in extreme poverty	Agriculture, livestock, fishing, mining	*Agalychnis spurrelli*
Esmeraldas Province	78.3% live in poverty, 37.3% in extreme poverty	Agriculture, livestock, fishing, mining	*Cruziohyla calcarifer*
Esmeraldas Province	78.3% live in poverty, 37.3% in extreme poverty	Agriculture, livestock, fishing, mining	*Hypsiboas picturatus*

1.3. Institutional context

17. Ecuador has a presidential system of government, represented at provincial levels by governors, which oversee the operation of different ministries in his/her province, through their provincial dependencies. Politically and administratively, Ecuador has 24 provinces and 224 municipalities (cantons). Each province has a Decentralized Autonomous Government (GAD) with prefects and provincial councils (made up of mayors of the province or designated councilors), who carry out

[11] Ley of Colonización and Reforma Agraria of 1964
[12] Svenning, 1998; Hofstede *et al.*, 2002; Sarmiento, 2002
[13] Censo de población y vivienda, INEC-SIISE-SISSAN, 2010
[14] Ibid.

executive and legislative functions. At the local level, there are Municipal and Parish Autonomous Governments. The roles of the provincial and municipal governments include the generation and execution of public policies, as well as provincial and municipal ordinances covering their area of jurisdiction.

18. The lead institution of the environment sector in Ecuador is the **Ministry of Environment (MAE)**, which in turn responds to the **Coordination Ministry of Strategic Sectors (MICSE)**. MAE is the country's National Environmental Authority. It consists of four Sub-Secretariats, for 1) Natural Heritage, 2) Environmental Quality, 3) Climate Change and 4) Marine and Coastal Management. The first of these (the Subsecretariat for Natural Heritage) is most directly related to the present project: it is home to the National Biodiversity Directorate (which in turn is home to the Protected Areas Unit and the Wildlife and Fragile Ecosystems Unit), as well as the National Forestry Directorate.

19. MAE also has offices at zonal and provincial levels, with similar structures to that at national level. In the provincial offices of MAE, local staff of the Protected Areas Unit are responsible for planning, management, vigilance and control within the boundaries of PAs, while local staff of the Wildlife and Fragile Ecosystems Unit have similar responsibilities in the surrounding landscapes, for example in relation to the policing and control of deforestation and the illegal hunting and trade of wildlife.

20. Zonal offices of MAE are responsible for the coordination of systems for the control and supervision of compliance with environmental quality norms and for the training plan for the management and administration of PAs; while provincial offices are responsible for management and technical control, including the conservation of biodiversity within the SNAP, the conservation of wildlife through control and sustainable management (*in situ* and *ex situ*), licenses for forest harvesting and environmental licenses.

National PAs (PANE)

21. Natural Protected Areas Heritage of Ecuador (PANE) are under the jurisdiction of the Ministry of Environment, which is responsible for the creation, administration and management of the same. The creation of a PANE PA requires an Alternative Management Study in which the most appropriate category is established based on the characteristics of the proposed area. These areas are supported financially by the state budget, and have the guarantee of inviolability, such that extractive and timber activities are prohibited within them, except for constitutional exceptions in the case of non-renewable resources, where appropriate prior authorization declaration of national interest and, if applicable, with the completion of a referendum, per the provisions of the Constitution.

Decentralized Autonomous Government Reserves

22. Decentralized Autonomous Governments (GAD) constitute the scheme of the country's internal political division. They can be of provincial, municipal or parish-based. A GAD has within its powers, the ability to carry out land use planning and regulation of land use within its territory, from which it has the power to declare "conservation areas". The 2008 Constitution grants GADs the ability to create a protected area through an ordinance, which is then incorporated into the National System of Protected Areas. In this sense, the Ministry of the Environment created the Single Registry of the National System of Protected areas via Ministerial Accord No. 30 (R.O. No. 926 of April 4, 2013), as a mechanism through which only those areas that meet the guidelines and are approved by the Ministry can become part of the SNAP; those areas which are not on this registry are not considered to be within the system, and in the specific case of the municipalities, these areas remain under the municipal land use and zoning authority. At the moment, there is only 1 officially-recognized GAD Protected Area – in the Municipality of Siete Iglesias.

Ecuadorian Intellectual Property Institute

23. Currently, the IEPI is attached to the National Secretariat of Higher Education, Science, Technology and Innovation, and maintains the Ancestral Knowledge Unit, with the clear obligation to "determine the existence of an intangible component associated with genetic resources"[15], in order to deny patenting – not according to Decision 391, which is when the access procedure is violated, but specifically in the manner established in the Constitution of Montecristi, which in article 402 indicates that "It is prohibited to grant rights, including intellectual property rights, to derived or synthesized products obtained based on collective knowledge associated with national biodiversity."

National Secretariat of Higher Education, Science and Technology (SENESCYT):

24. SENESCYT was established in the 2008 Constitution as the body in charge of the National System of Science, Technology, Innovation and Ancestral Knowledge proposed in article 385. Part of its mission is to "exercise leadership in public policymaking in the field of higher education, science, technology, innovation and ancestral knowledge, coordinating and facilitating efforts between the public sector and public and private productive sectors." Ancestral knowledge and bio-knowledge are conceived of as an activity capable of changing the economic matrix from a primary goods export economy, to an economy based on exporting goods with added value, and SENESCYT is conceived of as the institution capable of incorporating traditional knowledge into academia and ultimately into the economic sector. The obligation of SENESCYT, then, is to maximize the potential of ancestral knowledge with professional and technical training. In this case, through the Ancestral Knowledge Coordination Office.

25. In the context of SENESCYT's mandate to generate and promote scientific research, it became not only the governing body in the field, but the institution responsible for approving research programs and projects for public institutes that require state funds; as well as the accrediting body for individuals and institutions who wish to carry out any kind of scientific research activity in the country[16], regardless of whether they are funded publicly or privately[17], or if they are national or foreign. In this sense, Decree 905 establishes that: "The national environmental authority must enter into framework agreements with qualified Ecuadorian universities, research centers and researchers who are registered with the SENESCYT, and who are engaged in projects focused on research and conservation of access to genetic resources."[18]

26. Please see Section IV, Part V for further information on key institutional stakeholders.

1.4. Legal, Policy and Planning Context

27. The Ecuadorian Government recognizes the importance of its biological richness as a strategic resource for sustainable development as illustrated in various legal and planning instruments. Of particular note is the enactment of the 2008 Constitution which codifies the Rights of Nature, and the National Plan for Good Living (2009–2013), and provides the overarching guide to planning and public policy. It outlines a paradigm-shift from the current capitalist economic development model to one based

[15] Executive Decree 905.

[16] Art. 1. Authority of the Secretariat of Education over Public Research Institutes, executive decree no. 1285 published in R.O. 788 of September 13, 2012.

[17] Art. 4. Authority of the Secretariat of Education over Public Research Institutes, executive decree no. 1285 published in R.O. 788 of September 13, 2012. On the Operational Research Accreditation. In order to properly oversee the research done in the country and its results, any public or private sector person or entity engaged in research and technological development, must have the respective Operational Research Accreditation issued by the National Secretariat of Higher Education, Science, Technology and Innovation.

[18] Article 39.

on the country's comparative and competitive advantage - biodiversity. It sets out the medium-term (2025) goal for Ecuador to become an exporter of bio-knowledge and an ecotourism services provider. In this context, the diversity found at the genetic level has a fundamental role for its enormous potential application in therapeutics, cosmetics, pharmaceutical, biomedicine, agroindustry among other industries. In turn, the way in which genetic resources are accessed, and how the benefits of their use are shared, can create incentives for their research, conservation and sustainable use, and can contribute to the creation of a fairer and more equitable economy in support of sustainable development. It also provides a vehicle for emergency in *in situ* and *ex situ* conservation.

Table 4: Scope of Ecuador's National Legal Framework for ABS

Instrument/ Legal Hierarchy	Scope
Constitution of Montecristi (2008)	Establishes the competency framework for environmental matters, differentiated by levels of government. Reeognizes environmental rights and nature. States precautionary bans and tutelary environmental principles.
Integrated Organic Crime Code	Sanctions the crime of unlawful appropriation of genetic resources
Law of Forestry and Conservation of Natural Areas and Wildlife	Establishes environmental management tools (authorizations, declarations, applications, licenses, etc)
Law of Environmental Management	Establishes the environmental management system and the scheme of administrative authorizations for activities, works and projects.
Unified Text of Secondary Legislation of the Ministry of Environment	Regulates matters relating to collection permits, creation and management of protected areas, *in situ* and *ex situ* conservation.
Executive Decree 905	Regulation for the Common Regime on Access to Genetic Resources under Decision 391 of the Andean Community

28. *Protected Areas and Amphibians Conservation:* Habitat protection *in situ* has been the focus of state conservation actions and Ecuador has invested significantly in the establishment of State Protected Areas (PA) on public land through the Natural Protected Areas Heritage of Ecuador (PANE) which now covers 19.6% of the country's land area in 49 public PAs which cover 5,014,993 ha of terrestrial and 14,252,770 ha of marine area. Despite this important conservation effort, the PANE PAs do not include a representative percentage of Ecuadorian amphibian species. Out of the 546 species of amphibians, only 275 (50%) are inside State PAs, leaving 50% outside, including 136 of the 234 endemic amphibian species.

29. However, the PANE is part of a National System of Protected Areas (SNAP) which also includes protected forests, private, community and municipal protected areas, all of which could play an important role in protecting critical habitats. Furthermore, Ecuador has advanced a decentralization process to establish regional and district offices of the Ministry of Environment and support environmental management processes at the local level. For example, the authority for conserving natural heritage has been assigned to municipal governments through the COOTAD (2008); additionally the MAE already counts with the guidelines to legally include private, community and GAD reserves in the SNAP.

30. *Strategic Plan for the Conservation of Ecuadorian Amphibians in Risk of Extinction:* Ecuador leads one of the most important amphibian conservation strategies at the Regional level. In response to the catastrophic crisis facing amphibians, a team of Ecuadorian researchers and conservationists proposed, in 2005, the Strategic Plan for the Conservation of Ecuadorian Amphibians in Risk of Extinction. This ambitious plan was developed following the Global Action Plan for Amphibians guidelines and includes 6 operational programs: (a) monitoring and research, (b) strengthening local

capacity, (c) *ex-situ* (captive) management (d) *in-situ* management, (e) bioinformatics and (f) public education and awareness (Arca de los Sapos, 2011). The actions stated in the Strategic Plan (particularly the *ex situ* strategies) are proactive, complementary and innovative for preserving the biological and genetic resources of a representative group of Ecuadorian amphibians. However, the Plan is in need of being updated, particularly in line with Executive Decree 905 (see below), and bolstered by an Action Plan to strengthen local capacity, regulations and infrastructure for its implementation and for *ex situ* conservation to achieve a greater impact.

31. *ABS Policy:* Ecuador has made progress towards developing its ABS legal framework through Decision 391 and Executive Decree No. 905. Since 1996, ABS issues in the Andean region have been regulated by Decision 391 on the Common Regime on Access to Genetic Resources of the Andean Community of Countries. In 2011, the Ecuadorian government issued Executive Decree No. 905 on access to genetic resources in order to regulate key aspects of Decision 391 at a national level. Currently, the Nagoya Protocol (signed in 2011) is under discussion in the National Assembly for ratification, after having passed the review of the Constitutional Court of Ecuador. It should be noted that the National Assembly has the political will to ratify the Protocol and it is highly probable that this will occur during the project's implementation. This process has been closely accompanied by the MAE through socialization activities and the development and presentation of technical and legal information explaining the need to ratify the Protocol as well as the need to implement a specific national law to regulate access to genetic resources in accordance with the Protocol and Decree No. 905.

32. The *National Plan for Good Living* (*Plan Nacional del Buen Vivir*), was drawn up within the context of the National Participatory Planning System as an instrument to organize state action in the area of development[19] as proposed by the Constitution of Montecristi (2008). This instrument is mandatory and binding on the public sector, and is a guide for all other sectors. It encompasses public policies, programs and projects, the planning and execution of the National State Budget, the investment and allocation of public resources and the coordination of exclusive responsibilities between the central government and the Autonomous Decentralized Governments[20], and therefore makes it possible to attain the rights and obligations recognized in the Constitution, by indicating who is responsible for carrying them out, the clear goals that Ecuador has proposed, and the mechanisms for achieving them.

33. The Plan contains 12 objectives, each of which contains policies, lines of action and targets to meet by 2017. Goal number seven is of interest to this project, because it refers to respect for the rights of nature and environmental sustainability, with the conditions noted above. The seventh objective, entitled "Guaranteeing the rights of nature and promoting environmental, territorial and global sustainability", includes a policy especially related to the topic of the report, which in turn is called "Knowing, valuing, conserving and sustainably managing the natural heritage and its land-based, aquatic, marine and coastal biodiversity, with fair and equitable access to its benefits."[21] This policy confirms that it is necessary to conserve and sustainably use biological diversity and genetic resources, so that they can be researched to develop bio-knowledge[22].

34. The Plan envisages a strategic transition in the country's economic production model, from a primary goods export economy (i.e. oil-based), to an economy based on exporting goods with added value generated through knowledge creation and social and technological innovation. This transformation

[19] Article 279 of the Constitution.
[20] Article 280 of the Constitution.
[21] Policy 7.2.
[22] The National Plan for Good Living defines bio-knowledge as: "the set of know-how, knowledge and applications, both traditional and scientific that derive from the study, understanding, research and sustainable use of biological diversity."

process involves building institutional coordination to succeed in creating strong links between economic, social and environmental dimensions. To accomplish this, there is a need to expand scientific and technological knowledge, based on environmental sustainability[23]. The possibility of achieving a productive structure based on technological knowledge depends largely on investment in research, development and innovation (R + D + I); there is a need to develop a culture of scientific research in the country, and to encourage the publication of articles and indexed journals. Research and the exchange and development of new technologies need to be made more effective, as well as the transformation of the productive matrix to recognize and value the genetic resources of Ecuador's biodiversity.

35. Furthermore, the Plan establishes the need for promoting the participation and benefit-sharing of communities, peoples and indigenous groups in recognition of their contribution to the generation and utilization of bio-knowledge in Ecuador. Sustainable management is the cornerstone of developing projects related to genetic resources, particularly given the emphasis on developing research to foster bio-knowledge and biocommerce, with the participation of communities, peoples and indigenous groups. Hence, there is a need to mainstream genetic resources in national policies as a potential strategy for economic development, and this project offers the means to achieve this.

Part I.B. Baseline Course of Action

1.5. Threats to biodiversity

36. More than a third of the world's 7,388 species of amphibians are experiencing severe declines and extinctions. In the last decades of the 20th century the extinction rate of amphibians exceeded at least 200 times the average extinction rate of the last 350 million years. Since 1990, Ecuador, along with other countries of the world, has reported massive extinctions and drastic declines of amphibian populations. 186 species are now in extinction risk categories - an underestimation given the insufficient data to confirm the status of 30% (159) of the country's amphibians. Among the ones included in risk categories, at least 19 species are Possibly Extinct. Amphibian population decline and extinction-risk are highest in Ecuador's montane ecosystems – the Paramos, Andean and montane forests on both Andean slopes.

37. Three factors contribute significantly to the catastrophic crisis facing amphibians: climate change, infectious diseases, and habitat loss:

38. *Climate Change:* In the last century, the temperature increases in the Andes of 2 - 8.8°C is dramatically more than the global mean increase of ~ 0.7°C. Increased variability and overall decline in rainfall as well as increase in temperatures are predicted over large parts of Ecuador's west coast and could increase the incidence of fires that are common during the summer due to its equinoctial position, el Niño, etc. Because of their permeable skin, biphasic lifecycles and unshelled eggs, amphibians are extremely sensitive to small changes in temperature and moisture. The timing of amphibian breeding is largely driven by environmental cues such as temperature and moisture[24]; because of this, their breeding phenology may be directly affected by global warming. It is likely that climate change is also affecting amphibian populations in subtle more complex ways. For example, local changes in the environment can decrease immune function and lead to pathogen outbreaks and elevated mortality. Furthermore, changes in climatic conditions may become more favorable for growth of a pathogen, such as the chytrid fungus (*Batrachochytrium dendrobatidis*).[25]

[23] Senplades, 2013
[24] Carey and Alexander, 2003
[25] AmphibiaWeb. 2014

39. *Infectious Diseases:* Global warming is also likely to create more favourable conditions for the development of pathogens, such as fungus and viruses, including the chytrid fungus (*Batrachochytrium dendrobatidis*), which helps spread chytridiomycosis, a disease lethal to most amphibians. In Ecuador, climate change, chytridiomycosis and their synergistic effects are reported to have the greatest impact on amphibian population decline. There is a match between the distribution of the pathogen that causes chytridiomycosis and the Ecuadorian montane forests where amphibian endemism and vulnerability is high.

40. *Invasive species:* Approximately 50 years ago, trout were introduced to Ecuadorian waterways for sport fishing. Given its invasive nature, it has replaced native species in Ecuador's waterways, particularly those that are high-altitude. The threat from trout resides in its appetite for frog eggs and tadpoles, thereby putting at risk the ability to maintain viable populations of endemic amphibian species, such as the Sad Harlequin frog (*Atelopus nanay*).

41. *Loss of Habitat:* Already vulnerable populations are further threatened by deforestation rates ranging from 77,647 to 89,944 ha /year (MAE, 2012). These are caused mainly by the expansion of the agricultural frontier, the effects of mining and oil drilling, as well as human infrastructure, ultimately resulting in huge impacts on habitat loss and fragmentation, causing population extinctions and the consequent interruption of gene flow between populations. Indeed, the principle drivers of habitat destruction, fragmentation and contamination in the Cordillera del Cóndor are agriculture, livestock, forestry and mines[26].

42. Ecuador's government has launched a large-scale initiative to explore and extract gold and copper, where five of the seven flagship mining projects (Panantza - San Carlos, Fruta del Norte, Mirador, Condor Mining and Santa Barbara), are located in the Cordillera del Condor[27]. Of these, the flagship mining project that currently has a signed contract for the extraction of copper, gold and silver is Mirador with China's Corriente Resources, SA[28], thereby constituting one of the greatest threats facing the unique ecosystems of the Cordillera del Condor[29]. This activity would cause deforestation of harvested areas, soil erosion, population decline of species, and pollution of soil, rivers and streams. In addition, mining encourages the construction of roads, producing destruction and/or fragmentation of the Cordillera's ecosystems, and the introduction of invasive species and diseases[30]. In this context, the health of aquatic ecosystems in this area would also be threatened with a major impact on the diversity of frogs, as they provide breeding habitat for many species. The fact that many species of amphibians in this area have a restricted distribution makes them highly vulnerable to extinction[31].

43. The specific threats faced by amphibians in the areas to be covered by the project are detailed below in the following Table.

Table 5: Strategic Interventions to Combat Threats to Priority Amphibian Species

Species	Threats[32]	Interventions
Atelopus nanay	Pathogens (chytrid fungus) Climate Change (temperature and rainfall abnormalities)	*Ex situ* conservation *In situ* conservation Bioprospecting

[26] Guayasamin et al., 2011
[27] ARCOM, 2014
[28] Ministry of Non-Renewable Resources, 2012
[29] Armendariz et al., 2014
[30] Guayasamin et al., 2011
[31] Almendáriz et al., 2014
[32] Ron and Merino-Viteri 2000; La Marca et al. 2005; Pounds et al. 2006

Species	Threats[32]	Interventions
	Loss and fragmentation of habitat Invasive species (trout)	
Dendrobates (Excidobates) condor	Loss and fragmentation of habitat	*Ex situ* conservation
Atelopus sp. nov. aff. palmatus	Loss and fragmentation of habitat	*Ex situ* conservation
Atelopus coynei	Pathogens (chytrid fungus) Climate Change (temperature and rainfall abnormalities) Loss and fragmentation of habitat Invasive species (trout)	*In situ* conservation
Atelopus sp. (*aff. longirostris*)	Pathogens (chytrid fungus) Climate Change (temperature and rainfall abnormalities) Loss and fragmentation of habitat Invasive species (trout)	*In situ* conservation
Atelopus balios	Pathogens (chytrid fungus) Climate Change (temperature and rainfall abnormalities) Loss and fragmentation of habitat	*In situ* conservation
Agalychnis spurrelli	Loss and fragmentation of habitat	Bioprospecting
Cruziohyla calcarifer	Loss and fragmentation of habitat	Bioprospecting
Hypsiboas picturatus	Loss and fragmentation of habitat	Bioprospecting

44. Because the causative factors are diverse and their action is synergistic these threats are likely to spiral further and decisive emergency action is required. Habitat protection alone will not ensure their conservation. Rather, in several cases *ex situ* conservation measures are the only hope until adequate strategies to secure wild populations can be developed. The impact of the alarming extinction crisis facing Ecuadorian amphibians may be even greater if the amphibian diversity is taken to account as a genetic resource. With the extinction of Ecuadorian amphibian species the possibility of discovering new compounds that could be used for improving human health is being lost.

45. Precisely because of the importance of amphibians as biological and genetic resources, and high level of threat, this project will focus on this group of vertebrates as it offers the possibility of deriving win-win solution from an integrated approach of *ex-* and *in situ* conservation and it will provide an appropriate model on which to strengthen the country's capacity for ABS.

1.6. Baseline Analysis

46. The baseline investment for this project consists of foundational initiatives to conserve amphibian through *in situ* and *ex situ* means; to further on-going bioprospecting research; and institutional efforts to enable ABS frameworks. This has been estimated over five years at US$ 35.64 million. The GoE will continue to invest some US$ 18.20 million for *in situ* conservation within the PANE providing continued conservation to 50% of the amphibian species. Outside the PANE, a network of private reserves will continue to be supported by the Socio- Bosque programme which is an incentive for private land owners to set aside land. However, the mapping of critical habitats against private lands is incomplete, so this national baseline expenditure is not available. Indicative examples are the continued work of Centro Jambatu (Fundación Otonga) in maintaining a network of private reserves covering 2,000 hectares with the goal of protecting critical habitat of threatened species in the Ecuadorian Chocó, Andes and Amazon regions (Otonga, Otongachi, Otokiki and Otoyacu Reserves). The Otokiki Private Reserve (Esmeraldas Province, Alto Tambo) is taking concrete conservation actions for population enhancement of the devil frog (*Dendrobates sylvaticus*) and monkey frogs (*Agalychnis spurrelli, Cruzyohyla calcarifer*) and the colourful frog (*Hypsiboas picturatus*) through habitat enrichment. Also there are 3 initiatives in which

Municipal local governments have focused efforts to ensure the conservation of amphibians and their habitat, and these are: 1) the case of *Atelopus sp.* (Limon) by the Municipality of Limon-Indanza (Morona Santiago province), where current Centro Jambatu's staff led the initiative; 2) the Municipality of Quito's declaration in 2012 that the Andean marsupial frog (*Gastrotheca riobambae*) and the rocket frog of Quito (*Hyloxalus jacobuspetersi*) were **flagship species**; and 3) the Municipality of Cuenca, in cooperation with Amaru Amphibian Rescue Center, implemented a project for rescue, reproduction, reintroduction and repopulation of the arrowpoint and marsupial frogs of Azuay, recovering 10 urban public spaces for this purpose.

47. Despite important efforts, *in situ* conservation strategies are not enough to face amphibian population crisis. Field research and anecdotal observations indicate that amphibians have gone missing in diverse geographic areas and environments regardless of the protection afforded by these locations. Thus, effective amphibian conservation requires an integrated multi-disciplinary strategy of *in-situ* and *ex situ* actions to address the causes of declines and slow or reverse the losses.

48. *Ex-situ* conservation efforts have preliminarily been estimated at US$ 4 million based on projection of expenditures since the drafting of the Strategic Plan in 2005. This includes Centro Jambatu, established in 2011 to preserve and safeguard Ecuadorian amphibian diversity at high risk of extinction and the Amaru Amphibian Rescue Center founded in 2007. The "Arca de los sapos" programme (Toad's Ark) of Centro Jambatu manages populations of 13 endangered amphibian species in captivity and has developed successful technological packages including improved management protocols, biosecurity measures, adequate diets for different species, captive management for the reproduction of five species including 2 critically endangered harlequin frog species (*Atelopus elegans Atelopus sp.(spumarius pulcher* complex); and the endangered marsupial frog (*Gastrotheca riobambae*). Meanwhile, Amaru Amphibian Rescue Center manages three endangered species (*Gastrotheca pseustes*, *G.* sp. nov. *(litonedis* complex*)*, *Hyloxalus vertebralis*) and two *Atelopus*, one of which (*Atelopus nanay*) is highly endangered. In parallel, a number of research institutions are improving their Amphibian Genome banks (over 12,000 samples of tissue have been stored so far) to support conservation of genetic resources (e.g. Centro Jambatu, Universidad Tecnológica Indoamerica and Museum of Zoology of Pontificia Universidad Católica del Ecuador). These efforts represent an important foundation and have been recognised internationally - Centro Jambatu was nominated as an international management model by Amphibian ARK - yet more is needed.

49. *Bioprospecting Research.* Skin secretions of amphibians have not been studied in depth, although peptides (small proteins) have received special attention worldwide because of their antimicrobial, antifungal, anti-parasitic and antiviral activity, and their vasoactive properties which have potential biomedical applications. Studies of the bioactive properties of these amphibian molecules are a relatively new branch of research. In biomedicine, pexiganan acetate (MSI-78) derived from magainins of *Xenopus laevis* was tested as a topical agent against infected foot ulcers in diabetic patients. This compound reached stage III, with 90% of cure or improvement but did not receive FDA approval as its effectiveness has not been sufficiently demonstrated. Other potential applications include properties against Acne vulgaris with acyclic brevinin-1 RV-23 peptide from *Rana draytonii* which could have a dual benefit effect as antibacterial and anti-inflammatory agent. For the treatment and prevention of periodontal disease Caerulein precursor fragment CPF-AM1 of *Xenopus amieti* has antimicrobial activity against *Streptococcus mutans* and *Lactobacillus acidophi.* Epibatidine, a substance discovered in the skin of the Ecuadorian frog *Epipedobates anthonyi*, is an example of the potential benefits that Ecuador could obtain from genetic resources of amphibians but only if legal frameworks are in place.

50. The Therapeutics Molecular Laboratory at Queens University focuses its research interests towards the discovery of novel peptides from amphibian venoms, which may have clinically-important effects or may serve as leads for drug development. The group has so far studied 50 species of

amphibians. Among the discoveries, is a peptide from the giant Mexican leaf frog that can reduce blood pressure and acts as an anti-coagulant. Other peptides, from the North American pond frog, seem to influence the growth of tumours and might be useful in the treatment of cancer. Several of the molecules devised by these researchers have been patented and there is hope that some of them will eventually find a commercial home.

51. In Ecuador, pioneering work of young Ecuadorian Biologists has revealed the potential of some chemical compounds extracted from 8 species of Ecuadorian amphibians and several local efforts to analyse the secretions of the frog *Agalychnis spurrelli* testing for antimicrobial, antifungal and anticancer activity have had promising results. However, investigations to isolate and chemically characterize the active compounds are needed. Currently, only one Ecuadorian Biologist is pursuing PhD studies on the bioactive properties of chemicals extracted from the skin of amphibians through a National Secretariat of Science and Technology (SENESCYT) scholarship in one of the world's most important research centers for bioprospecting skin secretions of amphibians (Queen's University in Belfast, Ireland). Under this scenario, bioprospecting research of skin secretions of amphibians is initiating in Ecuador with the collaboration of Queens' University and IKIAM Regional Amazonic University – a recently-created public institution whose research mission includes bio-propecting of amphibian skins to discover potential pharmaceutical compounds -, the Centro Jambatu – an Ecuadorian Institution dedicated to Research and Conservation of Amphibians - and the National Environmental Authority (MAE), with a projected baseline expenditure of USD 6.51million. This focuses on 4 Ecuadorian frog species: *Agalychnis spurrelli*, *Cruziohyla calcarifer*, *Hypsiboas picturatus,* and *Atelopus nanay* with a high probability of containing new and unique peptides in their skins, with many interesting bioactive properties. This research is novel and may open an important window of opportunities for strengthening technical and scientific capabilities in bioprospecting.

52. *ABS frameworks*: The GoE will continue supporting the MAE and its Genetic Resources Unit as the National Regulatory Authority responsible for reviewing and processing access requests; together with personnel from National Institutions with an ABS assessing role (e.g. MAGAP, INIAP, INP, INOCAR and SENESCyT). To date these are limited (see Part 1.8 Barriers) but are expected to increase with ratification of the Nagoya Protocol. The MAE will continue supporting development of a Unified Environmental Information System (SUIA) as an online platform that covers all services provided by the Ministry to the citizenry. A key part of this is a Biodiversity Information System (SIB) with information needed to monitor and manage Ecuador's Natural Heritage and provide inputs for different CHM procedures. A SIB Biodiversity Information Module will include an information toolbox allowing a direct link with stakeholders (academia, private and public sector and citizenry). This currently accesses Herbarium plant record databases of the Pontificia Universidad Católica del Ecuador, It does not yet include amphibians but will be the basis on which interconnected data platforms for amphibian diversity and tools can be built to improve processes on ABS. Centro Jambatu has a bioinformatic platform with a free-access online encyclopaedia: AnfibiosWebEcuador, under development. Complete profiles have been published for 72 Ecuadorian species. This platform is being updated to a more versatile computer language (PHP) for user-friendly interfaces for both entering information in databases and accessing online. A baseline investment estimated at USD 6.70 million for this and government support of a SUIA technician during the first 3 years of the project.

53. Despite these important initiatives for conservation of amphibians in Ecuador, priority actions and conservation measures remain insufficient to conserve the nation's amphibians given levels of threat, and the likelihood of increases with climate change. Habitat protection as the only or main strategy does not guarantee the conservation of many amphibians; some require immediate emergency action in captivity (ex situ) to secure them through this extinction crisis, ensuring the offspring produced are genetically viable, capable of contributing to self-sustainability and keeping their potential contribution to biomedicine. For some species (at least 19) it may be too late: the Ecuadorian harlequin frog "jambatu"

(*Atelopus ignescens*), abundant until the 80s in PAs such as the Cotopaxi National Park is now considered as Possibly Extinct. With no populations or individuals of these species in captivity and no skin tissues, DNA, skin or sperm kept for future cultures, this biological and genetic resource is lost forever. Yet significant resources are needed to address these challenges, further exacerbated by the disconnection between theory and practice in conservation biology and consequent sub-optimal use of scarce resources.

1.7. Long-term solution

54. The long-term solution advanced by this project is to conserve biological and genetic resources of Ecuadorian amphibians at high risk of extinction through an integrated strategy that links *in situ* (habitat protection) conservation actions with *ex situ* (preserving genetic material and captive breeding insurance colonies) to ensure the sustainability of endangered amphibian populations and genetic material required for bio-discovery efforts that in turn can provide resources for continued conservation efforts as well as multiple benefits for human health. Achieving this goal requires strengthened institutions that work within a strong legal framework, in addition to updated information and available tools to support decision-making processes and thus advancing ABS implementation in Ecuador.

55. However, Ecuador must address three specific barriers that currently prevent the fulfilment of the proposed solution:

- Limited capacity to deliver the extreme measures for the conservation of amphibians.
- Insufficient technology and local capacity for research and genetic resource conservation of amphibians.
- Weak institutional and regulatory capacity for conservation and sustainable use of genetic resources.

1.8. Barrier Analysis

BARRIER 1 - Limited capacity to deliver the extreme measures for the conservation of amphibians.

56. *Ex situ*: For many endemic species of amphibians conservation *ex situ* is the only means to maintain viable populations given current threat levels. Captive colonies represent a crucial element of survival plans for a particular species, and will simultaneously provide important opportunities for research related to disease susceptibility, management and treatments, reproductive biology, and tolerance of environmental elements related to climate and toxins. The successes of the Arca de los Sapos of Centro Jambatu in this direction are laudable yet require up-scaling to address the level of extinction risk present in Ecuadorian amphibian. Captive breeding programmes and conditions required for conservation of genetic material require state of the art knowledge and facilities which are resource demanding both in human and monetary terms. Yet funding conservation in general and *ex situ* in particular is a global challenge, but one which could become a driving force of creative and innovative initiatives to confront the crisis facing amphibians, particularly in Ecuador. The present proposal intends to advance towards a midterm goal of identifying opportunities for expanding and diversifying the sources of funding for amphibian conservation through ABS mechanisms.

57. *Related to Barrier 3 below, is the issue of permits for removing individuals from their current habitat for ex situ conservation.* Without legal permits issued by MAE, efforts to rescue and study highly endangered populations are paralysed. Given the fairly recent evolving nature of the requirements and procedures for obtaining institutional and collection permits for *ex situ* conservation of genetic resources, they still remain fairly unclear or ambiguous, as well as the capacities for receiving, reviewing and approving these permits.

58. *In situ*: As 50% of amphibian species fall outside the public PA system, municipal and private reserves need to be harnessed to meet the growing pressures. The Ecuadorian legal framework provides GAD governments (Provincial, Municipal and Parish) the authority to establish PAs to preserve and maintain natural heritage within its territory and the legislative powers to establish related ordinances, orders and resolutions, but their contribution is still limited due to information-gaps and accessibility on priority habitats for critically endangered species and lack of technical support and guidance on how to create and maintain set-asides. Indeed, to date, only 1 GAD reserve (Siete Iglesias) has successfully been integrated within the SNAP, and thus officially counted in national conservation records. Ecuador conducted an evaluation in 2013 that identified priority areas for protection and conservation which has led to an increase in the creation of PAs at the GAD sub-level but without the full integration of these reserves into the SNAP, these reserves cannot access federal resources to support their management, nor is there accountability with regards to the inclusion of ecosystem data within the national system. Similarly, current incentives for private and community set asides do not specifically include amphibian conservation as criteria. Both GAD and private/community contributions are further limited by the still low awareness of the value that amphibians could provide for bio-medicine and the potential resources that could be derived through benefit sharing.

BARRIER 2 - Insufficient technology and local capacity for research and genetic resource conservation of amphibians.

59. The skin of amphibians is a rich source of chemicals that have a high potential for application in biomedicine, nevertheless they have not been studied in depth in Ecuador largely due to the still limited technical knowledge and essential equipment. There is a clear need for collaboration with international institutions with the required expertise and technical knowledge in this field. In recent years there has been a significant increase in the Ecuadorian pharmaceutical industry, but its importance as a supplier and as a research promoter is still incipient. The Ecuadorian pharmaceutical industry is dependent on imported raw materials and final products, needing to develop programs, projects and strategies that allow Ecuador not only to produce generic drugs, but to develop new molecules with therapeutic effects. While there are tools to analyze the various therapeutic compounds and various synthetic structures, it is important to describe the wide range of natural compounds that exist in Ecuador's biodiversity; in a gradual pursuit of the national, regional and global market, integrally contributing to changing the production matrix. ENFARMA EP (Public Company of Pharmacy) works in four emblematic projects: (i) the pharmaceutical complex pilot plant ENFARMA EP; (ii) research center in natural products that is planned as part of IKIAM Regional Amazonic University; (iii) biotechnology research center, (iv) clinical research center.

60. Biotechnology and biomedicine sectors are characterized by a multidisciplinary membership and a high level of training in terms of human resources that Ecuador does not have yet. While there is a shortage of researchers in the short-term, it is expected that in the midterm an important human talent component will develop with the return of young professionals who are pursuing graduate level studies abroad, granted by a State program of scholarships. Currently, only one student is pursuing graduate degrees in bioprospecting with support from a SENESCYT scholarship. However, strong research programmes in country backed by academia, private sector and government in which their talent can be used are limited. While several universities have laboratories that can perform some basic analyses, there is no fully-functional laboratory in Ecuador that has the capacity to do in-depth bioprospecting and/or cryopreservation for the establishment of a Genome Bank.

61. Furthermore, amphibian defensive skin secretions are complex, species-specific cocktails of biologically active molecules, including many uncharacterized peptides. The study of such secretions for novel peptide discovery is time-limited, as amphibians are in rapid global decline. Ecuador's achievements in amphibian research and conservation are mostly the result of personal efforts, motivated

by research interests and individual leadership. National or institutional policies to foster research have been limited and are not enough given time frames. The recently established partnership of Queens, IKIAM and the Centro Jambatu that counts with Government backing (as illustrated by the endorsement of this project), is an exception. It needs additional support to advance quickly enough to provide the basis for discovery of products and demonstrate the benefits that could be derived from ABS to conserve species of global significance on the brink of extinction. Given the timescales involved, current levels of transfer of technology and knowledge need to be up-scaled.

BARRIER 3 - Weak institutional and regulatory capacity for conservation and sustainable use of genetic resources.

62. *Legal and regulatory:* Despite the enactment of the National Regulatory Regime, implementation has been slow due to a number of weaknesses and shortcomings which have prevented the implementation of ABS and scientific research agreements. The scope of Executive Decree 905 does not provide parameters or guidelines to regulate the fair and equitable sharing of benefits, nor does it establish the procedures for obtaining prior informed consent for genetic resources associated with traditional knowledge. A framework contract model is under development with 34 minimum clauses, covering ABS topics such as intellectual property, benefit sharing (monetary and non-monetary), associated intangible components, technology transfer, and negotiation clauses, among others. Work is being finalized on the development of guidelines to apply Executive Decree 905 on access to genetic resources, regarding fair and equitable distribution of benefits and previous and informed consent, but has yet to begin a process of formalization by the MAE.

63. However, these are still too general to reflect the diversity of situations that surround and characterize different groups of living organisms and more specific model contracts tailored to Ecuadorian realities are needed. There are also various legal frameworks that define issues of access to genetic resources which are focused on different sectors or specific groups of organisms. For example, CONVEMAR has some articles on the use of genetic resources for marine organisms, the International Treaty on Plant Genetic Resources (ITPGR) is focused on a group of plant species as genetic resources for food and agriculture. With the imminent ratification of the Nagoya Protocol an in-depth review of all pieces of legislation on genetic resources is needed including potential modification to the Executive Decree 905 that regulates Decision 391.

64. With respect to broader management instruments for amphibian conservation in Ecuador, the Strategic Plan, whilst highly significant still needs official recognition from MAE for channelling sufficient resources for its implementation. Furthermore, there is no economic valuation of genetic resources specifically related to amphibians. Consequently, the draft Strategic Plan needs to be reviewed and updated with an Action Plan that defines actions as well as costs related to its implementation. In addition, specific and proactive legal frameworks are needed to respond to the new challenges and threats facing amphibians, including emerging new policies promoting mining, oil extraction, and construction of mega infrastructure that will put still further risk of extinction on many endemic populations and amphibian species living outside of PA.

65. The Environmental Authorities (MAE) have an important role during the environmental impact assessments, licensing and monitoring process to ensure high standards and adequate resources and mechanisms for financing proactive and reactive strategies for biodiversity conservation by users (companies' exploration, exploitation, etc). However, low awareness of potential losses and trade-offs, insufficient information on critical habitats, and only incipient research to back-up potential with clear Ecuadorian data are missing, thereby hindering the optimal use of existing EIA regulations.

66. *Institutional:* The MAE has received 39 applications related to genetic resources: 2 for access to genetic resources with economic and / or commercial use that are under negotiation; and the rest for for a framework contract for scientific research purposes, of which 1has been signed with PUCE, 3 have been sent to the requesting entities to sign, 2 are under legal review, 16 that did not respond in more than two months to the information requested, 2 that are in technical review, and 13 that are pending the receipt of specific documentation. The novelty of this type of contract in Ecuador has highlighted a number of institutional deficits/weaknesses regarding the elaboration, review and approval process. For example, several institutions have the mandate to evaluate proposals for research and commercialization, but there is no established process/protocol to guide the process and define times and criteria to ensure an effective and efficient review.

67. This is particularly crucial since, upon ratification of the Nagoya Protocol, a significant increase is expected in requests for access to both basic and applied research to develop products derived from genetic resources and expedited procedures are needed. Currently, the genetic resources unit of the MAE has limited personnel (only 3) dealing with all ABS processes. This needs to grow as a multidisciplinary team and, together with personnel from National Institutions with an ABS assessing role (IEPI, INIAP, SENESCyT, INP, Secretariat of Policy Management), requires training for implementing current Regulations and the Nagoya Protocol, for example, in negotiations, royalties, intellectual property, traditional knowledge, and technical evaluation of research.

68. *Decision making:* Information-gaps and limited access to existing data hinder successful decision making processes by national authorities with some key players still uninformed about the crisis facing amphibians and its potential foreclosing of new strategic priorites for development. The information available for conservation decision-making, the IUCN Ecuadorian Red List of amphibians is updated to 2013, but does not include quantitative parameters for assessing new threats to the amphibians, such as climate change, emerging pathogens, habitat vulnerability, rarity, etc. Moreover, at least 153 species with insufficient data need to be reassessed in light of updated information. Existing information in scientific research centres and academia is fragmented and not connected to the national Biodiversity Information System (SIB). Environmental education and communication to the public and other important stakeholders is still scarce, despite its crucial role.

69. The project will therefore adopt a multi-pronged, progressive approach consisting of three key components which will address the barriers set out above.

1.9. Stakeholder analysis

70. The following is a brief introduction of the main project stakeholders. Section IV Part V provides more details, along with a description of their main roles both in PA management and in the proposed project. The success of the project is understood to depend mainly on the reduction and/or elimination of the three barriers identified as critical for the present project (Section I.8). Nevertheless, the reduction and/or elimination of those barriers will depend in turn on adequate communication among stakeholders and on the level of participation in the work to be shared by those involved in implementing the project.

71. To address the limited capacity to deliver the extreme measures for the conservation of amphibians (Barrier 1), it is necessary to involve the following key stakeholders: (i) MICSE; (ii) MAE; (iii) MRNNR; (iv) SENPLADES; (v) SNGP; (vi) SENAGUA; (vii) CONGOPE; (viii) AME; (ix) GAD; (x) citizenry/communities; (v) Centro Jambatu; and (vi) Amaru Amphibian Rescue Center.

72. To meet the challenges that could arise from insufficient technology and local capacity for research and genetic resource conservation of amphibians (Barrier 2), the additional main actors involved

include: (i) SENESCYT; (ii) National Institute of Biodiversity (INB); (iii) IKIAM Regional Amazonic University; (iv) Queens University; and (v) private sector.

73. Additionally, to meet the challenges that could arise from weak institutional and regulatory capacity for conservation and sustainable use of genetic resources (Barrier 3), the additional main actors involved include: (i) INB; (ii) ABS Assessing Bodies (IEPI, INIAP, SENESCYT, INP, Secretariat of Policy Management); (iii) IUCN; and (iii) compatible projects.

Table 6: Summary of Main Stakeholders

Stakeholders	Implementation role
Coordination Ministry of Strategic Sectors (MICSE)	This Ministry is a key actor in the implementation of the project, and will be responsible for monitoring the effective implementation of its components in each of the institutions that are within its jurisdiction (Ministry of the Environment, Ministry of Non-Renewable Natural Resources, SENAGUA, Ministry of Renewable Energy and Electricity, among others). It will also help to position biodiversity and its genetic heritage as a strategic resource for transforming the production model.
Ministry of the Environment (MAE)	The MAE is the National Environmental Authority of Ecuador, and plays a crucial role in ensuring the conservation and sustainable use of biological diversity. Thus, it will be the primary coordinator of activities within and between the three proposed components. In addition, it will be the agency responsible for implementing the institutional strengthening component. Therefore, as a national beneficiary and funding agency, it must be involved in all of the phases of the project, from design and implementation to monitoring and closure.
Ministry of Non Renewable Natural Resources (MRNNR)	This Ministry is the link between public, private and mixed companies who are governed by the national government's hydrocarbon and mining policies. For this reason, it involvement will help to guarantee coordinated efforts with companies who operate in and have an impact on the ecosystems of amphibians, and can facilitate the definition of emergency *in situ* and *ex situ* conservation actions (Component 1). In this sense, the contribution of the Ministry is to involve its various oversight agencies, especially the Mining Control and Regulation Agency, to take steps to foster the development of responsible mining and to strengthen the strategic sector of biodiversity and genetic heritage.
National Secretary of Planning and Development (SENPLADES)	SENPLADES plays an important technical and coordinating role in bringing together the different levels of government, since it is involved in approving and allocating the resources of the national government and GADs which are co-financing the project. This Secretariat will provide technical assistance and oversight for the planning and implementation processes of the project, in order to guarantee its sustainability in all phases.
National Secretary of Policy Management (SNGP)	It is important to note that the SNGP took over the duties of the Secretariat of Peoples, Social Movements and Citizen Participation, the agency which in the context of Executive Decree 905 is considered to be an evaluating entity for access to genetic resources. Establishing a strategic alliance with this Secretariat will help to consolidate the political will of the project stakeholders, and to guarantee coordinated actions with the Executive branch, especially in the emergency in situ and ex situ amphibian conservation efforts.
National Higher Education, Science and Technology Secretariat (SENESCYT)	SENESCYT will provide fundamental support in strengthening local technical and scientific capacity, promoting the opportunity to bring professional experts in fields related to bioprospecting, to help design, develop and consolidate the country's flagship education projects. In addition, young professionals can benefit from graduate research scholarships to carry out bioprospecting. As an ABS evaluating entity, it will be responsible for guaranteeing that the specific frameworks for access to genetic resources are in line with the parameters of related public policies.
National Secretary of Water (SENAGUA)	To contribute to linking Ecuadorian amphibian conservation efforts, in situ and ex situ, to plans and programs related to water resources. This secretariat will need to include bio-indicators related to amphibians in its water conservation efforts.
Ecuadorian Institute of Intellectual Property (IEPI)	The duty of the IEPI is to ensure the effective enforcement of existing laws and regulations governing intellectual property, genetic resources and traditional knowledge, including the legal protection of traditional knowledge. It will also be the beneficiary of the training and exchanges of information facilitated by the project.

Stakeholders	Implementation role
ABS Assessing bodies	Some Government institutions and national research institutes are assessing bodies, responsible for developing evaluation reports on research and development proposals on Ecuadorian genetic resources. These reports help the MAE granting or denying access permissions. They include the Ministry of Agriculture, Livestock and Fisheries (MAGAP), The National Institute of Agricultural Research (INIAP), the National Fisheries Institute (INP), the Naval Oceanographic Institute (INOCAR), the newly created National Institute of Biodiversity, among others. They will benefit from training and information exchange and will coordinate with sectorial programs of relevance.
IKIAM Amazonic Regional University	One of the lines of research of the IKIAM is the bioprospecting of amphibians, and therefore it plays an important role in supporting implementation, especially in component two of the project, although its will also be involved through its qualified scientists who will support the implementation of a number of lines of action. Furthermore, the university will be one of the national institutions to benefit from the exchange and transfer of technology.
Autonomous Provincial Government Consortium (CONGOPE)	The CONGOPE will facilitate coordination with the provincial GADs, and serve as allies to help strengthen the political will of the corresponding authorities. The Environmental Management Office of CONGOPE will provide advice, technical assistance, accompaniment, training and institutional strengthening in the area of environmental management and integrated water management.
Ecuadorian Municipalities Association (AME)	The participation of AME in the project would involve efforts to strengthen the capacities of municipal governments in the area of environmental management, especially related to in situ conservation efforts. As a contribution to project implementation, the institution will provide the services of advisors and technicians who will help to prepare and implement the technical inputs needed to fulfill the project objectives, including: linkages with local physical and zoning plans, the determination of conservation areas, the design and implementation of special ordinances to regulate land use, and building institutional capacities for environmental management.
Decentralized Autonomous Governments (GAD)	There are three types of GADs: (1) Provincial: the exclusive mandates of provincial governments include guaranteeing the provision of public services, fostering provincial economic activities, and environmental management, and they can also designate provincial conservation areas and as such will be key partners in Output 1.2. (2) Municipal: municipal GADs are legally authorized to maintain and preserve the natural heritage within their jurisdictions. (3) Rural Parish governments: Parish GADs are strategic partners because of their closeness to the population, and their potential to help generate associative processes related to the proper management of possible *in situ* conservation zones.
Citizenry and Communities	Ecuadorians have to defend their territorial integrity and natural resources, as well as respect the rights of nature, preserve a healthy environment and use natural resources in a rational and sustainable manner. In this sense, the *in situ* conservation component provides for declaring protected areas for the preservation of amphibian species. As a result of these actions, these territories will have special management characteristics which will guarantee their sustainable development. Additionally, with this project citizen will benefit from information made available to them about the projects faced by amphibians and their enormous potential as the source of genetic resources, through their participation in citizen science projects.
International Union for Conservation of Nature (IUCN)	The IUCN will provide technical support in updating the red list of endangered species of amphibians in Ecuador.
Jambatu Center Amphibian Research and Conservation (Otonga Foundation)	The Jambatu Center will implement the *ex situ* conservation components of Outcome 1; it will provide support to the activities of the MAE as a scientific advisor for institutional strengthening efforts, and will be a local scientific partner for the research and bioprospecting components of Outcome 2.
Amaru Amphibian Rescue Center (Cuenca)	The Amaru Rescue Center will work with the Jambatu Center to co-implement the *ex situ* conservation component, to rescue and breed one of the target species in captivity (*Atelopus nanay*). In addition, it will help with searching for and gathering species in the southern part of the country to use in the Genome Bank.
Private sector	The engagement with the private sector, specifically the pharmaceutical industry, is intended to channel basic investment processes in order to attain profitability for those products that do have commercial potential.

Stakeholders	Implementation role
Telecom, water and sewerage Public Company (ETAPA EP)	ETAPA EP is a company of Municipal Public character, which in addition to providing potable water, sewerage, sanitation and telecommunications in Cuenca, runs a series of activities aimed at integrated water resource management and develops an environmental management policy within the jurisdiction of the canton Cuenca. ETAPA is a strategic partner to the A. nanay in situ conservation because in 2010, the "Delegation Agreement between the Ministry of Environment and Municipality of Cuenca, for the management of Cajas National Park" was signed, which put ETAPA EP in charge of running the Cajas NP through its Department of Environmental Management.
Indigenous Peoples and Nationalitics of Ecuador	There are no known traditional uses by the indigenous nationalities and peoples of Ecuador of the frog species subject to this project's studies. If new peptides are discovered and new products with commercial value are likely to be produced indigenous nationalities such as Awa and Tsáchilas as stakeholders would receive benefits when the distribution of the species subject to bioprospecting analysis overlaps with the territories of these nationalities.
Molecular Therapcutics Laboratory of Queen's University	The Queen's University of Belfast will be in charge of carrying out research on the skin scerctions of amphibians in order to synthesize chemical compounds to be analyzed by bio-medicine professionals, and will play a decisive role in transferring technologies and building research capacities in the field of amphibian bioprospecting.

74. At the organizational level, stakeholders involved in amphibians and ABS include: a) Governmental Organizations (GOs), Non-governmental Organizations (NGOs), Grassroots and Community Organizations (COs), Private Companies, Universities, Research Centers, and International Cooperation Agencies. Please see Section IV Part V for more detail.

PART II: Strategy

Design principals and strategic considerations

2.1. Project Rationale

75. The GEF's incremental funding and co-funding resources will be used to overcome the above mentioned barriers. It will contribute to the long-term solution through 3 interconnected strategies: (i) Supporting emergency actions to ensure the survival of highly endangered amphibian species for conservation and bio-prospecting purposes; (ii) advancing multi-partnership research for the discovery of active compounds derived from the skin secretions of Ecuadorian amphibians with potential applications in biomedicine as a basis for advancing future ABS benefit-sharing agreements; and (iii) strengthening key institutions for the implementation of biodiversity conservation measures and sustainable use of its genetic resources in Ecuador, to provide the enabling conditions for the first two strategies. Collectively these will provide the integrated approach needed to conserve amphibian diversity of outstanding global significance and put in place a consolidated ABS framework that will, in the mid-term, provide an effective conservation mechanism for Ecuador's highly significant natural heritage and for safeguarding sustainable development options for the future.

76. To accomplish this, the project will work at different levels- local and national - and with different stakeholders - government, academia, and communities. Outcome 1 has a direct impact at the local level with GAD authorities and communities associated with the new conservation areas to be established by the project. Meanwhile, the interventions in a national park will ultimately permeate at the national level through the impact on PANE and SNAP management practices. Furthermore, the outcomes will be interactive over time and between the different scales. For example, the national level work will provide enabling conditions for support to local level work (e.g. systematized procedures for permits) that test specific conservation strategies upon which will enable further policy and regulatory frameworks to be built as the project progresses. These in turn provide the framework for upscaling. The project also

offers an important interface between bioprospecting and conservation, e.g. the project will support the creation of Inter-Institutional agreements for technology transfer and capacity building to enhance the research and development capabilities in the country (provider). This thus also feeds into policy and regulatory frameworks as it will contribute to compliance with Articles 22 (Capacity) and 23 (Technology Transfer, Collaboration and Cooperation) of the Nagoya Protocol. The advances in R&D capabilities of the Ecuadorian institutions to identify potential products from amphibian species will provide a basis on which ABS agreements can be reached between users and providers which will render monetary and non-monetary benefits that will assist in conservation. This interaction enables the delivery of direct impacts to conservation within the life of the project but also the framework to expand to more amphibian species post project and still further beyond to other groups.

77. In order to further maximize specific benefits within the life of the project, a careful selection of species and sites has been undertaken based on studies in the PPG phase. The criteria for selection were:

A) Site selection of areas where species are in imminent danger of extinction from habitat destruction:

- The presence and planning of development and/or extractive activities, i.e. mining

B) Site selection of areas with critical habitat and the potential to upscale into SNAP and PANE:

- GAD Reserves: a) potential to fill gaps in coverage of critical habitat for highly endangered amphibians; b) local government interest and support in establishing a GAD conservation area; c) presence of populations of target species.
- National Park: a) interest of management unit to pursue amphibian-based conservation measures; b) experience in monitoring ecosystem health, i.e. water quality; c) presence of populations of target species.

C) Selection of 3 sets of species based on their potential to provide maximum contribution for each conservation strategy:

- *Ex situ* criteria emphasizes highly endangered species and the urgency and potential to safeguard them with two long-term goals in mind: i) conserve highly endangered species that form a part of Ecuador's wealth in biodiversity; ii) maintain stable, genetically viable captive-bred populations that will eventually be subject to bioprospecting without harming native populations.
- *In situ* criteria emphasized the species that a) are highly endangered and yet also have a high potential for conserving populations *in situ*; b) can provide important lessons on how to do habitat restoration; c) have previously-rescued "founding" individuals in Centro Jambatu and/or Amaru Amphibian Rescue Center that can provide lessons learned from experience garnered through their rescue and captivity; and d) could be a source of individuals for bioprospecting in a further distant future at which point all the details and processes for negotiating resources would be in place and ABS could truly provide resources for PA management.
- Bioprospecting: a) Species that already have a high potential for potentially commercial products, thereby providing an opportunity within the life of the project to make tangible progress toward optimizing technology transfer and developing potential examples for permits, agreements for return of benefits, etc.; b) species that are already being bred for biotrade so there is no risk of reducing their native populations *in situ*.

78. The prioritization exercise based on the above criteria determined the following species to be targeted by the proposed initiative, as well as the interventions to be pursued in specific sites:

Table 7: Target species, origins, and selected interventions

Species	Origin / Intervention Site	In Situ	Ex Situ	Bioprospecting
Atelopus nanay	Cajas National Park (Cajas NP)	X	X*	X
Dendrobates (Excidobates) condor	Canton Paquisha (Zamora Chinchipe)		X	
Atelopus sp. nov. (aff. *Palmatus)*	Nangaritza Canton (Zamora Chinchipe)		X	
Atelopus coynei	Carchi PA	X*		
Atelopus sp. (*aff. longirostris*)	Carchi PA	X*		
Atelopus balios	Guayas PA	X*		
Agalychnis spurrelli	Northwest Ecuador/ captive bred for biocommerce**			X
Cruziohyla calcarifer	Northwest Ecuador/ captive bred for biocommerce**			X
Hypsiboas picturatus	Northwest Ecuador/ captive bred for biocommerce**			X

* Species with previously-rescued "founding" individuals in Centro Jambatu and/or Amaru Amphibian Rescue Center.

** Species currently captive bred for biocommerce, with original specimens collected from Northwest Ecuador (Esmeraldas Province)

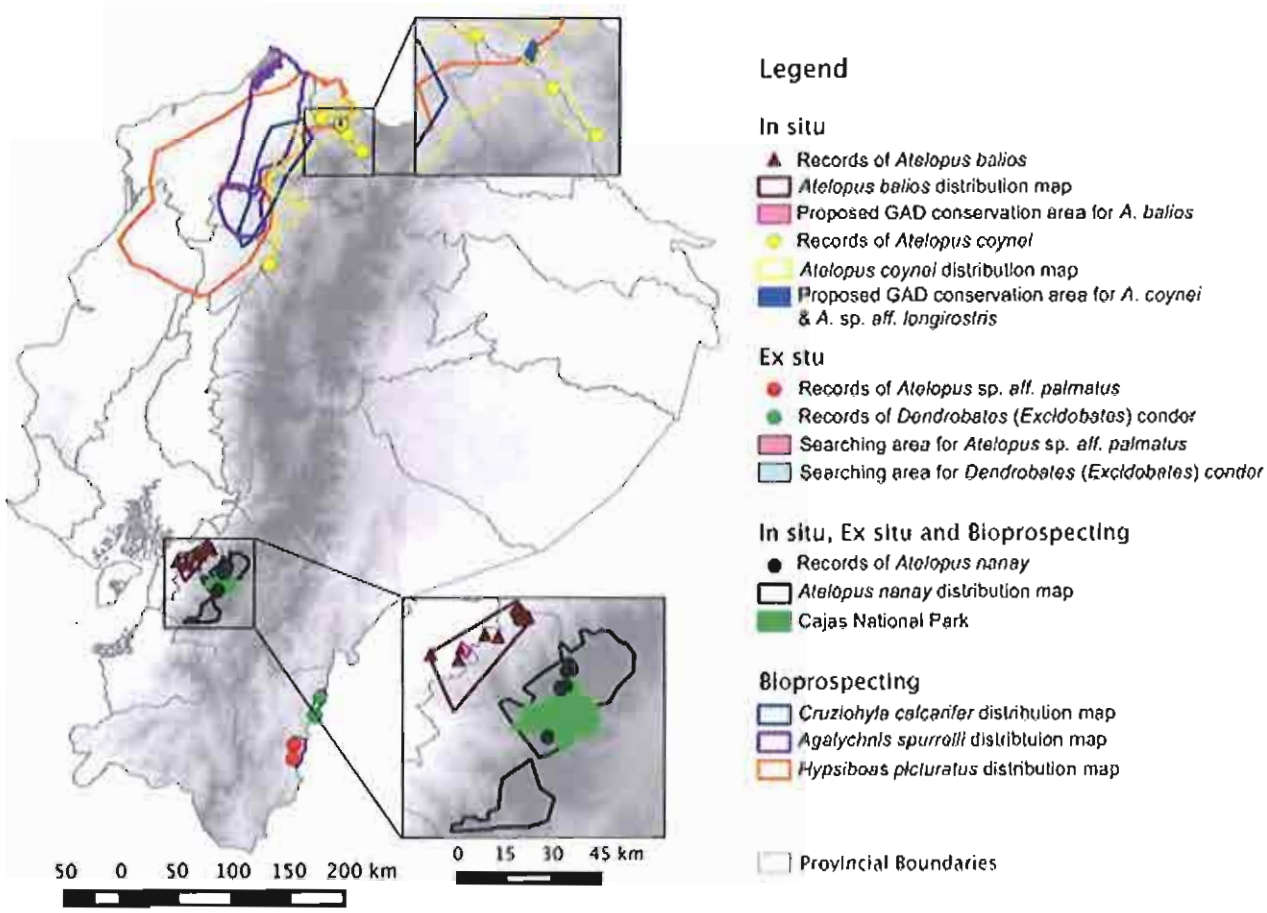
79. The Site selection resulted in the following priority areas:

- *Ex situ:* The project will pursue search and collection of parental individuals for *ex situ* conservation species along the Cordillera del Condor in areas with recent reports/sightings of the target species. This geographic area was chosen due to imminent threats to the target species from habitat destruction, fragmentation and pollution caused by agriculture, livestock, forestry and mining activities underway in the area. Furthermore, preliminary investigations in the area suggest a high level of endemism and biodiversity, with high probability of new species [33].It is important to note that the areas where the target species for this project are found are situated outside the protected areas of the Condor Cordillera which in combination with the pressure for large-scale mining operations, decreases the possibility of establishing conservation activities in situ to protect these endangered species. The threat to amphibians is so imminent, especially for those species classified at high risk of extinction, that if no emergency measures (such as protection ex situ) are taken, their chances of survival in the wild could be seriously reduced if located in the same area as a mining concession

- *In situ:* The project will pursue in situ conservation through the establishment of 2 new Provincial GAD reserves (Carchi and Guayas) and the strengthening of management effectiveness through amphibian-conservation measures in Cajas National Park (PANE -Azuay). In Carchi Province, the project will support the establishment of a Provincial GAD Reserve along the Chinambí Chico River in the Parish of Jijón and Caamaño, Mira Cantón. In Guayas Province, the project will support the creation of a Provincial GAD in Naranjal Canton, along the border with Azuay. These Provincial GADs were chosen for their commitment to conservation and their interest in conserving the critical habitat of the highly endangered amphibian species prioritized by the project. These Provincial GADs already have conservation units and technical capacities established, and as such provide a higher probability of sustainability post-project, as well as replication in other areas within the provinces.

[33] Guayasamin et al. 2011

Map 1[34]: Geographic distribution of the project's target species and their corresponding intervention sites and conservation strategies[35]



[34] SUIA 2014, Amphibiaweb.org, Centro Jambatu 2015, AmphibiaWebEcuador 2015, Andreas Kay (no publicado), CONDESAN (2012). **Elaborado por:** Centro Jambatu 2015

[35] Distribution maps are unavailable for undescribed species: *Atelopus* sp. aff. *Longirostris, Atelopus* sp. aff. *Palmatus* and *Dendrobates* (*Excidobates*). While the project will use captive-bred specimens for bio-prospecting, these species (with the exception of *Aelopus nanay*) are widely distributed and even if the project were to collect specimens from native populations for bioprospecting, there would be no harm to their chances of survival.

***Atelopus nanay* (Sad harlequin Frog)**

80. *Atelopus nanay* is endemic to the Andean highlands of southern Ecuador and is found across the Western Cordillera between 3600 and 4100 meters. Populations have been reported only in the kind of locality found in "Las Tres Cruces" (Cajas National Park), and in the valley surrounding the headwaters of the River Patul, around the lagoons of Jigeno and Patos[36] and in the Chalpi-Saguangal Forest. Recorded sightings from the Cajas National Park are historic and date back to the eighties; where it was last seen on July 28th, 1989. The most recent records come from the Patul River valley, where the habitat has been deforested and replaced by intensive agriculture and livestock. The decline in populations could be caused by synergetic effects of chytrid fungus, climate change, habitat degradation and the impact of the introduction of trout. Their restricted geographical distribution and evidence of significant population declines were the criteria used to classify this species as Critically Endangered[37].

81. Because of their vulnerability and the high interest in conserving this, the only species of the *Atelopus* genus to recently be found in the Andean highlands, as well as for the possible presence of peptides of biomedical interest in its skin, this project has identified *Atelopus nanay* as a target species within each of the three strategies covered by the project: conservation *in situ*, *ex situ* and bioprospecting. The bioprospecting potential of *Atelopus nanay* could produce future monetary benefits that could directly feed back into the Cajas National Park, thereby supplementing the PA's financial sustainability programme, and further supporting in situ and ex situ conservation.

***Dendrobates (Excidobates) Condor* (Condor poison frog)**

82. This species of poisonous frog was recently described[38]. Its known geographical range is 7 km2 and the area it inhabits covers a small altitudinal range between 1800 and 1900 m in the Condor Cordillera. These factors tightly restrict this species to the unique mountainous landscape of southeastern Ecuador. It belongs to the group of poisonous frogs found at altitudes where a large proportion of the species fall within Red Alert List categories. Very little is known about the natural history, conservation status and population dynamics of *Dendrobates condor*, either in the wild or in captivity. The species has not been evaluated for the IUCN Red Alert List; however, it was included in the Data Deficient (DD) category[39]. According to a recent study[40] Data Deficient species are more likely to be in extreme danger of extinction than species which can be assessed, especially in regions such as South America.

***Atelopus* sp. nov. (aff. *palmatus*) (Harlequin Frog Condor)**

83. The species was found at two study sites[41] at altitudes ranging from 1,200 to 1,800 meters. In one of the two places where this species was found adults and tadpoles looked healthy and in experimental tests for the quítirido fungus (Batrachochytrium dendrobatidis) there was no evidence of the pathogen. In addition, this report describes the tadpoles of this new species of Atelopus living in black and acidic water, which is a unique adaptation, as yet unreported in this genre.

84. Also, Guayasamin et al. (2011) establish a series of recommendations with regards to this species whjch was previously unknown to science, and urge that the following action should be taken: 1) restrict the access of people (locals and tourists) and exotic animals to the site so as to reduce the likelihood of diseases being introduced (e.g. chytrid fungus.) that can be lethal to harlequin frogs and other amphibians; 2) implement a research plan that establishes the status of this population of harlequin frogs and their

[36] Arbelaez-Ortiz and Vega-Toral, 2009
[37] Coloma and Quiguango-Uvillús, 2011-2015
[38] Almendáriz *et al.*, 2012
[39] Almendáriz y Brito, 2013
[40] Howard y Bickford, 2014
[41] Guayasamin et al, 2010 & 2011

viability; and 3) carry out searches in surrounding areas to establish whether there are additional populations of this and other species of Atelopus. Finally, it is important to note that besides the discovery of this new species, Guayasamin et al. 2011 take preventative measures against any possible impact that mining would have in the Condor Cordillera. In light of this and the rapid pace of such activities, it is essential to establish a program of ex situ management to ensure the healthy existence of the species as a precautionary measure against other possible threats (chytrid fungus, climate change).

***Atelopus coynei* (Coyne Harleqnin Frog)**

85. The Coyne harlequin frog is a frog endemic to the cloud forests of northwestern Ecuador. Their geographical range historically covers the provinces of Carchi, Imbabura and Pichincha between the altitudes of 900 and 1380m and across an area of about 2800 km^2. Their populations have suffered drastic depletion, accompanied by the reduction of forest cover and habitat loss[42]. It is also speculated that the presence of invasive species in their ecosystem, including both fish such as trout and the pathogenic fungus Batrachochytrium dendrobatidis, as well as the effects of climate change may have contributed to the sudden disappearance of this species[43]. As a result, the Coyne harlequin is danger of extinction; it is a species considered to be Critically Endangered (CR)[44]. The criteria that classify this species as Critically Endangered refer to a sharp decrease in population (> 80%) in the last 10 years and the causes of this decline may not yet have ceased.

***Atelopus* sp. (aff. *longirostris*) (Harlequin frog)**

86. This species has not been studied; the Jambatu Center is doing molecular analysis to learn about their phylogeny, determine their specific status (whether it is a new species) and assess their conversation status. The region surrounding the Chinambí Chico River is the only place where a population of this species has been found. This species probably enjoys a wider geographical distribution but these are not recorded. This species coexists with Atelopus coynei, and these two species are the last populations of harlequin frogs of the Atelopus genus in existence in the western foothills of the Occidental Cordillera in the northern Andes. The project proposes establishing a reserve to protect these two coexisting species in the Chinambí Chico region (Carchi Province, Mira Canton, in the parish of Jijón and Caamano), and as previoiusly mentioned, this region constitutes a conservation priority since it covers two species of the Atelopus genus, the most threatened kind of Ecuadorian amphibian.

***Atelopus balios* (spotted Harlequin frog)**

87. The spotted Harlequin (*Atelopus balios*) is a frog endemic to southern Ecuador which lives in the tropical rainforests of western Ecuador between altitudes of 350m and 650m. It has only been spotted in four locations in the provinces of Azuay, Cañar and Guayas in a restricted 200 km2 area demarked by a polygon. A recent global campaign (led by Conservation International) to search for disappearing frogs confirmed the existence of relictual populations of this species on the border of Guayas and Azuay provinces.The area in which it lives faces a high risk of habitat change due to agriculture, livestock and mining. The devastation of its habitat is extremely marked. Decades ago, rice plantations were the main cause of converting forests into agricultural zones. Today, the remnants of forest at the foot of the Andes are severely threatened by people's euphoria at planting cacao. This species is thought to be in the Critically Endangered category (CR) on the IUCN Red Alert List, because of a sharp estimated decrease in population (80%) over the last 10 years[45]. It is presumed that this species, like other harlequin frogs in the Atelopus genus, may have been affected by pathogens such as the chytrid fungus[46] such as

[42] Coloma et al. 2014
[43] Ron and Merino-Viteri 2000; La Marca et al 2005;. Pounds et al 2006
[44] Coloma et al. 2011-2015
[45] Cisneros-Heredia et al. 2004
[46] Ron and Merino-Viteri 2000

chytridiomycosis, which has been confirmed in the habitat areas where such records exist. Likewise, climate anomalies[47] have also caused a reduction in populations of this species.

88. The text below, as well as Section IV Part II on Amphibian BD, provides further detail regarding each of the species and each of their targeted intervention sites.

2.2. Project Objective, Outcomes and Outputs/activities

89. The **project goal** is to safeguard globally significant biodiversity of Ecuador through building capacity on access to genetic resources and benefit sharing while improving the sustainability of the protected area system through strengthening of GAD reserves. **The project objective** is Ecuador implements integrated emergency actions to conserve the diversity of amphibians of Ecuador and use its genetic resources in a sustainable way. This will be achieved by 3 interrelated outcomes (1. Emergency actions to ensure the survival of highly endangered amphibian species of Ecuador for conservation and bio-prospecting purposes; 2. Discovery of active compounds derived from the skin secretion of Ecuadorian amphibians with potential applications in biomedicine; and 3. Institutional strengthening for the implementation of biodiversity conservation measures and sustainable use of its genetic resources in Ecuador, using amphibians as a pilot case study) and an international strategy that includes national and local actions. The overall results of the Objective will enable the conservation *in situ* and *ex situ* of highly endangered amphibian species; close amphibian conservation gaps by increasing the hectares of critical habitat subject to amphibian conservation measures; increase the flow of resources to amphibian conservation/ABS; and provide the basis for strengthening public policy regarding official guidelines on amphibian conservation and requirements for environmental licensing of development and/or extractive activities that impact on key habitat.

90. The project's outcomes and outputs are described below.

OUTCOME 1: Emergency actions to ensure the survival of highly endangered amphibian species of Ecuador for conservation and bio-prospecting purposes. (Total cost: US$9,810,869: GEF $770,500; Co-financing: $9,040,369)

91. This outcome consists of emergency actions to counteract the imminent risk of extinction that several Ecuadorian species are facing in order to ensure the survival of highly endangered amphibian species, through an integrated approach including: (i) establishing insurance captive breeding colonies and (ii) habitat protection.

92. Without immediate captive management as a stopgap component of an integrated conservation effort, hundreds of amphibian species could become extinct. Thus, the first line of action in this component will add to the existing captive breeding programs at Centro Jambatu and Amaru Amphibian Rescue Center as a mechanism for immediate action in light of this urgent situation. The target species in *ex situ* may eventually lead to increased populations to allow future exploring for reintroduction on the one hand and eventual further bioprospecting on the other. This will be complemented by on-the-ground *in situ* conservation efforts to protect and improve the management of critical habitat to these and other endangered species, while also bolstering Ecuador's SNAP by covering crucial gaps in ecosystem coverage. The establishment of these reserves and ground proofing of conservation measures will also feed into Outcome 3.

93. By the end of the project this outcome will have developed and tested protocols for the enabled rescue of highly endangered harlequin and poison frog species from areas where critical habitat is being

[47] Pounds et al. 2006

impacted. It will also have developed conservation procedures through successful captive breeding programmes resulting in viable populations of 3 species thus reducing risks of their extinction. In addition, it will have developed the processes and tested requirements for habitat conservation and restoration for *in situ* conservation of a further 3 species and secured long-term sustainability by incorporation into the SNAP. This will result directly in improved habitat conservation for these species in 2 new GAD reserves and one national park and the replication to other protected areas in the SNAP and in private areas through the Socio Bosque programme.

94. Rescue locations and species include: *Atelopus nanay* (Azuay); *Atelopus* sp. nov. *aff. palmatus* (Morona Santiago and Zamora Chinchipe, Cordillera del Condor); *Dendrobates condor* (Morona Santiago and Zamora Chinchipe, Cordillera del Cóndor)

95. *In situ* conservation will focus on the establishment of 2 new GAD reserves (Carchi and Guayas) and the strengthening of management effectiveness through amphibian-conservation measures in Cajas National Park (PANE -Azuay) focusing on *Atelopus coynei*, *Atelopus* sp. *aff. longirostris*, *Atelopus balios* and *Atelopus nanay*.

96. Criteria for the selection of these species and geographical locations are summarized above in the Project Rationale (Section I, Part 2.1) and in detail in Section IV, Part II.

97. The Outcome will be delivered through the following outputs:

Output 1.1 Ex situ conservation through breeding actions to protect highly endangered amphibian species

98. As mentioned in Section 1, several amphibian species are at high risk of extinction due to habitat destruction expected from large-scale mining activities, climate change, invasive species and other threats. Some areas targeted by the GoE for imminent large-scale mining projects paradoxically overlap with extremely fragile and biologically rich natural areas of concern for the conservation of endemic Ecuadorian amphibians: for example Zamora Chinchipe, located in the Cordillera del Cóndor (southeastern part of Ecuador). Centro Jambatu and Amaru Amphibian Rescue Center are among a handful of local institutions working to conserve endangered species through *ex situ* rescue efforts, however, these are insufficient. The project will bolster these efforts by providing support to conservation efforts in threatened areas to rescue harlequin and poison frogs that are not only at high risk of extinction, but also have a high interest as genetic resources. Captive colonies established through the project will provide animals for the reintroduction to natural habitats in the long-term (post-project) as well as produce the animals needed to meet long-term research needs for bioprospecting.

99. The experience garnered from this Output 1.1 will strengthen efforts in Outcome 3 regarding institutional capacity, positioning of genetic resources in the adjusted production matrix, as well as the environmental licensing procedures for development and extractive sectors. For example, the approval of the Mirador copper mine in the Canton of El Pangui, Zamora Chinchipe, required an environmental impact study and environmental license with a management plan consisting of rescue activities. Nevertheless, the budget allocation to these activities is generally low and *ex situ* conservation activities are not evident in the plan. The project will support MAE's efforts, particularly through the Undersecretary of Environmental Quality, to manage the inclusion of additional requirements aimed at the conservation of species in *ex situ* conditions when issuing environmental licenses for development and extractive activities.

100. This will be done through:

A) Rescue operations will be undertaken once both centers are ready to receive and maintain optimal conditions for the survival of genetically-viable populations. The Project will proceed with the collection and rescue of the target species through expeditions in areas that consist of critical habitat, and particularly where there are large-scale mining concessions, thus necessitating precautionary action /rescue action. The project will pursue search and collection of parental individuals for *ex situ* conservation species along the Cordillera del Condor in areas with recent reports/sightings of the target species. This geographic area was chosen due to imminent threats to the target species from habitat destruction, fragmentation and pollution caused by agriculture, livestock, forestry and mining activities underway in the area. Furthermore, preliminary investigations in the area suggest a high level of endemism and biodiversity, with high probability of new species[48].The species and sites for *ex situ* conservation include:

Atelopus nanay (Sad harlequin frog) is found in the Cordillera Occidental at 3600-4100 m.a.s.l., near "Las Tres Cruces" (Parque Nacional Cajas), as well as in the valley of the headwaters of Patul River, around the lagoons of Jigeno and Patos[49] and in the Chalpi-Saguangal Forest. *Ex situ* conservation efforts for this species will bolster the existing 8 individuals at Amaru Amphibian Rescue Center and promote the transition of the 14 juvenile froglets to adulthood, as well as establish a reinforcement colony at Centro Jambatu, with the goal of 11 pairs in each Center.

Dendrobates (Excidobates) condor (Condor poison frog) has a distribution area of 7 km^2 at 1800 -1900 m.a.s.l. in the Cordillera del Cóndor (Morona Santiago and Zamora Chinchipe). Project efforts for *Dendrobates* (*Excidobates*) *condor* will focus on Canton Paquisha (Zamora Chinchipe) around the Rio Blanco Community. The Project will support the rescue and capture of 22 pairs and manage conditions in captivity at Centro Jambatu to encourage reproduction and viability of the population.

Atelopus sp. nov. (aff. *palmatus*) (Condor harlequin frog) recent records have located them at 1100 -1900 m.a.s.l. in the Cordillera del Cóndor (Zamora Chinchipe). Project efforts will focus on the Zurmi Parish in the Nangaritza Canton in the province of Zamora Chinchipe. The Project will support the rescue and capture of 22 pairs and manage conditions in captivity at Centro Jambatu to encourage reproduction and viability of the population.

Per the established protocol, the rescue efforts will be followed by the transfer of the collected individuals to the Centers' installations for their conservation and breeding. The project will engage local stakeholders (i.e. ETAPA) in these search and rescue operations and as such will train them to ensure their strict adherence to the above protocol. In turn, technical capacity will be transferred and strengthened, thereby providing on-the-ground complementarity to the capacity-building and communication strategy of Outcome 3. Indeed, this forms part of an awareness building activity to ensure that local stakeholders fully understand the dire situation of the frogs but also to make them aware of the potential future benefits that could be derived from keeping healthy populations, i.e. promoting the idea of ABS as a driver of conservation.

In order to increase the success of captive breeding, the project will collect at least 22 to 25 of each gender of each species. Rescued individuals must be F1, i.e. individuals resulting from random crossings of unrelated individuals (i.e. no siblings). Amaru Amphibian Rescue Center already hosts 8 adults and 14 juveniles of *Atelopus nanay* in its facilities, thus the lessons generated from the capture, maintenance and breeding of *Atelopus nanay* will be documented and shared with Centro Jambatu to guide the successful establishment of this particular species within

[48] Guayasamin et al. 2011

[49] Arbeláez-Ortiz y Vega-Toral, 2009

the new installations. In preparation for the rescue operations, the project will support the processing of the necessary permits for collection. MAE is expediting the permit processes in recognition of the urgency of the threats facing these species, the experience of which will serve as a lesson learned for the establishment and strengthening of the SUIA Permits Module in Outcome 3. In parallel to this, the project will also support the strengthening of Ecuadorian institutions dedicated to amphibian conservation (Centro Jambatu and Amaru Amphibian Rescue Center) through the reinforcement of current installations and equipment so as to ensure the best possible conditions to receive the species and ultimately maintain genetically viable populations.

B) Strengthened captive breeding programmes: a related and second step in the process of the *ex situ* conservation strategy is to strengthen captive breeding programmes by first improving installations needed for receiving the rescued individuals and by developing conditions and processes that enable the breeding of viable populations. As such, the project aims to develop successful management techniques for these species to ensure survival rates for genetically viable populations. This includes expanding the original building and equipment to ensure protocols are covered. Section IV Part II describes in detail the protocol to be implemented when carrying out the *ex situ* conservation efforts of the above-mentioned species. In summary, this protocol consists of (i) Strict hygiene procedures, including the use of protective clothing, gloves, shoe covers and masks; (ii) Sterilization and disinfection of all equipment and terrariums that might come in contact with the frogs; and (iii) Zoo-sanitary methods for frogs that might have parasites, infections and diseases that must be controlled, prevented and treated.

Centro Jambatu currently dedicates 175m^2 towards captive management of 13 species. In order to best comply with the established protocols for *ex situ*, these installations will be expanded to 325 m^2 for the captive-breeding of endangered species, including 150 m^2 dedicated to receiving the three new species: *Atelopus nanay, Atelopus* sp. aff. *palmatus* and *Dendrobates condor*. The project will also support the Amaru Center's expansion to ensure adequate space with proper equipment, i.e. water filter system, to receive and maintain genetically viable populations of *Atelopus nanay*. The successful breeding means maintaining 80% survival rate of the 22 to 25 individuals collected of each gender of each species to ensure sufficient genetic variation in the population, which is necessary to maintain genetically viable populations, i.e. without problems of inbreeding depression[50]:

Table 8: Captive breeding goals of target species

Species	Number of Pairs	Reproduction	Survival Rate
Atelopus nanay	At least 11 pairs in Amaru At least 11 pairs in Centro Jambatu	At least one egg mass[51] per couple	80% survival of 20-25 pairs
Atelopus sp. aff palmatus	22 pairs in Centro Jambatu	At least one egg mass per couple	80% survival of 20-25 pairs
Dendrobates condor	22 pairs in Centro Jambatu	At least one egg mass per couple	80% survival of 20-25 pairs

Output 1.2 In situ conservation of critical habitats of unique species at high risk of extinction in Decentralized Autonomous Government (GAD) reserves and PANE

101. In parallel with the *ex situ* conservation of Output 1.1, the project will support *in situ* conservation efforts for amphibian conservation. This strategy is two-fold:

[50] Amphibian Ark, Pool y Grow, 2008

[51] Each egg mass contains hundreds of eggs. Based on experience with *Atelopus nanay* the project expects that once the frogs are settled in captivity, there could be at least 1 egg mass per couple every 3 years.

102. First, the project will cover conservation gaps identified for amphibians not covered in the existing SNAP by creating new reserve areas with Provincial GADs. A gap analysis of critical habitat covered within the Natural Protected Areas Heritage of Ecuador (PANE) calculates that 8,328 hectares of critical habitat to the project's target species (*A. balios, A. coynei* and *Atelopus sp. aff. longirostris*) are unprotected. Efforts to protect critical habitat of 3 highly endangered Ecuadorian Amphibians will be supported by working with provincial government authorities to establish GAD reserves and integrate them in the SNAP. The steps to be followed in each are the following: Creation ordinance; Demarcating boundaries; Elaborating a Management Plan with a Program for Financial Sustainability; and incorporation into SNAP.

103. It is important to underscore that the Ecuadorian legal framework provides GADs the authority to establish PAs to preserve and maintain natural heritage within its territory. The project will work with Provincial GADs that have committed to conserving the critical habitat of the highly endangered amphibian species prioritized by the project. These Provincial GADs are crucial partners in the project as they have established Reserve Management Units as well as technical capacity and experience, and as such provide a higher probability of sustainability post-project, as well as replication in other areas within the provinces. The project will provide technical support and guidance to authorities of the provinces whose districts overlap with the distribution of target species, including identifying conservation needs of target species and legal and regulatory studies for habitat protection at the GAD level. The Project will support the development of the Management Plan for each GAD Reserve with a focus on water and amphibians, building comprehensive conservation plans for target species that involve GAD authorities. The conservation framework for these *in situ* sites will be designed to facilitate gender- and intercultural-sensitive management of critical habitat through the development of Management Plans that ensure the participation of resident communities. For example, the proposed GAD conservation area in Carchi coincides with an Afro-Ecuadorian community, while Guayas is predominantly mestiza[52]. As such, the project will support efforts to ensure these community stakeholders are consulted and engaged in the elaboration of the Management Plan and conservation activities, as appropriate.

104. The Management Plan for the new GAD Reserves will include monitoring activities for which the project will support capacity building within the GAD Reserve management units. To increase the chances of survival of target species, the *in situ* conservation work will ensure the inclusion of habitat enrichment and restoration measures in the Management Plans of new GAD reserves, as well as financial mechanisms in the Program for Financial Sustainability to cover the costs associated with pursuing these conservation measures. To accomplish this, experience and observations acquired by Centro Jambatu and MAE will be bolstered by biological monitoring of each species' habitat preferences beginning in Year 1 and continuing throughout the project's lifetime. In addition, given amphibians' association with water sources, the project will work with GAD Reserve management units to engage local farmers to adopt cleaner agricultural practices and reduce contaminants derived from agrochemicals. It is hoped that through the GADs, best practices in local development activities will be promoted, ultimately ensuring a safer environment for both amphibians and humans.

105. Moreover, the project will ensure the Management Plan and associated Program for Financial Sustainability are elaborated according to the guidelines for inclusion of GAD protected areas in the National System of Protected Areas (SNAP). To date, Siete Iglesias is the only GAD PA to be formally incorporated within the SNAP, so the project will pursue and exchange lessons learned from this process, and work with the corresponding department within MAE to ensure these 2 new GAD PAs are indeed formally recognized as part of the SNAP by project end by submitting the required Study of Management

[52] PPG Stakeholder Analysis, 2014

Alternatives; Creation Ordinance; and the Management Plan, including a Program for Financial Sustainability that considers the costs of conservation derived from the experiences generated from the project in situ. Furthermore, MAE's Wildlife Technicians will provide technical support to the management units of each GAD reserve to aid in the elaboration of their Management Plan. In this way, the project will ensure that the Management Plans function as a formal link between the establishment of the Reserve and the conservation of amphibians. Additionally, close coordination with the GEF-UNDP Financing PA system will be maintained to identify and broker potential funding mechanisms for reserves as complementary measures to potential ABS benefits that could be developed post-project if bioprospecting for commercial purposes results in these reserves.

106. Second, the project will improve the protection afforded by existing Protected Areas (PA) by using an existing PANE PA as a pilot: Complementary to the project's interventions to create 2 new GAD reserves, *in situ* conservation measures will also be implemented within an existing PA. PA Management Plans are reviewed every 5 years, with the most recent revision occurring in the past year. Rather than attempt to rewrite the entire Management Plan of a PA, the Project will support the development of an addendum to the PA's Management Plan to include a focus on water and amphibians, building comprehensive conservation actions for target species that involve PA authorities. The acute adjustment to PA management to include conservation considerations aimed at critical habitat for amphibians is expected to have an overall impact on management effectiveness.

107. Furthermore, by including cost-effective conservation measures, the project aims to demonstrate the feasibility of adjusting management practices to consider amphibian-based conservation in other PANE PAs. Crucial to this will be the formalization of the ABS legal framework and capacity-and awareness-building activities through the communication strategy to be carried out in Outcome 3.

108. The process for selection of these sites was determined based on criteria such as feasibility but also fundamentally targeting specific species of amphibians that are most vulnerable and are not conserved fully in the PAs. The species targeted in these *in situ* conservation efforts correspond to the most vulnerable group of amphibians – harlequin frogs of the *Atelopus* (Bufonidae) genus. This genus has undergone drastic population declines and /or extinctions throughout the Neotropics[53]and is severely threatened by the destruction and degradation of its habitat. In Ecuador, of the 28 recorded species (25 described 3 undescribed), 12 are possibly extinct and the rest are Critically Endangered. Of the 16 surviving species, the Project will support *in situ* conservation of four species of harlequin frogs that are at high risk of extinction (*Atelopus nanay, A. coynei, A. sp. (aff. longirostris)* and *A. balios)* as well as their critical habitat. Indeed, a gap analysis of critical habitat covered within the PANE calculates that 8,328 hectares of critical habitat to the project's target species *(A. balios, A. coynei* and *Atelopus* sp. *aff. longirostris)* are unprotected.

109. The Project will help close these gaps by conserving at least 2,200 hectares of humid premontane forest in GAD conservation areas: (a) 1400 ha in Carchi Province and (b) 800 ha in Guayas Province along the border of Azuay Province[54]:

> *Atelopus coynei* (Coyne harlequin frog) is endemic to the cloud forests of northwest Ecuador, with historic ranges in the provinces de Carchi, Imbabura and Pichincha between 900- 1380 m.a.s.l. and an extension of 2,800 km ^{2}. The Project will focus on a population found along the Chinambí Chico River (Parish of Jijón and Caamaño, Mira Cantón, Carchi Province[55]).

[53] La Marca *et al.* 2005

[54] An ongoing border dispute between these two provinces was recently resolved and this project offers a unique opportunity to foster inter-provincial cooperation in the establishment and management of a GAD reserve.

[55] First discovered in February 2012, with recent observations by Andreas Kay, August 2014

Atelopus sp. *(aff. longirostris)* (Harlequin frog) has only been found in the region surrounding the Chinambí Chico River. The project will focus on the Parish of Jijón and Caamaño, Mira Cantón, Carchi Province, where it coexists with *Atelopus coynei.*
Atelopus balios (Spotted harlequin frog) is an endemic frog of southwest Ecuador that lives in the tropical rainforests at 350-650 m.a.s.l. It has only been registered in four locations in the provinces of Azuay, Cañar and Guayas in a polygon of 200 km^2.

110. The PANE Protected Area chosen for *in situ* conservation is Cajas National Park.
Atelopus nanay (Sad harlequin frog) is endemic to the Andean highlands of southern Ecuador and is found across the Western Cordillera between 3600 and 4100 meters. Populations have been reported in Cajas National Park (Cajas NP), and in the valley surrounding the headwaters of the River Patul, around the Jigeno and Patos Lagoons[56] as well as in the Chalpi-Saguangal Forest. The project will focus on *Atelopus nanay* populations in Cajas NP.

111. Specific interventions for the target species include:
Atelopus coynei (Coyne harlequin frog), a population that coexists with *Atelopus* sp. *(aff. longirostris)* (Harlequin frog). These constitute the last 2 remaining species of harlequin frogs of the *Atelopus* genus in the western foothills of the Cordillera Occidental in the northern Andes. The Project will work with the Province of Carchi to conserve critical habitat for both of these species through the creation of a GAD reserve. The Province will create a conservation area of approximately 1400 ha. to support an integral goal of ecosystem stability, hydrologic resources, and community development. The Province of Carchi has experience managing *Protective Forests* and has a Management Unit for Natural Heritage but this will be its first protected area. UNDP has worked in Carchi in the development of biological corridors through a GEF Small Grants Project and has developed certain capacity that can be expanded and added to for the management of this new GAD conservation area. The Roundtable developed by UNDP's Territorial Articulation Programme has also developed some capacity that the project can build on and complement, while *Mancomunidad de provincias del Norte* also provides a space for planning the project's interventions. GEF funds will support the development of capacity to establish and manage the protected area efficiently and effectively so as to promote the conservation of habitat vital to *Atelopus coynei* and *A. spp (Aff. Longirostris)* and promote the reproduction of the species in their natural habitat. Meanwhile, the Carchi Provincial GAD will provide technical support, a technician for the new reserve and offices, as well as financial support for the Management Plan.

Atelopus balios (Spotted harlequin frog) The project aims to support the creation of a GAD Reserve in Guayas to establish a conservation area of approximately 800 ha of habitat that is critical to A. balios and thereby encourage and strengthen other local conservation initiatives. By conserving the habitat of *A. balios* the reserve will preserve the only species of *Atelopus* in the country's southwestern tropical region. Conservation efforts will rely on experience and lessons learned from Center Jambatu's previous *ex situ* rescue and captivity efforts with *A. balios*. The new Guayas Provincial GAD reserve will benefit from the experience and capacity of an existing provincial system of conservation - the GAD Provincial system will take charge of the delimitation and signage of the new reserve as part of their co-financing contribution.

Atelopus nanay (Sad harlequin frog): As mentioned in Output 1.1, this species will serve as an example of all three of the Project's direct species interventions. With regards to *in situ*

[56] Arbelaez-Ortiz and Vega-Toral, 2009

conservation, the project will join forces with Cajas National Park and ETAPA[57] to improve the effective management of this species within its natural habitat, an estimated area of 761 hectares. The project will build upon ETAPA's monitoring capacities and engage ETAPA in biological monitoring of the species in terms of population census and discovery of new populations. The *Atelopus nanay* population will be supported through habitat conservation and based on current understanding of the species and its habitat requirements, the project will also work with ETAPA to include suggestions/make adjustments in Cajas NP's Management Plan to consider more amphibian conservation-specific management actions to be applied in the target species' direct habitat and eventually expand across a broader area of the Park. These could include increase of the vegetation critical to the species' survival, i.e. bio-restoration or habitat-enriching activities based on the results/findings of biological monitoring activities.

OUTCOME 2: Discovery of active compounds derived from the skin secretion of Ecuadorian amphibians with potential applications in biomedicine. (Total cost: US$4,300,295; GEF $733,704; Co-financing: $3,566,591)

112. Through this Outcome, the project aims at creating Inter-Institutional agreements for technology transfer and capacity building between the Queens University, Ecuadorian partners, the Centro Jambatu, and Ministry of Environment (MAE). These activities are key to enhance the research and development capabilities of the provider country in compliance with Articles 22 (Capacity) and 23 (Technology Transfer, Collaboration and Cooperation) of the Nagoya Protocol. The advances in research and development (R&D) capabilities of the Ecuadorian institution to identify potential products from 4 amphibian species (*Agalychnis spurrelli, Cruziohyla calcarifer, Hypsiboas picturatus* and *Atelopus nanay*) will not deliver GEBs per se. These are means to reach ABS agreements between users and providers which will render monetary and non-monetary benefits that will assist in the conservation of the humid premontane forests, through the establishment and maintenance of protected areas, be these GAD reserves, areas already in the PANE, or community lands (see Outcome 1). The advances in R&D capabilities of Ecuadorian institution will also enable conservation of genetic resources of Ecuadorian amphibians at high risk of extinction, safeguarding these for future bio-prospecting agreements and conservation purposes. These include the tissues of 50% of Ecuadorian amphibian species and skins and germ cells of ~ 70% of Ecuadorian amphibians on the IUCN Red List.

113. The outcome will be achieved through four outputs which are: 1) Institutional procedures completed to foster amphibian bio-prospecting research; 2) Research on skin secretions for new peptides with bioactive properties from four species of Ecuadorian amphibians; 3) Technical and scientific capabilities for bio-prospecting improved; and 4) BioBanking of genetic resources of Ecuadorian amphibians strengthened.

Output 2.1 Institutional procedures completed to foster amphibian bio-prospecting research

114. Discovery of active compounds derived from amphibian skin secretions will be led by the Molecular Therapeutics Laboratory of Queens University which has advanced technology and qualified personnel for this specific bio-prospecting research. In doing so, it will build the capacities of Ecuadorian graduate students and local research institutions with the eventual transference of technology and training described in Output 2.3. As noted earlier, ABS activities in Ecuador are regulated by Executive Decree No. 905. This Decree establishes procedures for access to genetic resources, but the experience in implementing these procedures has only just been acquired through the recent approval of the first Framework Contract between Pontificia Universidad Catolica del Ecuador (PUCE) and MAE. As such,

[57] In Cajas NP, ETAPA monitors water quality to ensure compliance within established parameters for drinking water.

the experience garnered from the PUCE/MAE permit process will be used to guide the project's permit request process.

115. While the PIF originally suggested a direct permit for access to genetic resources by Queens University, during the PPG stage, further legal analysis proved this to be untenable. Rather, a national public university/institute will need to establish a third-party agreement with Queens University and then apply to MAE for access to genetic resources for research purposes so as to pursue this research in cooperation with Queens University. For this project, Ikiam Amazonic Regional University will serve as the national counterpart for Queens University. Upon acquisition of a third-party agreement between Ikiam and Queens, the project will then follow through with the formalization of the permit request and associated procedures. MAE has committed to supporting an expedited process once the institutions present a complete application and the documentation is prepared in the proper format. Thus, it is of particular interest to the project to ensure that the requirements are as clear as possible so as to foster a smooth approval process and avoid months of delays due to incomplete information in the application.

116. The experience garnered from this process will be documented and ultimately used to strengthen MAE's capacity to process this type of request in an efficient manner, so as to influence the establishment of the SUIA genetic resources module in Outcome 3.

Output 2.2 Research on skin secretions for new peptides with bioactive properties from four species of Ecuadorian amphibians

117. Once the Framework Contract is signed through Output 2.1, the Project will proceed to support research on skin secretions for new peptides from four species of Ecuadorian frogs: *Agalychnis spurrelli, Cruziohyla calcarifer, Hypsiboas picturatus,* and *Atelopus nanay,* all of which have great potential of containing novel and unique skin peptides with properties of interest. These species were selected for 3 main reasons:

- Preliminary studies with crude extracts of three of these species have demonstrated antimicrobial activity and the occurrence of peptides and proteins.
- *Agalychnis* and *Cruziohyla* belong to the Phyllomedusinae subfamily which is a known source of antimicrobial peptides, yet these particular species have not been previously studied in depth.
- *Agalychnis spurrelli, Cruziohyla calcarifer,* and *Hypsiboas picturatus* are currently being bred successfully in captivity in Centro Jambatu, thereby ensuring availability of this resource. Captive-bred specimens can be used instead of or in addition to field-collected specimens, thereby reducing the interference with wild populations. While *Atelopus nanay* has not yet been successfully bred to adult stage in captivity[58], the number of individuals required for these studies is relatively low and is not expected to interfere with *ex situ* and *in situ* goals.

118. As these species have not been previously studied and represent 4 different genera, there is a high probability of finding new and unique peptides with a range of interesting bioactive properties. This research will (1) isolate hundreds of peptides from the skin secretions; (2) construct cDNA libraries (complementary DNA) to identify genetic precursors (molecular characterization) for several peptides which will be structurally and functionally characterized; and (3) test biological activity[59] of at least one synthetic peptide of each species.

[58] Amaru's experience with reproducing *Atelopus nanay* consists of 6 attempts that have generated 14 froglets/juveniles. To date, no froglet has survived to the full adult stage. Thus the documentation of lessons learned during Output 1.1 will be crucial for on-going efforts.

[59] Biological activities that will be analyzed include: (a) antimicrobial activity (*Escherichia coli, Staphylococcus aureus, Candida albicans*), (b) haemolytic activity (horse red blood cells), (c) anticancer activity (mammal cell lines, 9 cell lines available) and (d) smooth muscle test to determine vasoactive activity.

119. Since most specimens obtained for this study will come from a legal Ecuadorian bio-commerce company, Ecuador could be supported on the issue of certification of origin and the associated return of benefits if new compounds with potential commercial value are discovered from the amphibian peptides research. It is important to underscore that there is no traditional knowledge associated with the peptide research derived from these 4 Ecuadorian amphibian species.

120. In Queen's University Belfast, the study of one of the target species, *Cruziohyla calcarifer,* is already underway and advances have been made in the molecular study of the skin secretions of this species, including the discovery of proteinase inhibitors, tryptophyllins, and antimicrobial peptides, in addition to other peptides already characterized in related species such as: medusin, phyllokinin, and insulinotropic peptide and 4 novel peptides with unknown activity. Based on these initial results obtained in only 6 months, the project aims for the following:

Table 9: Bioprospecting targets

Baseline	Target
Agalychnis spurelli: 1 Active compound isolated and characterized by mass spectrometry (*insulin tropic peptide) 0 New peptides molecularly characterized	*Agalychnis spurelli*: 25 Active compounds isolated and characterized by mass spectrometry. 4 New peptides molecularly characterized (sequence of amino acids) by molecular cloning and sequencing by mass spectrometry
Cruziohyla calcarifer: 1 Active compound isolated and characterized by mass spectrometry (*insulin tropic peptide) 0 New peptides molecularly characterized	*Cruziohyla calcarifer*: 25 Active compounds isolated and characterized by mass spectrometry. 4 New peptides molecularly characterized (sequence of amino acids) by molecular cloning and sequencing by mass spectrometry
Atelopus nanay: 0 Active eompound isolated and characterized by mass spectrometry 0 New peptides molecularly charaeterized	*Atelopus nanay*: 1 Active compound isolated and characterized by mass spectrometry. 1 New peptide molecularly characterized (sequence of amino acids) by molecular eloning and sequencing by mass spectrometry
Hypsiboas picturatus: 0 Aetive compound isolated and characterized by mass spectrometry 0 New peptides molecularly characterized	*Hypsiboas picturatus*: 25 Active eompounds isolated and characterized by mass spectrometry. 1 New peptide molecularly eharacterized (sequence of amino aeids) by molecular cloning and sequencing by mass spectrometry

Output 2.3.Technical and scientific capabilities for bio-prospecting improved

121. In order to support the strengthening of national capabilities related to the research conducted in Output 2.2, inter-institutional agreements will be set up for technology transfer between Queens University, Ikiam, Centro Jambatu, and MAE, as well as professional training of at least 5 Ecuadorian students at the graduate level in the field of bioprospecting amphibian skin substances. Partnerships with the National Secretariat of Science and Technology (SENESCYT), particularly through its scholarship program, will be promoted to support qualified students interested in pursuing graduate-level studies in bioprospecting specializations, with emphasis on compounds from amphibians, thus broadening the scope of the project for technology transfer to other research centers and universities around the world. Furthermore, the project will promote SENESCyT's call for proposals for a Prometeo expert in themes of bioprospection to bring at least one expert to a national institution to share experiences in bioprospecting and thereby transfer technical and scientific capacity.

122. As part of this transfer, a small branch lab of bioprospecting skin secretions of amphibians will be established in Centro Jambatu with imminent construction of a second, full-size branch laboratory at Ikiam Amazonic Regional University expected by 2017. As such, IKIAM will replicate Centro Jambatu at a larger and more advanced scale, while Centro Jambatu's branch laboratory will continue to serve as an important back-up and complementary site. This falls in line with the project's aim to establish capacity, as well as strengthen Centro Jambatu's role as custodian of the country's amphibian genetic resources. Basic bioprospecting facilities will be set up in Centro Jambatu with the guidance of Queen's University's Therapeutics Laboratory to permit the acquisition of chemical substances, peptides, and other materials associated with bioprospecting research. Training in basic specimen management, in addition to extraction, and storing techniques for bioprospecting skins secretions of amphibians will be provided by staff from Queen's University targeted at Ecuadorian students and/or professionals. The branch lab will serve as a training, practice and research center for students of Biological Sciences and Biotechnology from Ikiam and other national universities (both undergraduate and postgraduate). Throughout the project, SENESCYT will be engaged to provide feedback on the strategies and institutions that will benefit in order to optimize the transfer of skills and training.

Output 2.4 BioBanking of genetic resources of Ecuadorian amphibians strengthened

123. The establishment of an organized repository that offers systematic management to preserve genetic material in a Genome Bank (BioBank) can serve as a second line of defense against species' extinction [60] and will be complementary to the Project's conservation actions in Outcome 1. As such conservation of genetic resources (tissue, skin, and sperm) will be supported by the project as a key tool for both conservation and bioprospecting purposes. Intensive management and use of biomaterials including germplasm, embryos, tissues, blood products and DNA are a vital tool for the preservation of a species' genetic signature, maintaining genetic diversity, and enhancing the reproductive success of species in captivity.

124. Management and use of biomaterials, including germplasm, tissues, blood products, RNA and DNA through specialized technologies will be supported along with the establishment of an Ecuadorian Amphibian Genome Bank (EAGB) within Centro Jambatu[61] to safeguard tissue, skin, and reproductive cells (sperm cells of endangered amphibians, as an organized repository and a second line of defense against species extinction. This will include increasing the technological capabilities (infrastructure, equipment and training) of Centro Jambatu to expand its role as custodian of the country's amphibian genetic resources through preservation technologies such as lyophilization and cryopreservation; and training staff and researchers for storage and appropriate uses.

125. The project will support Centro Jambatu in establishing the EAGB by:

- Increasing the current tissue bank to preserve muscle and nervous tissue, and organs (eyes, heart, liver, brain) from 50% of Ecuadorian amphibian species in 95% ethanol and keep those tissues in deep freeze at -80°C;
- Establish a skin bank for Lyophilized skins (with chemical compounds) to be preserved in 100% methanol and/or lyophilized secretions, both frozen at -80°C, for bioprospecting purposes of 40% (~ 70) of Ecuadorian species included in the IUCN Red List;
- Cryopreserve reproductive cells (sperm), starting with pilot trials using two model species and then moving on to use those protocols in *Atelopus* sp, with the aim of eventually including all of the same threatened species (~ 70) in "component ii)" to ensure that living material is safely

[60] IUCN, 2007

[61] While Centro Jambatu will host the EAGB during the lifetime of the project, ultimately a national institution will be assigned the responsibility of managing this Genome bank to ensure institutionalized long-term viability. An analysis of potential host institutions is currently underway.

stored, biologically viable and capable of being used for propagation and maintaining the genetic integrity of populations and species. Trials will include the preservation of sperm and tissue culture. Furthermore, the project will establish collaboration with the Frozen Zoo in San Diego Zoo and Memphis Zoo to acquire technical advice in this area.

126. By project end, it is expected that the establishment of an Ecuadorian Amphibian Genome Bank will ensure the following:

- Tissue from 50% of Ecuadorian amphibian species will be stored.
- Skins (with chemicals compounds) and skin secretions of 40% of Ecuadorian amphibian species on the IUCN Red List (about 70 species of frogs).
- Cryopreserved sperm samples of at least one *Atelopus* sp. species tested and confirmed as viable for reproduction.

OUTCOME 3: Institutional strengthening for the implementation of biodiversity conservation measures and sustainable use of its genetic resources iu Ecuador, using amphibians as a pilot case study. (Total cost: US$1,823,543; GEF $952,850; Co-financing: $870,693)

127. This Outcome seeks to strengthen the overall framework for ABS in the country to provide the enabling conditions not only for supporting and replicating the emergency actions for conserving amphibians (Outcome 1) and bioprospecting (Outcome 2) but also to creating the foundations for the application of ABS as a driver of conservation of BD in general. Thus this Outcome will have two interactive and mutually beneficial lines of actions.

128. The first is to develop the overall policy, regulatory and intuitional capacities for processing and guiding ABS. These include aligning national policy with national, subregional and international regulations; institutional training programmes for those processing permits (MAE, INB and ABS Assessing Bodies); developing an information system and ABS-CH for monitoring progress of permits.

129. The second level would be to develop specific policy instruments to improve amphibian conservation and replicate the lessons learnt through the project. This would include a conservation strategy, action plan and finance plan for amphibians; case-study and economic valuation to influence decision-making; and awareness and communication strategy for targeted communities, decision makers, SNAP and Socio-Bosques. These instruments would in turn provide inputs to fine tune the broader policy for ABS.

130. These interventions will be an integral part of this outcome's delivery through the following outputs:

Output 3.1 National and local frameworks aligned for conservation and sustainable use of genetic resources of amphibians

131. As described earlier in Section I, Part I: 1.4, Ecuador has made progress towards developing its ABS legal framework through Decision 391 and Executive Decree No. 905. Currently, the Nagoya Protocol (signed in 2011) is under discussion in the National Assembly, after having passed the review of Ecuador's Constitutional Court, and is expected to be ratified during the project's implementation. In order to prepare Ecuador to implement the Nagoya Protocol, the project, through this Outcome, proposes a series of interventions to improve current strategies and capacities related to access to genetic resources. These are:

(1) Carrying out an in-depth legal analysis to facilitate the alignment of the existing National Decree with the current international and national regulations and integrate the identified adjustments to the current Decree, as well as finalizing the Strategic Plan and elaborating its Action Plan for implementation;

(2) Carrying out an economic valuation study of genetic resources, using Ecuadorian amphibians as a case study;

(3) Conducting a case study on 2 target species to follow the entire ABS process from collection permit to return of benefits to the place of origin in the event of discovering and developing biomedicine from amphibian skin secretions, in order to propose a guide to the menu of access and benefit-sharing procedures and contract models;

132. The project will support the updating and alignment of national ABS regulations related to the Nagoya Protocol to facilitate their implementation. To achieve this, the project will support an in-depth legal analysis of the current Decree and Strategic Plan; an economic valuation study of genetic resources using Ecuadorian amphibians as a case study; and a semi-hypothetical case study of 2 scenarios regarding the procedures and agreements required for pursuing ABS in Ecuador.

133. An in-depth legal analysis will be undertaken to facilitate the alignment of the existing regulatory framework with the current national, subregional and international regulations: the Nagoya Protocol, the International Treaty on Plant Genetic Resources, the Sea Convention, the World Intellectual Property Organization and Decision 391 of the Andean Community ("The Common Regime for Access to Genetic Resources"). Led by MAE, Decree 905 will be updated and strategic measures needed to assure the conservation of biological and genetic resources of Ecuadorian amphibians will be included in the National Biodiversity Strategy and Action Plan, (NBSAP) enabling the updating, adopting and implementing of the Strategic Plan for the Conservation of Ecuadorians Amphibians and its accompanying Action Plan.

134. This legal analysis will be complemented by an economic valuation study of genetic resources of Ecuadorian amphibians aiming at influencing decision making and ultimately policy at two different levels. At the macro level, genetic resources have been inserted as a strategic axis (bio-industry) within the model of change of the Productive Matrix. While a general economic valuation was done on genetic resources[62], there is no specific study related to amphibians' potential as a strategic resource for the country's development. Given the potential benefits derived from bioprospecting the chemical properties of amphibian skin secretions, the project will undertake an amphibian-specific economic valuation study to explore and define the potential strategic role of genetic resources within the Productive Matrix and support the mainstreaming of the study's findings into policy and decision making including in terms of research investments etc. Performing an economic valuation study specific to Ecuadorian amphibians will thus lend weight to the argument of genetic resources as a strategic sector, particularly when considering development and extractive projects. At the micro level the valuation will measure opportunity costs based on target frog species in priority areas, and the cost of conservation to prevent those losses. The would enable a stronger justification to include specific costing and measures for inclusion into mitigation plans included in environmental licensing processes. Information on the potential losses the country could suffer in terms of forgone resources from ABS if habitat and attendant species are lost in development will be included in the communication strategy.

135. Parallel to this, the project will conduct a case study on ABS guidelines, procedures and contracts; protocol of Prior Informed Consent; and distribution of potential future benefits. The national regulation allows several institutions to evaluate proposals for research and commercialization of genetic resources, but there is no established process/protocol to guide the process and define times and criteria to ensure an effective and efficient review. The case study will be semi-hypothetical with 2 scenarios regarding what is needed for each stage in terms of procedures, permits and costs associated with access

[62] Valor Potencial de Recursos Geneticos en el Cambio de Matriz Productiva, GIZ, 2014

and collection for research, to commercialization, and mechanisms to ensure equitable flow of potential future benefits/profits back to the place of origin. To ensure realistic information and provide a potentially applicable case study, these will be based on the species and sites in Outcomes 1 and 2. Cajas National Park will be used for the 1st scenario to define the structure and procedures to be followed regarding potential resources flows to a State owned property, while a community in Esmeraldas Province or Carchi Province will be used for a 2nd scenario based on local communities. Consequently, it is envisioned that the results of the case study will help define criteria for the procedures and protocol in terms of criteria for applications and time limits for approvals, as well as an agreement that determines a mechanism for the effective return of potential future benefits generated by bioprospecting to conservation areas and the institutions and/or communities that manage them.

136. Decree 905 (2011) brings the Andean Community's Decision 391 to the national level, establishing the institutional links to the issue of access to genetic resources, and the obligation of the Ministry of Environment to develop framework agreements on access to genetic resources that could be used by interested parties. However, implementation of this Decree has revealed gaps and sections to be reviewed and/or updated to make its applicability more institutionally feasible. Therefore, the project will support the revision of this regulation and evaluate the critical points to improve it for more efficient and effective application. The legal framework analysis performed during the PPG (Section IV Part IV) suggests some possible areas for improvement:

- Development of specific procedures and requirements for the application and subscription of framework contracts, i.e. for non-commercial purposes. Additionally, the proposed component will review ABS agreements of diverse taxa (flora, fauna and marine and terrestrial microorganisms) in order to propose different access contract models that characterize the specificities involved in Ecuador's diverse biota. This would fill a gap, since Decree 905 focuses on access contracts for commercial purposes.

- Review, update and/or adjust the procedures and requirements for access contracts for commercial purposes. The PUCE-Yale case provides practical experience that can be systematized and integrated to optimize time and resources in the Regulation.

- Integration of key elements set out in international conventions. Depending on the existing regulations at the level of the United Nations Convention on the Law of the Sea, the Nagoya Protocol and the ITPGR, it is necessary to integrate the envisaged institutional scheme, identifying and clarifying responsibilities, procedures to be used and the coordinated management of information associated with genetic resources.

- Alignment with key elements of national regulations, i.e. National Plan for Good Living. As mentioned in Output 1.1, the project could coordinate with the MAE's Deputy Secretariat of Environmental Quality to consider the inclusion of additional requirements aimed at the conservation of species in *ex situ* conditions when environmental licenses for extraction activities are issued. Additionally, the project could approach the Ministry of Natural Resources Non-Renewable regarding the inclusion of additional safeguard mechanisms in the environmental management plans of concession companies to ensure the conservation of amphibian species, and thereby bolster the Ministry's Sustainable Mining Strategy. Through the TULAS (Unified Text of Environmental Legislation), Environmental Impact Assessments (EIA) can require protocols for the protection and conservation of amphibians as a pre-requisite for the emission of an environmental license. In particular, the project will suggest adjustments to the EIA guidelines to consider the loss of economic value associated with genetic resources, i.e. management plan budgets to include these costs as offsets to the costs of implementing the conservation strategies

to be tried and tested in Outcome 1. The economic valuation study on the use of amphibians would provide important data to guide these recommendations.

137. The development of specific policy for amphibian conservation will be further completed by the formalization of the Strategic Plan for the Conservation of Ecuadorian Amphibians in Risk of Extinction, Action Plan and associated financial plan. The Strategic Plan was elaborated in 2005 following the Global Action Plan for Amphibians guidelines and includes 6 operational programs. The actions stated in the Strategic Plan (particularly the *ex situ* strategies) are proactive, complementary and innovative for preserving the biological and genetic resources of a representative group of Ecuadorian amphibians. Whilst highly significant, the Strategic Plan lacks a vulnerability analysis with indexes of threats for climate change, decrease/degradation of habitat and pathogens, and has not been formalized via official recognition by the Environmental Authority (MAE) in order to channel sufficient resources for its implementation.

138. Through this Output, the Project will review and update the draft Strategic Plan, as well as develop an accompanying Action Plan for implementation with defined actions and related costs, in accordance with the National Biodiversity Strategy and Action Plan. Examples from other countries will serve as important points of reference. Conclusions from the case study will also guide the definition of the Action Plan and provide additional input for determining the most effective procedures to lower costs and maximize benefits associated with genetic resources. Furthermore, the actions of other project Outputs to strengthen local capacity, regulations and infrastructure will establish the necessary bases for its implementation and for conservation and bioprospecting efforts to achieve a greater impact.

Output 3.2 Improved capacities of National Competent Authority and related agencies on ABS, including procedures and Prior Informed Consent & Mutually Agreed Terms

139. In order to be prepared to implement and manage the abovementioned legal framework, the MAE, together with ABS Assessing Bodies (IEPI, INIAP, SENESCyT, INP, Secretariat of Policy Management) established in the National Regulation on Access to Genetic Resources, will be trained for effective implementation of ABS agreements, including Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT). The project will support the development of a training program to be integrated within MAE's annual capacity development plan, and will use Amphibians as a case-study for ABS. The training program will take into consideration the results of the Capacity Development Scorecard (Section IV Part IX), which was applied during PIF development and again during the PPG phase for ProDoc elaboration in collaboration with MAE, SENECyT and IEPI. As a result of this exercise, the following themes were prioritized for improving the capacities of MAE and Assessing Bodies with regards to ABS in Ecuador:

- CR1:3 Capacity to conceptualize and formulate policies, laws, strategies and programmes; Increased capacity to conceptualize policy and related instruments for ABS. This is related to Output 3.1's focus to update and align the regulations, and as such, will strengthen capacities to ensure the rules are more efficient and clear. Through the experiences generated by the Project on issues such as bioprospecting and the Genome Bank, as well as all issues related to amphibian biodiversity and conservation, the INB would be strengthened with regards to the changing production matrix.

- CR2:14 Capacity to implement policies, legislation, strategies and programmes; Expanding ABS decision-making Institutions' knowledge on ABS issues. This will be specifically linked to the Communication Strategy described below so that decision makers have the necessary knowledge to fulfill their roles and responsibilities related to ABS. This will include promoting training courses to personnel from the MAE, INB and ABS assessing bodies on topics related to the effective implementation of the current ABS Regulation, the Nagoya

Protocol and its complementary legal frameworks; for example in negotiations, royalties, intellectual property, traditional knowledge, as well as in techniques of research project evaluation, among others.

- CR5:7 Capacity to monitor, evaluate report and learn; improved capabilities of ABS Institutions to execute, monitor and evaluate requests for access to genetic resources. The project will ensure that the technicians from different ABS institutions have the knowledge to properly execute all processes, as well as monitoring and evaluation of said processes. This includes capacity development of 25 functionaries from MAE and Assessing Bodies charged with the evaluation and processing of applications/requests related to ABS and administrative procedures, as well as compliance with national and international regulations/agreements (e.g. Article 17 of the Nagoya Protocol).

140. Furthermore, the MAE Genetic Resources Unit will be upgraded to a multi-disciplinary team by hiring at least two technicians (one through MAE co-funding and one through GEF funds) in order to improve its effective response to ABS requests and processes. The project will support the design of a strategy and model for the strengthening of capacity regarding the management of genetic resources. The institutionalization of capacities to be strengthened during the project will ensure that ABS is not only an essential part of the Genetic Resources Unit, but is mainstreamed throughout institutional management of personnel. This will be bolstered by the formation of a roundtable / coordination committee that provides constant feedback and updating of information and practices, and allows continuous training of existing and future personnel of both MAE and relevant institutions. The case study in Output 3.1 may also partially guide the institutional training to be conducted in this Output 3.2.

141. Part of this improved capacity will be put to task in operating the new module for permits regarding the collection of genetic resources to be created by the project within the existing Unified Environmental Information System (SUIA). Currently, permits are received and processed by Provincial offices of MAE, with varying degrees of efficiency and little-to-no standardization of requirements and responses. The project will support MAE's creation of a new centralized Permits Module to cover the processing of all permits nationwide. The Module will be established to manage and generate Permits for collection of species, genetic resources and ABS for investigation/research and/or commercial means. The system will be developed to automatically generate the Permits, with the goal of making the processing of applications more efficient by decreasing the number of sign-offs and time for review. The system will be designed to detect if the request is for (1) Collection; (2) Framework Contract (access to resource without commercial use); or (3) Access to Genetic Resources (with commercial intention), and then direct the application to the appropriate department for review and approval. This will be based on experience garnered from the CITES system. Once the module is established, the ABS unit will be duly trained with the aim of increasing efficiency in permit and contract issuance:

- Permits for Collection, i.e. for ex situ conservation, currently vary from 2 weeks to 6 months. The project will work with MAE to establish a protocol within the SUIA to allow a maximum period of 2 weeks for review and approval.

- The project will support the systematization of the process and steps required for the elaboration and approval of a Framework Contract for access to genetic resources for non-commercial use, i.e. bio-prospecting. The current experience is limited to the negotiation of one Framework Contract between MAE and PUCE. Currently, there is no time limit established for the emission of this type of contract. The lessons learned from the current process will lead to a clear path and requirements to achieve an optimal review and approval period of 3 months.

- Contract for Access for commercial use requires an average 2 years for approval. The current Norm establishes a limit of 180 days, but the lack of a systematized process has led to a lack of compliance. The current experience is limited to the negotiation of one Framework Contract between MAE-PUCE-Yale University. This Contract has taken 3 years, to date. Through the establishment and implementation of the SUIA's Module, the project will support compliance with the established Norm.

Output 3.3 National information improved and available for effective decision making on protection and sustainable use of genetic resources of endangered amphibians

142. This output relies on a multi-pronged approach to socialize the importance of the Nagoya Protocol to a wide audience (civil society, NGOs, industry, academia, various governmental institutions, GADs, indigenous groups, Montubios and Afro-Ecuadorian communities, etc.). The MAE has facilitated a widespread socialization process through the development and presentation of technical and legal information targeted at national authorities and stakeholders, explaining the importance of ratifying the Nagoya Protocol and the need to implement Decree No. 905. The project will build upon these efforts with targeted interventions.

143. Information-gaps and limited access to existing data hinder successful decision making processes by national authorities with some key players still uninformed about the crisis facing amphibians and its potential foreclosing of new strategic priorities for development. It is essential to make available all the information collected on amphibians in Ecuador to date as well as create opportunities to continue to collect new data so as to adequately present the realities associated with extinction. To address this, the Project will support the updating of IUCN's Red List of endangered amphibian species in Ecuador to include threat indexes for climate change, habitat destruction, and pathogens, as well as "rarity". This will be accompanied by the completion of electronic factsheets[63] for 100% of amphibian species already described (538) and in the process of being described (9). Cofinancing from Ikiam will support the elaboration and of these records, as well as their review by experts.

144. Existing information platforms in the MAE and relevant research centers will be updated with the abovementioned information and interlinked, thereby further facilitating decision-making based on sound scientific information. Initially, the project will support the interconnection of Centro Jambatu's Ecuadorian amphibian bioinformatics platform with MAE to achieve a unified CHM-ABS platform (thereby complying with Article 14 of the Nagoya Protocol). This platform will include a link to the Citizen Science portal (research conducted in whole or in part by civilians to contribute to scientific discovery) to significantly increase the updating of records of sitings and habitat information related to amphibian species across Ecuador. Citizen Scientist provides as opportunity to increase awareness about genetic resources via the awareness and identification of priority species in the field. Rather than design an independent portal, the program will use existing portals for biological monitoring by civilians such as iNaturalist, which is already being used by Centro Jambatu and can be linked with the SUIA. Once verified by experts, these records will form part of the official platform.

[63] The factsheets are a user-friendly compilation of information on each amphibian species backed by a database of Ecuadorian amphibian taxonomy, natural history-related information, images, videos, biogeography and literature. Currently, the Centro Jambatu's bioinformatics platform has factsheets on 74 species, which, together with the rest to be completed by the project, will serve as the basis of the ABS Clearing House Mechanism (CHM) once Centro Jambatu's Ecuadorian amphibians bioinformatics platform is interconnected with MAE's Unified Environmental Information System (SUIA).

145. Finally, in order to promote the activities and findings of the project's interventions and foster effective decision-making on protection and sustainable use of genetic resources of endangered amphibians, the project will develop and implement a communication strategy directed at the different levels of stakeholders in each of the components. Targeted information exchange meetings amongst various institutions and government bodies at various levels (Executive, National Assembly, Council of Citizen Participation, Decentralized Autonomous Governments, Indigenous Peoples and Nationalities, Academy, and other interested stakeholders) will promote the implementation and further socialization of the Nagoya Protocol. This strategy will be aligned with the updated Strategic Plan for the Conservation of Ecuadorian Amphibians in Risk of Extinction and its accompanying Action Plan, as well as promote tools for monitoring and complaints, ultimately increasing awareness of citizens on ABS and the need to preserve the country's amphibian diversity and its genetic resources.

146. The project will support the elaboration of a Communication Strategy regarding ABS and the need to preserve the diversity of amphibians in the country and their genetic resources. A crucial resource for the implementation of this resource will be an Amphibian Monitoring Protocol to be used in promoting participation in monitoring activities. The project will support the mainstreaming of this Protocol as part of a model for biological monitoring to be conducted within different conservation schemes: PANE areas, Socio Bosques areas, biological corridors, etc. as well as include it as standard material for the training of officials within the Green Classrooms program. The communication strategy will consist of a very specific awareness campaign directed at four target groups:

- Decision-makers, such as MAE's Department of Environmental Quality, for which the Project will generate an information packet, i.e. bulletin, brief documentary, on Genetic Resources, aimed at increasing their awareness on the topic and the opportunities they possess;

- SNAP, for which the Genetic Resources and biological monitoring modules of the "Green Classrooms" for park rangers would be adjusted to include amphibian conservation, including the promotion of replicating lessons learned in other PAs;

- Socio Bosques, with a focus on engaging owners of private reserves that have the potential to enter the Socio Bosques program. The project can support the inclusion of amphibian conservation criteria in Socio Bosques' restoration programs. Consequently, this would serve as an incentive to private reserve owners to assist in monitoring and promoting certain conservation actions in areas that coincide with the distribution of endangered species.

- Communities, encouraging their participation in conservation and biological monitoring actions in and around the newly-created GAD reserves.

147. The communication strategy will be designed to promote achieving the overall objectives of the project, among which includes ensuring that people understand what is being implemented and greater public awareness of the benefits of and threats to amphibians and their genetic resources. It will also enable the effective participation of all strategic partners and change the behavior of target groups, as well as displaying the successes of the project. The Strategy will consider the political, economic, social and technological factors, both positive and negative, that could have a major impact on meeting the goals outlined in the project, and thereby determine the most appropriate communication mechanisms to approach each target audience. Finally, since there are many stakeholders who will need to report and communicate on project experiences and results, this strategy will help define and maintain a joint line of action on best practices in which multiple stakeholders can operate more smoothly.

2.3. Project Indicators, Risks and Assumptions

148. The project indicators, risks and assumptions are detailed in the Strategic Results Framework (Section III).

Risks

149. The risks confronting the project have been carefully evaluated during project preparation, and risk mitigation measures have been internalized into the design of the project. A careful analysis of barriers has been conducted and measured designed to lower or overcome these barriers. The main risks have been identified and are summarized below. Other assumptions behind project design are elaborated in the Strategic Results Framework in Section II.

Table 10: Risks and risk mitigation strategy

Risk	Rank	Mitigation strategy
Numbers of individuals collected for captive breeding programmes and *ex situ* collections are insufficient to maintain genetically viable populations and provide the basis for future bioprospecting. Key factors for the reproduction and maintenance of captive breeding species cannot be identified	Medium to Low	Emergency expeditions will be carried out by professionals with extensive field experience using local guides in inventory teams prioritizing areas with high compliance to habitat requirements for target species (*Atelopus nanay, Atelopus* sp. nov. aff. *palmatus* and *Dendrobates condor*). Captivity programmes will build on the proven experience of the Centro Jambatu and Amaru Amphibian Rescue Center. Amaru Center has conducted several attempts to reproduce *Atelopus nanay* and currently has 40 froglets in varying degrees of the maturation process, thus providing important lessons to replicate in the project's *ex situ* interventions. These 2 rescue centers will be further strengthened to ensure work under high standards of biosecurity and control of hazards to reduce mortality from accidents and to optimize breeding and feeding mechanisms, in accordance with the established *Ex situ* Protocol (see Project Document, Section IV Part II).
Extreme effects of chytridiomycosis and climate change accelerate impacts to amphibian populations at risk of extinction	Medium	The project strategy has been designed to pre-empt this risk recognising the synergistic relationship of climate change and chytridiomycosis underlying amphibian decline- namely it will support an integrated strategy that combines emergency collection, and captivity breeding integrated with enhanced *in-situ* conservation. Chytridiomycosis is nearly impossible to be controlled in nature. Nevertheless, it can be completely removed from specimens in lab conditions. This is one of the key activities to be carried out as part of the *ex-situ* conservation activities of Component 1. Furthermore, one of the project's approaches is to increase *in situ* conservation and thus maintain genetically viable and increasing populations and hence increase the likelihood of survival. Also, under component 3 the project is increasing the monitoring of amphibians so as to have a clearer idea of where they are; that together with the vulnerability index; the new and clearer guidelines on how to conserve in situ and the addition of economic studies to show potential gains should all lead to increasing populations *in situ* and gain having larger populations that may help in the fight against chytridiomycosis. In addition, project actions will develop vulnerability indexes that incorporate climate data to guide priority action for amphibian conservation. This will be coordinated with relevant programs and projects that generate climate information including *Adaptation to Climate Change through an Effective Water Governance in* Ecuador which gathers climate data that is relevant to endangered and/or endemic amphibian species.

Risk	Rank	Mitigation strategy
Skin secretions of target species for bioprospecting studies do not contain new peptides to test bioactive activity and advance ABS contracts	Medium	There is high probability of discovering new peptides in target species but there is also a chance that these would be similar to those found in other amphibians and even in mammals. Also peptides with commercial use could be perhaps 1% of those discovered. Given this uncertainty as a first step the application in preparation is for scientific, non-commercial research on the chemical compounds of the 4 species to advance understanding of the biological function in the human body and in amphibians. This will provide data of paramount importance to understand Ecuadorian amphibian genetic resources; provide improved techniques and enhance local capacities to find new compounds when other species are studied. If a peptide of commercial value is identified during the project a second application would be prepared. As legal bio-commerce activities the certification of origin is guaranteed for the target research species so the Ecuadorian government will have a strong case to negotiate ABS contracts.
Lack of qualified candidates apply for scholarships to pursue graduate-level studies in bioprospecting and ABS-related topics	Medium	Bioprospecting is a priority area, as emphasized in Ecuador's National Plan for Good Living, and as such the government is committed to supporting its development through programmes such as scholarship grants. However, there is a perceived risk that not all grants are filled because there is a tendency for students to seek more traditional studies. The project will support SENESCYT's efforts to promote scholarship opportunities. Interaction with national universities and research centers throughout the project's implementation is expected to generate interest in qualified candidates. Furthermore, the project will promote SENESCyT's call for proposals for a Prometeo expert in themes of bioprospection to bring at least one expert to a national institution to share experiences in bioprospecting and thereby transfer technical and scientific capacity, as well as generate interest in students.
Construction of Hydroelectric Plant in Carchi Province	Low	The possible construction of a hydroelectric plant in Carchi is low as current plans do not imply a direct threat or impact on target species. The project will coordinate with MICSE and MAE throughout the lifetime of the project to ensure construction does not impact on endangered species' habitat. Furthermore, the experiences developed through the implementation of *in situ* conservation will better define conservation measures that are expected to be included in environmental licensing procedures for development and extractive activities.
Lack of political will to ratify the Nagoya Protocol	Medium	Ecuador signed the Nagoya Protocol in 2011 and is in the process of negotiating its ratification. While there is no guarantee of its ratification during the lifetime of the project, Outcome 3 will support the updating the regulations on ABS associated with the Protocol.
Lack of political will and funding hinders GAD authorities to conserve amphibian species at risk of extinction	Low	Through the project's work on economic values of amphibian ABS and awareness raising of potential benefits from this in the future, GADs (parish, municipal and/or provincial) will be more favorable for conserving amphibians. The mechanism for GADs to do this is through creating reserves. While the costs associated with creating and managing GAD reserves is not fully known, or funding sources, the project will address this by providing support for the development of the management plans and the attendant financial sustainability plan (business plan). This will be complemented by linking GADs to the GEF/UNDP PA finance project that is developing legal frameworks and financial mechanisms that could help define funding sources. Furthermore, the Ecuadorian Constitution requires that the National Government provide funding for all PA within the SNAP - including GAD PAs – so the project is committed to supporting the new Provincial GAD reserves through the integration process for the SNAP so that by project end they are formally recognized as pertaining to the SNAP.

2.4. Incremental Reasoning and Expected Global, National and Local Benefits

150. ***Global benefits***: This project will contribute significantly to the conservation and sustainable management of Ecuadorian amphibians that encompasses ~8% of the world's species. In doing so it will also enable Ecuador to protect important biological and genetic resources which have enormous potential for application in biomedicine, from which the impact could be global. By supporting the increased management effectiveness of a National Park within SNAP, and the establishment of 2 new GAD conservation areas in key habitat of critically endangered species, the project will also contribute to conserving remnant montane forests and paramos of the Tropical Andes, a hotspot of biodiversity. (See Part 2.2 for more details).

151. This project will generate important global benefits in the field of scientific research of chemical compounds from amphibian skin secretions through dissemination of results in peer-reviewed publications. Specifically, the project is expected to contribute to the knowledge of the peptides produced in the skin of the 4 target species and hope to find new peptides with interesting biological activities that may be key molecules to the development of new medicines. On the other hand, research of peptides in several species of amphibians demonstrates the enormous diversity at the molecular level that is hidden in these species and this adds value to this taxonomic group in the sense that conservation should not be focused exclusively on a particular species or group of species but rather it should cover all possible diversity.

152. Over the long-term further global environmental benefits will be incurred once the legal framework is aligned and in place, along with the needed technological and operational efficiencies.

153. ***National benefits***: At the national level, expected benefits of this project are the impetus of scientific research in bioprospecting projects to be supported by the MAE through established procedures regarding the processing and signing of contracts for access. The Ecuadorian government will benefit from future research as well as the expected revaluing of biodiversity and their genetic resources within the Production Matrix. This is in turn will generate interest and resources for the conservation of biodiversity, and amphibians in particular.

154. A further benefit is expected regarding the quality of university education, because with the transfer of knowledge and technology, a larger number of trained professionals may be involved as teachers/researchers in universities and research centers around the country. This will boost the ability to replicate and expand research in the area of bioprospecting.

155. ***Local benefits:*** The project will enhance local support for conservation and ABS. Strengthened relations with GAD, provincial and national government agencies will facilitate the flow of other social and economic benefits to previously disenfranchised areas. By establishing the legal and policy framework for ABS to allow for the access and bioprospecting of genetic resources, the project will establish a mechanism for the return of benefits generated from those genetic resources to the communities that conserve them, thereby providing financial incentives to support conservation operations, with the potential of directly benefiting communities and private landowners. In addition, secondary beneficiaries, including MAE, INB, ABS Assessing bodies, NGOs and other government agencies and partners will benefit from capacity building. Coordination will be sought with Socio Bosques to stimulate the access to incentives such as the Restoration programme available to owner of private lands that embark on amphibian conservation.

156. For more information, please see Section IV Part V: Stakeholder Participation Plan.

2.5. Policy Conformity and Country Ownership: Eligibility and Country Drivenness

157. *Strategic Objective and Programme Conformity*: This project is framed within the BD focal area through habitat protection of critical habitat in set asides it will benefit the focal objective BD1 -Improve the sustainability of protected area systems. This project will undertake emergency actions needed to conserve biological and genetic resources of endangered amphibians and provide the basis for bioprospecting purposes; it will foster local research capacity on amphibian genetic resources and advance the discovery of active compounds derived from skin secretions of amphibian with potential application in biomedicine, and will strengthen the current national ABS framework using Ecuadorian amphibians as a case study. Ultimately the project will create conditions that facilitate turning bio-prospection in amphibians into a driver for conservation of critically endangered species of global value and for advancing new development models in the country that optimise the fair and equitable sharing of benefits derived from its comparative advantage as a bio diverse rich country. In doing so it is aligned directly with the Objective 4 of the GEF5 Strategy - Build capacity on Access to genetic resources and Benefit Sharing (ABS).

158. *CBD Conformity:* Through Output 3.1, the strategic measures needed to assure the conservation of biological and genetic resources of Ecuadorian amphibians will be included in the National Biodiversity Strategy and Action Plan, (NBSAP) enabling the updating, adopting and implementing of the Strategic Plan for the Conservation of Ecuadorians Amphibians and its accompanying Action Plan. The project will also support the interconnection of Centro Jambatu's Ecuadorian amphibian bioinformatics platform with MAE to achieve a unified ABS-CH platform, thereby supporting the country's CH compliance for CBD.

159. *Aichi Targets:* The project is consistent with the Aichi Biodiversity Targets, and will significantly contribute to Target 12: Prevent the extinction of known threatened species and improve their conservation; and Target 16: By 2015 the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation. By setting the initial framework for the win-win strategy of bioprospecting and ABS agreement as potential sources of revenues for conservation, it will also provide insights for advancing Target 20; Mobilize financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020.

Country Eligibility

160. Ecuador ratified the Convention on Biological Diversity (CBD) on June 9, 1995 and became a Party to the Convention on February 23, 1993. Ecuador has also effectively fulfilled various assessment and reporting requirements under the Convention, and is eligible for UNDP assistance. The long-term commitment of the GoE to biodiversity conservation is further demonstrated by its ratification of other major multilateral environmental conventions and agreements. The principal ones are summarized below:

Table 11: Main Multi-lateral Environmental Conventions to which Ecuador is a Signatory Party

Convention/Agreement	Date signed	Date ratified
CITES	December 12, 1974	February 11, 1975
CBD	January 18, 1993	March 16, 1993
Cartagena Protocol on Biosafety	May 24, 2000	January 30, 2003
The RAMSAR Convention	May 10, 1990	January 7, 1991
The United Nations Convention to Combat Desertification (UNCCD)	January 19, 1995	September 6, 1995
The United Nations Framework Convention on Climate Change (UNFCCC)	February 23, 1993	September 27, 1994

Link to National Strategies

161. By strengthening the framework for ABS agreements, furthering multiple partnerships for bio-prospection and transferring related technology to local institutions this proposal significantly contributes to the National Plan for Good Living (2009-2013) providing new opportunities for the country's economic development by positioning biodiversity as a strategic resource and contributing to the construction of a bio-knowledge society that incorporates knowledge, information, science, technology and innovation into the production system. In this sense, the proposed activities support the fulfilment of various goals and policies set out in the National Plan of Good Living including to maximize the citizens' capabilities and potentialities by promoting scientific research and knowledge, the revaluation of ancestral knowledge and wisdom, and technological innovation and by fostering the access to information and new information and communication technology; and to guarantee the rights of nature and promote a healthy and sustainable environment by preserving and sustainably managing natural heritage, land-based and marine biodiversity, as strategic sectors. By strengthening the national policy for ABS; improving information platforms for improving decision-making on conservation and use of amphibians and safeguarding genetic resources from the skin of amphibians as potential resources for economic benefits, the project is in line with the NBSAP strategic lines namely: consolidating and enhancing the sustainability of production activities based on native biodiversity; securing the availability, integrity and functionality of the components of biological diversity: ecosystems, species and genes; balancing pressures for conservation and sustainable use of biodiversity; assuring that the benefits of conservation and use of biodiversity and traditional knowledge, innovations and practices of indigenous and local communities, are fairly and equitably distributed. The NBS recognizes priority geographical areas which include those where amphibian diversity at high risk of extinction, is threatened by impending sectoral activities such as large scale mining and agricultural expansion.

Linkages with UNDP Programme

162. UNDP Country Programme: This project complements the existing portfolio and has direct bearings on the 2010-2014 UNDAF objective for environmental sustainability and risk management [Outcome 5/Strategic component 3, Environmental sustainability and risk management:- Institutions and local stakeholders promote a safe and healthy environment and environmental sustainability, that considers biodiversity conservation, natural resources and environmental management]. The UNDP Ecuador office is organized in two main clusters, each of which has a Cluster Manager and a Program Associate and combines on-the-ground experience of executing projects in protected areas working with communities; technical expertise in ecosystems; and experience in GEF project design and implementation. In addition, the project will count with specialized support from the assigned regional Technical Advisor in the UNDP Regional Service Centre for LAC and from the Senior Technical Adviser (STA) for ABS who holds a Ph.D on a related topic with direct experience in ABS projects and manages a growing ABS projects globally.

163. UNDP Comparative Advantage: UNDP has experience working globally in biodiversity conservation projects and in Ecuador has provided support to the Government in numerous and diverse programmes involving multiple stakeholders to support strategies and mechanisms for sustainable development. UNDP is currently supporting the development and implementation of the following GEF projects: Financial Sustainability for the National System of Protected Areas - SNAP, National Biodiversity Strategy (NBSAP), Adaptation to Climate Change through an Effective Water Governance in Ecuador (PACC) and the Fifth Operational Phase of the GEF Small Grants Program in Ecuador. Further advantages in the context of this project are extensive experience in comprehensive development policies, human resource development, institutional strengthening and non-governmental and community involvement; the provision of technical support in a flexible, efficient and timely manner focused on strengthening institutional capacities at both national and local levels; a well-established ability to mobilize resources for development at national and local level in Ecuador; access to global networks of information, experience and knowledge that can be used to strengthen project implementation; neutrality,

credibility and social trustworthiness aiming to facilitate agreements as well as prevention and mediation of social conflicts.

Linkages with other projects, including UNDP GEF Portfolio

164. The project will work closely with a number of related initiatives including several funded through the GEF. Amongst others these include:

165. *GEF-UNDP Support to the updating NBSAP* in particular reference to integrating and coordinating activities of the proposed amphibians bioinformatics platform into the institutional strengthening and CHM Tools under development in that project.

166. *GEF-UNDP Sustainable Financing of Ecuador's National System of Protected Areas* (SNAP) to jointly define strategies to establish set-asides where emergency actions are required and to support the sustainability of GAD set aside. As mentioned in Output 1.2, close coordination with this project m will be maintained to identify and broker potential funding mechanisms for reserves as complementary measures to potential ABS benefits that could be developed post project if bioprospecting for commercial purposes results in these reserves.

167. *GEF-UNDP Advancing Landscape Approaches in Ecuador's SNAP to Improve Conservation of Globally Endangered Wildlife* where synergies can be expected in overlapping geographical areas of interest for *in situ* conservation outside the PANE- and where it will work with set-up of municipal and private reserves. Although the target species and taxa are very different lessons exchange on the reserves and set asides will be sought in annual meetings and programming exercises. *Small Grants Program (SGP)* implementation of community projects to improve agricultural practices in protected areas and sensitive ecosystems can provide crucial lessons learned regarding methodoclogy for engaging local communities in conservation interventions. While current SGP areas do not overlap with critical habitats of the project's target species, there may be a potential opportunity for replication regarding critical habitat conservation later on during the project's lifetime.

168. Coordination will also be sought with GEF-FAO's project *Mainstreaming of the use and conservation of agro-biodiversity in public policies in three provinces in the Andean Highlands* for lessons learned on agreements and administrative procedures that may be relevant for ABS.

169. At the regional level, the GEF-UNEP project *Strengthening the Implementation of Access to Genetic Resources and Benefit Sharing Schemes in LAC* concluded during the PPG, however, valuable lessons were learnt and several meetings held in the region, which allowed the exchange of information and contributed to strengthening the national capacities for the development of regulatory frameworks as tools for Prior Informed Consent and the fair and equitable sharing of benefits. In particular, the different model contracts are available through the GEF regional project on ABS Capacity Building, and serve as examples for the completion of the Ecuadorian model.

170. Since Ecuador will be ratifying the Nagoya Protocol shortly, it was selected as one of the countries to benefit from the GEF-UNDP global ABS project: *Strengthening human resources, legal frameworks and institutional capacities to implement the Nagoya Protocol.* Under this project, Ecuador may access up to US$350,000 to cover key outcomes and outputs outlined under each of the three components of the global project. These components are: 1) Strengthening the legal, policy and institutional capacity to develop national ABS frameworks; 2) Building trust between users and providers of genetic resources to facilitate the identification of bio-discovery efforts; and 3) Strengthening the capacity of indigenous and local communities to contribute to the implementation of the Nagoya Protocol. This global ABS project is currently undergoing the project preparation phase in Ecuador and will focus on the identification of key outcomes and outputs not covered by the project *"Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources"* and that have a

synergistic effect *vis-a-vis* this project and other ABS investments. Project activities of the global ABS project are likely to commence in January 2016.

2.6. Sustainability

171. Environmental Sustainability: The project will support long-term viability of globally significant biodiversity in Ecuador by protecting critical habitat, closing gaps in ecosystem coverage, engaging additional actors in conservation efforts, and promoting the GAD Reserve model to strengthen the National System of Protected Areas (SNAP).

172. The SNAP is currently comprised of fifty natural areas within four constitutionally-established subsystems: State; Decentralized Autonomous Governments (GAD); Private; and Community[64]. The project complements these efforts by supporting the creation of new GAD reserves (Guayas and Carchi) and strengthening the management of Cajas National Park. The establishment and inclusion of additional reserves within the SNAP will ultimately contribute to the closure of gaps in the coverage of critical ecosystems as identified in the 2013 evaluation[65] of priority areas for protection and conservation. In particular, a gap analysis of critical habitat covered within the PANE calculates that 8,328 hectares of critical habitat of the project's target species (*A. balios, A. coynei* and *A. sp. (aff. longirostris*) are unprotected. The Project will help close these gaps by conserving at least 2,200 hectares of humid premontane forest in the 2 new GAD conservation areas: (a) 1400 ha in Carchi Province and (b) 800 ha in Guayas Province along the border of Azuay.

173. The new GAD reserves not only increase critical habitat area under conservation but will also serve as an important model of this new management category within SNAP, which is particularly important since to date only 1 GAD Reserve has been integrated into the SNAP (Siete Iglesias). By supporting the new reserves through the integration process, it is expected that procedural issues will become more fluid, with increased capacity to support the elaboration of Management Plans and guide the review process of integration requests, ultimately inspiring other GAD Reserves to follow suit. The promotion, creation and integration of these GAD reserves into the SNAP is considered a key aspect for strengthening the SNAP as expressed not only in the Constitution of Montecristi, but more specifically in the SNAP Policy and Strategic Plan 2007-2016. The integration of GAD reserves into the SNAP not only expands the SNAP's official coverage of critical ecosystems (see above), but also enables these reserves to access Federal resources (financial and capacity building) to support their management.

174. To increase the chances of survival of the species targeted through *in situ* conservation, the project will document findings from biological monitoring to determine habitat preferences to be incorporated in management plans for habitat enrichment and restoration efforts. Additionally, amphibians are associated with water sources, therefore, the project will ensure the Management Plans include stakeholder participation mechanisms to engage local farmers and promote agricultural practices that use fewer agrochemicals. It is expected that through the GAD reserve, best practices will be mainstreamed in local development activities, so as to ensure a safer environment for both amphibians and humans.

175. Finally, the project's goal of maintaining 20 pairs of each target species through *ex situ* conservation measures will ensure genetic viability of each population and bodes well for conserving species in critical risk of extinction. The *ex situ* populations established through the project are expected to provide animals for the reintroduction to natural habitats in the long-term (post-project) as well as produce the animals needed to meet long-term research needs for bioprospecting.

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[64] Constitution of Montecristi, 2008

[65] MAE, Identificacion de vacios y prioridades de conservación en el Ecuador continental, 19 Nov. 2013

176. Institutional sustainability: The Project will address the need to improve the enabling environment for effective management of genetic resources and ABS in Ecuador. The project's outcomes will support capacity building activities and other interventions, such as the alignment of Executive Decree 905 and the Strategic Plan with its accompanying Action Plan, to create the appropriate institutional environment for effectively promoting and managing genetic resources and ABS in Ecuador. This will be bolstered by the establishment of the ABS Permits Module in the SUIA, as well as the strengthening of the Genetic Resources unit within MAE, and associated capacity building of MAE/INB/ABS Assessing Bodies.

177. The project will also achieve institutional sustainability through the involvement and cooperation established with domestic and foreign universities and/or research centers engaging in bioprospecting and genome bank activities. This is feasible and likely given the emphasis of current policies of the Ecuadorian government to promote and strengthen higher education and research. Through this project, both research and the exchange and development of new technologies will be made effective; the formation of human talent will generate scientific publications worldwide. Additionally, through the economic valuation and case studies in Outcome 3, the project will contribute to the transformation of the productive matrix by providing the necessary data to recognize the value of genetic resources derived from the country's biodiversity.

178. Financial Sustainability: The project will achieve long-term financial sustainability through the design and implementation of legal and policy changes so that potential monetary benefits generated from genetic resources are distributed equitably to the State and places of origin. Crucial to this will be the results of the economic valuation and case studies that will nourish the alignment process of the ABS legal framework in Outcome 3. In addition, the project will support the development of financial sustainability programmes within the Management Plans of the 2 new GAD reserves to be established in Outcome 1. These reserves will test the potential, determine standards and build capacities for revenue generating activities related to genetic resources and ABS.

179. An important opportunity for financial sustainability is if a compound identified through bioprospecting is of interest to the pharmaceutical industry and can be taken to the next level of development and commercial application, generating patents and economic benefits to be reinvested in the conservation and research components established through the project. While this is possible and there are promising preliminary results, the scope of this has generally been long-term, requiring an important investment in time, research and development due to the number of molecules to be studied and the slim chances of discovering the characteristics required for their application and product development. Of the 5,000-10,000 compounds found through basic research and screening for drug discovery, only 1 molecule reaches a new drug application in the span of 15-20 years with an investment of billions of dollars from the pharmaceutical industry[66]. However, with improved technology and research techniques, there have been recent exceptions to this tendency with shorter-time periods for generating financial benefits, i.e. derivatives of Epibatidine are already being commercialized as a radiopharmaceutical biomarker for Alzheimer's disease, or for research purposes. Ultimately, through Outcome 3, the project aims to ensure the legal framework is in place to guarantee the return of profit generated from genetic resources to the communities that conserve the habitat critical to the species' survival, thereby creating a sustainable cycle.

180. Social sustainability: Efforts to ensure sustainable support from diverse stakeholders are a key component of the Project. The project was developed in a highly participatory fashion, including staff from key public institutions, academia, NGOs, municipalities associated with critical habitat and other

[66] Pharmaceuticals Research and Manufacturers of America, 2013

stakeholders from civil society. Participation and interest in conservation mechanisms, genetic resources and ABS will be enhanced through the execution of a comprehensive Stakeholder Involvement Plan (Section IV, Part V), which identifies stakeholder interests and possible conflicts and responsive mitigation measures to assure strong and effective stakeholder participation. Other elements of project design to address social sustainability include: stakeholder participation in the establishment of the new GAD reserves in Carchi and Guayas, as well as the elaboration of the Management Plans for the new PAs; awareness raising to increase societal appreciation of the benefits of BD and the value of the ecosystem services they provide, including the genetic resources they host.

181. Furthermore, a long-standing border dispute between the provinces of Azuay and Guayas was recently resolved and this project offers a unique opportunity to foster inter-provincial cooperation in the establishment and management of a GAD reserve along the border that can benefit not only Guayas as host, but Azuay as an indirect beneficiary of the conservation interventions. Given the distribution of *Atelopus balios* along both sides of the provincial border, it is possible to consider engaging the Municipality of Cuenca in expanding the reserve to conserve more critical habitat or establish a separate GAD Reserve that neighbors the Guayas PA. The capacities built through the project's interventions in Guayas can open an opportunity for dialogue, exchange and cooperation between the two provinces.

2.7. Replicability

182. The project has identified two initial opportunities for replication by project-end: 1) at least 1 PA within the SNAP will adapt conservation measures with a focus on amphibians and their critical habitat; 2) at least 1 Socio Bosque area will adopt conservation measures with a focus on amphibians and their critical habitat.

183. By supporting the new GAD reserves through the SNAP integration process, it is expected that procedural issues will become easier and other GAD Reserves will be encouraged to follow suit. The replication of conservation areas with a focus on amphibian conservation and their inclusion within the SNAP will ultimately contribute to the closure of gaps in the coverage of critical ecosystems as identified in the SNAP's 2013 evaluation of priority areas for protection and conservation.

184. The project will also coordinate with Socio Bosque to consider the possibility of adapting its ecosystem restoration programme as an incentive to private landowners to adopt amphibian-based conservation measures in the management of their properties.

185. In terms of the research and technological capacities developed through the project, replicability of the project is highly feasible because the methodologies for research on frog peptides can be extrapolated to study other amphibian species as well as other poisons derived from reptiles, scorpions and insects. For example, Queen's University has generally focused on the study of venoms of amphibians. However, in recent years, the University has embarked on the study of snake venoms and scorpion poisons. Considering Ecuador's status as a megadiverse country, it is very plausible to consider the replication of these methodologies to the secretions of other Ecuadorian amphibian species as well as the venom of reptiles, scorpions, and countless species of insect with secretions of interest.

186. Furthermore, the links developed with research centers and universities around the country, both public and private, will foster opportunities for replication. This is feasible and highly probable because (i) government requirements regarding higher education require universities to increase the amount of scientific research they conduct; and (ii) the bioprospecting research supported by this project is among the priorities of the Ecuadorian Government and as such, state policies are currently seeking a major increment in research aimed at sustainable use of biological diversity as well as the development of pharmaceutical research.

2.8. Financial Modality and Cost-Effectiveness

Cost-effectiveness

187. In line with the GEF Council's guidance on assessing cost-effectiveness of projects (Cost Effectiveness Analysis in GEF Projects, GEF/C.25/11, April 29, 2005), the project development team has taken a qualitative approach to identifying the alternative of best value and feasibility for achieving the project objective:

188. Selection of different conservation strategies: The *ex situ* and *in situ* interventions are designed to be cost-effective pilots for conserving critical habitat of priority endangered amphibian species. These small-scale initiatives offer large-scale returns and lessons for replication at the national scale. In particular, the GAD reserves established through the *in situ* interventions of this project will serve as models for promoting this new sublevel of PAs within the SNAP. By establishing capacity and experience in the integration process of GAD PAs within the SNAP, it is expected that the integration process of other GAD reserves will be more efficient, thereby allowing for more timely access to federal resources associated with SNAP recognition and ultimately closing priority conservation gaps. This also holds true for Socio Bosques, as the project expects that through the training in biological monitoring, private landowners will recognize the benefits of conservation of critical habitat for amphibians, and be motivated to join Socio Bosques so as to access the restoration program resources.

189. Selection of species: Two of the species targeted through *ex situ* conservation are found in Morona Santiago and Zamora Chinchipe along the Cordillera del Condor. As such, the project will focus search and rescue efforts on one area of the country rather than several, distant areas, thereby ensuring cost-effective use of time, human and monetary resources. The overlapping of distribution areas of species targeted for *in situ* conservation allows for measures to have a larger impact. For example, the GAD reserve to be established in Carchi covers an area of coexistence of *Atelopus coynei* (Coyne harlequin frog) with *Atelopus* sp. (aff. *longirostris*) (Harlequin frog). Furthermore, the bioprospecting potential of Atelopus nanay could produce future monetary benefits that would feed back into the Cajas National Park, thereby supplementing the PA's financial sustainability programme, and further supporting in situ and ex situ conservation.

190. Selection of sites: The project will establish 2 new GAD reserves in Carchi and Guayas Provinces to close gaps in coverage of critical habitats for highly endangered amphibian species. The Provincial GADs already have Reserve Management Units established and technical capacity to manage conservation areas, and as such provide a higher probability of sustainability post-project, as well as replication in other areas within the provinces. Furthermore, the project will work in 1 PA that already has a conservation management structure and can also be replicated throughout PANE. Cajas National Park already has PES schemes so the application of an ABS scheme could be plausible in the future. Additionally, the project is also coordinating with Socio Bosque, which has resources for biological monitoring and conservation/restoration which will also improve replication by providing incentives for members to engage in amphibian conservation, as well as attract new members.

191. Physical facilities: The expansion of Centro Jambatu and Amaru Amphibian Rescue Center for the purposes of *ex situ* conservation was deemed more cost-effective than building a separate national rescue center from zero. The existing collaboration between Centro Jambatu, MAE and a variety of universities and research centers around Ecuador and the world will allow for timely and cost-effective implementation of project components, not only in *ex situ*, but also in the establishment of the Genome Bank and bioprospecting laboratory. While IKIAM Regional Amazonic University is under construction, the establishment of a small functional branch lab at Centro Jambatu is a cost-effective option to foster

the development of national technical capacities. Furthermore, once IKIAM is fully-functional, Centro Jambatu's branch laboratory will continue to serve as an important back-up and complementary site.

192. Selection of Universities/Research Institutes for bioprospecting: One of the lines of research of the IKIAM Regional Amazonic University is the bioprospecting of amphibians, and therefore it plays an important role in supporting implementation, especially in Outcome two of the project. Involvement of IKIAM is also cost-effective due to the number of qualified scientists who will provide technical support and participation in a number of lines of action. The Queen's University of Belfast is an internationally-recognized premier research institution on bioprospecting and as such will be in charge of carrying out research on the skin secretions of amphibians in order to synthesize chemical compounds to be analyzed by bio-medicine professionals. Queens will aso play a decisive role in transferring technologies and building research capacities in the field of amphibian bioprospecting.

193. Cost effectiveness will also be monitored as an integral part of the monitoring and evaluation process. The project budget provides for independent financial auditing on a yearly basis.

194. Finally, cost effectiveness is ensured through a prescribed project management process that will seek the best-value-for-money. UNDP rules as well as MAE rules employ a transparent process of bidding for goods and for services based on open and fair competition and selection of best value and best price alternatives. Procurement will be managed by UNDP in coordination with MAE to ensure the application of all effective regulations. An independent committee is utilized for all procurement of personnel and selection of contractors.

PART III: Management Arrangements

Implementation Modality

195. The project is in line with the Standard Basic Assistance Agreement between UNDP and the Government of Ecuador. It will be implemented over a five-year period, under the National Implementation Modality (NIM) with UNDP as the GEF Implementing Agency (IA) and the Ministry of Environment (MAE) as Implementing Partner. In this role MAE will undertake full programmatic and administrative-financial control and responsibility for supervising the project, and will be responsible for approving deliverables prior to their reporting to GEF by UNDP.

Implementing Agency

196. As GEF implementing agency, UNDP is ultimately accountable and responsible for the delivery of results, subject also to their certification by MAE, as Implementing Partner. UNDP shall provide project cycle management services as defined by the GEF Council (described in Section IV Part VII), that will include the following:

1) Providing financial and audit services to the project,
2) Overseeing financial expenditures against project budgets,
3) Ensuring that activities including procurement and financial services are carried out in strict compliance with UNDP/GEF procedures,
4) Ensuring that the reporting to GEF is undertaken in line with the GEF requirements and procedures,
5) Facilitate project learning, exchange and outreach within the GEF family,
6) Contract the project mid-term and final evaluations and trigger additional reviews and/or evaluations as necessary and in consultation with the project counterparts.

197. At the request of the Government of Ecuador, UNDP shall also provide Direct Project Services (DPS) specific to project inputs according to its policies and convenience. These services, and the costs thereof, are specified in the Letter of Agreement in Section IV Part VII. In accordance with GEF requirements, the costs of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. UNDP and the Government of Ecuador acknowledge and agree that these services are not mandatory and will only be provided in full accordance with UNDP policies on recovery of direct costs. Direct project services will be charged annually using the Universal Price List for Direct Project Services requested by the GoE.

198. UNDP will provide Project Assurance, supporting the Project Board Executive by carrying out objective and independent project oversight and monitoring functions. UNDP Technical Specialists in the Sustainable Development Cluster at the regional office and the Energy and Environment Unit at the country office, will be involved as necessary in key project meetings, consultations, events and reviews of technical and other reports.

Strategic Local Partner

199. To achieve project success, it is essential to generate strategic alliances with specialized stakeholders in scientific research on amphibians. Therefore, by request of the Ministry of Environment (see Section IV Part VII), the non-government organization (NGO) Otonga Foundation through the Jambatu Center for Research and Conservation of Amphibians, will be a Strategic Local Partner for the delivery of selected outputs of the project, as indicated in Table 13. This arrangement is particularly useful since it will maximize the delivery of Otonga Foundation technical expertise for specific project activities.

200. The Otonga Foundation through the Jambatu Center for Research and Conservation of Amphibians was chosen as the Strategic Local Partner, by the Ministry of Environment and UNDP, in view of the following: (i) The extensive experience of Jambatu Center on issues related to scientific research and amphibian conservation of Ecuador; (ii) having the appropriate technical capabilities for the support to the management of the project outputs; (iii) and having the functioning patent granted by the Ministry of Environment (No. 002-2015-FAU-DPAP-MA) and the research permits (No. 005-15 IC-FAU-DNB/MA) necessary for the proper execution of the project (Section IV Part VII).

201. The Otonga Foundation is a nongovernmental and nonprofit organization, legally established by ministerial agreement No. 93 of May 28th, 1998 by the Ministry of Environment. This was ratified and approved via statutory reform, by ministerial decree No. 003 of January 10th, 2012 issued by the Ministry of Environment.

202. Among the objectives of the Otonga Foundation are conservation, research and sustainable management of the environment and biodiversity, to improve the quality of human life, through the formation of new ethics with social and environmental responsibility; protect areas critical to the conservation of endangered amphibians of Ecuador and the associated natural resources; generate scientific information and knowledge through the development and implementation of research related to environmental issues; provide scientific information that can be used by public and private entities that are involved in the planning, scientific research, conservation and sustainable management of natural resources; collaborate with institutions or authorities on request, on issues related to conservation, research, and sustainable management of natural resources.

203. Previous experiences of Otonga Foundation for amphibian research and conservation, as indicated in Table 12, have demonstrated they have the experience and technical expertise, highly

relevant to this project, after having successfully implemented over 6 related projects through multiple funding sources totaling over US$767,287.22.

Table 12. Projects carried out by of Otonga Foundation in Ecuador to date

Project name and duration	Budget (US$)	Sources of financing
"Enhanced production of beef cattle farms in small Toachi Valley" December 2009 – July 2011	238,679.02	Fund Italo-Ecuatoriano F.I.E.
"Protection initiative in Toachi River Watershed through training and reforestation with priority in agroforestry species" January 2007 – August 2009	210,945.40	Fund Italo-Ecuatoriano F.I.E.
"Emergency actions for the conservation of *Hyloxalus jacobuspetersi* (Amphibia: Dendrobatidae), a species at verge of extinction" April 2012 – April 2013	25,000.00	U.S. Fish and Wildlife Service
Providing sustainability to the Jambatu Center and *ex situ* conservation program of amphibians in risk of extinction January 2011 – December 2015	125,000.00	Saint Louis Zoo,
Proactive conservation actions to save from extinction the direct development mode of reproduction of marsupial frogs (*Gastrotheca*, Hemiphractidae) in the Eeuadorian Andes. June 2012 – June 2013	12,112.80	People's Trust for Endangered Species
"Flexibility, constraints and selection in repeated ear loss and regain in toads" July 2014 – June 2019	155,550.00	Colorado State University

204. MAE, as implementing partner will execute funds through the Harmonized Approach to Cash Transfer (HACT) in which direct cash transfers will be applied.
For that, MAE must meet the following requirements:

- To open a unique bank account in Central Bank of Ecuador specifically assigned to the project, in which at least two signatures should be registered.
- Prior to the first disbursement of funds, MAE with project management unit will be trained by UNDP in the principal programmatic and financial accounting norms required for budgetary reporting. In this context, reviews should be carried out initially on a three-monthly basis, becoming more widely spaced as MAE becomes more practiced in UNDP accounting norms.
- Reports of advances of funds should be provided on a three-monthly basis, and at any moment UNDP may carry out financial monitoring, review or audit, if considered necessary.

205. UNDP will ensure that these requirements are ready prior to making the first disbursement of funds to MAE.

206. MAE and UNDP will require Jambatu Center of Otonga Foundation to support in the development of the specific outputs detailed in Table 13. The mechanism to operate effectively this technical support will be defined in the decision-making committees established in this instrument.

Table 13: Division of Outputs

Sub-output	MAE	UNDP/Otonga Foundation
1.1. Highly endangered harlequin and poison frogs rescued from areas impacted by mining and conserved in captive breeding facilities. Rescue locations and species include: Azuay (*Atelopus nanay*), Morona Santiago and Zamora Chinchipe and Cordillera del Cóndor (*Atelopus* sp. nov. *(aff. palmatus)* and *Dendrobates condor*).		

Sub-output	MAE	UNDP/Otonga Foundation
a) Collection permits	X	
b) Captive breeding facilities	X	X
c) Search / collection of amphibian species	X	X
d) Captive breeding and keeping of the three species of amphibians	X	X
1.2 Critical habitat of 4 Ecuadorian amphibian species at high risk of extinction (*Atelopus coynei*, *Atelopus* sp. *aff. longirostris*, *Atelopus balios* and *Atelopus nanay*) legally protected in 2 new Decentralized Autonomous Government (GAD) reserves (in Carchi and Guayas) and 1 existing protected area of the PANE (Cajas National Park in Azuay).		
a) GAD's Reserves declaration	X	
b) Management Plan of declared Reserves	X	
c) Management Plan application	X	
d) Biological monitoring	X	X
2.1 Amphibian genetic resources under research for biomedical applications; and access to genetic resources of amphibians granted to an Ecuadorian University or Research Institution through a framework contract for research purposes.		
a) Framework contract	X	
2.2. Four lead compounds characterized and one new small protein (peptide) synthesized and pharmacologically tested from the skin secretions of 4 amphibians: (*Agalychnis spurrelli*, *Cruziohyla calcarifer*, *Hypsiboas picturatus* and *Atelopus nanay*).[67]		
a) Active compounds isolated and structurally characterized	X	X
b) Molecularly characterized new peptides	X	X
c) Chemically synthesized and pharmacologically studied new peptides	X	X
2.3 Technology transfer improves the bio-prospecting research capacity of Ecuador and advances in science knowledge on peptides from skin secretion of 4 species amphibians (10 publications in peer review scientific journals).		
a) Bioprospecting laboratory equipped	X	X
b) Bioprospecting Scientist Prometeo	X	
c) Scholarship program[68]	X	X
2.4 Genetic resources of Ecuadorian amphibians at high risk of extinction conserved for bio-prospecting and conservation purposes: (i) Tissues of 50% of Ecuadorian amphibian species; (ii) Skins (with chemical compounds) and germ cells of ~ 40% (~ 70 of Ecuadorian amphibians on the IUCN Red List); (iii) Cryopreserved sperm samples tested and proven viable for reproductive use.		
a) Life and gene bank installation and equipment	X	X
b) Expeditions / collections	X	X
c) Database collections	X	X
d) Research of sperm cryopreservation	X	X
3.1 Nagoya Protocol ratified and regulations on ABS updated; model ABS agreements and contractual clauses for different taxa defined; policy for amphibian conservation measure included in permit processes for development projects.		
a) Strategic Plan for Amphibians Research and Conservation and Action Plan	X	X
b) Case study in two scenarios	X	
c) Economic evaluation of the potential uses of amphibians	X	
d) Legal study	X	
3.2. Capacities of national agencies for ABS implementation improved as measured by ABS Capacity Development Scorecard (baseline 35 target 49)		
a) Upgrading the MAE genetic resources unit	X	
b) Genetic Resources Module (SUIA)	X	

[67] The MAE is in charge of equipment, while Jambatu Center of Otonga Foundation of the results of researches referred to the logical framework matrix.

[68] MAE and the Jambatu Center of Otonga Foundation will be responsible for the dissemination of the importance of bioprospeeting studying in the country Universities.

Sub-output	MAE	UNDP/Otonga Foundation
c) Training program	X	
3.3. Increased awareness of citizens about ABS and the need to preserve the country's amphibian diversity and its genetic resources.[69]		
a) Communication strategy	X	X
b) MAE CHM platform interconnected with the Jambatu Center	X	X
c) Updated IUCN Red List of Ecuadorian Amphibians	X	X
d) Amphibians factsheets completed and published	X	X
e) Citizen science portal	X	X

207. In accordance with the instructions of the National Authority of the International Cooperation (SETECI, for its Spanish acronym), MAE will implement a 60% of the total amount of the project through full NIM modality and 40% will be through UNDP support to NIM modality. UNDP support to national implementation will follow UNDP corporate guidelines. Jambatu Center of Otonga Foundation will be a Strategic Partner and will support the project in implementing activities.

208. Facilities of Jambatu Center of Otonga Foundation will be adapted for conservation of species that are the objective of this project. The Jambatu Center of Otonga Foundation together with MAE will support to do the biological monitoring of the target conservation species. The bioprospecting laboratory will be temporarily installed and equipped in the Jambatu Center of Otonga Foundation, while definitive IKIAM facilities are completed. The installation of the equipment and the hiring of technical staff for the Life and Gene Bank for amphibian conservation will be established in the Jambatu Center of Otonga Foundation. The Jambatu Center of Otonga Foundationg together with MAE will provide support for the biological monitoring of the target conservation species. There will be continuous communication, coordination, cross-fertilization and strengthening between PNUD, Otonga Foundation and MAE, at operational level as well as through the Technical Committee, as shown in the organizational diagram.

Project Board

209. The Project Board is the project coordination and decision making body. It will meet semiannually to review project progress, approve project work plans and approve project deliverables. The responsibility of the Board is to see that project activities lead to the required outcomes as defined in the project document. The Board will oversee project implementation, approve work plans and budgets as supplied by the National Coordinator, approve any major changes in project plans, approve major project deliverables, arbitrate any conflicts which might arise, be responsible for the overall evaluation of the project. The Board may be convened extraordinarily by the Chair, at the request of individual members.

210. The make-up and TORs of the Board will be finalized in the Project Inception Workshop.

211. The Project Board will be responsible for making executive decisions for the project, in particular when guidance is required by the National Coordinator. The Project Board will play a critical role in facilitating inter-ministerial coordination, project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It will ensure that required resources are committed and will arbitrate on any conflicts within the project or negotiate a solution to any problems with external bodies. In addition, it will approve the appointment and responsibilities of the National Coordinator and any delegation of its Project Assurance

[69] The implementation of the activities of 3.1 a) and all 3.3, will be made to MAE with the technical support of Jambatu Center of Otonga Foundation.

responsibilities. Based on the approved Annual Work Plan, the Project Board will also consider and approve the quarterly plans and will also approve any essential deviations from the original plans.

212. In order to ensure UNDP's ultimate accountability for the project results, Project Board decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP.

213. The Board will consist of the following members:

1) The Executive Secretary, who will chair the Board. This role will be filled by the highest authority of MAE or his/her delegate.

2) A representative of the Senior Supplier, who will provide guidance regarding the technical feasibility of the project. This role will be filled by UNDP.

3) A representative of the partner project beneficiaries, who will represent the interests of those who will ultimately benefit from the project and ensure the realization of project outputs from the perspective of project beneficiaries. This role will occupy by the IKIAM Regional Amazonic University.

214. A representative of the Strategic Local Partner (Otonga Foundation), who will participate as an adviser every time technical inputs are needed regarding the outputs under its responsibility and/or within its technical expertise.

National Project Director

215. The project will be under the overall leadership of a National Project Director (NPD), who will be a represented of the National Biodiversity Director of MAE and will be responsible for orienting and advising the National Project Coordinator on Government policy and priorities. The NPD will also be responsible for maintaining regular communication with the National Secretary of Higher Education Science, Technology and Innovation (SENESCYT, for its acronym in Spanish), and with relevant educational institutions to ensuring that their interests are communicated effectively to the National Project Coordinator.

National Project Coordinator

216. A National Project Coordinator (NPC) will be responsible for the implementation of the project, providing technical expertise, reviewing and preparing TOR's and reviewing the outputs of consultants and other sub-contractors. She/he will be hired based on a competitive process.

217. The National Project Coordinator will run the project on behalf of the Implementing Partner and within the framework delineated by the Project Board. She/he will work in close cooperation with, and oversee, the Jambatu Center of Otonga Foundation team. The NPC will:

- Be the signing authority of requests to UNDP for disbursements of project funds.
- Ensure the logistical, administrative and financial effectiveness of the IP in fulfilling its roles set out above.
- To this end, provide monitoring, supervision and guidance to the technical teams based in the project areas.
- Promote incidence in and coordination with MAE, UNDP and the donor agencies that are supporting them.

- Collaboration will also be made with the GEF-UNDP global ABS project: Strengthening human resources, legal frameworks and institutional capacities to implement the Nagoya Protocol, see paragraph 170 for more details.

218. In addition, the NPC, with the assistance of the Otonga Foundation Team (and other senior experts mentioned above) will manage the following:

1) preparation of project reports, work plans, budgets and accounting records,
2) drafting of TORs, technical specifications and other documents,
3) identification of consultants and supervision of consultants and suppliers,
4) overseeing the implementation of project activities in a timely and efficient way,
5) maintaining contacts with project partners at the national, state and local level,
6) organization of seminars, workshops and field trips which are linked to project activities.

219. The National Project Coordinator, with the assistance of the Otonga Foundation Project Manager, will produce in a timely fashion annual work plans and budgets to be approved by the Project Board and quarterly operational and annual progress reports for submission to the Board. The reports will provide details about the progress made, any shortcomings and the necessary adjustments made to achieve project outcomes. The National Project Coordinator will also be responsible for any national or international service provider and the recruitment of specialist services (with due consultation with the Board).

Technical Committee

220. The National Project Coordinator will be advised by a Technical Committee composed of representatives of MAE (the National Project Director), UNDP, Otonga Foundation, IKIAM University and ETAPA, which will meet on a quarterly basis. The Technical Committee will also advise the NPC on ensuring coordination between the project and other related initiatives such as the GEF Small Grants Programme, the different initiatives of MAE (especially SUIA, Socio Bosque), IKIAM, ETAPA, GADs and SENESCYT of relevance to the project, and current and emerging projects and programmes of donors.

Linkages to on-going related activities

221. Overlapping and double funding will be avoided at all times, especially with the Ministry of Environment. It is important to emphasize and encourage a close and permanent coordination with similar initiatives within the area of intervention with the intention of capitalizing the impact of this proposal.

Administrative Costs

222. Costs associated with project cycle management services will be covered by the standard GEF Implementing Agency fee and the internal division of these with CO will follow current UNDP procedures. Direct project services will be charged annually using the Universal Price List for Direct Project Services requested by the GoE as described earlier.

Contribution of the implementing Partner

223. MAE will contribute with this initiative through the active participation of their technical staff particularly from the National Biodiversity Directorate.

Agreement on intellectual property rights and use of logo on the project's deliverables

224. In order to accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF project publications, including among others, project hardware and equipment purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF.

Property of Equipments and Goods

225. Goods and equipment purchased as part of this Project will belong to UNDP CO according to provisions stated in the Standard Basic Assistance Agreement (SBAA) signed between the Govermment of Ecuador and UNDP in January 19, 2005, and the following instruments: internal policy for NIM projects, financial regulations, and corporate management guides on equipments and goods. As GEF implementing agency, UNDP is responsible for assuring fiduciary sound management of these GEF funds. During the implementation phase, transfer to national beneficiaries will be undertaken in accordance to UNDP procedures and policies and subject to agreement with MAE as Implementing Partners. Only national organizations will be considered as beneficiaries.

226.

227. Procurements of goods, equipment and services under NIM will be carried out through the National Public Procurement System (SERCOP as in Spanish).

228. MAE will provide the equipment necessary for keeping active and properly functioning, in the long term, the Life and Genetic Bank and other activities to develop the outcome 2.3 of the project. Otonga Foundation, as strategic local partner could make use of this equipment for theactivities directly related to this project.

Audit

229. According to UNDP's general corporate audit regulations, internal and external audits will be carried out individually to each responsible party, and these costs will be covered by the project (in Outcome 4). The audit should be performed in accordance with UNDP financial regulations and rules and applicable to audit policies on UNDP projects.

230. The Ministry of Environment will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by a special and certified audit firm. UNDP will be responsible for making audit arrangements for the project in communication with the Project Implementing Partner.

231. UNDP and the project Implementing Partner will provide audit management responses and the Project National Coordinator and project support team will address audit recommendations.

232. As a part of its oversight function, UNDP will conduct audit spot checks at least two times a year. UNDP shall have the right, at its own expense, to audit or review such Project-related books and records as it may require.

Collaborative arrangements with related projects

233. Of particular importance will be coordination with the following initiatives:

- The GEF Small Grants Programme (SGP): Currently the project amphibian conservation and SGP have no geographical overlap in their interventions; however, they have generated important tools for conservation work *in situ* (as the adaptation of the ART methodology). Additionally, it is expected that in the future they can joint there intervention, looking forward into incorporating amphibians as an important bioindicator for the intervention of other geographical areas, of which the actual project is not going to intervene.
- The GEF PA financial sustainability project will provide the mechanisms needed and the effectiveness tools to ensure financial sustainability of conservation GADs areas. This project will provide the technical amphibian information and decision making tools to guide investments to vulnerable areas and will drill down on the cost-estimates and efficiencies for amphibian conservation.

- The GEF Advancing Landscape Approaches in Ecuador's National Protected Area System to Improve Conservation of Globally Endangered Wildlife: The wildlife project should generate protocols for biodiversity monitoring; the purpose of the synergy between the two projects will be to obtain a monitoring scheme that allows mainstream amphibians, along conservation areas PANE, GADs, Sociobosque and biological corridors.
- There will be synergies between the present project and the project GEF/FAO Mainstreaming of the Use and Conservation of Agrobiodiversity in Public Policies through Integrated Strategies and In situ Implementation in three Provinces in the Andean Highlands: Through this project a protocol for prior informed consultation on issues of agrobiodiversity and under the Convention ITPG must be developed. Therefore it is necessary to establish a common agenda to develop the theme under a national focus and also in relation to the Nagoya Protocol.

234. To ensure the maximum benefit of the programmatic approach promoted by this project, a number of coordination mechanisms will be established with these and other emerging initiatives, including the following:

- The Technical Committee, which will play a key role in advising the NPC on and facilitating, coordination.

- Annual planning meetings between the relevant GEF projects and selected projects from other funding sources;

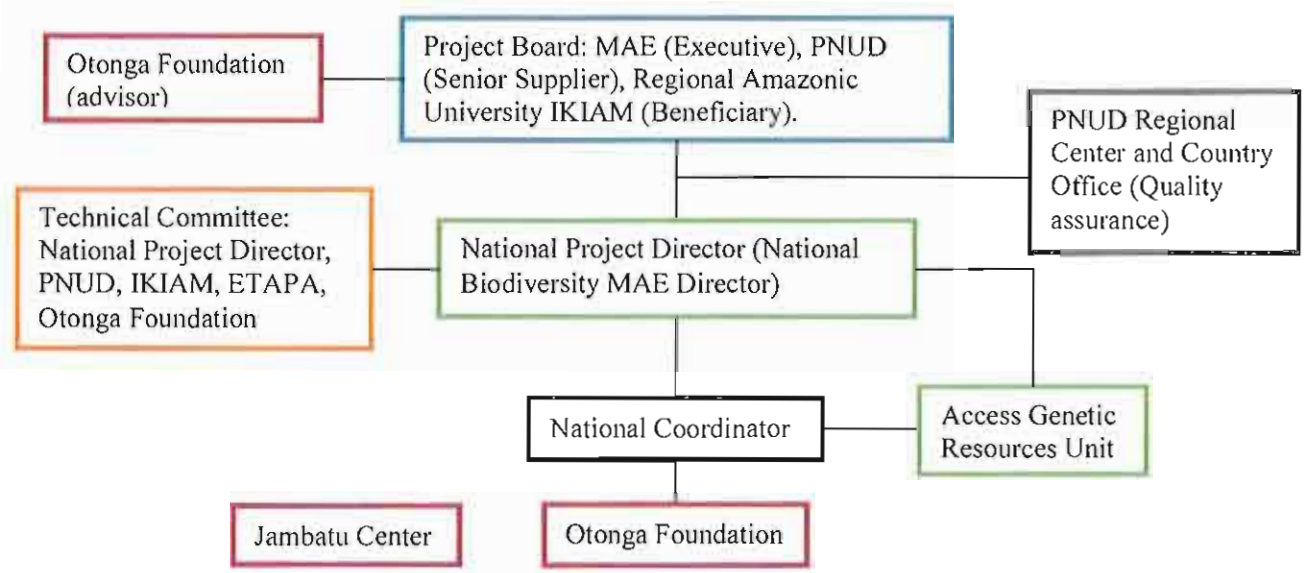
- Protocols of understanding in which specific meetings are scheduled by each project on a regular basis to discuss and explore project findings of relevance to landscape conservation

Cash Transfer Modality to implementing partner

235. Direct Cash Transfer (advances) modality will be used (see Section IV Part VII). MAE will receive the funds through advances, based on its financial reporting. After first installment, the second and subsequent installments will be advanced to the MAE quarterly (based on agreed work plan detailed planning of expenses to be made by the project), who will in turn report back expense through Funding Authorization and Certification of Expenses (FACE) forms for harmonized programme countries (See SECTION IV Cash Transfer Modality Workflow). Note that the recording of expenses, from requisition through to disbursement, occurs in the books of the Implementing party. UNDP is pre-funding the activities with advances of cash.

236. In order to receive the funds advanced by UNDP, the Implementing Partner will open a public bank account (cash transfer, TE for its Spanish acronym) in the Central Bank of Ecuador to be used only for receiving UNDP advances and to make payments of the project. This account must not have access to any credit (i.e. overdrafts) nor be used for investments. UNDP will not make arrangements for opening or closing such accounts, and will not be in any case a signatory for these accounts. MAE must maintain strict control of such bank accounts, making bank reconciliations at least quarterly (monthly is advisable), and must keep on file all documentation related to account transactions. Bank statements must be filed by the project and a copy should be submitted to the country office with the Financial Reports or FACEs.

Organizational Structure of the Project



PART IV: Monitoring and Evaluation Plan and Budget

237. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF Regional Coordination Unit in Panama. The Logical Framework Matrix (in Section II) provides impact and outcome indicators for project implementation along with their corresponding means of verification. The TT tool is going to be used as one of the main instruments to monitor progress. The M&E plan includes: inception report, project implementation reviews, quarterly operational reports, a mid-term and final evaluation, etc. The following sections outline the principal components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities (table below). The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Meeting following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

Project start:

238. A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan. The Inception Workshop will address a number of key issues including:

239. Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

240. Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.

241. Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.

242. Discuss financial reporting procedures and obligations, and arrangements for annual audit.

243. Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the inception workshop.

244. An Inception Workshop Report will be a key reference document and will be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

245. Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.

246. Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical).

247. Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.

248. Other ATLAS logs can be used to monitor issues, lessons learned etc... The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

249. Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared by the Project Coordinator to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

250. The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR

251. Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

Periodic Monitoring through site visits:

252. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO

and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

253. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (insert date). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

End of Project:

254. An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

255. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

256. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

257. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Audit Clause

258. The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals.

The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

Communications and Visibility Requirements

259. The project will comply with UNDP's Branding Guidelines, which can be accessed at: http://intra.undp.org/coa/ branding.shtml.

260. Specific guidelines on UNDP logo use can be accessed at: http://intra.undp.org/branding/useOfLogo.html.

261. Amongst other requirements, these guidelines describe when and how the UNDP and the logos of donors to UNDP projects are used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo

262. Full compliance will also be observed with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"), which can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf.

263. These guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. These Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items. Where other agencies and project partners have provided support through co-financing, their branding policies and requirements will be similarly applied.

Table 14: Project Monitoring and Evaluation Plan and Budget

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project staff time*	Time frame
Inception Workshop & associated arrangements	PM UNDP CO UNDP GEF	Indicative cost: 5,000	Within first two months of project start up
Inception Report	Project Team UNDP CO Service contract to arrange/run workshop and produce report	Indicative cost 0	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	PM will oversee the hiring for specific studies and institutions, delegate responsibilities to relevant team members, and Support from International consultant- sets up long term M+E Plan	To be finalized in Inception Phase and Workshop. Indicative cost 10,000	Start, mid and end of project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	Oversight by Project GEF Regional Advisor and PM Measurements by regional field officers and local IAs Local consultant to support M+E	To be determined as part of the Annual Work Plan's preparation. Indicative cost 15,000	Annually prior to APR/PIR and to the definition of annual work plans
APR/PIR; GEF-4 Biodiversity Tracking Tool; METT	Project Team UNDP-CO UNDP-GEF	Indicative cost: 0	Annually

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project staff time*	Time frame
Steering Committee Meetings and relevant meeting proceedings (minutes)	PM UNDP CO	Indicative cost: 2,000	Following Project IW and subsequently at least once a year
Quarterly status reports	Project team	Indicative cost: 0	To be determined by Project team and UNDP CO
Technical reports	Project team Hired consultants as needed	Indicative cost: 3,000	To be determined by Project Team and UNDP-CO
Project Publications (e.g. technical manuals, field guides)	Project team Hired consultants as needed	Indicative cost: 5,000	To be determined by Project Team and UNDP-CO
Mid-term External Review	Project team UNDP- CO UNDP-GEF RCU External Consultants (i.e. evaluation team)	Indicative cost: 30,000	At the mid-point of project implemcntation.
Final External Evaluation	Project team, UNDP-CO UNDP-GEF RCU External Consultants (i.e. evaluation team)	Indicative cost: 30,000	At the cnd of project implementation
Terminal Report	Project team UNDP-CO External Consultant	Indicative cost: 0	At least one month before the end of the project
Lessons learned	Project team UNDP-GEF RCU (suggested formats for documenting best practices, etc) End of Project Event	Indicative cost: 5,000	Yearly
Audit	UNDP-CO Project team	Indicative cost: 20,000 (average $4,000 per year)	Yearly
Visits to field sites (UNDP staff travel to be charged to IA fees)	UNDP Country Office UNDP-GEF RCU (as appropriate) Government representatives	Indicative cost: 15,000 (3-4 visits per year)	Yearly
TOTAL INDICATIVE COST Excluding project team staff time and UNDP staff and travel expenses		US$ 140,000	

PART V: Legal Context

264. This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA and all CPAP provisions apply to this document.

265. Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

266. The implementing partner shall:

- put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

267. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

268. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

SECTION II: STRATEGIC RESULTS FRAMEWORK AND GEF INCREMENT
This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD: **1. Inclusive and sustainable growth and development incorporating production capacities that generate employment and lifestyles for the poor and excluded.** **2. National capacities to reduce conflict likelihoods and reduce natural risks, including those arising for climate change.**
Country Programme Outcome Indicators: By 2018, support has been provided to strengthening institutional and citizen capacities to promote the rights of nature, create conditions for a sustainable low-emission development, and improve the resilience and risk management facing the impacts of climate change and natural and man-made disasters (Those linked to the project and extracted from the country programme document)
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one):
Applicable GEF Strategic Objective and Program: BD-1 and BD-4
Applicable GEF Expected Outcomes: Outcome 1.1: Improved management effectiveness of existing and new protected areas; Outcome 4.1: Legal and regulatory frameworks, and administrative procedures established that enable access to genetic resources and benefit sharing in accordance with the CBD provisions
Applicable GEF Output Indicators: Output 2. New protected areas (2) and coverage (2,200) of nnprotected threatened species (4). Output 4.1. Access and benefit-sharing agreement (1) that recognizes the core ABS principles of Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) including the fair and equitable sharing of benefits

Objective	Indicator	Baseline	Target	Means of Verification	Risks & Assumptions
Project Objective: Ecuador implements integrated emergency actions to conserve the diversity of amphibians of Eeuador and use its genetic resources in a sustainable way	1. Increase in additional hectares of habitat critical for conservation of target amphibian species that is under legal protection thereby closing conservation gaps.	• 0 ha of *humid premontane forest* conserved in GAD reserves • Conservation gap is 8,328 hectares[70]	• 2,200 ha *humid premontane forest* conserved in GAD reserves • Conservation gap reduced by 25%	Creation ordinance of new Protected Areas (PAs)	• Search & rescue of sufficient individuals of each gender • Rescued individuals remain healthy in captivity • Relevant governments entities continue to show willingness to adopt policy measures for amphibian conservation
	2. Replication of *in situ* amphibian conservation measures tested by project further reducing conservation gaps	• 0 PA within SNAP • 0 Socio Bosque	• At least 1 PA within SNAP • At least 1 Socio Bosque (hectares to be measured once replication sites determined)	• Project reports • Management plans	
	3. Number of amphibian species on updated IUCN red list • under successful captive breeding • with cryopreserved sperm samples viable for reproductive • with skins or secretions preserved in the Ecuadorian Amphibian Genome Bank (EAGB)	• 18 rescued and maintained *ex situ* • 0 species • 0	• 20 rescued and under successful captive breeding programmes • At least 1 sample from 2 target species • Approx. 70 (40%)	Centro Jambatu & Amaru websites PA reports	

[70] A gap analysis of critical habitat covered within the Natural Protected Areas Heritage of Ecuador (PANE) calculates that 8,328 hectares of critical habitat to the project's target species (*A. balios, A. coynei* and *Atelopus sp. aff. longirostris*) are unprotected.

Objective	Indicator	Baseline	Target	Means of Verification	Risks & Assumptions
	4. Increase in the flow of resources to amphibian conservation/ABS	• TBD –based on the findings of the case study and economic valuation	• 10% increase from case study base line • By midterm case study and baselines established	Case study report and annual budgets of relevant institutions	• Capacity strengthening efforts in MAE continue ineluding the completion of the eentralized data management system and neeessary policies to ensure the exchange of information online
	5. Degree of compliance in environmental licensing with regards to official guidelines on amphibian conservation in sites prioritized in the National Strategic Plan	• 0%	• 100% once official • By mid-term guidelines defined • By Year 4 guidelines made official in secondary Norm	• MAE reports and audits • Guidelines • Ministerial accord	
	6. % Reduction in processing times for Collection Permits, Framework Contracts, and Access Contracts	Processing times: • Collection Permits: 2 weeks to 6 months. • Framework Contracts: 2 months • Access Contracts: more than 2 years	Processing times: • Collection Permits: 1 week • Framework Contracts: 1 month • Access Contracts: in compliancc with established Norm (approx. 6 months)	• Genetic Resources Module published online via SUIA portal • Approval reports of Collection Permits, and Contracts	
Outcome 1. Emergency actions to ensure the survival of highly cndangered amphibian species of Ecuador for conservation and bio-prospecting purposes	7. # of protected areas and hectares of habitat critical for amphibians with specific conservation measures for highly endangered amphibian species legally-recognized and integrated in the SNAP.	• 0 Provincial GAD reserves declared with focus on amphibian conservation • 0 Management Plans include amphibian conservation measures.	• 2 Provincial GAD reserves deelared with focus on amphibian conservation: - Carchi PA (1400 ha) - Guayas PA (800 ha) • 3 Management Plans covering total of 2,961 ha. Critical Habitat include amphibian conservation measures: Carchi PA; Guayas PA and Cajas NP (761 hectares)	• Creation ordinances of new PAs • Management Plans with Financial Sustainability Programs • SNAP reports	• Provinces eontinue to show interest and politieal will to deelare reserves, and complete requirements for formal integration into the SNAP.
	8. Increase in management effectiveness of 3 legally-recognized PAs with conservation measures for highly endangered amphibian species (METT)	METT Score • Carchi PA: 0 • Guayas PA: 0 • Cajas NP: 62	METT Score • Carchi PA: TBD • Guayas PA: TBD • Cajas NP: 82	• METT applied at midterm and end project	• Conservation interventions have a positive impact on PAs and their management
	9. Successful captive breeding programmes measured by: • # of reproductive events (egg mass) of target species • % survival of rescued individuals in captivity	• # reproductive events - *Atelopus nanay*: 2 - *A.sp. aff palmatus* 0 - *Dendrobates condor*: 0 • %survival - *Atelopus nanay: 66%* - *sp. aff. palmatus: 0%*	• # reproductive events - *Atelopus nanay: 22* - *A.sp. aff. palmatus: 20* - *Dendrobates condor:20* • %survival - *Atelopus nanay: 80%* - *A. sp. aff. palmatus: 80%*	Centro Jambatu & Amaru reports and websites	• Colleetion permits granted within established time frames • Reseued

Objective	Indicator	Baseline	Target	Means of Verification	Risks & Assumptions
		- *Dendrobates condor: 0%*	- *Dendrobates condor: 80%*		individuals remain healthy in captivity
Output 1.1 *Ex situ* conservation through breeding actions to protect highly endangered amphibian species **Output 1.2** *In situ* conservation of critical habitats of unique species at high risk of extinction, *Atelopus coynei*, *Atelopus balios* , *Atelopus* sp . (Aff. *longirostris*), in Decentralized Autonomous Governments (GAD) reserves and *Atelopus nanay* in one existing PANE area.					
Outcome 2. Discovery of active compounds derived from the skin secretion of Ecuadorian amphibians with potential applications in biomedicine	10. Active compounds[71] isolated and structurally characterized (peptides and natural proteins sequenced) from the skin secretions of 4 amphibians: 1= *Agalychnis spurelli* *2= Cruziohyla calcarifer* 3= *Hypsiboas picturatus* *4= Atelopus nanay*	<table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>A</td><td>1*</td><td>1*</td><td>0</td><td>0</td></tr><tr><td>B</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>A= Active compound isolated and characterized by mass spectrometry (*insulin tropic peptide) B= New peptides molecularly characterized (sequence of amino acids) by molecular cloning and sequencing by mass spectrometry	<table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>A</td><td>25</td><td>25</td><td>25</td><td>1</td></tr><tr><td>B</td><td>4</td><td>4</td><td>1</td><td>1</td></tr></table>	Laboratory reports, publications	• Permits and contracts granted for collection and exportation of specimens and samples within established time frames • Availability of sufficient samples of secretions to perform analyses • Synthetic peptides have biological activity and resemble natural peptides • Sufficient qualified candidates for scholarships • Availability of biological material.
	11. # of new peptides synthesized and pharmacologically tested from the skin secretions of 4 amphibian species	2	4	Laboratory reports, publications	
	12. # of students with Senescyt scholarships pursuing graduate studies in amphibian bio-prospecting	1 Student	At least 5 Students	Scholarship documents	
	13. Ecuadorian bio-prospecting laboratory equipped with appropriate technology and conducting research on amphibian bio-prospecting	0	At least 1	Reports generated by laboratory	
	14. # of publications in peer review scientific journals on bio-prospecting research on amphibian skin secretions by Ecuadorian Institutions	0	10	Publications	
	15. % Ecuadorian amphibian species[72] with tissues preserved	0%	50%	Genome Bank catalog accessible	

[71] In this context an active compound is synonymous with peptide or protein.

[72] As of January 2015, 546 amphibian species have been recorded in Ecuador, distributed across three groups: Anuros (represented by frogs and toads) comprise 514 species, Salamanders (Caudata order) comprise 8 species, and Caecilians (Gymnophiona order) comprise 24 species.

Objective	Indicator	Baseline	Target	Means of Verification	Risks & Assumptions
	in the Ecuadorian Amphibian Genome Bank (EAGB)			on Centro Jambatu's webpage	• Timely availability of equipment and materials
Output 2.1 Institutional procedures completed to foster amphibian bio-prospecting research **Output 2.2** Research on skin secretions for new peptides with bioactive properties from four species of Ecuadorian amphibians **Output 2.3** Technical and scientific capabilities for bio-prospecting improved in Ecuador **Output 2.4** BioBanking of genetic resources of Ecuadorian amphibians strengthened					
Outcome 3. Institutional strengthening for the implementation of biodiversity conservation measures and sustainable use of its genetic resources in Ecuador, using amphibians as a pilot case study.	16. Strengthened policy and regulations measured by: • % implementation of the Strategic Action Plan for Conservation of Ecuadorian Amphibians • Nagoya Protocol ratified • Regulation 905 aligned with national, sub-regional and international legislation[73]	• 0% (draft Strategic Plan, no Action Plan) • Nagoya Protocol signed and under discussion in National Assembly • Regulation 905 not aligned	• 20% implementation by MAE of Action Plan (plan approved by Midterm) • Nagoya Protocol ratified • Regulation 905 updated and aligned	• Strategic Plan and Action Plan • MAE work plans include components of Action Plan • Ratification of Nagoya Protocol • Updated/aligned Regulation 905	• Government continues to show political will to align regulatory framework for genetic resources and ABS with national, sub-regional and international regulations. • Training programmes are institutionalized and staff increased • Approval of the norm that defines the procedures for Access Contract for Genetic Resources • The MAE completes the
	17. Improved capacities of national ABS implementing agencies, measured by the ABS Capacity Development Scorecard	ABS Capacity Development Scorecard: 35 3 areas to improve: CR 1: 3 [74] CR2: 14 CR5: 7 - Capacity to conceptualize: The institution(s) has financial resources but has limited personnel and expertise. - Capacity to Apply: The ABS institution(s) has weak leadership and provides little guidance. - Capacity to Monitor: The institution(s) has financial resources but has limited personnel and expertise 0% - Genetic Resources	ABS Capacity Development Scorecard: 49 3 areas improved CR 1: 6 CR2: 19 CR5: 13 Capacity to conceptualize: - Increased capacity to conceptualize policy and related instruments for ABS, in particular to ensure the rules are more efficient and clear. Capacity to Apply - ABS decision-making Institutions have expanded knowledge on ABS issues and ability to act on it. Capacity to Monitor: - Improved capacities of ABS Institutions to execute, monitor	ABS Scorecard	

[73] e.g. National Plan for Good Living, Decree 391, Nagoya Protocol, ITPGR, CONVEMAR

[74] CR 1: 3 Capacity to conceptualize and formulate policies, laws, strategies and programmes;
CR2: 14 Capacity to implement policies, legislation, strategies and programmes;
CR5: 7 Capacity to monitor, evaluate, report and learn

Objective	Indicator	Baseline	Target	Means of Verification	Risks & Assumptions
		Permit Module does not exist in the National Environmental Data base (SUIA)	and evaluate requests for access to genetic resources 100% - SUIA Genetic Resources Permit Module established and producing quality updated reports.		centralized data management system and necessary policies to ensure the exchange of information online.
	18. % Reduction in processing times for Collection Permits, Framework Contracts, and Access Contracts	Processing times: • Collection Permits: 2 weeks to 6 months. • Framework Contracts: 2 months • Access Contracts: more than 2 years	Processing times: • Collection Permits: 1 week • Framework Contracts: 1 month • Access Contracts: in compliance with established Norm (approx. 6 months)	• Genetic Resources Module published online via SUIA portal • Approval reports of Collection Permits, and Contracts	
	19. Increase in awareness on amphibian conservation as measured by • Increase in users accessing ABS-CH Platform • Increase in records of amphibians from unofficial sources	• ABS-CH website does not have a user counter • 317 records of 107 species from 40 members of the Science Citizen portal	• > 5% annual increase once interconnected platform established • > 5% annual increase once interconnected platform established and connected to Science Citizen portal	• ABS-CH website online • Amphibian factsheets available online via ABS-CH portal and Centro Jambatu website	
Output 3.1. National and local frameworks aligned for conservation and sustainable use of genetic resources of amphibians **Output 3.2** Improved capacities of National Competent Authority and related agencies on ABS, including procedures and Prior Informed Consent & Mutually Agreed Terms **Output 3.3** National information improved and available for effective decision making on protection and sustainable use of genetic resources of endangered amphibians					

SECTION III: TOTAL BUDGET AND WORKPLAN

Award ID:	00086955	Project ID(s):	00094106
Award Title:	ECU: Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources		
Business Unit:	ECU10		
Project Title:	ECU: Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources		
PIMS no.	5314		
Implementing Partner (Executing Agency)	Ministry of Environment		

GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
OUTCOME 1	MAE	62000	GEF	71300	Local Consultants	46,559	93,119	93,119	93,119	46,559	**372,475**	1
				71600	Travel	8,942	8,942	8,942	8,941	0	**35,767**	2
				72100	Contractual Services Companies	0	43,408	40,000	0	0	**83,408**	3
				72200	Equipment and Furniture	41,900	0	0	0	0	**41,900**	4
				72300	Materials & Goods	59,383	5,266	18,600	18,601	18,600	**120,450**	5
				73200	Premises Alternation	112,500	0	0	0	0	**112,500**	6
				74500	Miscellaneous Expenses	1,000	1,000	1,000	1,000		**4,000**	7
					Total Outcome 1	**270,284**	**151,735**	**161,661**	**121,661**	**65,159**	**770,500**	
OUTCOME 2	MAE	62000	GEF	71300	Local Consultants	36,504	39,204	36,504	28,405	28,405	**169,022**	8
				71400	Contract Services Individual	27,738	27,739	27,739	27,738	27,738	**138,692**	9
				71600	Travel	26,607	34,577	26,607	2,697	1,872	**92,360**	10
				72100	Contractual Services Companies	15,000	0	0	0	00	**15,000**	11
				72200	Equipment and Furniture	234,000	0	0	0	0	**234,000**	12
				72300	Materials & Goods	23,697	15,234	15,234	15,233	15,232	**84,630**	13
					Total Outcome 2	**363,546**	**116,754**	**106,084**	**74,073**	**73,247**	**733,704**	
OUTCOME 3	MAE	62000	GEF	71300	Local Consultants	11,904	69,854	51,854	26,904	11,904	**172,420**	14
				71400	Contract Services Individual	18,420	18,420	18,420	18,421	18,422	**92,103**	15
				71600	Travel	0	11,686	11,686	11,685	11,685	**46,742**	16
				72100	Contractual Services Companies	0	347,000	50,000	20,000	0	**417,000**	17
				74200	Audio Visual&Print Prod Costs	0	5,000	0	0	0	**5,000**	18
				75700	Training, Workshops and Confer	11,398	34,797	34,464	69,463	69,463	**219,585**	19
					Total Outcome 3	**41,722**	**486,757**	**166,424**	**146,473**	**111,474**	**952,850**	
OUTCOME 4: Monitoring & Evaluation plan	MAE	62000	GEF	71200	International Consultants	0	0	30,000	30,000	0	**60,000**	20
				71300	Local Consultants	10,000	15,000	3,000	0	0	**28,000**	21
				71600	Travel	3,000	3,000	3,000	3,000	3,000	**15,000**	22
				74100	Professional Services	0	5,000	5,000	5,000	5,000	**20,000**	23
				74200	Audio Visual&Print Prod Costs	1,000	1,000	1,000	1,000	1,000	**5,000**	24
				75700	Training, Workshops and Confer	2,500	2,500	2,500	2,500	2,000	**12,000**	25
					Total Outcome 4	**16,500**	**26,500**	**44,500**	**41,500**	**11,000**	**140,000**	

GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
Project Management	MAE	62000	GEF	71400	Contract Services Individual	22,197	22,197	22,197	22,197	22,198	**110,986**	26
				74599	UNDP Cost Recovery Charges	6,902	4,418	3,561	2,701	1,286	**18,868**	27
					Total Project Management	**29,099**	**26,615**	**25,758**	**24,898**	**23,484**	**129,854**	
					TOTAL PROJECT	**721,151**	**808,361**	**504,427**	**408,605**	**284,364**	**2,726,908**	

Total Budget Summary

Donor Name	Year 1 Amount (USD)	Year 2 Amount (USD)	Year 3 Amount (USD)	Year 4 Amount (USD)	Year 5 Amount (USD)	Total (USD)
GEF	**721,151**	**808,361**	**504,427**	**408,605**	**284,364**	**2,726,908**
Government of ECU (MAE)	1,019,075	819,075	727,312	727,312	660,824	**3,953,598**
Amaru Center	40,064	21,670	21,670	21,670	21,670	**126,744**
GAD Carchi	14,209	14,209	10,000	14,210	0	**52,628**
GAD Guayas	11,988	11,989	11,989	11,989	11,989	**59,944**
ETAPA	631,377	631,377	631,377	631,377	631,377	**3,156,885**
Otonga Foundation	541,600	541,600	541,600	541,600	541,600	**2,708,000**
IKIAM University	387,465	387,465	387,465	387,465	387,465	**1,937,325**
Queens University	400,000	400,000	400,000	400,000	400,000	**2,000,000**
UNDP	44,200	44,200	44,200	44,200	44,200	**221,000**
TOTAL	**3,811,129**	**3,679,946**	**3,280,040**	**3,188,428**	**2,983,489**	**16,943,032**

Summary of Funds by Outcome

Source	Amount Outcome 1	Amount Outcome 2	Amount Outcome 3	Amount Outcome 4	Amount Project Management	Total
GEF	770,500	733,704	952,850	140,000	129,854	**2,726,908**
Government of ECU (MAE): Cash (392,914 ProjMgt)	3,061,205	0	0	0	392,914	**3,454,119**
Government of ECU (MAE): In-kind	233,528	0	265,951	0	0	**499,479**
Amaru Center: Cash	108,350	0	0	0	0	**108,350**
Amaru Center: In-kind	18,394	0	0	0	0	**18,394**
ETAPA (Parque Nacional Cajas): Cash	2,828,575	0	0	0	63,960	**2,892,535**
ETAPA (Parque Nacional Cajas): In-kind	264,350	0	0	0	0	**264,350**
GAD Carchi: Cash	10,000	0	0	0	0	**10,000**
GAD Carchi: In-kind	42,628	0	0	0	0	**42,628**
GAD Guayas: Cash	16,446	0	2,025	0	0	**18,471**
GAD Guayas: In-kind	40,579	0	894	0	0	**41,473**
Otonga Foundation: Cash (279,000 ProjMgt)	1,368,408	60,592	0	0	279,000	**1,708,000**
Otonga Foundation: In-kind	1,000,000	0	0	0	0	**1,000,000**

Source	Amount Outcome 1	Amount Outcome 2	Amount Outcome 3	Amount Outcome 4	Amount Project Management	Total
Queen's University: In-kind	0	2,000,000	0	0	0	**2,000,000**
Ikiam Amazonic University: Cash	0	1,491,325	446,000	0	0	**1,937,325**
UNDP: Cash	15,330	14,674	21,937	0	2,597	**54,538**
UNDP: In Kind	32,576	0	133,886	0	0	**166,462**
Total	9,810,869	4,300,295	1,823,543	140,000	868,325	**16,943,032**

Part II: Budget Notes

Budget note	Notes **MAE: Full NIM** **S-NIM UNDP: UNDP will be providing NIM support**
Outcome 1	
1	**Local consultants MAE** (US$346.112): National consultants to provide technical expertise for the delivery of the following products: (i) Three highly endangered harlequin and poison frogs rescued from areas impacted by mining and conserved in captive breeding facilities in Quito and Cuenca (sub-outputs 1.1.d): (ii) biological monitoring in Carchi and Cajas National Park of amphibian species targeted for *in situ* conservation (1.2.d); GAD reserve declaration in Carchi and Guayas for *in situ* conservation (1.2.a). **S-NIM UNDP** (US$26.363): National consultants for search and rescue of three highly endangered harlequin and poison frogs from areas impacted by mining in Condor Cordillera (1.1.c) ; and in Captive breeding and keeping of the three species of amphibians in Quito (sub-output 1.1.d).
2	**Travel S-NIM UNDP** (US$35,767): Given the distances and remote field sites for amphibian conservation interventions, particularly search and reseue expeditions for species targeted for conservation and bioprospecting (1.1.c), resources will be alloeated to co-fund national travel for technical team and field staff within field sites, supervisory and advisory visits of Quito-based project staff and consultants to field sites, and occasional travel of field staff to Quito for planning meetings and forums. Rescue locations and species include: Azuay (*Atelopus nanay*), Morona Santiago and Zamora Chinchipe and Cordillera del Cóndor (*Atelopus* sp. nov. *(aff. palmatus)* and *Dendrobates condor*).
3	**Contractual Services – Companies MAE** (US$83,408)**:** Contracts for the delivery of the following sub-outputs related to *in situ* conservation interventions: Preliminary studies for the declaration of GAD conservation areas in Carchi and Guayas (Alternative Management Study) (1.2.b); and Management Plans of the declared GAD reserve areas, including a program for financial sustainability (1.2.c). Both sub-outputs are requirements for the integration of the 2 new GAD reserves into the SNAP by project end.
4	**Equipment and Furniture MAE** (US$41,900): Equipment (e.g. terrariums, tanks) for *ex situ* conservation of target species in Quito and Cuenca (1.1.b).
5	**Materials and Goods MAE** (US$67,750): Materials for reeeiving and maintaining target amphibian species for *ex situ* conservation in Quito and Cuenca (Systems: watering, purification, oxigenation, drainage, heating, glass trays, scales, water, printouts, copies) (1.1.b). **S-NIM UNDP** (US$12,700): Complementary materials (water; supplies) for receiving and maintaining amphibians targeted for *ex situ* conservation (1.1.b)
6	**Premises Alterations S-NIM UNDP** (US$112,500): Construction of laboratory (150m2) and Bioterium (75m2) to ensure successful captive-breeding and keeping of key species targeted for *ex situ* conservation (1.1.b)
7	**Miscellaneous Expenses S-NIM UNDP** (US$4,000) Potential contingencies including amongst others specific insurances (vehicle, life etc); communication services (internet).
Outcome 2	
8	**Local Consultants S-NIM UNDP** (US$169,022): Speeialists responsible for the conservation of genetic resources of Ecuadorian amphibians at high risk of extinction through the installation of the Life and gene bank, including the identification and cataloguing of species' tissues, as well as administration of resources and organization and reporting of results (2.4.a); and field operations related to the expeditions / collections of genetic resources of Ecuadorian amphibians at high risk of extinction (2.4.B)

Budget note	Notes MAE: Full NIM S-NIM UNDP: UNDP will be providing NIM support
9	**Contractual services individual S-NIM UNDP** (US$138,692): (i) National Project Coordinator (NPC)- Technical expertise provided by NPC in Outcome 2 for ensuring technical quality; relevance and harmonization and integration of the project's activities related to bioprospecting and establishment of the amphibian genetic resources BioBank, as well as the associated technical capacity development in collaboration with Queen's University, Otonga Foundation, Ikiam Univeristy and Yachay City of Knowledge; (ii) Administrative-Financial Assistant- support provided to Outcome 2 for ensuring ease of communication and integration of project partners, resources flow to research, and documentation of project progress and findings.
10	**Travel S-NIM UNDP** (US$93,184): Resources will be allocated to co-fund expeditions to various provinces (Pastaza, Napo, Esmeraldas, Cotopaxi, Santo Domingo de los Colorados, Zamora Chinchipe, Sucumbios, Azuay-Cañar Guayas-Santa Elena, Carchi, El Oro, Bolivar) to collect 50% of amphibian species for the BioBank. (2.4.b); resources will be allocated to co-fund national travel for technical team and field staff and consultants for activities related to Outcome 2 in the provinces of Carchi, Azuay and Guayas.
11	**Contractual Services – Companies MAE** (US$15,000): Legal expertise will be contracted to guide the elaboration, negotiation and execution of the framework contract for bioprospecting research purposes to be granted to an Ecuadorian University or Research Institution (2.1.a)
12	**Equipment and Furniture MAE** (US$189,120): Resources will be allocated to support the transfer of technology to improve the bio-prospecting research capacity of Ecuador and advances in science knowledge on peptides from skin secretion of 4 species amphibians through the establishment of the Bioprospecting laboratory (shelves, lyophilizer, 1 ultrafreezer) (2.3.a); (ii) Funding will also support the conservation of genetic resources of Ecuadorian amphibians at high risk of extinction through the installation of the Biobank laboratory (shelves, 2 microscopes for dissection, 2 optic microseopes, camera, computer, elcetric plant/generator, 2 tanks liquid N) (2.4.a). **S-NIM UNDP** (US$44,880): (i) Acquisition of equipment (1 ultrafreezer and 2 computers) for establishing the Bioprospecting laboratory to support the development of technical capacity in Ecuador (2.3.a); (ii) Electric plant/generator and 1 tank liquid N for installation of the Biobank (2.4.a).
13	**Materials and Goods: MAE** (US$38,850) Materials and supplies for installing the bioprospecting laboratory to support the development of technical capacity and technology transfer related to bioprospecting (precise scale, hard drive, glassware, maintenance, RNA ladder) (2.3.a); **S-NIM UNDP** (US$45,780) Materials and supplies for installing the bioprospecting laboratory (data storage, updating, reagents, alcohol, 3 tanks liquid N) (2.3.a).
Outcome 3	
14	**Local Consultants MAE** (US$172,420): (table 13) (i) (3.2.a) ($1,240x4yrs) Technical support in ABS to strengthen Genetic Resources Unit; (ii) (3.3.c) ($7,000x6mths) Updating of IUCN Red List; (iii) (3.3.b) ($30,000) Interconnection of Centro Jambatu Platform with MAE. (iv) (3.3.d) ($133x300) Establishing protocol for monitoring amphibians.
15	**Contractual services individual S-NIM UNDP** (US$88,041): (i) National Project Coordinator (NPC)- Technical expertise provided by NPC in Outcome 3 for ensuring technical quality, relevance and integration of the project's activities related to establishing a robust and applieable legal framework for genetic resources access and benefit-sharing (ABS), increased ABS capacity, and awareness of citizens about ABS and the need to preserve the country's amphibian diversity and its genetic resources; (ii) Administrative-Financial Assistant- support provided to Outcome 3 for activites such as those related to ABS capacity development and awareness-raising (e.g. communication strategy).
16	**Travel S-NIM UNDP** (US$54,804): Resources will be allocated to co-fund travel of project personnel and consultants to planning meetings, international events on ABS, workshops
17	**Contractual Services – Companies MAE** (US$417,000): Contracts for the delivery of the following sub-outputs: (3.1.a) Strategic Plan for the Conservation of Ecuadorian Amphibians in Risk of Extinction, Action Plan and associated financial plan; (3.1.b) Case study of 2 scenarios; (3.1.c) Economic valuation of the potential uses of amphibians: (3.1.d) Legal guidance for Updating ABS Regulations in Ecuador; (3.2.b) Preparation and implementation of the genetic resources module (SUIA) for processing research permits, framework contracts and access contracts to Genetic Resources; (3.3.a) ABS Communication strategy to increase awareness 4 target audiences about ABS and the need to preserve the country's amphibian diversity and its genetic resources.
18	**Audio Visual&Print Prod Costs MAE** (US$5,000): Resources will be allocated to the publication (design, printing) of the updated IUCN Red List as part of the project's strategy to increase awareness of citizens and decision-makers about ABS and the need to preserve the country's amphibian diversity and its genetic resources (3.3.c).
19	**Training, Workshops and Confer MAE** (US$219,585): (i) work group meetings for the elaboration of (3.1.a) Strategie Plan for the Conservation of Ecuadorian Amphibians in Risk of Extinction, Action Plan and associated financial plan; (3.3.c) updating of the IUCN Red List; (3.1.b) Case study on two scenarios related to the conservation, access and benefit sharing of amphibian genetic resources; (ii) (3.2.c) Training Program for evaluating institutions; (iii) (3.3.b) Awareness program on ABS

Budget note	Notes **MAE: Full NIM** **S-NIM UNDP: UNDP will be providing NIM support**
	for: MAE and other decision-makers; communities; Socio Bosque; SNAP (training and workshop materials).
Outcome 4	
20	**International Consultants S-NIM UNDP** (US$ 60,000): Consultants specialized in identifying and measuring project progress; identifying lessons learned and good practices (MTR & TE)
21	**Local consultants S-NIM UNDP** (US$28,000): Consultant to provide technieal oversight and doeumentation of project progress (PIR, AWP), coordination between pertinent partners to acquire results from Outeomes 1. 2 and 3; as well as (ii) National consultant to support, accompany and complement the International Consultant responsible for M&E (MTR & TE)
22	**Travel S-NIM UNDP** (US$28,000): Travel related to identifying, measuring and documenting project progress; identifying lessons learned and good praetices; and support to International Consultant responsible for M&E (MTR, TE).
23	**Professional Services S-NIM UNDP** (US$20,000): External Financial Audits
24	**Audio Visual&Print Prod Costs S-NIM UNDP** (US$5,000): Publication of project tools and results (technical manuals, field guides).
25	**Training, Workshops and Confer S-NIM UNDP** (US$12,000): Inception and Final Workshops, Steering Committee meetings, Work group meetings.
Project Management	
26	**Contractual Services Individual** (US$110,986): Salaries for National Project Coordinator and Administrative-Financial Assistant for *management* functions ensuring project is executed in an effieient manner (this excludes cost of provision of technical expertise for Outcomes 1, 2 and 3);
27	**Direct Project Costs** (US$ 18,868) Estimated UNDP Direct Project Service/Cost recovery charges to UNDP for executing services. In accordance with GEF Counеil requirements, the eosts of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. DPS costs would be charged at the end of each year based on the UNDP Universal Price List (UPL) or the actual eorresponding serviee cost. The amounts here are estimations based on the services indieated, however as part of annual project operational planning the DPS to be requested during the ealendar year would be defined and the amount included in the yearly project management budgets and would be charged based on actual services provided at the end of that year.

SECTION IV: ADDITIONAL INFORMATION

PART I. Amphibian Biodiversity and Target Site Interventions

I. Amphibians in Ecuador

Ecuador is one of the most amphibian diverse countries worldwide, hosting 9% of the world's amphibian diversity. As of January 2015, 546 species were recorded, distributed across three groups: Anuros (represented by frogs and toads) comprise 514 species, Salamanders (Caudata order) comprise 8 species, and Caecilians (Gymnophiona order) comprise 24 species. These figures are considered to be conservative since it is thought that amphibian diversity in Ecuador could be as high as 700 species[75].

Amphibian endemism is also notable in Ecuador; about half of Ecuador's amphibian species (233 or 43%) are exclusive to the country's territory. Species that are not endemic and enjoy a wider geographical distribution generally extend into the neighboring countries of Colombia and Peru, which are also well-known for their wealth in this group of vertebrates.

A large proportion of amphibian fauna in Ecuador is considered to be highly threatened directly and indirectly by human activities; 174 species (33%) have been classified under problematic conservation categories according to criteria applied by the International Union for Conservation of Nature (IUCN). At least 18 species are possibly extinct and 160 others may have been depleted in the wild. It is important to note that current knowledge is still based on preliminary data and these figures may underestimate the true situation, since many species (158) are Data Deficient (DD). Among Anuros, those families with a greater number of species on the IUCN Red List of Threatened Species correspond to the *Craugastorids*, toads (mainly harlequin frogs of the *Atelopus* genus), followed by *Dendrobatids*, *Centrolenids*, *Hemifractids* (marsupial frogs) and *Hylids*.

Effective conservation of a group as vulnerable and exposed as amphibians in Ecuador requires huge inputs in terms of financial, human and technical resources. Within this in mind, a prioritization exercise was executed to focus the limited resources on the conservation of the most important or relevant species. Prioritization criteria were defined at two levels: (1) importance or relevance of the conservation of species groups, and (2) the importance or relevance of the conservation of species within the previously identified groups, depending on the intervention strategies.

For the prioritization exercise at species groups level, the criteria used were endemism and vulnerability, and as a result the groups that obtained the highest weighted values were: toads (9); *Telmatobids* (9), *Dendrobatids* (7); *Hemifractids* (7), *Centrolenids* (6) and *Ceratofrids* (6). These are the families with the highest percentage of species listed on the IUCN Red List and highest endemism among the anurans of Ecuador.

While *Telmatobids* or *Ucos* also achieved a high weighting, mainly due to their endemism and the conservation issues affecting this species, it is no longer feasible to work with them because the genus *Telmatobius* has disappeared from nature and is possibly extinct. In the case of *Ceratofrids*, since this family is made up of only three species, the prioritization weighting obtained is considered to be skewed by the small number of species within the family so this group was not included as a priority; although it is worth mentioning that the species *Ceratophrys stolzmanni* forms part of a captive management program "The Toad Ark" at Jambatu Center.

[75] Center Jambatu, 2015

Among all the priority groups, the harlequin *Atelopus* (Bufonidae) frogs are of greatest interest for conservation *via* the development of both *in situ* and *ex situ* action plans, as the decline in number and extinction of their populations seem to be markedly affecting this group of harlequin frogs. Several investigations reveal that this genus has undergone a dramatic decline in numbers, with the most catastrophic being in Anura[76] and are therefore considered a priority group for research and the implementation of emergency conservation activities.

In Ecuador, the *Atelopus* genus faces serious conservation problems - trends for most species within this genus have shown a marked decrease in populations while others have disappeared from the wild. The most iconic and dramatic decline corresponding to *Atelopus* in Ecuador is the case of the *Jambato*, A. *ignescens*, a species which was abundant until the mid-1980s across all areas of its habitat. However, sightings have not been reported in the wild since 1988, including within Protected Areas, such as the Cotopaxi National Park or the Fauna Protection Reserve in Chimborazo, where it was once abundant; this could possibly mean that it is now extinct[77]. In addition to this species, 11 further species of harlequin frogs might be extinct in Ecuador.

Meanwhile, glass frogs (*Centrolenidae*) total 51 species in Ecuador, among which 15 are endemic. They are mostly found in the cloud forests of the eastern and western mountain ranges although a significant proportion of the population also inhabits the tropical rainforests of Chocó in northwest Ecuador. Knowledge of glass frogs has improved significantly over the last decade, with 12 species having been studied over this period[78]. Researchers are expected to continue to report new species as natural history collections are revised, comprehensive molecular analyses are performed and as yet undiscovered locations are visited. Besides the attention these glass frogs deserve with regards to studying their taxonomy and phylogenetic relationships, this group would merit research efforts aimed at understanding their conservation issues and action to ensure their ongoing viability in nature.

Poisonous frogs (*Dendrobatidae*) are unique to tropical regions in America and some 299 species have been identified[79]. They are popularly known as poison dart frogs because the glands of their colorful skins (aposematism) produce a number of chemicals which help to defend them from predators. In Ecuador, this group is made up of 54 species, of which 34 are endemic. This family is also subject to high risk factors and 26 of its species are on the IUCN Red List of Threatened Species.

One of the more dramatic examples of decline and extinction of populations in the Neotropics (including Ecuador) is demonstrated by marsupial frogs: *Gastrotheca* (*Amphignathodontidae*). These are a cause for concern for conservationists because of their evolutionary characteristics, reproductive strategies and high risk factors. Despite the lack of information regarding population data for any kind of *Gastrotheca*, declining populations have been evident over the last decades. For example, of the 16 species found in Ecuador, only two are categorized as Near Threatened (NT), while the others are categorized as being at risk (14) or are listed as Data Deficient (DD) (4 species). The direct development group, i.e. monophasic (comprised of 9 species in Ecuador), are the least understood and therefore benefit the least from conservation projects, not only in Ecuador, but across their entire geographical area. Because of these factors, the Jambatu Center makes a special effort to conserve single phase marsupial frogs and their unique reproductive method.

[76] Brand et al., 2005
[77] Ron et al., 2003
[78] Center Jambatu 2011-2015
[79] Amphibiaweb, 2014

II. Conservation Interventions

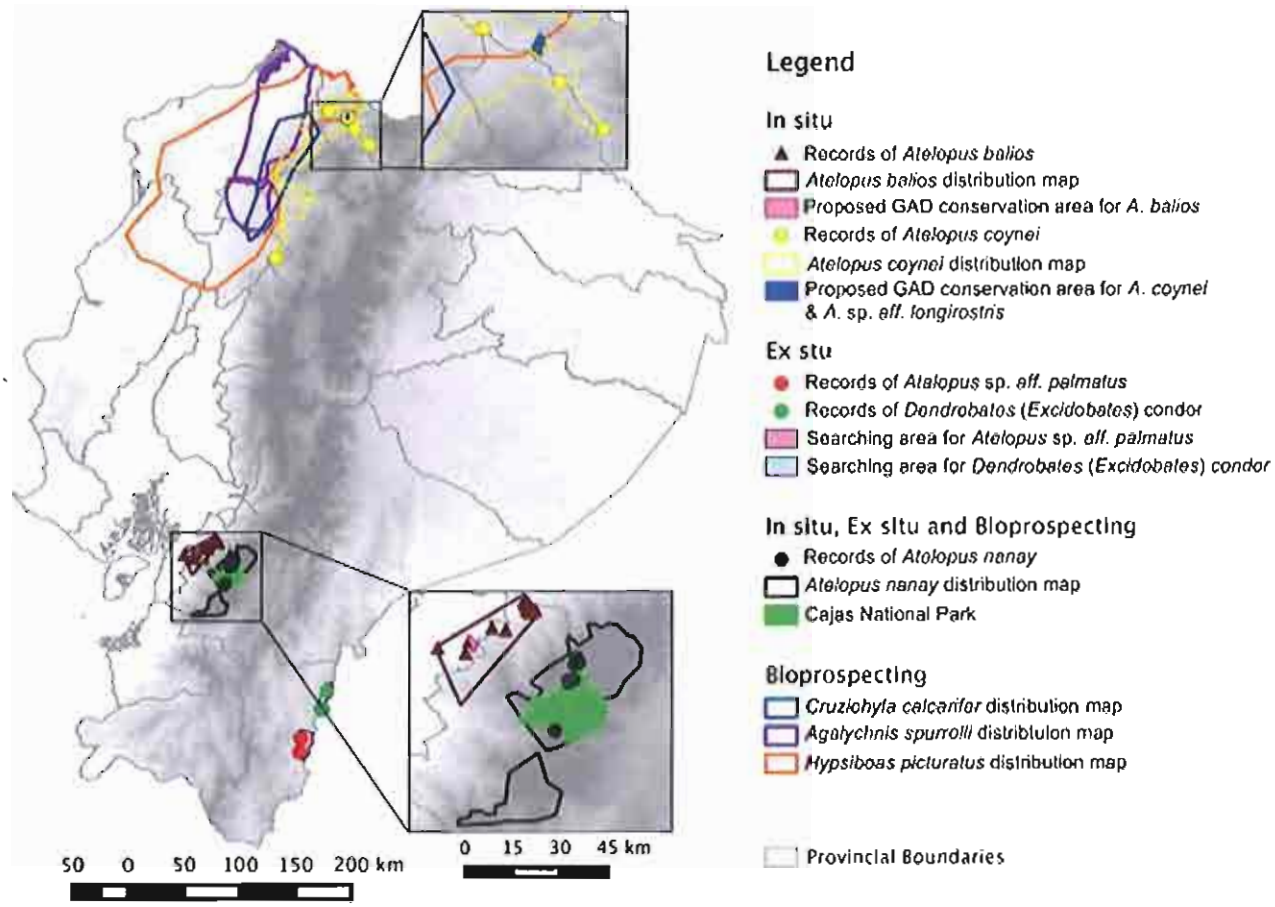
This project's scope is comprised of different components: *ex situ* conservation, *in situ* conservation and bioprospecting. For each individual component, different target species found in the priority groups (described above) have been selected.

Table 1: Target species and intervention sites

Species	Origin/Location/Local council	In Situ	Ex Situ	Bioprospecting
Dendrobates (Excidobates) condor	Alto Machinaza – Cóndor Mountain Range, Zamora Chinchipe Province		x	
Atelopus sp. *nov. (aff. palmatus)*	Alto Nangaritza – Cóndor Mountain Range, Zamora Chinchipe Province		x	
Atelopus nanay	Cajas National Park, Azuay Province	x	x	x
Atelopus sp. *nov. (aff. longirostris)**	Northwestern Tropics – Carchi Province. Source of the Chinambí Chico River	x		
*Atelopus coynei**	Northwestern Tropics – Carchi Province. Source of the Chinambí Chico River	x		
*Atelopus balios**	Southwestern Tropics – Cañar, Azuay and Guayas Provincial borders.	x		
Agalychnis spurelli	Captive-bred specimens for the study of peptides contained in their skins			x
Cruziohyla calcarifer				x
Hypsiboas picturatus				x
Sample of 50% of Ecuadorian amphibian species	This will focus on a representative sample of the range of amphibians in the country. However, since most endangered species are located in the Andes, sample collection will have a bias towards Andean species.		x	
Skins of 40% of the species of amphibians on the Ecuadorian Red Alert List (with chemicals) and gametes from two species of amphibians included on the IUCN Red List	These will be stored in the Amphibian Genome Bank		x	

*** Species that are currently handled in the *ex situ* program of the *Arca de los Sapos* (Toad Ark) Research and Conservation Center.**

Map 2[80]: Geographic distribution of the project's target species and their corresponding intervention sites and conservation strategies



N.B. Distribution maps are unavailable for undescribed species: *Atelopus* sp. aff. *Longirostris*, *Atelopus* sp. aff. *Palmatus* and *Dendrobates* (*Excidobates*). While the project will use captive-bred specimens for bio-prospecting, these species (with the exception of *Aelopus nanay*) are widely distributed and even if the project were to collect specimens from native populations for bioprospecting, there would be no harm to their populations.

[80] SUIA 2014, Amphibiaweb.org, Centro Jambatu 2015, AmphibiaWebEcuador 2015, Andreas Kay (unpublished), CONDESAN (2012). Elaborado por: Centro Jambatu 2015

A. *Ex Situ* Conservation

The *ex situ* component of the project includes the *Atelopus nanay* species of harlequin frog, a priority species for carrying out integrated conservation action plans (*in situ*, *ex situ* and bioprospecting activities) due to both its vulnerability and conservation interest as the only species in the *Atelopus* genus to be found recently in the Andean highlands, and because of the possible presence of biomedically-significant peptides in its skin. Other species to be included in the *ex situ* component of this project were selected according to the following criteria:

(1) Imminent threat from extraction activities (mining) and destruction of habitat

(2) High degree of endemism and the possibility of finding new species

(3) Unknown range of biodiversity

(4) Areas with emerging scientific explorations.

The geographic area in which species meeting these criteria is most concentrated is the area of the Condor Cordillera (Map 1). Despite being an area seldom explored by scientists, preliminary research suggests a high level of endemism and biodiversity. The main threats to biodiversity in the Condor Cordillera are habitat destruction, fragmentation and pollution due to agricultural, livestock, forestry and mining activities[81]. In the case of mining, the Ecuadorian government has launched a large-scale exploration and extraction initiative for gold and copper where three of the five flagship mining projects identified by the 2012 Mining Cadastre (ARCOM) are located in the Condor Cordillera: Panantza - San Carlos, Fruta del Norte and Mirador. In addition, according to updated 2014 data, mining in the Condor Cordillera is expanding: emblematic mining activities include two more projects in this area: Condor Mining and Santa Barbara[82]. Of these, the flagship mining project that currently holds a signed assignment contract for the extraction of copper, gold and silver is Mirador under the auspices of China's Corriente Resources SA[83], as well as artisanal and semi-artisanal mining concessions.

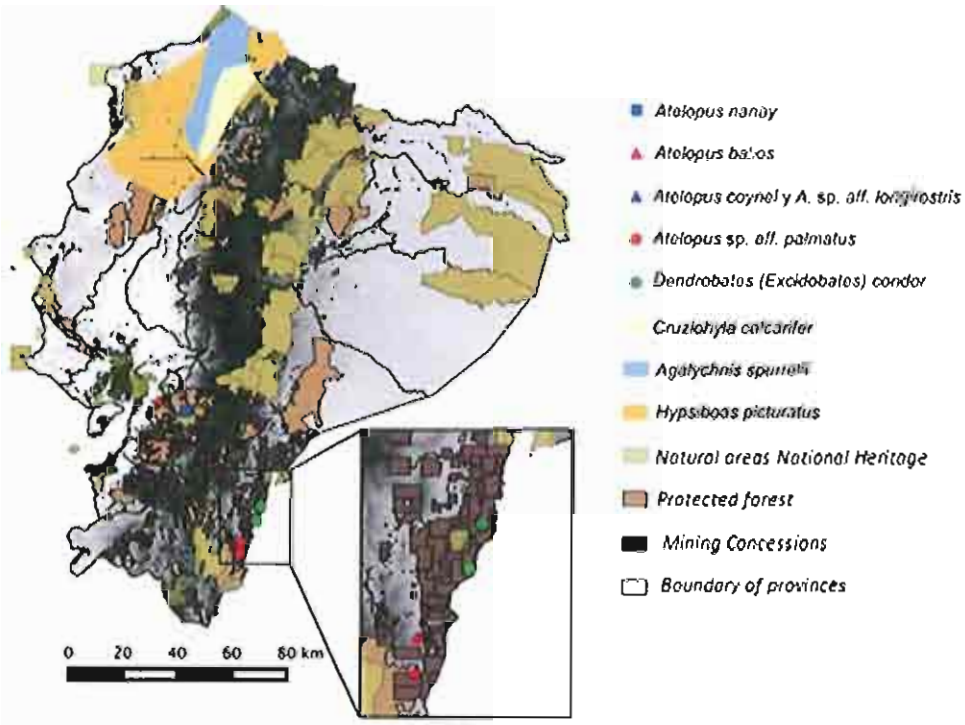
Mining activity implies the greatest threat to the unique ecosystems of the Condor Cordillera[84] (Map 2, below), as this activity would cause deforestation of mined areas, soil erosion, a decline in species' populations, and pollution of soil, rivers and streams. In addition, mining promotes the construction of roads, producing destruction and / or fragmentation of the Cordillera's ecosystems, and the introduction of invasive species and diseases[85]. As such, the health of aquatic ecosystems in this area would also be threatened, hugely impacting the diversity of frogs, since this habitat provides a breeding ground for many species. The fact that many species of amphibian in this area have a restricted geographical distribution makes them highly vulnerable to extinction[86].

The Condor Cordillera region includes three areas belonging to the National System of Protected Areas: the Quimi and El Condor Biological Reserves, and El Zarza Wildlife Refuge. The establishment of these protected areas in 2006 was the result of a long process initiated after the signing of the Peace Agreement between Ecuador and Peru (1999) to establish a Binational Conservation Peace Area in the Condor Cordillera[87]. While the establishment of protected areas was an important milestone in maintaining a representative sample of the ecosystems in the Condor Cordillera, these protected areas are not as large as the protected areas in the northern Amazon, and consequently face challenges in finding methods for

[81] Guayasamin et al. 2011
[82] ARCOM 2014
[83] Ministry of Non-Renewable Resources, 2012
[84] Almendáriz et al. 2014
[85] Guayasamin et al., 2011
[86] Almendáriz et al. 2014
[87] Fundación Natura 2009

long-term maintenance of the conservation area network and implementing management plans in remote areas[88], where mining and logging activities both shape and put pressure on the dynamics of human activity in this region of the country (Map 2). The strong pressure and threats exerted by the mining activity on natural ecosystems in the Condor Cordillera are clear, where one can observe either an overspill of mining concessions into protected areas (e.g. El Zarza Wildlife Refuge) or direct influence due to them bordering protected areas (Biological Reserve El Quimi) (Map 2).

Map 2[89]. Geographical distribution of the project's target species in relation to the location of SNAP conservation areas (National System of Protected Areas), protective forests and mining concessions.



Currently, the range of amphibians on the Ecuadorian side of the Condor Cordillera includes 50 catalogued species and 13 under taxonomic study. Of these, more than 25% are extremely endangered[90]. The combination of vulnerability and endemism for Ecuadorian frog species in the Condor Cordillera precipitated a prioritization process in which seven species were selected and prioritized for conservation programs. Another prioritization exercise was carried out based on expert criteria[91] as part of the preparatory process of this project. The following species were selected as being at highest risk of extinction and will be included in the *ex situ* component of this project: *Dendrobates (Excidobates) condor*, and *Atelopus* sp. nov. (aff. *palmatus*) from the Condor Cordillera, and *Atelopus nanay*, which is

[88] Ibid

[89] Source: Suiá 2014 Amphibiaweb.org, Centro Jambatu 2015 AmphibiaWebEcuador 2015, Andreas Kay (unpublished), CONDESAN (2012). Prepared by the Jambatu Center, 2015.

[90] Coloma et al. (2011-2015)

[91] Coloma et al. unpublished

found in areas of mountain forest and moorland in the southwestern Andes of Ecuador (see Fact Sheets below).

It is important to note that the areas where the target species for this project are found are situated outside the Protected Areas of the Condor Cordillera which, combined with the pressure for large-scale mining operations, decreases the possibility of establishing *in situ* conservation activities to protect them. The threat to amphibians is so imminent, especially for those species classified at high risk of extinction, that if no emergency measures (such as *ex situ* protection) are taken, their chances of survival in the wild could be seriously reduced in areas that coincide with mining concessions (Map 2).

Search expeditions for target species will be conducted in areas where recent sightings have been recorded, specifically in the altitudinal ranges where these species occur. For the uncatalogued species of *Atelopus sp. nov. (aff. palmatus)* searches will be concentrated in the province of Zamora Chinchipe, in the Parish of Zurmi in Nangaritza Canton, where recent sightings were recorded (between 1100 and 1900 m). In addition, a search for *Dendrobates (Excidobates) condor* will be carried out in the Canton of Paquisha (Zamora Chinchipe) around the Rio Blanco Community at an altitude ranging between 1700 and 2000 m. The goal is to collect at least 20 to 25 males and 20 to 25 females from each species, which must be F1 samples, i.e. random crossings resulting from individuals which are not closely related (i.e. no siblings). It is assumed that this number of individuals will represent the genetic variation in the population that is necessary to maintain genetically viable populations, i.e. free of inbred depression problems[92].

To safeguard the rescued species, the Centro Jambatu has devised a strict biosafety protocol:

Biosafety Protocol for *ex situ* Conservation

Infrastructure Requirements for the Amphibian Management Center

General adaptations:

- The different areas of the Center must be completely isolated from each other, there should be no holes that connect these areas, even above the suspended ceiling.
- The ceilings, walls and countertops must be made of resistant materials that are easy to clean and disinfect. The floor must be uniform, waterproof, and non-slip, able to safely withstand the weight and movement of any mobile equipment.
- All openings (doors, windows, air vents, drains for liquids, etc.) must be equipped with devices to prevent the entry or exit of insects, rodents or other animals that may carry pathogens.
- The drainage and septic systems must be hermetically sealed so as to prevent the entry of foreign bodies or water intrusion in case of heavy rain.

The following standards are mandatory in all areas of the laboratory:

- Access to the laboratory is limited to authorized personnel.
- No family or friends are allowed in the laboratory.
- Laboratory personnel are responsible for complying with safety standards.

[92] Amphibian Ark, Pool and Grow, 2008

- All areas shall be adequately marked with biohazard signs and their level of containment.

- All doors and windows should be closed to maintain proper biological containment.

- All surfaces must be cleaned and disinfected daily.

- The laboratory must remain clean and tidy and hallways should not be used for storage. There should always be a clear space of no less than 120 cm so that the laboratory can be evacuated in the event of an emergency.

- Protective, easily adjustable and comfortable clothing, gloves, goggles, etc. must be available at all times. The protective clothing and gear for use in laboratory areas should never be used outside of the workplace.

- All staff should take special care to avoid direct contact with the specimens. For this purpose individual gloves should be worn when handling each frog. Gloves must always be discarded before leaving the work area. Workers should never leave the work area with gloves on, nor answer the telephone, or touch the steering wheel, etc. while wearing gloves.

- After removing the gloves, staff must wash their hands.

- Goggles and face masks shall be used if there is a risk of dust and airborne toxic substances.

HYGIENE

- Personnel with long hair must keep it up and contained.

- Eating, drinking, smoking, and applying cosmetics is formally prohibited in the laboratory work area, as well as the food and beverage storage areas.

- Staff should wash their hands frequently during routine activities, after finishing the workday and before leaving the laboratory (i.e. for lunch). Hands must be washed with antiseptic soap, and dried with paper towels.

- Any wounds or cuts to the hands, if they have occurred in the laboratory, must be reported to the head of the corresponding Section, as well as to the Supervisor, who will record the incident and all of the circumstances in which it took place. Such wounds and cuts must be property bandaged, and the person in question must then wear gloves at all times.

Protection of hands and arms. Gloves are perhaps the most commonly used item, however the elementary rules for wearing them are not always properly followed: a) hands must be washed after removing gloves; b) the use of gloves must be restricted to those operations for which protection is necessary, and therefore it is prohibited, for example, to open doors with gloves on, handle steering wheels, pick up the telephone, etc.; c) not every type of glove provides protection against every type of chemical, which means that the proper type of glove must be chosen depending on the risk that one is being exposed to.

Gloves are widely used in the laboratory, since in addition to protecting against biological and chemical hazards, they are also used to protect against physical hazards, such as heat or cold in certain operations.

Respiratory protection. Masks in general are useful in vivariums, especially for protection against dust (particles), aerosols and gases and chemical vapors. The masks known as "surgical"-type masks offer no protection whatsoever.

Respirator masks, whether a half-mask or full face mask, can be useful for offering protection in the event of large spills or leaks. The different filters that can be attached must be discarded as contaminated material.

Clothing as protective equipment. In principle it is essential to make a clear distinction between clothing that is part of a uniform and the pieces of clothing that act as elements of personal protection. In addition, there are a number of general recommendations, including:

a) laboratory clothing must never be washed outside of the center;

b) the user must wear their garments in such a way that they benefit from their use, but they do not become a hazardous element that carries contaminants outside of the laboratory;

c) clothing that serves as personal protection equipment should never leave the site where it is used (i.e. to go to the library, the cafeteria, or outside);

d) one should never wear street clothing to work that increases the amount of exposed body surfaces (shorts, sandals).

Protective clothing pieces can include **gowns** (preferable fastened in back with elastic cuffs) and **aprons**. At times, **shoe covers** are also useful.

STERILIZATION

The sterilization of materials, containers and other inputs used in breeding the frogs shall be performed using different methods:

1. Heat:

a) Wet: Autoclave

- The application of heat is the simplest method of sterilization.
- Pressurized steam is the most commonly used sterilization method in laboratories, and should be done using an autoclave. At a temperature of 100° C, all bacterial forms, excluding spores, will die. Killing spores requires a temperature of 120° C for at least 15 minutes. Steam provides a suitable means to distribute heat evenly throughout and achieve greater penetration, since water is involved denaturing proteins.

b) Dry: Hot air oven, stove.

- Dry heat is produced in ovens or stoves, and requires higher temperatures (160 ° C to 180 ° C) for longer periods (1-2 hours.)

Disinfection

- Chemical disinfectants are used to decontaminate laboratory surfaces, environments and equipment that cannot be sterilized in the autoclave. For proper disinfection treatment, one must use the right chemical, in the right concentration, and for the right amount of time.
- Certain disinfectants (alcohol, phenols) are not recommended because they lack sporicidal activity, and have drawbacks when applied to objects in the environment (rapid evaporation, corrosion, etc.)
- Chemicals for disinfecting floors and materials which cannot withstand high temperatures are 8% formaldehyde aqueous solution and 1% 30 iodine solution.

Frog Animal Health Plan Protocol

Frogs, like other animals, have parasites, infections and diseases that must be controlled, prevented and treated. The

information available for the creation of an animal health plan for frogs is scarce. However, this protocol will focus on preventing and preventing the most commonly known disease: chytridiomycosis.

Preparation of Itraconazole

- Remove the contents of one capsule and ground on a mortar
- Dissolve the powder into one liter of water
- Place the container with the drug in a dark place

Preparation of terrariums

- Disinfect two terrariums per specimen to be treated
- Place a false floor in each terrarium
- Pour in dechlorinated water up to the level of false floor
- Place a double paper towel on the false floor
- Moisten the paper towel
- Place one piece of coconut in each terrarium to be used as a frog shelter
- Cover the holes in the lid of the terrarium with packing tape
- Place one frog in each terrarium
- Cover the terrarium
- Number terrarium (using the same number as the frog's original terrarium).

Frogs

Isolate the frogs to be treated in disinfected terrariums

Treatment

- Place the itraconazole in small containers with a lid (the amount of liquid depends on the size of the frog to be treated)
- Number the container (with the same number as the frog's original terrarium)
- Remove the frog to be treated from the disinfected terrarium using vinyl gloves
- Place the frog in the container for a period of 10 minutes
- Remove the liquid after treatment and put the frog in the second disinfected terrarium prepared for the frog
- Place food for the frog in the terrarium
- The treatment lasts 12 days
- Each frog has two disinfected and safe terrariums, one treatment container and one pair of gloves.

Cleaning and disinfecting terrariums

- Put detergent and a pinch of bleach in the empty terrarium and fill it with water
- Let it soak for about 30 minutes and then wash it
- Wash the false floor, the coconut, the terrarium itself and the lid with abundant water
- Prepare the terrarium with the proper level of water, paper towels, coconut and lid and leave it ready for the following day
- Perform this cleaning procedure for the duration of the treatment (12 days)

B. *In Situ* Conservation

The species identified for the *in situ* conservation interventions are the most vulnerable group of amphibians, identified in the prioritization exercise as corresponding to the harlequin (*Bufonidae*) frogs of the *Atelopus* genus. In particular, this project will focus on protecting the habitat of: *Atelopus balios*, *Atelopus coynei* and *Atelopus* sp. (aff. *longirostris*) (see Fact Sheets below). This genre of amphibian has suffered drastic population declines and / or extinctions throughout the Neotropics[93]. In Ecuador, of the 28 recorded species (25 studied 3 unstudied), 12 are possibly extinct and the rest are Critically Endangered. In recent years, only 10 species have been found: *Atelopus balios, A. coynei, A. elegans, A. exiguus*[94], *A. nanay, A. palmatus, A. spumarius, A.* sp. (aff. *spumarius-pulcher*), *A.* sp. (aff. *longirostris*) and *A.* sp. (aff. *palmatus*).

The target species are severely threatened by the destruction and degradation of their habitat[95] and constitute representative populations of the genus *Atelopus*. For example, *A. coynei* and *Atelopus* sp. (aff. *Atelopus longirostris*) share the same habitat and are the last surviving species of the genus *Atelopus* of the western subtropical area. Thus, the establishment of a reserve around the Chinambí Chico River in Mira Canton of Carchi Province, will provide protection for two species of the genus *Atelopus*. Meanwhile, conservation of habitat of *A. balios* will preserve the only species in the *Atelopus* genus found with a distribution extending to southern geographical limits and across the western tropical areas. Therefore, the project will be protecting the only species and the last population in the south of the country.

The focus of the *in situ* conservation project subcomponent is the conservation of critical habitat through the establishment of protected areas; in the case of *Atelopus coynei* and *A. sp. (aff. longirostris)*, the habitat of the two species will be covered by the same protected area since the two species coexist. In addition, further stakeholder analysis revealed that positive conditions exist (counterpart, technical equipment, interest and openness) to enable the establishment of a protected area by the GADs (Decentralized Autonomous Government).

In the case of *Atelopus coynei* and *A. sp. (aff. longirostris)* the area of conservation interest corresponds to Chinambí Chico river region (Carchi province, Mira Canton, Parish of Jijón and Caamano). The proposed protection zone comprises an area of 14 km² (1,400 hectares) which covers important stretches of Andean mountain ecosystems: lower mountain evergreen forest in the Western Cordillera of the Andes, mountain evergreen forest in the Western Cordillera of the Andes and evergreen forest at the foot of the Western Cordillera of the Andes[96].

Meanwhile, for the *in situ* conservation of the species *Atelopus balios*, 4 areas have been identified where individual specimen can be found: one of these areas is found on the Playas River in the Naranjal Parish of Guayas Province. The proposed protected area covers 8 km² (800 acres) including the following ecosystems: semi-deciduous lowland forest of Jama-Zapotillo and seasonal evergreen forest at the foot of the Western Cordillera of the Andes[97]. This area borders the province of Azuay, where a provincial border has only recently been defined.

Conservation gap studies in continental Ecuador[98] as well as an analysis of conservation gaps regarding groups of organisms, including amphibians [99] coincide with a gap analysis of critical habitat covered

[93] Brand et al. 2005
[94] This species was earmarked for work within this project but was not found during the PPG.
[95] Coloma 2015
[96] MAE 2011
[97] MAE 2011
[98] Lessman et al. 2014
[99] Cuesta et al. 2013

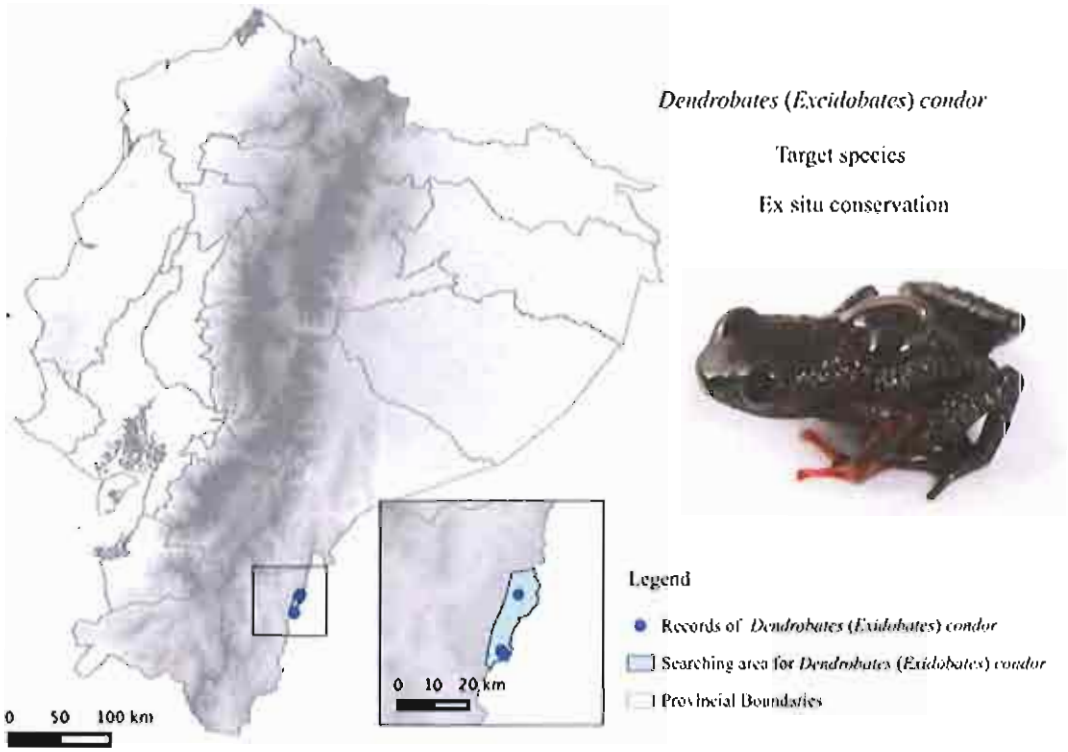
within the Natural Protected Areas Heritage of Ecuador (PANE) which calculates that 8,328 hectares of critical habitat to the project's target species (*A. balios, A. coynei* and *Atelopus sp. aff. longirostris*) are unprotected. As such, the proposed areas for conservation of habitat associated with the target species of this project match the priority conservation areas identified in these analyses.

Given the high vulnerability of the target species for the *in situ* component, the *Atelopus* genus will be protected with comprehensive strategies that combine both *in situ* and *ex situ* activities, and a major effort in their study and long-term monitoring, as well as communication and outreach strategies to raise public awareness about the importance of these species in nature and the high level of threats they face. The Toad Ark program at the Jambatu Centre already includes conservation activities in captivity for the target species of the *in situ* component (Table 1). The experience garnered through the Center's *ex situ* efforts with these species will provide important species-specific information to guide and complement the project's *in situ* efforts, thereby ensuring the species' survival.

Target Species Fact Sheets

Ex Situ Species:

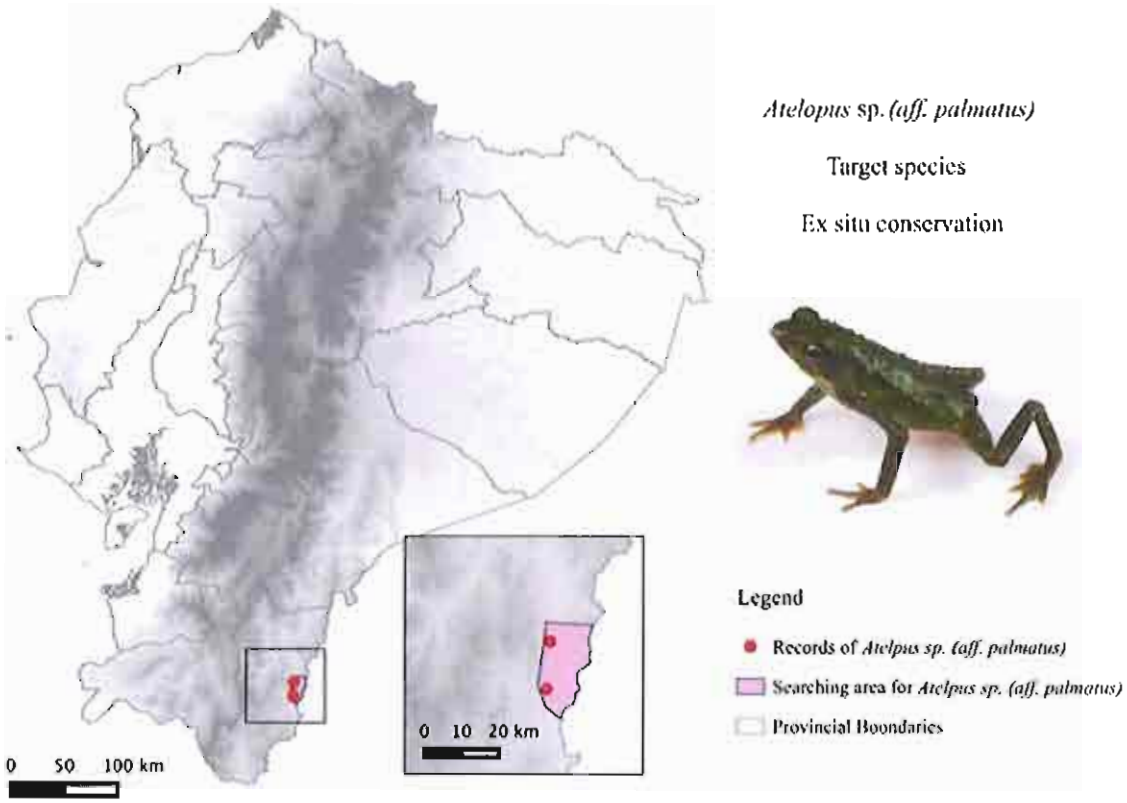
Dendrobates (Excidobates) Condor **(Condor Poison Frog)**



This species of poisonous frog has been recently studied (Almendáriz et al., 2012). Its known geographical range is 7 km2 and the area it inhabits covers a small altitudinal range between 1800 and 1900 m in the Condor Cordillera. These factors tightly restrict this species to the unique mountainous landscape of south-eastern Ecuador. It belongs to the group of poisonous frogs found at altitude where a large proportion of the species fall within Red Alert List categories. Very little is known about the natural history, conservation status and population dynamics of Dendrobates condor, either in the wild or in captivity. The species has not been evaluated for the IUCN Red List of Threatened Species, however, Almendáriz and Brito (2013), included it in the Data Deficient (DD) category. According to a recent study by Howard and Bickford (2014) Data Deficient species are more likely to be in extreme danger of extinction than species which can be assessed, especially in regions such as South America.

These considerations confirm the need for search efforts for wild species in order to understand their population biology and conservation status, and to promote *ex situ* conservation efforts. Like other species that live in the Condor Cordillera, *Dendrobates condor* faces serious threats from the incursion of open air mining activities, and deterioration in habitat quality. Knowledge regarding the conservation status of this species is limited and includes a) threats in the Condor Cordillera region, b) belongs to the group of extremely endangered poisonous frogs at altitude 1800-1900m, c) survival in this location is by no means guaranteed. As such, this project will focus on this species for research and conservation efforts. Additionally, there is an interest in the sustainable management of this species for the purposes of biocommerce in the global pet market, which makes its management in *ex situ* conditions necessary.

Atelopus sp. nov. (aff. *palmatus*) (Condor Harlequin Frog)

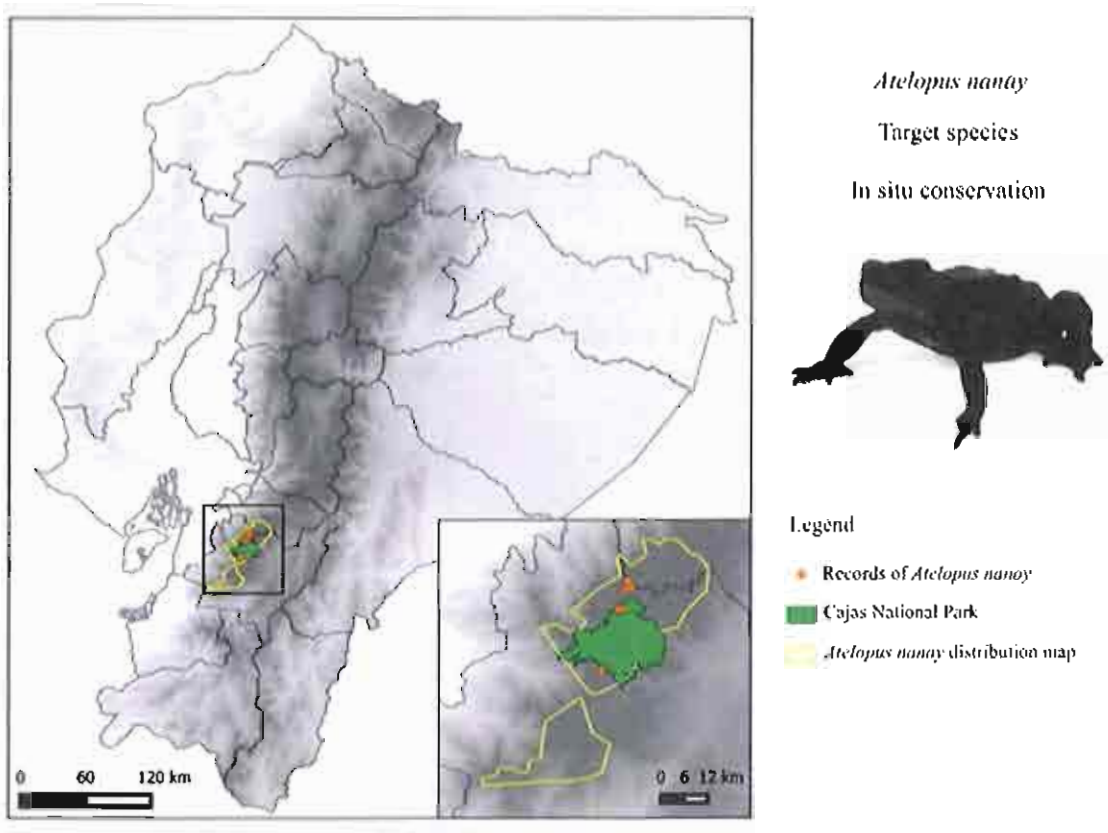


In their rapid ecological assessment for amphibians and reptiles of the Tepuys High Basin of the Nangaritza River, Condor Cordillera, Guayasamin and colleagues (2010, 2011) reported a new species of the genus *Atelopus* to be related to *Podocarpus* and *A. palmatus*. The reported species was found at the two study sites at altitudes ranging from 1,200 to 1,800 meters. It is reported that in one of the two places where this species was found, adults and tadpoles looked healthy[100], and in experimental tests for the chytrid fungus (*Batrachochytrium dendrobatidis*) there was no evidence of the pathogen. In addition, this report describes the tadpoles of this new species of *Atelopus* living in black and acidic water, which is a unique adaptation, as yet unreported in this genre.

Also, Guayasamin et al. (2011) establish a series of recommendations with regards to this species which was previously unknown to science, and urge that the following action should be taken: 1) restrict the access of people (locals and tourists) and exotic animals to the site so as to reduce the likelihood of diseases being introduced (e.g. chytrid fungus.) that can be lethal to harlequin frogs and other amphibians; 2) implement a research plan that establishes the status of this population of harlequin frogs and their viability; and 3) carry out searches in surrounding areas to establish whether there are additional populations of this and other species of *Atelopus*. Finally, it is important to note that besides the discovery of this new species, Guayasamin et al. 2011 take preventative measures against any possible impact that mining would have in the Condor Cordillera. In light of this and the rapid pace of such activities, it is essential to establish a program of *ex situ* management to ensure the healthy existence of the species as a precautionary measure against other possible threats (chytrid fungus, climate change).

[100] Guayasamin et al, 2011

Atelopus nanay **(Sad Harlequin Frog)**

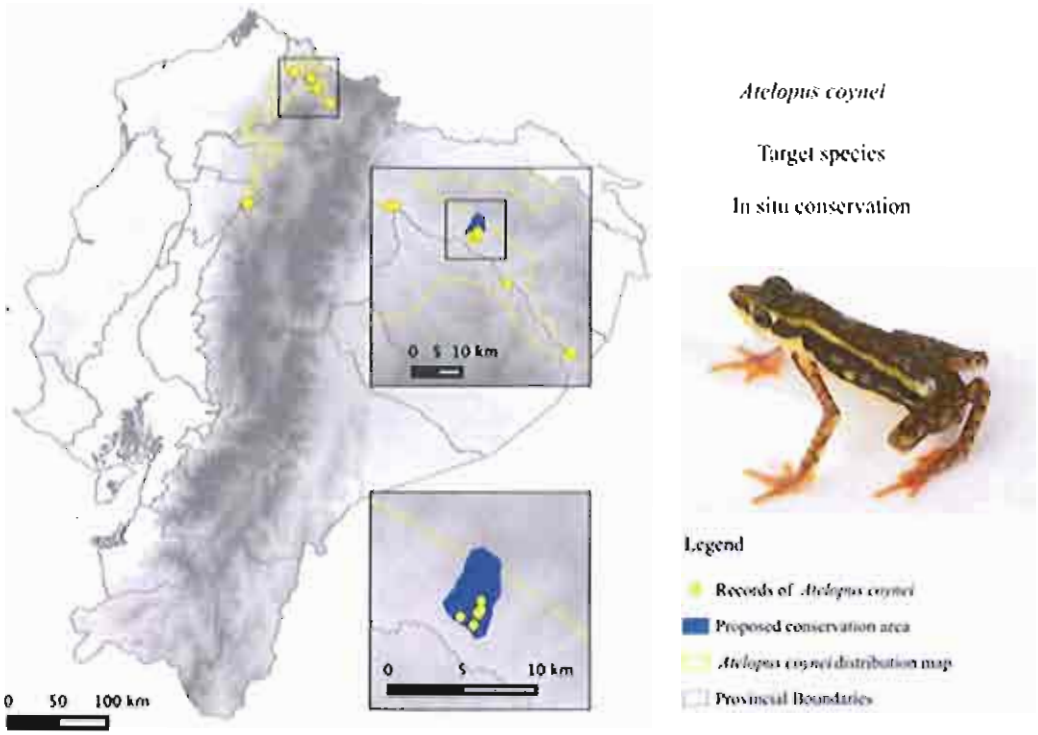


Atelopus nanay is endemic to the Andean highlands of southern Ecuador and is found across the Western Cordillera between 3600 and 4100 meters. Populations have been reported in "Las Tres Cruces" (Cajas National Park), and in the valley surrounding the headwaters of the River Patul, around the Jigeno y Patos Lagoons (Arbelaez-Ortiz and Vega-Toral, 2009) and in the the Chalpi-Saguangal Forest. Recorded sightings from the Cajas National Park are historic and date back to the eighties. Recent records are from the Patul River valley, where the habitat has been deforested and replaced by intensive agriculture and livestock. The decline in populations could be caused by synergistic effects of chytrid fungus, climate change, habitat degradation and the impact of the introduction of trout. Their restricted geographical distribution and evidence of significant population declines were the criteria used to classify this species as Critically Endangered (Coloma and Quiguango-Uvillús, 2011-2015).

Because of their vulnerability and the high interest in conserving this, the only species of the *Atelopus* genus to recently be found in the Andean highlands, as well as for the possible presence of peptides of biomedical interest in its skin, this project has identified *Atelopus nanay* as a target species within each of the three strategies covered by the project: *ex situ* and *in situ* conservation, as well as bioprospecting. For *in situ* conservation, work will take place in conjunction with Cajas National Park and ETAPA to improve the effectiveness of this species' management in its natural environment. Likewise, the Amaru Amphibian Rescue Center will continue to be supported so at to boost the *ex situ* conservation efforts and a support colony will be established through the Toad Ark program at Jambatu Center. Furthermore, bioprospecting will attempt to identify peptides with potential applications in biomedicine.

***In Situ* Species :**

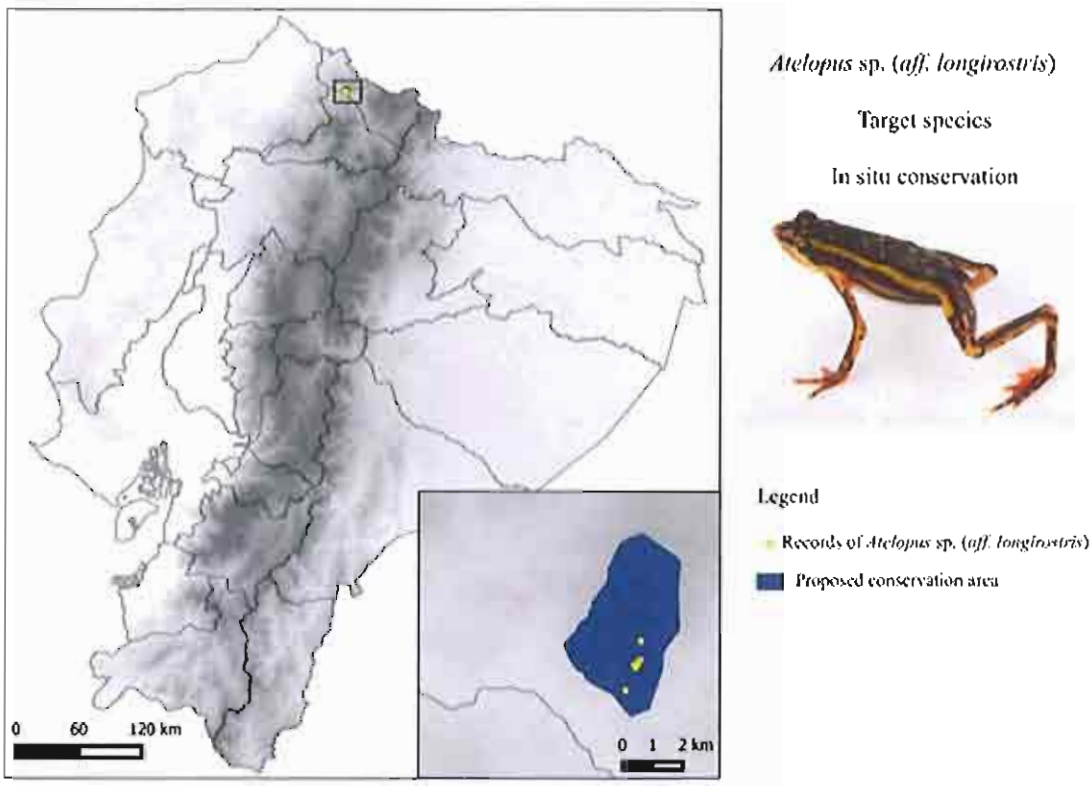
***Atelopus coynei* (Coyne Harlequin Frog)**



The Coyne harlequin frog is endemic to the cloud forests of northwestern Ecuador. Their geographical range historically covers the provinces of Carchi, Imbabura and Pichincha between the altitudes of 900 and 1380m and across an area of about 2800 km^2. Their populations have suffered drastic depletion, accompanied by the reduction of forest cover and habitat loss (Coloma et al. 2014). It is also speculated that the presence of invasive species in their ecosystem, including both fish such as trout and the pathogenic fungus *Batrachochytrium dendrobatidis*, as well as the effects of climate change may have contributed to the sudden disappearance of this species (Ron and Merino-Viteri 2000; La Marca et al 2005;. Pounds et al 2006). As a result, the Coyne harlequin frog is considered to be Critically Endangered (CR) (Coloma et al. 2011-2015), referring to a sharp decrease in population (> 80%) in the last 10 years.

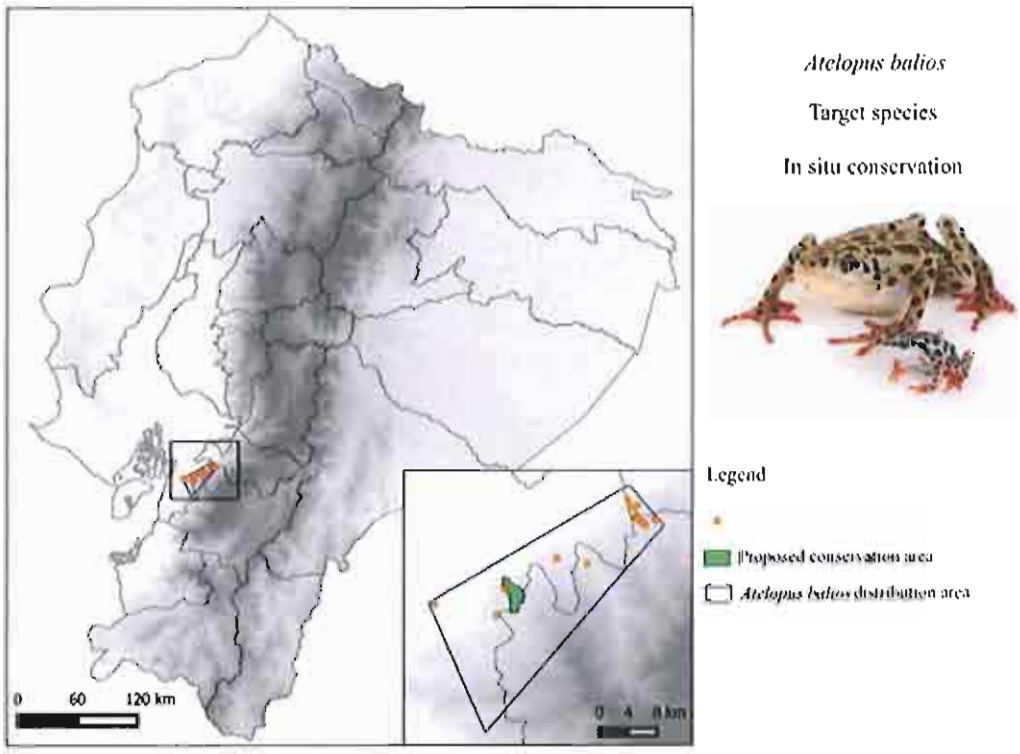
On February 7, 2012, one population of this species was found in the area around Chinambí Chico River (in the parish of Jijón and Caamano, Mira Canton, Carchi Province), and was confirmed in August 2014 (Andreas Kay, August 2014). This finding is of special significance, because (along with *Atelopus* sp. (aff. *longirostis*) it is the only species of *Atelopus* observed in the last twenty years to have come from forests in subtropical and temperate areas (1000-3000 m) on the western slopes of the Ecuadorian Andes. Before 1990, the presence of no fewer than 10 species of this genus was known in these areas. The project proposes establishing a GAD reserve to protect these two coexisting species in the Chinambí Chico region (in the parish of Jijón and Caamano, Mira Canton, Carchi Province). In addition, it is important to mention that this species is already being managed *ex situ* in the Jambatu Center's Toad Ark program. Because of its critically endangered status and the tragic disappearance of other species of *Atelopus* from their natural environment, it is believed that conservation efforts both in natural environments and in controlled laboratory conditions must include complementary activities to favor the survival of this species.

Atelopus sp. (aff. *longirostris*) (Harlequin frog)



This species has not been studied; the Jambatu Center is doing molecular analysis to learn about their phylogeny, determine their specific status (whether it is a new species) and assess their conversation status. The region surrounding the Chinambí Chico River is the only place where a population of this species has been found. This species probably enjoys a wider geographical distribution but these are not recorded. This species coexists with *Atelopus coynei*, and these two species are the last populations of harlequin frogs of the *Atelopus* genus in existence in the western foothills of the Occidental Cordillera in the northern Andes. The project proposes establishing a reserve to protect these two coexisting species in the Chinambí Chico region (in the parish of Jijón and Caamano, Mira Canton, Carchi Province), and as previously mentioned, this region constitutes a conservation priority since it covers two species of the *Atelopus* genus, the most threatened kind of Ecuadorian amphibians.

Atelopus balios **(Spotted Harlequin frog)**



The Spotted Harlequin (*Atelopus balios*) is endemic to Ecuador and lives in the southwestern tropical rainforests between the altitudes of 350m and 650m. It has only been spotted in four locations in the provinces of Azuay, Cañar and Guayas in an area of 200 km^2 (see the polygon in the map above). The area in which it lives faces a high risk of habitat change due to agriculture, livestock and mining. The devastation of its habitat is extremely marked. Decades ago, rice plantations were the main cause of converting forests into agricultural zones. Today, the remnants of forest at the foot of the Andes are severely threatened by cacao plantations. This species is in the Critically Endangered category on the IUCN Red List because of a sharp estimated decrease in population (80%) over the last 10 years (Cisneros-Heredia et al. 2004). It is presumed that this species, like other harlequin frogs in the *Atelopus* genus, may have been affected by pathogens such as the chytrid fungus (Ron and Merino-Viteri 2000) chytridiomycosis, which has been confirmed in the species' habitat areas. Likewise, climate anomalies (Pounds et al. 2006) have also caused a reduction in populations of this species.

As part of a global campaign (led by Conservation International), a recent push to search for disappearing frogs confirmed the existence of vestigial populations of this species. The presence of *A. balios* was confirmed in some localities along the border of Guayas and Azuay provinces. This project aims to support the establishment of a Provincial GAD Protected Area covering *A. balios'* habitat and thus strengthening provincial conservation initiatives. By preserving the habitat of *A. balios* it will preserve the only species in the *Atelopus* genus to be found extending to southern geographical limits and across the western tropical areas. The conservation projects and research which are conducted on *Atelopus balios* as part of the rescue and *ex situ* conservation programs run by the Toad Ark at Jambatu Center have the aim of increasing population numbers for this species sufficient for a future reintroduction to the wild. Furthermore, the experience garnered in these efforts will guide and inform the application of *in-situ* conservation interventions.

PART II. Bioprospection and Biobanking in Ecuador

I. Bioprospecting Potential

A. Experience in Ecuador: Amphibian skin is a rich source of chemicals that comprise its defense system against microorganisms and predators. The toxins and other substances from the skin of some frogs have been used since ancient times by indigenous communities in Ecuador in their diet, rituals, and also in traditional medicine. These compounds have a high potential for application in therapeutics, cosmetics, pharmaceutical, biomedicine, among other industries. Peptides from amphibian skins have been tested and proved as antibiotic agents against multi-resistant bacteria. Over 20 years ago, Michael Zasloff at the National Institutes of Health (USA) and Dudley H. Williams at the University of Cambridge isolated the *magainins* - peptides obtained from the skin of the African clawed frog (*Xenopus laevis*). These peptides were the first amphibian peptides with antimicrobial activity to be fully characterized. A derived molecule from *magainins*, the *pexiganan*, has been tested as a topical agent against infected foot ulcers in diabetic patients by the University of Washington's School of Medicine (USA). The research group at the United Arab Emirates University has also made important contributions to the discoveries of new peptides and has proven interesting bioactive properties of *brevinin* and *caurelin*-like peptides, isolated from the skin secretions of different species of frogs.

Parallel studies by the National Institutes of Health (USA) have focused on complex alkaloids and molecular pharmacology of acetylcholine receptors and sodium channels level, mainly in *Dendrobatidae* family, resulting in the identification of hundreds of different alkaloids. Among them, *Epibatidine* has an analgesic effect 200 times more potent than morphine acting under a non-opiod mechanism. *Epibatidin* was isolated from 750 skins from the frog *Epipedobates anthonyi* (former *E. tricolor* in original publications) collected in Ecuador. At present, analogs of this molecule are tested as treatment for rheumatoid arthritis, Alzheimer's and epilepsy. The Ecuadorian State has a pending royalties claim to countries that are party to the Convention on Biological Diversity with regards to the commercial use of *Epibatidine* or its derivatives.

Current databases for amphibian peptides around the world register a total of 2571 peptides characterized from 167 species and there is great interest in antimicrobial, antifungal, tumoricidal, antiviral and anti-protozoa activity.

In Ecuador, pioneering work of young Ecuadorian biologists has revealed the potential of some chemical compounds extracted from 8 species of Ecuadorian amphibians and several local efforts to analyse the secretions of the frog *Agalychnis spurrelli* - testing for antimicrobial, antifungal and anticancer activity have had promising results. However, investigations to isolate and chemically characterize the active compounds are needed. Furthermore, while Ecuadorian student theses have provided important advances, the material has yet to be published in recognized scientific journals[101]. Currently, only one Ecuadorian Biologist is pursuing PhD studies on the bioactive properties of chemicals extracted from the skin of amphibians through a National Secretariat of Science and Technology (SENESCYT) scholarship in one of the world's most important research centers for bioprospecting skin secretions of amphibians (Queen's University Belfast, Northern Ireland, UK). Under this scenario, bio-prospecting research of skin secretions of amphibians is initiating in Ecuador with the collaboration of Queens University, the Centre Jambatu and the National Environmental Authority (MAE).

[101] Caicedo, 2007; Torres, 2009; Chuang, 2010; Vargas, 2010; Ramírez, 2012

This research forms the basis of Outcome 2 and focuses on 4 Ecuadorian frog species: *Agalychnis spurrelli*, *Cruziohyla calcarifer*, *Hypsiboas picturatus* and *Atelopus nanay* with a high probability of containing new and unique peptides in their skins, with many interesting bioactive properties. This research is novel and may open an important window of opportunities for strengthening technical and scientific capabilities in bio-prospecting. These species were selected for 3 main reasons:

- First, because preliminary studies with crude extracts of three of these species have demonstrated antimicrobial activity and the occurrence of peptides and proteins.
- Second, *Agalychnis* and *Cruziohyla* belong to the *Phyllomedusinae* subfamily, which is a known source of antimicrobial peptides, but these particular species have not been previously studied in-depth.
- Third, *Agalychnis spurrelli, Cruziohyla calcarifer, Hypsiboas picturatus,* and *Atelopus nanay* are being bred in captivity in the Center Jambatu so there is availability of this resource. Captive-bred specimens can be used instead of or in addition to field collected ones, thereby reducing interference with wild populations. Regardless, the number of individuals required for these studies is relatively low and will not impact species' populations.

Amphibian skin contains granular glands that produce an arsenal of chemical compounds which constitute a defense mechanism against pathogens, microorganisms and predators. These glands secrete a variety of peptides, biogenic amines, and alkaloids with a wide spectrum of biological activities. Recent studies demonstrate the incredible variety of peptides found in a single species: >200 with different characteristics and biological activities. As such, the analysis of new species provides promising opportunities to find new and unique compounds. However, amphibians are confronting an unprecedented extinction crisis, the impact of which could be more devastating when considering the genetic and molecular resource inherent in amphibians. With every extinct species, the possibility of discovering new molecules that could lead to the development of new medicines vanishes.

As the selected species for this project have not been previously studied and come from 4 different genera, there is a high probability of finding unique peptides with a range of interesting bioactive properties. In Queen's University Belfast, the study of one of the target species, *Cruziohyla calcarifer,* is already underway and in the past 6 months advances have been made in the molecular study of the skin secretions of this species, including the discovery of proteinase inhibitors, tryptophyllins, and antimicrobial peptides, in addition to other peptides already characterized in related species such as: medusin, phyllokinin, and insulinotropic peptide and 4 novel peptides with unknown activity.

Favourable conditions exist for developing bioprospection in Ecuador:

First, the Ecuadorian government has stated in the National Plan for Well-being that bio-knowledge – including bioprospection - is a strategic tool for national development in medium and long terms. With this in mind, the Ecuadorian government is investing in higher education and scientific research through the creation of new Universities and research centers, including the Yachay City of Knowledge and Ikiam Regional Amazonic University, which will develop scientific research focused on the sustainable use of Ecuadorian biodiversity and technology.

Second, the Ecuadorian government is also investing in human resources through a scholarship program. Hundreds of Ecuadorian students are pursuing postgraduate studies in the best Universities around the world, acquiring experience and knowledge in a whole range of different areas, including bioprospection, with the expectation that this will drive the development of higher education and scientific research towards a sustainable use of Ecuadorian biodiversity.

Third, the National Environmental Authority (MAE) is aware of the legal requirements associated with conducting this level of research, in particular the need to ensure an agreement for benefit sharing with the Ecuadorian State in accordance with guidelines set out under the Convention of Biological Diversity (CBD). Aside from the current project, another project supported by Yale University and the Pontificia Universidad Catolica del Ecuador is close to signing a contract to access genetic resources with the ABS rule in order to study an endophytic fungus able to degrade polyester polyurethane. This is a clear sign of the commitment of the MAE to develop and legally support bioprospection in Ecuador. This aspect is further developed in Outcome 3 of this project.

B. Bioprospection Plan for Project Implementation

In order to support the strengthening of national capabilities related to bioprospecting research, inter-institutional agreements will be set up for technology transfer between Queens University, Ikiam, Centro Jambatu, and MAE, as well as professional training of at least 5 Ecuadorian students at the graduate level in the field of bioprospecting amphibian skin substances. Partnerships with the National Secretariat of Science and Technology (SENESCYT), particularly through its scholarship program, will be promoted to support qualified students interested in pursuing graduate-level studies in bioprospecting specializations, with emphasis on compounds from amphibians, thus broadening the scope of the project for technology transfer to other research centers and universities around the world. Furthermore, the project will promote SENESCyT's call for proposals for a Prometeo expert in themes of bioprospection to bring at least one expert to a national institution to share experiences in bioprospecting and thereby transfer technical and scientific capacity.

As part of this transfer, a small branch lab of bioprospecting skin secretions of amphibians will be established in Centro Jambatu with imminent construction of a second, full-size branch laboratory at Ikiam Amazonic Regional University expected by 2017. As such, IKIAM will replicate Centro Jambatu at a larger and more advanced scale, while Centro Jambatu's branch laboratory will continue to serve as an important back-up and complementary site. This falls in line with the project's aim to establish capacity, as well as strengthen Centro Jambatu's role as custodian of the country's amphibian genetic resources. Basic bioprospecting facilities will be set up in Centro Jambatu with the guidance of Queen's University's Therapeutics Laboratory to permit the acquisition of chemical substances, peptides, and other materials associated with bioprospecting research. Training in basic specimen management, in addition to extraction, and storing techniques for bioprospecting skins secretions of amphibians will be provided by staff from Queen's University targeted at Ecuadorian students and/or professionals. The branch lab will serve as a training, practice and research center for students of Biological Sciences and Biotechnology from Ikiam and other national universities (both undergraduate and postgraduate). Throughout the project, SENESCYT will be engaged to provide feedback on the strategies and institutions that will benefit in order to optimize the transfer of skills and training.

Conservation of genetic resources (tissue, skin, sperm and library of cDNA) will be supported as a key tool for both conservation and bioprospecting purposes. Management and use of biomaterials, including germplasm, tissues, blood products, RNA and DNA through specialized technologies will be supported along with the establishment of an Ecuadorian Amphibian Genome Bank (EAGB) to safeguard tissue, skin, and reproductive cells (sperm cells) of endangered amphibians, as an organized repository and a second line of defense against species extinction.

II. Biobank

A. Biobank Options

Intensive management and the use of biomaterials including germplasm, embryos, tissues, blood products and DNA are a vital tool for the preservation of the genetic signature of a species, maintaining genetic diversity, increasing the base the founders and enhance the reproductive success of managed species in captivity individuals. Therefore, an organized repository that offers a systematic management to preserve the genetic material in a Genome Bank can serve as a second line of defense against extinction of species (IUCN 2007).

A Genetic Resources Bank could be a valuable tool for integrating recovery efforts for amphibians, especially in the context of captive breeding programs, and the efforts of studies and population monitoring in the field where it can be relatively easy to collect biomaterials to form the foundation of such a Bank. This could include short-term periods in captivity where animals become donors of germplasm before being released back into the wild. Such efforts would capture the genetic composition of the founders who, in turn, could provide valuable biomaterials to reinforce the *ex situ* collections. At the same time, the assessment of the reproductive status of individuals in the field provide important information on the potential impact of environmental disturbances, stress exposure to pollutants or inbreeding depression.

The Amphibian Conservation Action Plan (ACAP) conducted in 2005 established as one of its nine priority areas of action the establishment of a biobank to safeguard genetic resources of amphibians. This includes cryopreserve blood, cell cultures, tissues, sperm, oocytes, stem cells, embryos and DNA to preserve their genetic, proteomic and transcriptomic information in the form of viable cells. The objective of this biobank is to safeguard genetic diversity of endangered species to allow use of assisted reproduction techniques - *in vitro* fertilization, molecular cloning, using sperm generation of germ cells, etc., - in order to ensure the viability of the species retaining at least 90% of their genetic diversity[102]. Since the establishment of ACAP in 2005, few groups have begun work on this topic. The most advanced are: 1) the Frozen Zoo which is part of the Center for Endangered Species Conservation at the San Diego Zoo, Ca. USA; 2) the Memphis Zoo; and 3) the Zoological Society of London[103]. They have reported significant progress in the generation and preservation of cell cultures, preservation of sperm and semen mixed with urine, as well as the successful use of this frozen sperm for fertilization. However, cryopreservation of these cells needs to be optimized to ensure greater viability. Furthermore, efforts to cryopreserve oocytes and embryos have been unsuccessful, so the need for much more research in this area is evident. It should be noted that successes are isolated and cannot be generalized but must be adapted to each species by molecular and structural variability of these type of cells and tissues[104].

Within Ecuador, Museums and conservation Centers, such as Centro Jambatu (CJ), PUCE Museum of Zoology (QCAZ), and Ecuadorian Museum of Natural Sciences (MECN) have implemented the preservation of tissue (muscle and liver) in 95% ethanol at -20°C or -80°C for its zoological collections, including amphibians. This technique preserves genetic information as DNA for genetics, phylogenetic or taxonomic studies (including barcode). The quality of DNA obtained from these tissues is enough for such studies, but it is known that the quality of DNA, RNA, proteins and lipids in these tissues preserved at -20 ° C decreases with time, so this material is not recommended for research involving modern techniques such as next-generation sequencing or other high-throughput technologies. As such, there is a recognized need to develop more long-term preservation techniques to establish a viable Genome Bank in Ecuador, as proposed in Outcome 2.

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[102] Gascon et al 2007
[103] Kouba et al., 2013
[104] Lloyd 2012;. Kouba et al, 2013

In order to safeguard the components of amphibian skins (alkaloids and peptides) a bank of skins and/or secretions should be established. This is particularly important in *Dendrobatid* frogs and *Bufonid* toads known to contain such compounds. However, the bank will eventually aim to collect specimens of all threatened species to preserve the molecules that have yet to be studied and discovered. To accomplish this, some specimens per species (1-10 samples)[105] will need to be sacrificed to preserves those skins in 100% methanol.

Another component that must be safeguarded is venom or skin secretions of amphibians. In this sense, specimens do not need to be collected. Secretions can be extracted in the field and specimens can be returned to their capture site. The secretions should be frozen and lyophilized. It is recommended to include samples of at least two individuals per population of endangered species, as well as some periodic extractions from animals maintained *ex situ* to increase the samples collected, when feasible. The risk of the stress caused by extraction varies among amphibians and could potentially interfere with the objectives of reproduction, so this should be evaluated by the curator of the living collection. It is recommended to preserve at least 20mg of dry material per species or population.

Finally, the concentration of hormones required for each species needs to be adjusted according to established protocols for other species. Cryopreservation of sperm and sperm with urine can also be implemented by adapting established protocols for other species. It must be remembered that fertility obtained using frozen semen has not exceeded 100%. However research on this topic should be encouraged due to the availability of biological resources. It is recommended to start these tests with species that reproduce more or less regularly or which have developed methodologies for reproduction such as: *Epipedobates tricolor* and *Gastrotheca riobambae* and then adapt them in order to preserve sperm of *Atelopus* sp.

B. Establishing a BioBank in Ecuador

The establishment of an organized repository that offers systematic management to preserve genetic material in a Genome Bank (BioBank) can serve as a second line of defense against species' extinction [106] and will be complementary to the Project's conservation actions in Outcome 1. As such conservation of genetic resources (tissue, skin, and sperm) will be supported by the project as a key tool for both conservation and bioprospecting purposes. Intensive management and use of biomaterials including germplasm, embryos, tissues, blood products and DNA are a vital tool for the preservation of a species' genetic signature, maintaining genetic diversity, and enhancing the reproductive success of species in captivity.

Management and use of biomaterials, including germplasm, tissues, blood products, RNA and DNA through specialized technologies will be supported along with the establishment of an Ecuadorian Amphibian Genome Bank (EAGB) within Centro Jambatu[107] to safeguard tissue, skin, and reproductive cells (sperm cells of endangered amphibians, as an organized repository and a second line of defense against species extinction. This will include increasing the technological capabilities (infrastructure, equipment and training) of Centro Jambatu to expand its role as custodian of the country's amphibian genetic resources through preservation technologies such as lyophilization and cryopreservation; and training staff and researchers for storage and appropriate uses.

The project will support Centro Jambatu in establishing the EAGB by:

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[105] Fitch et al., 2003; Daly et al., 2005

[106] IUCN, 2007

[107] While Centro Jambatu will host the EAGB during the lifetime of the project, ultimately a national institution will be assigned the responsibility of managing this Genome bank to ensure institutionalized long-term viability. An analysis of potential host institutions is currently underway.

- Increasing the current tissue bank to preserve muscle and nervous tissue, and organs (eyes, heart, liver, brain) from 50% of Ecuadorian amphibian species in 95% ethanol and keep those tissues in deep freeze at -80°C;

- Establish a skin bank for Lyophilized skins (with chemical compounds) to be preserved in 100% methanol and/or lyophilized secretions, both frozen at -80°C, for bioprospecting purposes of 40% (~ 70) of Ecuadorian species included in the IUCN Red List;

- Cryopreserve reproductive cells (sperm), starting with pilot trials using two model species and then moving on to use those protocols in *Atelopus* sp, with the aim of eventually including all of the same threatened species (~ 70) in "component ii)" to ensure that living material is safely stored, biologically viable and capable of being used for propagation and maintaining the genetic integrity of populations and species. Trials will include the preservation of sperm and tissue culture. Furthermore, the project will establish collaboration with the Frozen Zoo in San Diego Zoo and Memphis Zoo to acquire technical advice in this area.

By project end, it is expected that the establishment of an Ecuadorian Amphibian Genome Bank will ensure the following:

- Tissue from 50% of Ecuadorian amphibian species will be stored.

- Skins (with chemicals compounds) and skin secretions of 40% of Ecuadorian amphibian species on the IUCN Red List (about 70 species of frogs).

- Cryopreserved sperm samples of at least one *Atelopus* sp. species tested and confirmed as viable for reproduction.

The conservation of genetic resources of Ecuadorian amphibians will focus on the representation of the diversity of amphibians in the country. However, since most threatened species are located in the Andes, collection efforts will have a bias towards Andean species.

PART III. Institutional Framework & Capacity Analysis

I. LEGAL FRAMEWORK

1. INTERNATIONAL LAW: While the Convention on Biological Diversity (CBD) and the Nagoya Protocol are key to this project, it is important to understand additional International/Regional and National legal instruments related to Genetic Resources and ABS in the Ecuadorian context.

1.1. Decision 391 of the Andean Community of Nations (CAN)

Since 1996, ABS issues in the Andean region have been regulated by Decision 391 on the Common Regime on Access to Genetic Resources of the Andean Community of Nations (CAN). Decision 391 is fully applicable to CAN members and binding for Ecuador. Under this instrument, CAN members must prepare contracts when providing access to genetic resources, and supplementary agreements in the event that there is ancestral knowledge involved. The Decision also sets limits on access depending on the vulnerability of the environment and the species in question, as established in Article 45. The procedure for obtaining access begins with a request sent to the competent authority in the country of origin of the genetic resources, which in Ecuador's case is the Ministry of the Environment, and must publish the request so that both domestic and foreign stakeholders can share their opinion with respect to the possibility of providing access to the resources. The Decision mentions the sanctions that are to be imposed for the failure to gain access in accordance with its provisions. Violators are penalized with the withholding of intellectual property rights to the derived or synthesized product that is ultimately obtained[108].

While Article 3 of the Decision limits its application to the members of the Andean Community, Ecuador uses Decision 391 as a procedural rule applicable to all research projects – not limited to the Andean Community – being carried out for the purpose[109] of bioprospecting. Furthermore, other activities, e.g. those aimed at conservation or non-commercial research, are not subject to any procedural rules other than the standards established by the Convention on Biological Diversity, which in practice translates into a regulatory gap that affects the way in which research requests are responded to and managed.

1.2 International Treaty on Plant Genetic Resources for Food and Agriculture

The International Treaty on Plant Genetic Resources for Food and Agriculture (under the auspices of FAO) entered into force on June 29, 2014. Its primary objective is to encourage the conservation and sustainable use of plant genetic resources to ensure food security and address the prevailing private ownership of intellectual property regarding food and genetic resources. The treaty includes a Multilateral System of Access to Plant Genetic Resources which fully respects the sovereignty of countries over their natural resources - especially those classified as plant genetic resources - and thereby establishes a common pool of plant genetic resources that all members can access, provided they respect the established conditions and the sharing of benefits. In the event that a member country denies access, they must share a percentage of the sales obtained from that resource with the international community.

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[108]Member countries shall not recognize rights, including intellectual property rights, to genetic resources, derived or synthesized products and their associated intangible components, obtained or developed as the result of an access activity that does not comply with the terms of this Decision. In addition, the affected Member Country may request annulment and initiate any actions it deems appropriate in those countries that have conferred rights or granted legal protection.

[109] Article 19, book IV of the Unified Text of Secondary Legislation of the Ministry of the Environment.

Access is granted rapidly for carrying out research, genetic improvements and training for food and agricultural purposes, but not for chemical, pharmaceutical, or other industrial interests. Member countries are expressly prohibited from obtaining intellectual property rights to these resources; the genetic resources which already have such rights attached to them will be transferred, respecting the requirements of the system. The origin of the resource is irrelevant, and the benefits are shared among all member countries, especially among farmers in developing countries.

2. NATIONAL LEGISLATION

2.1. Ecuador's Constitution of Montecristi (2008)

Ecuador's Constitution of Montecristi (2008) contains a number of specific references to biodiversity and genetic resources. The Constitution codifies the Rights of Nature and the National Plan for Good Living, and provides the overarching guide to planning and public policy. It outlines a paradigm-shift from the current capitalist economic development model to one based on the country's comparative and competitive advantage - biodiversity. Through the Rights of Nature, it recognizes that human beings, nature, and respect for knowledge are all integrated. Chapter 7 of the Constitution details the rights and obligations attached to nature as "existence, maintenance, regeneration of life cycles and restoration," as summarized under Articles 71[110] and 72[111]. Meanwhile, Article 3 Paragraph 5 establishes that the primordial duties of the State are to "plan the nation's development, eradicate poverty, and promote sustainable development and the equitable redistribution of resources and wealth, to attain good living."

The Constitution sets out the medium-term (2025) goal for Ecuador to become an exporter of bio-knowledge and an ecotourism services provider. In this context, the genetic diversity has a fundamental role for its enormous potential application in therapeutics, cosmetics, pharmaceutical, biomedicine, agroindustry among other industries. In turn, the way in which genetic resources are accessed, and how the benefits of their use are shared, can create incentives for their research, conservation and sustainable use, and can contribute to the creation of a fairer and more equitable economy in support of sustainable development. It also provides a vehicle for emergency in *in situ* and *ex situ* conservation.

2.1.1. Recognition of Rights

Article 400 of the Constitution is aligned with the CBD in stating that "The State will exercise sovereignty over biodiversity, which will be administered and managed with inter-generational responsibility. The conservation of biological diversity and all of its components are declared to be in the public interest, in particular agricultural and forest biodiversity, and the country's genetic assets." Ecuador has classified biological diversity and genetic resources as strategic resources, by virtue of their potential for biotrade, and their importance and utility for food and energy independence. Therefore, the administration, regulation, control and management of these resources is the exclusive jurisdiction of the State[112], through its own companies, or mixed companies in which it is a majority shareholder. Access, in these terms, will be subject to governmental authorization, and to the country's needs, and will therefore

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[110] Art. 71. Nature, or *Pacha Mama*, where life is reproduced and occurs, has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes. All persons, communities, peoples and nations can call upon public authorities to enforce the rights of nature. To enforce and interpret these rights, the principles set forth in the Constitution shall be observed, as appropriate. The State shall give incentives to natural persons and legal entities and to communities to protect nature and to promote respect for all the elements comprising an ecosystem.

[111] Art.72. Nature has the right to be restored. This restoration shall be apart from the obligation of the State and natural persons or legal entities to compensate individuals and communities that depend on affected natural systems. In those cases of severe or permanent environmental impact, including those caused by the exploitation of nonrenewable natural resources, the State shall establish the most effective mechanisms to achieve the restoration and shall adopt adequate measures to eliminate or mitigate harmful environmental consequences.

[112] Article 313 of the Constitution.

depend on whether the reasons behind a request for access are for academic, research, conservation or exploitation purposes.

The Constitution declares that conservation of natural resources is in the public interest. This implies that the interest of the collective must take priority over private interests through democratic decision-making. The public interest in biodiversity and genetic heritage must be understood then as decisions to ensure the common good, within the bounds of the Rights of Nature. This reinforces the concept that only the State can grant access permits to genetic resources, and illustrates the notion that the communities connected to those resources must be engaged and participate in determining their use, conservation or other actions. This highlights the need to define the scope of rights specifically associated with genetic resources, and their relationship to the collective rights of local communities, indigenous peoples and groups.

With regards to genetic resources linked to ancestral knowledge, it is important to differentiate between the rights of:

(1) communities, peoples and indigenous groups in possession of biological resources that contain genetic resources and have developed ancestral knowledge associated with these resources, and

(2) those communities, peoples and indigenous groups that simply live alongside the resources.

This is crucial in order to specify the degree of participation and the level of engagement, both in the preliminary environmental consultation, as well as the distribution of any resulting benefits. Traditional knowledge is capable of producing goods and services that are needed by the community but that can also be used in biotrade; therefore, both the international community and the State has recognized this knowledge as a collective right, as confirmed by Article 57, Paragraph 12 of the Constitution, which acknowledges their right to "maintain, protect and develop collective knowledge; their traditional sciences, technologies and know-how; the genetic resources contained in the biodiversity and agro-biodiversity; their medicines and traditional medical practices." Furthermore, "all forms of appropriation of their knowledge, innovations and practices is prohibited."

With respect to consultation, the communities, peoples and indigenous groups who are in possession of ancestral lands have ownership rights to that land, and can take advantage of the utilization of it, regardless of how much ancestral knowledge they contribute. The Constitution provides for collective rights[113], which include:

- "Maintain possession of ancestral land and territories and their free title"; and
- "Participation in the use, enjoyment, administration, and conservation of the renewable natural resources that are found on their lands."

This implies that they have a right to the benefits derived from the natural or genetic resources that are obtained from ancestral or community territories to which they have ownership or can prove possession of[114], to the extent that this resource is renewable. Meanwhile, in cases where there is no ancestral knowledge, the agreed-upon conditions must be negotiated between the State and the community, not the third party who is getting access to the resource, as is the case when there is ancestral knowledge involved.

With respect to environmental consultation and the consent that must be given by the communities directly affected by the access to genetic resources, regardless of whether or not they are contributing

[113] Article 57.

[114] Article 715 of the Civil Code defines possession as "having control over a certain thing as owner, whether the owner or the person acting as owner has the thing himself, or through another person in his place and on his behalf." In this sense it is not necessary to prove ownership with a public deed, but rather by demonstrating that a group of people are the ancestral owners of the land.

ancestral knowledge, the Constitution establishes the right to preliminary, environmental, and/or pre-legislative consultation, of which 2 are pertinent in this project:

Preliminary consultation stems from the recognition of the rights of the communities, peoples and indigenous groups to voice their opinion on actions that directly affect them, and to be able to do so before the implementation of a project that could affect them, pursuant to Article 15 Number 2 of Convention 169 of the ILO[115]. The right to preliminary consultation is recognized as part of the collective rights, with the condition that it is only applicable to "plans and programs to prospect, exploit and commercialize non-renewable resources that are found on their land, and that could affect them environmentally or culturally (...) The consultation must be done by competent authorities and shall be obligatory and done in a timely fashion. If consent is not obtained from the consulted community, then the process will continue as per the Constitution and the Law."[116]

Furthermore, international treaties on human rights prevail over any national legal instrument when they acknowledge rights that are more favorable than those established in the Constitution, according to Article 424 which states: "(...) The Constitution and any international human rights treaties ratified by the State which acknowledge rights that are more favorable than those acknowledged in the Constitution, shall prevail over any other public sector law or action." Regardless of whether or not the community contributes its knowledge, and only in regard to the impact that granting access to genetic resources within its territory could have, the applicable consultation in this case would be preliminary consultation, and therefore if a positive opinion is issued, the project could continue without any problems. If the opinion were to be negative, the interested party must obtain a properly justified and reasoned resolution from the government that allows it to continue, as per Article 83 of the Organic Citizen Participation Act[117].

Environmental consultation is aimed at those citizens who live in the direct area of influence of a project; that is, those who are affected but who do not necessarily live in, own or belong to the precise place where the genetic resource will be extracted, and who have not contributed any ancestral knowledge. Thus, the consultation is not a result of ancestral claim or in recognition of collective rights, but rather out of respect for the idea of participation in environmental matters. This consultation is related to Article 398, which states: "Any government decision or authorization which could affect the environment must be made in consultation with the community, which will be informed in a complete and timely fashion. The entity carrying out the consultation will be the State, the Law will regulate the preliminary consultation, the citizen participation, the timetable, the group to be consulted and the criteria used to assess and object to the activity being discussed in the consultation ..."

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[115] 1. The rights of the peoples concerned to the natural resources pertaining to their lands shall be specially safeguarded. These rights include the right of these peoples to participate in the use, management and conservation of these resources.
2. In cases in which the State retains the ownership of mineral or sub-surface resources or rights to other resources pertaining to lands, governments shall establish or maintain procedures through which they shall consult these peoples, with a view to ascertaining whether and to what degree their interests would be prejudiced, before undertaking or permitting any programmes for the exploration or exploitation of such resources pertaining to their lands. The peoples concerned shall wherever possible participate in the benefits of such activities, and shall receive fair compensation for any damages which they may sustain as a result of such activities.

[116] Article 57 number 7.

[117] Art. 83. Valuation. If the consultation processes result in a majority opposition from the respective community, the decision on whether or not to carry out the project will be made through a duly argued and justified resolution issued by the proper authority; if the decision is to move forward with the project, then the resolution must establish parameters to minimize the impact on the communities and the ecosystems; in addition, it must provide for measures to mitigate, compensate and repair any damages, as well as, to the extent possible, to use local labor provided by community members in the respective projects, in conditions that guarantee their human dignity.

This is consistent with Article 82 of the Organic Citizen Participation Act[118], which holds that the community affected by the granting of access, regardless of their contribution of traditional knowledge, must give its opinion, since it will be affected by the bioprospecting taking place in its territory, with the movement of people and perhaps equipment, to a lesser extent, although as with the preliminary consultation, a negative opinion on the part of the community would not be decisive as to whether or not the activity is allowed to take place. What differentiates those communities, peoples and indigenous groups who provide ancestral knowledge, is that they can enter into supplemental agreements alongside the genetic resource access agreement, regarding the benefits derived from the knowledge that they provide.

2.1.2. Specific Regulations

Article 322 of the Constitution addresses the prohibition of appropriating genetic resources and ancestral knowledge:

> "Intellectual property is recognized pursuant to the conditions provided for by law. Any form of appropriation of collective knowledge, in the fields of science, technology and ancestral wisdom, is forbidden. The appropriation of genetic resources contained in biological diversity and agricultural biodiversity is likewise forbidden."

The appropriation referred to in this Article occurs when the conditions for access to genetic resources are not respected by the interested parties. The Constitution expressly prohibits unauthorized access to genetic resources, defined as any access that does not respect the procedures established in national, international or community legislation. Unauthorized access and biopiracy[119] are penalized with prison sentences, given their classification as crimes against national genetic heritage, and as stated in Article 248, Paragraph 1 of the Comprehensive Criminal Code, which identifies the following as a crime:

> "Unauthorized access: any person who in violation of national law accesses genetic resources that are part of the national heritage which may or may not include an intangible component, will be penalized with a sentence of three to five years in prison. This sentence shall be extended by one-third if it is demonstrated that the access was done for commercial purposes."

The sentence imposed and the treatment of biopiracy is a reflection of the respect that third parties must have for the principle of sovereignty over natural resources and decisions in the framework of the public interest. However, the country has developed CBD-related provisions to regulate access to genetic resources and ancestral knowledge only at the level of the Andean Community, and not for the rest of the world. Therefore, it is difficult to establish which access mechanisms third parties must respect in order to avoid illegal appropriation, and the resulting criminal sentence. While Decision 391 is applicable in cases of bioprospecting, this is not so for other cases, and therefore it is crucial for Ecuador to ratify the Nagoya Protocol so as to establish the appropriate reserves related to the treatment of intellectual property, based on the legal-regulatory framework that governs the patent system.

At the same time, the current legal framework does not grant protection to products derived from ancestral knowledge under the intellectual property system. If not resolved soon, this will lead to a

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[118] For any State decision or authorization that could affect the environment, the community must be consulted, and for this process they must receive sufficient information in a timely manner. The consulting body will be the State. The State will evaluate the community's opinion according to the criteria established in the Constitution, international human rights instruments and the law.

[119] This is a practice in which researchers or companies illegally access and use the biodiversity of other countries and/or the collective knowledge of indigenous or *campesino* peoples, in order to manufacture products and services that are exploited for commercial and/or industrial purposes, without the authorization of their creators or innovators (Source: Delgado Isabel, "Biopiratería en América Latina. Casos célebres de apropiación ilegal de nuestros conocimientos colectivos" in Biodiversidad (Uruguay), June 2004.

shortage of patent rights, making it impossible to develop biological knowledge as Ecuador has proposed to do in its development plans and objectives. Article 402 of the Constitution states: "the granting of rights, including intellectual property rights, to byproducts or synthetics obtained from collective knowledge associated with national biodiversity is forbidden." Therefore, until the issue of ownership is resolved at the Constitutional level[120], research done in the country cannot result in a product that has any ancestral knowledge associated with it at any stage of production, or else the patent or intellectual property right will be denied.

With regards to environmental services, Article 74 of the Constitution states that: "environmental services shall not be appropriated; their production, provision, use and enjoyment shall be regulated by the State." According to secondary national legislation[121], environmental services are the benefits that people obtain directly or indirectly from the functions of biodiversity (ecosystems, species and genes), especially native ecosystems and forests, as well as forestry and agro-forestry plantations. This includes genetic resources, and therefore the government has the right to produce, supply, use and exploit them through genetic resource access agreements. Environmental services can therefore be categorized as common goods, or goods without an owner, and thereby regulated by Article 602 of the Civil Code. Ultimately, regardless of land tenure, environmental services, especially those related to genetic resources, may not be appropriated by anyone, and the State alone must regulate how they are used and exploited.

However, this raises concern that the Constitution places environmental services as an illicit activity as described in Article 1480 of the Civil Code, and therefore in light of the prohibition against appropriating environmental services, any type of business initiative which falls into this category would automatically be illegal, and therefore be detrimental to any biotrade initiatives. This issue requires further definition and/or issuance of specific laws and instruments to regulate the use and access to environmental services. Private entities and individuals would not own these services, but rather only be able to obtain use and access permits, based on the principle of sovereignty over natural resources.

2.2. Executive Decree 905 and Regulation to Decision 391

In 2011, the Ecuadorian government issued Executive Decree No. 905 on access to genetic resources in order to regulate key aspects of Decision 391 at a national level[122]. Executive Decree 905 describes the institutional framework related to access to genetic resources, and establishes the Ministry of the Environment (MAE) as the National Environmental Authority that can execute framework agreements providing access to genetic resources to be utilized by interested third parties. Article 39 of the Regulation specifies that it is an obligation of the National Environmental Authority to "enter into framework agreements with Universities, Research Centers and qualified Ecuadorian researchers registered with SENESCYT, who can support the implementation of research and conservation projects in the area of access to genetic resources." The MAE manages genetic resources and access to related ancestral knowledge, in the case of "land-based wildlife: animals, plants and microorganisms"[123], which includes amphibians. Meanwhile, the Ministry of Agriculture, Aquaculture, Livestock and Fisheries is charged with genetic resources involving "marine and freshwater organisms with the exception of amphibians; cultivated and domesticated organisms, as well as wild species and varieties related to crops."

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[120] The National Secretariat for Higher Education, Science, Technology and Innovation sent its recommendations for changing this article to the President, due to the problem cited; if the recommendation is adopted then it will most likely be included in the list of Constitutional amendments proposed by President Rafael Correa.

[121] Unified Text of Secondary Environmental Legislation of the Ministry of the Environment, Book III, Forestry Regime. Glossary of Terms. Executive Decree No. 3516, Special R.O.S. 2, March 31, 2003.

[122] Official Gazette, October 11, 2011

[123] Article 11.

Despite the clear demarcation of responsibilities, the Regulation charges MAE with preparing an inventory of genetic resources to serve as Ecuador's defense mechanism against third parties who attempt to obtain intellectual property rights without having respected country's rights as sovereign over its resources, or the rights of the communities as the direct owners of their traditional knowledge. Furthermore, Executive Decree 905 adapts the text of Decision 391 to describe the procedure for accessing genetic resources based on the national context. In Ecuador, the party requesting access must sign a genetic resources access agreement with MAE, including the conditions for fair and equitable sharing of benefits, as well as, if applicable, a supplemental contract signed between the requestor and the community that possesses the associated intangible element. Without these prerequisites, the access could be considered to be appropriation and would be penalized with a sentence of 3 to 5 years in prison[124], as described above.

However, implementation of this Decree has revealed gaps and sections to be reviewed and/or updated to make its applicability more institutionally feasible. The scope of Executive Decree 905 does not provide parameters or guidelines to regulate the fair and equitable sharing of benefits, nor does it establish the procedures for obtaining prior informed consent for genetic resources associated with traditional knowledge. Therefore, the Project, through Outcome 2, will support the revision of this regulation and evaluate the critical points to improve it for more efficient and effective application.

2.3. National Environmental Policies

Ecuador's national environmental policies emerged as a mechanism to promote the sustainable development model in pursuit of *sumak kawsay* proposed by the 2008 Constitution of Montecristi, and were published via Ministerial Accord No. 86[125]. They call for the rational use of biological diversity in recognition of its role in achieving the three pillars of sustainable development: poverty reduction, rational economic growth and respect for nature.

Environmental Policy 2 refers to "Efficiently using resources that are strategic for sustainable development: water, air, soil, biodiversity, and genetic heritage." This is relevant to this Project because it refers to the need to carry out activities to conserve and rationally utilize the country's biological diversity. Initiatives that are intended to conserve, study, and even utilize natural resources and genetic assets are feasible as long as they respect the life cycles of each species. The utilization of these resources, and the sharing of the resulting benefits, must include the communities, peoples and indigenous groups familiar with the resources, as an incentive to conserve and respect the space that they occupy and give to the resource, as expressed in Strategy 2 of this policy.

This expands to Policy No. 5, entitled "Incorporating the social dimension into environmental matters to ensure citizen participation." Strategy No. 3 of this policy stresses the need to "recognize the interculturalism of Ecuador in its environmental dimension," because it holds that there is an absolute and unbreakable connection between nature and the culture of the communities, peoples and indigenous groups. In fact, this relationship is necessary and beneficiary for the country, given that their knowledge is needed for conservation, and can be used to generate products for biotrade. As such, their participation is not only a condition to comply with to proceed with any natural resource use or conservation activity, but rather encourages communities to conserve and rationally use their resources.

2.4 The National Plan for Good Living

The National Plan for Good Living (*Plan Nacional del Buen Vivir*), was drawn up within the context of the National Participatory Planning System as an instrument to organize state action in the area of

[124] Article 248 of the Comprehensive Criminal Code.
[125] R.O. No. 64 from November 11, 2009

development[126] as proposed by the 2008 Constitution of Montecristi. This instrument is mandatory and binding in the public sector, and serves as a guide for all other sectors. It encompasses public policies, programs and projects; the planning and execution of the National Budget; the investment and allocation of public resources; and the coordination of exclusive responsibilities between the central government and the Autonomous Decentralized Governments[127]. As such, it indicates who is responsible for carrying out the rights and obligations recognized in the Constitution, as well as national goals and the mechanisms for achieving them.

The Plan contains 12 objectives, or goals, each of which contains policies, lines of action and targets to meet by 2017. Goal 7 - "Guaranteeing the rights of nature and promoting environmental, territorial and global sustainability" - is of interest to this project, because it refers to respect for the rights of nature and environmental sustainability, with the conditions noted above, through its policy, "Knowing, valuing, conserving and sustainably managing the natural heritage and its land-based, aquatic, marine and coastal biodiversity, with fair and equitable access to its benefits."[128] This policy confirms that it is necessary to conserve and sustainably use biological diversity and genetic resources, so that they can be researched to develop bio-knowledge[129].

In order to study the country's natural heritage, this policy calls for the creation of the National Institute on Biodiversity[130], as an agency attached to the Ministry of the Environment[131] in order to "plan, promote, coordinate and execute research efforts related to the field of biological diversity, aimed at the conservation and rational use of this resource and strategic sector, in accordance with existing environmental policies and all relevant laws and regulations."[132] This Institute absorbed the responsibilities, authority, assets and processes of the Ecuadorian Museum of Natural Sciences, and some of its responsibilities include:

> "2. To encourage and coordinate the inter-disciplinary work of research teams with renowned national and international groups in this field;"
>
> "3. To inventory, classify, conserve, exhibit and disseminate knowledge on the country's natural species."

The Institute is also charged with conducting an inventory of Ecuador's biological diversity and genetic resources, per the Regulations to Decision 391 discussed above, and it is the entity that will facilitate the transfer of technology and innovation related to biodiversity in the genetic resource access agreements.

With respect to valuing biodiversity, the policy of the Plan proposes internalizing costs and incorporating environmental values into the national accounts. The Plan establishes the need for promoting the participation and benefit-sharing of communities, peoples and indigenous groups given their contribution to the generation and utilization of bio-knowledge in Ecuador. Sustainable management is the cornerstone of this policy, and is the component of greatest interest when developing projects related to genetic resources, since the plan proposes developing research to foster bio-knowledge and biotrade, with the participation of communities, peoples and indigenous groups.

National Biodiversity Strategy (2001-2010)

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[126] Article 279 of the Constitution.
[127] Article 280 of the Constitution.
[128] Policy 7.2.
[129] The National Plan for Good Living defines bio-knowledge as: "the set of know-how, knowledge and applications, both traditional and scientific that derive from the study, understanding, research and sustainable use of biological diversity."
[130] created via Executive Decree No. 245 (R.O. No. 205 of March 17, 2014)
[131] Policy 7.2. Paragraph n.
[132] Article 2 of the Decree.

The Ministry of the Environment is in the process of updating the National Biodiversity Strategy for 2014-2020. With respect to genetic resources, the current Strategy highlights the inherent potential in the use of biodiversity and genetic resources, and thus establishes the need to both conserve and do research in this field. As a result, the main elements of the policy revolve around sustainable use (primarily for commercialization abroad) as well as enhanced academic knowledge and research. The ancestral knowledge know-how of the communities is not taken into account when proposing training programs or efforts to restore biodiversity and genetic resources; rather these are limited to scientific and academic personnel. The project will therefore be attentive to the updated strategy to see what new goals Ecuador proposes with respect to the conservation and utilization of its biodiversity and genetic resources.

3. *In Situ* and *Ex Situ* Conservation of Biological Diversity

At the International level, the first policy instrument that mentioned *ex situ* conservation was the International Undertaking on Plant Genetic Resources (1983), of which Article 3 establishes the obligation that States have to organize prospecting missions for plant genetic resources that have a real or potential value, especially when they are at risk of extinction. Later, the Convention on Biological Diversity (CBD) established *ex situ* research as a complementary approach to *in situ* conservation, preferably to be carried out in the country of origin.

The CBD establishes that *ex situ* conservation is important but should be done in the same country of origin; countries have the obligation to maintain *ex situ* conservation facilities within their national territories. The CBD also mentions the adoption of measures intended to "recover and rehabilitate threatened species and to reintroduce them into their natural habitats under appropriate conditions", the use of species collection techniques that cause no harm[133], and the cooperation of developed countries on the ground in developing countries such as Ecuador, whether in the form of financial resources, training, infrastructure, education, etc.

At the Regional level, Decision 345[134] of the Andean Community (CAN) requires the parties to conserve the samples of protected varieties *ex situ* to maintain the validity of their certificate. Also, Decision 391 complements the provisions of the Convention on Biological Diversity, by obligating parties to deposit the genetic resources *ex situ* in order to conserve duplicates of all of the material collected as a result of the access granted. The possibility of transferring material for *ex situ* research, conservation and sustainable use to a place other than the place of origin emerged in the mechanisms for access to genetic resources established in Decision 391, and in the Treaty of Plant Genetic Resources. The Material Transfer Agreements are an integral part of the genetic resource access agreements, and in the framework agreements defined in Decision 391. In both cases, these types of agreements have to address the fair and equitable distribution of benefits for all stakeholders. These kinds of agreements are established in the Treaty on Plant Genetic Resources, and are exclusively applicable to the crops that are listed in the appendix.

At the National level, Article 15 of Book IV of the United Text of Secondary Environmental Legislation (TULAS) establishes that research projects on endangered species can be done through two mechanisms:

a) *In situ* research projects, with the objective of protecting and conserving said species and their habitats: *In situ* research for conservation purposes is allowed, and any interested individual or entity can apply to the Ministry of the Environment for the required permit. When these types of research projects are carried out within State Natural Heritage Areas (PANE), the researcher needs authorization from MAE; this is not the case for activities carried out on private or communal land, or on property of Decentralized Autonomous Governments, unless they involve removal of the specimens to be studied.

[133] See the Unified Text of Secondary Environmental Legislation (TULAS).
[134] Decision 345 regarding the Common System for Protecting the Rights of Obtainers of Plant Varieties

b) *Ex situ* research projects, by direct handling of the population through programs involving captive breeding and reintroduction: *Ex situ* conservation implies protecting biodiversity outside of its natural habitat, and is a complement to *in situ* conservation, since the ultimate goal is for the species to return to their habitat.

With regards to the distribution of roles and responsibilities associated with *ex situ* and *in situ* conservation, the Ministry of the Environment is responsible for conserving wild flora and fauna, and for strengthening protected areas. Meanwhile, the National Institute of Agricultural Research (INIAP), an agency within the Ministry of Agriculture, Aquaculture and Fisheries, is responsible exclusively for conserving agricultural plant genetic resources.

II. INSTITUTIONAL FRAMEWORK

The 2008 Constitution of Montecristi establishes a system of institutional competencies, some of which are exclusive to the central government, while others are exercised at both the national level as well as by the Decentralized Autonomous Governments (GADS). Article 261 of the Constitution states: "The central government shall have exclusive authority over: (...) 11. Energy, mineral, hydrocarbon, water, biodiversity and forestry resources." Furthermore, Article 313 grants the national government exclusive responsibility for strategic resources, which include both the country's biological diversity as well as its genetic heritage. Within the national structure, there is a set of sector-specific ministries. Under this structure, the Ministry of the Environment (MAE) is responsible for Ecuador's natural heritage (e.g. biodiversity, conservation and genetic resources): "1. Exercising leadership in public policies in the area entrusted to it, and issuing any administrative accords and resolutions required in the performance of its responsibilities."

A. Ministry of the Environment

The Ministry of the Environment (MAE) was created in 1996 and is responsible for (i) formulating public policies to ensure respect for the Rights of Nature, respect for a healthy and ecologically-balanced environment; (ii) fostering sustainable development in pursuit of good living; and (iii) managing the exclusive competencies and strategic resources that are directly related to its portfolio, such as biodiversity and genetic heritage. The latter is not only a reflection of Ecuadorian law, but also of the Regulation of Decision 391, which states: "The Ministry of the Environment is hereby designated as the National Environmental Authority with the authority to enforce these Regulations in the area of Access to Genetic Resources." Ultimately, MAE has exclusive charge over the processes and decisions related to genetic resources. As for protected areas, the Ministry is responsible for the National System of Protected Areas (SNAP), which in turn, by constitutional mandate and as established in the SNAP Strategic Plan, is comprised of four subsystems, namely:

1) State Natural Area Heritage (PANE)
2) Decentralized Autonomous Government Subsystem (GAD)
3) Community Subsystem
4) Private Sector Subsystem

As the entity responsible for biodiversity, MAE can grant permits for conducting research on native species, as long as said research does not affect or endanger the conservation of the species; if there were a possible impact, the MAE could restrict the scope of activities.[135] Permits for *in situ* research are

[135] Article 7 Book IV of the TULAS: Art. 7. The Ministry of the Environment shall give differentiated treatment, facilitating or restricting the activities proposed in scientific research projects regarding wild flora or fauna, among others in relation to the following aspects: a) The state of conservation (population status) of the species to be researched, b) The level of experimental or other manipulation to which the individuals, populations or their

species- and site-specific, and are acquired through direct requests to MAE, with a clear commitment to provide the results of the research[136] to MAE for use in promoting pro-conservation public policies.

MAE's Undersecretariat of Natural Heritage is responsible for two areas in particular: forest resources and biodiversity, through their corresponding Directorates. The mission of the Undersecretariat for Natural Heritage in relation to genetic resources is: "To direct and promote environmental management for the conservation and sustainable use of the natural heritage of Ecuador", and its responsibilities include: "directing the management, preservation and maintenance of biodiversity, protected areas, wildlife, biosafety and access to genetic and forest resources."[137] As such, this is the office responsible for biodiversity conservation - both *in situ* and *ex situ* –, creating and managing natural protected areas, and managing genetic resources.

While MAE's Undersecretariat of Marine-Coastal Management does not have direct influence on the process of drafting, negotiating and signing framework agreements or genetic resource access agreements, it acts as an advisory body in the case of rules or projects that are carried out in sea, mangrove, or other related areas, and when research projects or biodiversity prospecting for commercial purposes are carried out in marine areas. It also plays an important role in the declaration of protected coastal and marine areas at the national level.

National Directorate of Biodiversity

Within the Undersecretariat for Natural Heritage, the National Biodiversity Directorate is in charge of everything relate to protected areas and genetic resources, including "the implementation of international conventions and treaties related to biological diversity: the CBD and the Cartagena Protocol, CITES, RAMSAR, CMS, the UNCCD."[138] In addition, it is directly responsible for managing the process for gaining access to genetic resources. As such, the Directorate established a "Genetic Resources Unit", which is responsible for implementing and carrying out[139]:

i) The strategic plan for the implementation of the CBD;
ii) The Strategy and Action Plan for Genetic Resource Access;
iii) The Benefit Sharing Strategy and Action Plan;
iv) The work plan of the National Commission on Genetic Resources;
v) The Regulations for Implementation of CAN Decision 391 on access to genetic resources;
vi) The technical monitoring and evaluation reports prepared as part of the process leading up to the signing of genetic resource access contracts;

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habitats will be subjected to, or the potential direct and indirect impacts on them. Given the ecological and biological sensitivity of the organisms being studied and the natural habitats where the research will take place, the MAE may approve or deny any activities involving flora or fauna to the extent that it considers said activities to be harmful to the species.

[136] Art. 9 book IV of the TULAS: In addition to the project proposal, national and foreign researchers must fulfill the following requirements in order to carry out research activities with wild flora and fauna resources:

a) Request from the researcher addressed to the corresponding Regional District Director, containing general information such as full name, identification document or passport number, address and the objectives of the research;

b) Acceptance of the commitment to provide the MAE with two copies in print, diskette or CD of the results of the study, in Spanish. For masters, doctoral or other degree theses performed by Ecuadorian researchers, the final report with the corresponding results must be submitted. In addition, the researcher must provide a copy of the results of his or her work to each of the Protected Area or Regional Districts where the research took place. The failure to provide the final results, or progress reports, will be sufficient cause to prevent the researcher from continuing their research activities in the country. (…)

[137] Article 7.1 Book I of the TULAS

[138] Article 7.1.1 Book I of the TULAS

[139] Article 7.1.1.4 Book I of the TULAS

vii) The Procedures Manual and technical rules for genetic resources;
viii) Technical management and progress reports on the country's implementation of the CBD;
ix) The statistics for the research and development centers engaged in genetic resource activities; and
x) The implementation plans for the regional biodiversity strategies (CAN, OTCA) related to genetic resources, and the technical biodiversity valuation studies.

The Genetic Resources Unit of the National Biodiversity Directorate consists of three technicians in charge of drafting the framework and genetic resource access agreements. However, the Unit has not yet been formally institutionalized, and therefore lacks the decision-making authority with respect to finalization of framework contract and access agreement processes. Rather, higher-level authorities must ultimately approve these requests, thereby increasing the time required for review and approval, and leading to delays. This apparent "disconnect" has led to a failure to meet the schedules and deadlines for granting access agreements and framework agreements as set forth in the Regulations to Decision 391.

B. Decentralized Autonomous Governments

In addition to the exclusive central government responsibilities for environmental matters, the Constitution grants the Decentralized Autonomous Governments (GADs) - in provinces, municipalities, and parishes - other areas where they, and not the central government, are in charge. Article 264 of the Constitution states that GADs "will have the following exclusive competencies, notwithstanding others determined by law: (...) 2. To exercise oversight on land use and occupation within the canton. 10. To delimit, regulate, authorize and control the use of beaches, river banks and beds, lakes and ponds, without prejudice to the limitations established by law".

The authority over land use has been used as a mechanism to create protected areas, or more commonly called "conservation areas" within GAD limits, both before and after the creation of the SNAP. The power to plan and design the land use system, and to zone economic activities, has historically allowed GADs to set aside areas for conservation. Following the 2008 Constitution of Montecristi, this power was modified somewhat, in that the GADs now have the ability to create a protected area through an ordinance, which is then incorporated into the National System of Protected Areas. In this sense, the Ministry of the Environment created the Single Registry of the National System of Protected areas via Ministerial Accord No. 30 (R.O. No. 926 of April 4, 2013), as a mechanism through which only those areas that meet the guidelines and are approved by the Ministry can become part of the SNAP. It is important to note that those areas which are not on this registry are not considered to be within the SNAP, and in the specific case of GADs, these areas remain under the corresponding GAD land use and zoning authority.

C. Oversight Entities

The MAE receives assistance from various technical entities in the process leading up to the signing of framework agreements and the agreements granting access to genetic resources. Executive Decree 905 speaks of evaluating entities, which are responsible for preparing a technical report to help the MAE to make an informed decision, providing better scientific justification for the authorization to access or research genetic resources. Given that this GEF project does not impact species related to ancestral knowledge nor plant genetic resources, the most relevant institutions are SENESCYT and IEPI, as described below:

National Secretariat of Higher Education, Science and Technology (SENESCYT) was established in the 2008 Constitution as the body in charge of the National System of Science, Technology, Innovation and Ancestral Knowledge. With the enactment of the Higher Education Act, an institution was born that was slightly different from the one proposed in the Constitution, and establishes as part of its mission to "exercise leadership in public policymaking in the field of higher education, science, technology,

innovation and ancestral knowledge, coordinating and facilitating efforts between the public sector and public and private productive sectors." Ancestral knowledge and bio-knowledge are capable of changing the economic matrix from a primary goods export economy, to an economy based on exporting goods with added value, and SENESCYT is the institution capable of incorporating traditional knowledge into academia and ultimately into the economic sector. The obligation of SENESCYT, then, is to maximize the potential of ancestral knowledge with professional and technical training, particularly through the Ancestral Knowledge Unit (see IEPI below).

SENESCYT is not only the governing body in generating and promoting scientific research, but is also responsible for approving research programs and projects for public institutes that require state funds; as well as the accrediting body for individuals and institutions who wish to carry out any kind of scientific research activity in the country[140], regardless of whether they are funded publicly or privately[141], or are national or foreign. In this sense, Decree 905 establishes that: "The national environmental authority must enter into framework agreements with qualified Ecuadorian universities, research centers and researchers who are registered with the SENESCYT, and who are engaged in projects focused on research and conservation of access to genetic resources."[142] It is important to note that the qualification of researchers and the accreditation issued by SENESCYT are not the same as the research authorization or permission granted by the Ministry of the Environment to carry out research activities in areas that are part of the National System of Protected Areas, or outside of them when it involves collecting specimens.

Ecuadorian Intellectual Property Institute (IEPI): Currently, the IEPI is attached to the National Secretariat of Higher Education, Science, Technology and Innovation (SENESCYT), and maintains the Ancestral Knowledge Unit, with the clear obligation to "determine the existence of an intangible component associated with genetic resources"[143], in order to regulate patenting specifically in the manner established in the Constitution of Montecristi: Article 402 indicates that "It is prohibited to grant rights, including intellectual property rights, to derived or synthesized products obtained based on collective knowledge associated with national biodiversity."

III. CONCLUSIONS

Ecuador's legal framework for biodiversity conservation and genetic resources has varying levels of applicability and oversight. As mentioned above, implementation of the Executive Decree 905 has revealed gaps and sections to be reviewed and/or updated to make its applicability more institutionally feasible. The scope of Executive Decree 905 does not provide parameters or guidelines to regulate the fair and equitable sharing of benefits, nor does it establish the procedures for obtaining prior informed consent for genetic resources associated with traditional knowledge. Therefore, the Project, through Outcome 3, will support the revision of this regulation and evaluate the critical points to improve it for more efficient and effective application. In particular, some possible areas for improvement include:

- Development of specific procedures and requirements for the application and subscription of framework contracts, i.e. for non-commercial purposes. A review of ABS agreements of diverse taxa (flora, fauna and marine and terrestrial microorganisms) in order to propose different access

[140] Art. 1. Authority of the Secretariat of Education over Public Research Institutes, executive decree no. 1285 published in R.O. 788 of September 13, 2012.
[141] Art. 4. Authority of the Secretariat of Education over Puhlic Research Institutes, executive decree no. 1285 published in R.O. 788 of September 13, 2012. On the Operational Research Accreditation. In order to properly oversee the research done in the country and its results, any public or private sector person or entity engaged in research and technological development, must have the respective Operational Research Accreditation issued by the National Secretariat of Higher Education, Science, Technology and Innovation.
[142] Article 39.
[143] Decree 905.

contract models that characterize the specificities involved in Ecuador's diverse biota. This would fill a gap, since Executive Decree 905 focuses on access contracts for commercial purposes.

- Review, update and/or adjust the procedures and requirements for access contracts for commercial purposes. The PUCE-Yale case provides practical experience that can be systematized and integrated to optimize time and resources in the Regulation.

- Integration of key elements set out in international conventions. Depending on the existing regulations at the level of the United Nations Convention on the Law of the Sea, the Nagoya Protocol and the ITPGR, it is necessary to integrate the envisaged institutional scheme, identifying and clarifying responsibilities, procedures to be used and the coordinated management of information associated with genetic resources.

- Alignment with key elements of national regulations, i.e. National Plan for Good Living. The project could coordinate with the MAE's Deputy Secretariat of Environmental Quality to consider the inclusion of additional requirements aimed at the conservation of species in *ex situ* conditions when environmental licenses for extraction activities are issued. Additionally, the project could approach the Ministry of Natural Resources Non-Renewable regarding the inclusion of additional safeguard mechanisms in the environmental management plans of concession companies to ensure the conservation of amphibian species, and thereby bolster the Ministry's Sustainable Mining Strategy. Through the TULAS (Unified Text of Environmental Legislation), Environmental Impact Assessments (EIA) can require protocols for the protection and conservation of amphibians as a pre-requisite for the emission of an environmental license. In particular, the project could suggest adjustments to the EIA guidelines to consider the loss of economic value associated with genetic resources, i.e. management plan budgets to include these costs as offsets to the costs of implementing the conservation strategies to be tried and tested in Outcome 1. The economic valuation study on the use of amphibians would provide important data to guide these recommendations.

Meanwhile, the assessment of institutional capacities related to the access, management, monitoring and oversight of the sustainable management of genetic resources, is shaped by two variables:

1. The degree of institutionalization that this topic has obtained in the national governmental structure; and
2. The resources available toward meeting the objectives that have been set at the institutional level for genetic resource management.

In looking at the structure of both the Ministry of the Environment as well as other related entities – in particular the IEPI and SENESCYT –while the issue of genetic resources is addressed within institutional structures, it has not been positioned in a significant hierarchical level for its priorities for action to be overarching. This can be explained given the timing of the subject – it is relatively new and only recently being implemented – and due to the emphasis that has been placed from a public policy perspective on developing and institutionalizing it.

In particular, the number of staff and other people who are familiar with genetic resources and trained to operate and work within the existing institutional structures related to this topic appears to be limited, in terms of quantity, experience and degree of specialization. This is primarily due to the personnel management system that exists in the public sector, and which is structured based on the Organic Public Service Act. This, among other things, limits the length of time people work on any given set of activities, under the system of professional services contracts. Without further institutional strengthening and capacity building, the combination of these factors could present a limitation for the development of the sustainable management of genetic resources. The ABS Capacity Development Scorecard presents specific areas to be improved and/or strengthened through the Project.

PART IV. Stakeholder Analysis and Participation Plan

I. Conceptual Framework

Historically, many protected areas in Ecuador were created without properly consulting the people living in those areas, due to the absence of an established process to carry out these types of consultations. Today, the Ecuadorian government has implemented a policy of social participation in managing protected areas, both in the process of declaring areas to be protected, as well as in the subsequent management of that area, through the establishment of Management Committees. This experience has helped to consolidate the Natural Heritage Protected Areas of Ecuador (PANE), with 49 areas legally recognized since 1959. The 2008 Constitution of Montecristi expands the possibilities of implementing this environmental management mechanism by authorizing the establishment of local protected areas through the Decentralized Autonomous Government Subsystem. To date, the Siete Iglesias Municipal Ecological Conservation Area, declared by the Municipality of San Juan Bosco through an ordinance issued in February 2009, is the only protected area outside of the PANE that is recognized as part of the National System of Protected Areas (SNAP).

Additionally, the National Strategy for the Future proposes transforming the country's production model by stimulating strategic sectors in order to diversify the economy by incorporating and commercializing products with added value. This transition requires improving the country's commercial offerings, including its inventory of biological diversity, by identifying the potential uses of its genetic resources in order to develop bioproducts (bioprospecting, bioproduction and biotrade). To accomplish this, the formation of human talent has recently been reinforced by the creation of a permanent scholarship program of SENESCYT and allowing universities and public research institutes to seek out technical and scientific assistance from experts in different fields (Prometeo Program). Furthermore, the Ecuadorian government has spearheaded the creation of two public universities related to science, research and technology: (1) YACHAY University of Experimental Technological and Scientific Research (within the Yachay City of Knowledge), and (2) IKIAM Regional Amazonic University. The latter is focused on research and training professionals specializing in life sciences, earth sciences and human settlements.

Considering the current environmental public policy of Ecuador and the positioning of biodiversity and genetic heritage as strategic resources, the Ecuadorian state needs to define the mechanisms that regulate access to these resources, and which ensure a fair and equitable sharing of benefits (Access and Benefit Sharing, or ABS). In this context, the project will serve as an initiative that contributes to the fulfillment of the objectives of the CBD, and at the same time is an opportunity to further the mandates of public policy. While the country has public policy instruments in place to allow it to regulate access to genetic resources, the scope of Executive Decree 905 does not provide parameters or guidelines to regulate the fair and equitable sharing of benefits, nor does it establish the procedures for obtaining prior informed consent for genetic resources associated with traditional knowledge.

In response to this gap, the MAE is currently drafting two proposed complementary regulations: (1) A proposal to ensure the fair and equitable distribution of the benefits arising from access to genetic resources of biodiversity is in line with the First General Provision of the Organic Code of Planning and Public Finances (COPFP), published in Official Gazette Supplement 306 of October 22, 2010, which establishes that regardless of the origin of the resources, public sector entities and bodies may not create accounts, funds or other mechanisms for administering revenues and expenditures that are not authorized by the highest authority of the Public Finance System. (2) With regard to the procedure for regulating the process of obtaining prior informed consent for accessing genetic resources associated with traditional knowledge, the proposed secondary regulation is currently being formulated through a participatory process. The goal is to prevent the use and transfer of traditional knowledge without prior consent from the communities, respecting the collective rights of indigenous and other peoples and groups. The instrument that governs Prior Informed Consent will lay out a protocol to guide each of the stakeholders

interested in accessing genetic resources associated with the traditional knowledge of peoples and nationalities.

Stakeholder definition and analysis methodology

Given the current transformation in environmental policies, and specifically in the mechanisms employed to conserve biodiversity and make use of its genetic resources, a list of strategic partners and stakeholders in the project was drawn up.

The methodology was aimed at identifying possible strategic partners, taking into account three levels of interpretation: (a) the general level involved an analysis of primary and secondary sources in order to identify the sectors and actors related to the different components of the Project; (b) at the specific level, the project's areas of intervention were established and the social, political, economic and environmental conditions of the stakeholders involved in the process of implementing emergency amphibian conservation efforts and in researching genetic resources; and (c) at the strategic level, the Participation Plan is intended to facilitate the design of the project's mechanisms for political and technical coordination and management.

Analysis of stakeholder roles and responsibilities (interests / needs) [144]

Stakeholders are those people, groups, collectives, organizations or institutions who act as implementers, promoters or beneficiaries of the project. From this perspective, a critical reflection was carried out regarding the possible contributions or forms of cooperation of the strategic partners and stakeholders involved. The analysis also revealed the interests and needs of the stakeholders involved in the project.

STAKEHOLDER	RELATIONSHIP TO THE PROJECT BASED ON ROLES AND RESPONSIBILITIES	INTERESTS AND NEEDS
Coordinating Ministry of Strategic Sectors (MICSE)	The mission of the MICSE is to direct the policies and actions of institutions involved in the Strategic Sectors. The Coordinating Ministry is responsible for approving strategic plans and allocating the line ministries that it coordinates, which include: Ministry of the Environment, Ministry of Non-Renewable Natural Resources, Secretariat of Water, among others. Therefore, the MICSE must be involved in to all of the Project components in order to guarantee coordination with public policies. This involvement will also help to position biodiversity and genetic heritage as a strategic resource for transforming the country's production model.	The MICSE is interested in consolidating the strategic sectors prioritized by the State, and therefore it values the potential that exists in access to and use of genetic resources. In addition, it is noteworthy that the capacity-building and promotion aspects of the project's components must avoid any political and technical contradictions with the development of other strategic sectors (mining, hydrocarbons and hydroelectric power). In response to this adjustment to the scope of the project, it is recommended that during implementation, socio-environmental research be done to assess the impact of human activities on biological diversity conservation processes.

[144] The analysis of stakeholder roles and responsibilities is the result of an assessment of "the interest of each stakeholder in the project and the possible contributions that they can make to project design, implementation and monitoring," as well as to "assess the willingness of key stakeholders to collaborate with project activities.

STAKEHOLDER	RELATIONSHIP TO THE PROJECT BASED ON ROLES AND RESPONSIBILITIES	INTERESTS AND NEEDS
Ministry of the Environment of Ecuador (MAE)	The MAE is responsible for effectively and efficiently directing environmental management efforts in the country, gnaranteeing a harmonious relationship between economie, social and environmental aspects, to ensure the sustainable management of strategic natural resources. The Ministry, as the head national environmental authority of Ecuador, will direct and coordinate activities within and between the three proposed components, and will play an important role and benefit from the implementation of the institutional strengthening component. From this perspective, the MAE is responsible for enacting complementary public policies, authorizing research efforts[145] and issuing contract and permits for accessing genetic resources.	The MAE's interest is in having the tools to facilitate the processes involved in granting access to genetic resources, based on consolidating transparent procedures that are consistent with public environmental policies, within a short period of time and in accordance with the duration and complexity of the request. Furthermore, the MAE seeks to capitalize on research experiences that incorporate various actors, such as the government, academia and the private sector, in order to guarantee the proper implementation of the protocol and complementary laws and regulations, and to build institutional capacities to generate sustainable alternatives aimed at transforming the production model. The Ministry also wants to strengthen and feed into its institutional programs, such as: the National Biodiversity Strategy, the Biodiversity Information System, the National System of Protected Areas (SNAP), among others.
Ministry of Non-Renewable Natural Resources (MRNNR)	The mission of this Ministry is to guarantee the sustainable and sovereign exploitation of non-renewable natural resources, formulating and enforcing policies, researching and developing the hydrocarbon and mining sectors. As the ministry in charge of public oil and mining policy, the NRNNR must ensure the proper operation of these industries based on the principles of social justice and safeguarding the rights of citizens and the rights of nature. In this context, the Ministry serves as the link between public, private and mixed companies who must abide by the Executive Branch's sectorial public policies. For this reason, its engagement guarantees coordinated efforts with the companies who operate in and have an impact on amphibian ecosystems, and can facilitate the definition of emergency in situ and ex situ conservation actions.	On the part of the MRNNR, there is an interested in working with the project in the context of things that the companies can do and to establish mechanisms to mitigate environmental impacts. Also, to help ensure that social compensation processes support the different biodiversity conservation strategies. By establishing coordinating bodies, necessary guidelines can be introduced for companies located in the project's areas of intervention, and to strengthen mechanisms to oversee and monitor mining activities in certain zones identified by the project. Part of this Ministry's contribution, together with the MAE, could be to establish environmental parameters for preparing Environmental Management Plans that are geared toward fostering in situ and ex situ biological diversity conservation efforts. Nonetheless, achieving this goal will require technical assistance and scientific research criteria to strengthen these areas and facilitate the proper supervision of the companies' technical activities.

[145] The Unified Text of Secondary Environmental Legislation (TULAS), Book IV, article 5, states that: "The Ministry of the Environment has the following functions in the area of scientific research involving wildlife: a) To propose policies and strategies that foster wildlife research. b) Define natural wildlife research priorities. c) Document and disseminate information and keep a database on wildlife research projects carried out within the national territory. d) Organize, regulate and supervise studies done on wildlife within the national territory. E) Promote research on wildlife among public and private entities, especially institutions of higher education. F) Organize and sponsor training courses for its officials on managing databases on wildlife with public and private entities, especially institution of higher education. (TULAS, 2003).

STAKEHOLDER	RELATIONSHIP TO THE PROJECT BASED ON ROLES AND RESPONSIBILITIES	INTERESTS AND NEEDS
National Secretariat of Planning and Development (SENPLADES)	This institution is responsible for administering and coordinating the National Decentralized Participatory Planning System, as a means for pursuing the comprehensive development of the country at the sectorial and territorial levels; establishing strategic objectives and policies, supported by information, research, training, monitoring, and evaluation efforts; guiding public spending and promoting the democratization of the State, through active citizen participation which can contribute to transparent and efficient public administration. SENPLADES focuses its work on the following areas: a) Territory, by seeking to bring the government closer to citizens though better services and efficient administrative models; b) Equity, aimed at generating institutional changes that promote equality and awareness and the full exercise of people's human rights; and Excellence, which encourages the transformation of the State to guarantee the provision of quality products and services. SENPLADES has a central technical role in coordinating and linking together the different levels of government.	SENPLADES seeks to generate positive actions to address the challenges set forth in the National Plan for Good Living, by putting in place planning and public spending mechanisms. The assessment of this institution's interests is connected to its roles and competencies, as well as its objectives which are closely related to the project, among which are: • Increase the effectiveness of the National Decentralized Participatory Planning system, with a territorial emphasis promoted and sustained by the people. • Increase the level of coordination and connection between the policies, guidelines, and actions of the State to eradicate poverty. • Optimize and target public investments to meet the objectives proposed by national, intersectorial, sectorial and territorial strategies and policies. • Enhance the positioning of the Ecuadorian model of participatory national and territorial planning, at the international level, starting from the binational context. Therefore, a management model must be designed that allows for coordination between the different national authorities, the GADs and national and regional planning mechanisms.
National Secretariat of Policy Management (SNGP)	This Secretariat is in charge of formulating policies to strengthen governance by fostering political interactions with other branches of governments and the GADs, political dialogue with social actors and political coordination with the representatives of the Executive branch on the ground. The SNGP took over the portfolio of the Secretariat of People's Social Movements and Citizen Participation, the institution which within the context of Executive Decree 905 is considered to be an oversight entity. Therefore, establishing an alliance with this office will help to consolidate the political will of the different project stakeholders, and guarantee the coordinated efforts of the Executive Branch, especially for the component of emergency in situ and ex situ amphibian conservation actions.	According to the institution's vision, it seeks to establish mechanisms of political coordination between the actions of the different levels of government and its citizens, and to generate democratic and participatory spaces to strengthen citizen power. Currently, the Secretariat is implementing the "Dialogue with GADs in Ecuador" project, which should be considered as an instrument to use to facilitate the implementation of the in situ conservation component. One of the specific components of this project is to facilitate spaces of dialogue and consensus-building between GADs and national government offices within their territories, in order promote the coordination of programs and projects implemented by the executive branch at the regional and local level with the objectives and strategies defined in Local Development Plans by the different levels of government.
National Secretariat of Higher Education, Science, Technology and Innovation (SENESCYT)	This institution is in charge of public policies in the fields of higher education, science, technology and ancestral knowledge, and manages the implementation of these policies, with a focus on the strategic development of the country. It also coordinates efforts between the executive branch and institutions of higher education to foster academic, economic and social development. In the field of science, technology and ancestral knowledge, it promote the formation of advanced human resources, and the development of research, innovation and technology transfer, through the design, execution and evaluation of policies, programs and projects.	The institution seeks to exercise its powers within the guidelines of public policy. In this context, SENESCYT has prioritized building human capacities, and especially those related to life sciences, and as such will support the project by continuing its post-graduate scholarship and Prometeo programs.

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National Water Secretariat (SENAGUA)	This institution is responsible for leading the comprehensive and integrated management of water resources throughout the national territory, by designing policies, regulations, and de-concentrated monitoring and management mechanisms to ensure the efficient administration of how water is used. During the preliminary research process, the projeet identified the need to coordinate any Eeuadorian amphibian conservation efforts *in situ* and *ex situ* with the plans and programs associated with water. For this reason, the project needs this Secretariat to inelude bio-indicators, espeeially those related to amphibians, in its watcr conservation work.	Taking into account that one of the most important sources of water pollution is the improper management of solid and liquid wastes, the Secretariat is responsible for the coverage of potable water supply, sanitation and wastewater treatment services. Therefore, it is always seeking for ways to expand the coverage of these serviees at the national level, in eoordination with canton-level GADs, who have the exclusive responsibility for guaranteeiug the provision of these public serviees within their territories.
Ecuadorian Intellectual Property Institute (IEPI)	The IEPI promotes and defends intellectual property, using cutting-edge systems as a tool to contribute to the holistic development of Ecuador through the generation and implementation of public policies. The duty of this institution is to ensure the effective enforcement of existing laws and regulations governing intelleetual property, genetic resonrees and traditional knowledge, including the legal protection of traditional knowledge.	Thc Institute's interest is in controlling intellectual property, both using traditional and sui generis systems; in other word it recognizes the intellectual property rights of genetic resources, whether or not there is any traditional knowledge associated with them. In this context, traditional knowledge is characterized as sui-generis intellectual property, and is assoeiated with the recognition of collective rights. For this purpose, it is consolidating efforts to institutionalize positive protection measures intended to guarantee the intellectual property rights of communities, and preventive measures designed to avoid the granting of intelleetual property rights or databases to third parties, and to limit the rights they can acquire. However, therc needs to be a legal foundation that regulates the intelleetual property rights of traditional knowledge, and therefore work is being done on a proposal to establish an entity to regulate and eontrol the illicit use of traditional knowledge, traditional cultural expressions and assoeiated genetie resourees.
Evaluating Entities	Exeentive Decree 905 calls for establishing evaluating entities for access to genetic resources pursuant to Deeision 391. This legal instrument states that governmental institutions and national research institutes are responsible for evaluating and preparing evaluation reports on research and development proposals involving Ecuadorian genetic resourees. Based on these reports, the MAE authorizes or validates the permits needed to grant aeeess to the resource in qnestion. Among the entities listed in the regulations are: the Ministry of Agriculture, Livestock, Aquaculture and Fisheries (MAGAP), the National Institute for Agricultural Research (INIAP), the National Fisheries Institute (INP), the Oceanographic Institute of the Navy (INOCAR), the National Secretariat of Peoples (now the National Seerctariat of Political Management), among others.	For the evaluating entities, it is fundamental that they comply with the mandates assigned by the regulations, within the framework of their roles and powers. In this context, while the eorresponding entities eannot partieipate in the preparation of requests for access to the projeet's amphibian genetic resources, they are interested in putting in plaee management mechanisms that facilitate the fulfillment of their duties and inter-institutional eoordination. Within the context of the project and specifically component number 3, the evaluating entities need to have access to training and an exehange of information.

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IKIAM Regional Amazonian University	The Ecuadorian government is currently spearheading an emblematic project with the Yachay City of Knowledge and the IKIAM Regional Amazonian University, in order to strengthen the country's human resources and promote scientific and technological development. The IKIAM Regional Amazonian University is an institution of higher education which will prepare professionals and researchers in line with the highest international standards. This university will have degree programs in Plant-based Medicines and Food, Water Management, Geology, and Agro-ecology. IKIAM will promote the generation of knowledge, technology and the sustainable use of natural resources, and will focus its research on remote areas with little or no human intervention, thus transforming the Amazon into a living laboratory. In the context of the project, these institutions will participate as local counterparts who are engaged in scientific research, and will also benefit from professionals with specialized experience and training in the analysis of potential genetic resources and the generation of derived products.	The interest of the university is to generate bio-knowledge through scientific research at the highest academic level, and to contribute to a new model of development based on added value derived from human talent. In addition, the research component is one of the university's objectives, and is in fact a requirement that it must comply with according to the state institutions that regulate higher education in Ecuador. In addition, this project falls within the field of study of a number of the degree programs currently offered in Ecuadorian universities, for instance: biotechnology, biology, pharmaceutical science, microbiology, molecular biology, translational medicine, among others. Therefore, it is of direct interest for these institutions that their undergraduate, and especially graduate, students benefit from the transfer of technology that takes place in these types of initiatives. In this project, the University will install the bioprospecting laboratories to be used to work with amphibian skins.
The Consortium of Decentralized Autonomous Provincial Governments of Ecuador (CONGOPE)	The Consortium designs and implements objectives, policies, plans and strategies defined by its executive bodies in response to the requests and needs of Consortium members. The CONGOPE will facilitate coordination with the provincial GADs, and will help to strengthen the political will of the corresponding authorities. The Environmental Management Office of CONGOPE will provide advice, technical assistance, accompaniment, training and institutional strengthening in the area of environmental management and integrated water management.	This institution seeks to build the management capacity of provincial governments, by generating spaces to foster dialogue and the exchange of knowledge and experiences; as well as to foster the creation and implementation of tools, strategies, models, programs, plans and/or projects within the framework of its competencies in the areas of environmental management and water management. From this perspective, the project can contribute to the Consortium's objectives; furthermore, the project's components are in line with the strategic guidelines of the Environmental Management Office of CONGOPE; which include: mitigation of climate change, the protection of hydrographic resources, conservation of biodiversity, etc.
Association o Municipalities of Ecuador (AME)	The Association of Ecuadorian Municipalities (AME) is a grouping of municipal and metropolitan GADs. It promotes the creation of a decentralized and autonomous model of local administration, based on the integrated planning and participatory management of the territory, through the exercise of institutional representation, quality technical assistance and coordination with other levels of government and state institutions. The participation of AME in the project would involve efforts to strengthen the capacities of municipal governments in the area of environmental management, especially related to in situ conservation efforts.	AME is interested in participating in the project, and in generating systematic processes of institutional strengthening for the municipalities in the area of environmental management. It is worth noting that there are a number of municipalities with experience in declaring protected areas in order to protect water resources, and that this level of government, given its administrative and financial autonomy, has the power to establish land use regulations, and specifically conservation areas. Nevertheless, municipalities typically have institutional and financial weaknesses that are the result of the lack of effective decision-making processes.

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Provincial GADs	The Provincial GADs are public sector institutions with political, administrative and financial autonomy. Aecording to the COOTAD, the funetions of Provineial Governments are to promote provincial-level public polieies based on the principles of Good Living. Taking into account that one of the projeet's goals is to establish in situ conservation areas, it is important to note that the exclusive competencies of this level of government are related to providing publie services, fostering produetive provineial activities, and *environmental management*, whieh are fundamental aspects of physical planning that guarantee the proper management of these conservation areas.	The Provincial Councils are interested in building institutional capacities to guarantee the proper fulfillment of the duties of the provincial government. Therefore, one of the mandates of provincial governments is to eoordinate their planning mechanisms with other public sector institutions and civil society stakeholders. Therefore, provincial development must be eonsistent with national, regional, cantonal and parish-level planning. In this context, the project is an attractive pilot experience for strengthening proviucial conservation mechanisms and to demonstrate management capacity, by establishing spaces for planning and decision-making with other levels of government and the different executive branch agencies.
Municipal GADs	Municipal governments are exclusively responsible for land use and zoning in their cantons; providing public services including potable water, sewer, wastewater management, solid waste management, environmental health activities, among others. Furthermore, municipal governments are responsible for regulating, preventing and controlling environmental pollution within the canton territory in concordance with national environmental policies. From this perspective, the munieipal GADs are legally authorized to maintain and preserve the natural heritage within their jurisdictions.	One of the main concerns of municipal GADs is to take positive actions to cover the urgent needs of the population in each canton. Most of these concerns are focused on promoting economie activities, and on providing basic services. The Munieipal GADs are interested in participating in processes involving the conservation and use of their genetic resources, nevertheless they would need more technical and financial resources to participate effectively.
Rural Parish GADs	Rural parish GADs are responsible for: planning, together with other institutions of the public sector and eivil society, the development of the parish and its eorresponding physical planning, eneouraging the development of productive community initiatives, preserving biodiversity and protecting the environment, as well as promoting the organization of the residents of villages, districts and other rural settlements. Therefore, the parish governments are considered to be strategie partners of the project, because of their closeness to the population, and their potential to help generate associative processes related to the proper management of possible in situ conservation zones.	It is a priority for rural parish GADs to be empowered as instruments of local-level management to help to meet the basic needs of the population. At this level of government, there are often serious technical and budgetary shortcomings that can limit their ability to fulfill their exclusive funetions. However, there is the politieal will to participate in processes involving uational government and international cooperation resources. Furthermore, it should be said that these authorities wish to show results to their constituents, in order to bolster their political and social legitimaey.
Citizens / Communities	The Constitution of Eeuador establishes that the people, communities, indigenous peoples, and other groups enjoy the rights guaranteed by the Constitution, and in international instruments. It also states that people have the right to enjoy the benefits and applications of seientific progress and ancestral knowledge. The Constitution gives citizens rights, but also assigns them duties and responsibilities. Therefore, Ecuadorians must defend the territorial integrity and its natural resources, as well as to respect the rights of nature, preserve a health environment and use natural resources in a rational and sustainable way.	The formulation and implementation of the Project, as perceived of by the community, especially those people living in the areas of influence of the in situ amphibian conservation sites, is interested in promoting efforts to preserve the environment. This is because agricultural activities are becoming less and less effieient due to the impacts caused by elimate change and the accelerated degradation of natural resources. From this perspective, the greatest need is to establish snstainable alternatives that can generate economic resources for the population. Even for the communities, conservation has potential benefits, as long as there are incentives in place. They are willing to participate in Forest Partner (Socio Bosque) programs, and to engage in grassroots organization in order to foster economie models that are environmentally responsible

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Centro Jambatu	The Center is dedicated to research and conservation of amphibians in Ecuador. At the moment it is carrying out scientific development and public information programs, aimed at mitigating and preventing the aceelerated loss of the diversity of amphibians in Ecuador, through ex situ conservation measures. The Jambatu Center will implement the ex situ conservation components, both of biologieal and genetie resources; it will provide support to the activities of the MAE as a scientific advisor for institutional strengthening efforts, and will be a local seientific partner for the research and bioprospecting components.	The interest of the Jambatu center is in doing scientific research focused on biodiversity conservation, through in situ and ex situ management and breeding programs for endangered speeies. The Center seeks to safeguard biological diversity and the molecular eomponents eontained in each species, with the objective of eontributing to future studies by ereating a 'bank of life' to preserve a variety of tissues for moleeular studies and bioprospeeting. Additionally, the center is interested in generating added value with amphibians, by doing bioprospeeting studies of the components of their skin, which can again be used in eonservation efforts for these species and others who cohabitate with them.
Sector privado	The national government seeks to promote scientific research which ean contribute to the country's educational system and can also generate, over the medium and long term, a change in Eeuador's produetion model though the sustainable use of biodiversity. These objectives are ineluded in the National plan for Good Living as well as in the Constitution. This project fits with those objectives.	The pharmaeeutical industry requires eonstant investments in researeh and development of new active ingredients and drugs that can be used to manufacture medicines. The level of investment needed is high, and the quantity of products that end up having real commereial applications is limited, and therefore only larger companies can develop this eomponent, and in fact many large pharmaceutical companies have created linkages with universities and researeh eenters, so that these institutions can earry out most of the basic research, while the pharmaceutical laboratories focus on the advanced studies related to commercial applications.
Universidad de Queens Belfast	The Queen's University of Belfast is a world-renowned academie institution. It is a member of the Russell Group of the 24 main research universities in the United Kingdom. It is highly regarded for the support it gives to world class research. The Therapeutic Molecular Laboratory will be in charge of doing research on the secretions of amphibian skin in order to synthesize ehemical compounds derived from those secretions, to be analyzed from a biomedical perspeetive, and will play a decisive role in transferring technology and building Ecuadorian research capacity in the field of chemical prospecting of amphibians.	The laboratory for diseovering natural drugs in Queens has a scientific interest in studying the seeretions of a wide variety of amphibian, reptile and scorpion species from around the world. The laboratory has been working in this field for over 15 years, and is aware of the variety of substances that can be found in the different species. The second interest that the University has is in training its graduate students, both at the master's and PhD levels, so that they can disseminate their knowledge in their countries of origin. This transfer of technology has been carried out successfully with some universities from China for the past several years, and at the moment there is a more or less stable number of 32 graduate students who receive training in this laboratory.

II. Stakeholder Participation during Project Preparation

The project was prepared using a participatory approach, allowing the different stakeholders to learn about and get involved in the project in a direct and interpersonal manner, and to share their concerns. Stakeholders were consistently involved in the project design process, but there were certain moments where this involvement was especially intense: (1) during the stakeholder identification, which included defining their interests and opportunities (individual meetings held with each institution); (2) confirmation of the species and the sites where the Project would be working, and (3) confirmation and drafting of co-financing letters.

During the PPG phase of the Project, the stakeholder participation involved workshops and thematic working groups with participants from MAE, Centro Jambatu, UNDP, and members of academia and NGOs. This participation included:

- Inception workshop on May 15, 2014.

- Thematic working groups. The primary group was the project advisory committee, made up of representatives from SENESCYT, IEPI, the Coordinating Ministry of Knowledge and Human Talent, and the IKIAM Regional Amazonian University.
- Project design workshop on November 24 – 28, 2014 – organized by an international consultant, the MAE, the advisory committee, the Jambatu Center and UNDP.
- Validation workshop held on January 22, 2015.

1) Inception Workshop
Objectives: i) to know and validate the project goals, objectives and strategies with the Project staff and other key stakeholders ii) to determine the roles, functions and responsibilities within the project decision-making structures, including the lines of communication and the outputs of the PPG, iii) to validate the PPG Work Plan.

2) Thematic or Community Outreach Groups
Objectives: i) based on the contents of the PIF, revise and develop proposals for the expansion and adaptation of the Project design, ii) address the actions and outputs associated with the following components: stakeholder involvement in threat reduction, communication campaign.

3) Project Design Workshop
Objectives: to revise, adapt and socialize the proposals of the working groups to consolidate Project design.

4) Individual Meetings and Consultations
The final Project design also required a series of meetings and consultations with individuals and organizations to address various aspects, namely: i) specific capacity strengthening needs, ii) monitoring and evaluation system, iii) budget, among others.

III. Stakeholder Participation Plan for Project Implementation

Given the characteristics of the project, the process of engaging stakeholders requires establishing spaces for multi-stakeholder decision-making and coordination, aimed at ensuring the fulfillment of project objectives and the implementation of each of its components. In order to achieve this, the table below describes the roles and responsibilities of the different project stakeholders and strategic partners, which will form the basis for property implementing the Stakeholder Participation Plan.

1) Snmmary of Stakeholder Roles in Project Implementation

Stakeholders	Implementation role
Strategic Sector Coordinator Ministry (MICSE)	This Ministry is a key actor in the implementation of the project, and will be responsible for monitoring the effective implementation of its components in each of the institutions that are within its jurisdiction (Ministry of the Environment, Ministry of Non-Renewable Natural Resources, SENAGUA, Ministry of Renewable Energy and Electricity, among others). It will also help to position biodiversity and its genetic heritage as a stratcgic resource for transforming the production model.
Ministry of the Environment (MAE)	The MAE is the National Environmental Authority of Ecuador, and plays a crucial role in ensuring the conservation and sustainable use of biological diversity. Thus, it will be the primary coordinator of activities within and between the threc proposed components. In addition, it will be the agency responsible for implementing the institutional strengthcning component. Therefore, as a national beneficiary and funding agency, it must be involved in all of the phases of the project, from design and implementation to monitoring and closure.

Ministry of Non Renewable Natural Resources (MRNNR)	This Ministry is the link between public, private and mixed companies who are governed by the national government's hydrocarbon and mining policies. For this reason, it involvement will help to guarantee coordinated efforts with companies who operate in and have an impact on the ecosystems of amphibians, and can facilitate the definition of emergency *in situ* and *ex situ* conservation actions (Component 1). In this sense, the contribution of the Ministry is to involve its various oversight agencies, especially the Mining Control and Regulation Agency, to take steps to foster the development of responsible mining and to strengthen the strategic sector of biodiversity and genetic heritage.
National Secretary of Planning and Development (SENPLADES)	SENPLADES plays an important technical and coordinating role in bringing together the different levels of government, since it is involved in approving and allocating the resources of the national government and GADs which are co-financing the project. This Secretariat will provide technical assistance and oversight for the planning and implementation processes of the project, in order to guarantee its sustainability in all phases.
National Secretary of Policy Management (SNGP)	It is important to note that the SNGP took over the duties of the Secretariat of Peoples, Social Movements and Citizen Participation, the agency which in the context of Executive Decree 905 is considered to be an evaluating entity for access to genetic resources. Establishing a strategic alliance with this Secretariat will help to consolidate the political will of the project stakeholders, and to guarantee coordinated actions with the Executive branch, especially in the emergency in situ and ex situ amphibian conservation efforts.
National Higher Education, Science and Technology Secretariat (SENESCYT)	SENESCYT will provide fundamental support in strengthening local technical and scientific capacity, promoting the opportunity to bring professional experts in fields related to bioprospecting, to help design, develop and consolidate the country's flagship education projects. In addition, young professionals can benefit from graduate research scholarships to carry out bioprospecting. As an ABS evaluating entity, it will be responsible for guaranteeing that the specific frameworks for access to genetic resources are in line with the parameters of related public policies.
National Secretary of Water (SENAGUA)	To contribute to linking Ecuadorian amphibian conservation efforts, in situ and ex situ, to plans and programs related to water resources. This secretariat will need to include bio-indicators related to amphibians in its water conservation efforts.
Ecuadorian Institute of Intellectual Property (IEPI)	The duty of the IEPI is to ensure the effective enforcement of existing laws and regulations governing intellectual property, genetic resources and traditional knowledge, including the legal protection of traditional knowledge. It will also be the beneficiary of the training and exchanges of information facilitated by the project.
ABS Assessing bodies	Some Government institutions and national research institutes are assessing bodies, responsible for developing evaluation reports on research and development proposals on Ecuadorian genetic resources. These reports help the MAE granting or denying access permissions. They include the Ministry of Agriculture, Livestock and Fisheries (MAGAP), The National Institute of Agricultural Research (INIAP), the National Fisheries Institute (INP), the Naval Oceanographic Institute (INOCAR), the newly created National Institute of Biodiversity, among others. They will benefit from training and information exchange and will coordinate with sectorial programs of relevance.
IKIAM Regional Amazonic University	One of the lines of research of the IKIAM is the bioprospecting of amphibians, and therefore it plays an important role in supporting implementation, especially in component two of the project, although its will also be involved through its qualified scientists who will support the implementation of a number of lines of action. Furthermore, the university will be one of the national institutions to benefit from the exchange and transfer of technology.
Autonomous Provincial Government Consortium (CONGOPE)	The CONGOPE will facilitate coordination with the provincial GADs, and serve as allies to help strengthen the political will of the corresponding authorities. The Environmental Management Office of CONGOPE will provide advice, technical assistance, accompaniment, training and institutional strengthening in the area of environmental management and integrated water management.
Ecuadorian Municipalities Association (AME)	The participation of AME in the project would involve efforts to strengthen the capacities of municipal governments in the area of environmental management, especially related to in situ conservation efforts. As a contribution to project implementation, the institution will provide the services of advisors and technicians who will help to prepare and implement the technical inputs needed to fulfill the project objectives, including: linkages with local physical and zoning plans, the

	determination of conservation areas, the design and implementation of special ordinances to regulate land use, and building institutional capacities for environmental management.
Autonomous Decentralized Governments (GAD)	There are three types of GADs: (1) Provincial: the exclusive mandates of provincial governments include guaranteeing the provision of public services, fostering provincial economic activities, and environmental management, and they can also designate provincial conservation areas and as such will be key partners in Output 1.2. (2) Municipal: municipal GADs are legally authorized to maintain and preserve the natural heritage within their jurisdictions. (3) Rural Parish governments: Parish GADs are strategic partners because of their closeness to the population, and their potential to help generate associative processes related to the proper management of possible *in situ* conservation zones.
Citizenry / Communities	Ecuadorians have to defend their territorial integrity and natural resources, as well as respect the rights of nature, preserve a healthy environment and use natural resources in a rational and sustainable manner. In this sense, the *in situ* conservation component provides for declaring protected areas for the preservation of amphibian species. As a result of these actions, these territories will have special management characteristics which will guarantee their sustainable development. Additionally, with this project citizen will benefit from information made available to them about the projects faced by amphibians and their enormous potential as the source of genetic resources, through their participation in citizen science projects.
International Union for Conservation of Nature (IUCN)	The IUCN will provide technical support in updating the red list of endangered species of amphibians in Ecuador.
Jambatu Amphibian Research and Conservation Center (Fundación Otonga)	The Jambatu Center will implement the *ex situ* conservation components of Outcome 1; it will provide support to the activities of the MAE as a scientific advisor for institutional strengthening efforts, and will be a local scientific partner for the research and bioprospecting components of Outcome 2.
Amaru Amphibian Rescue Center (Cuenca)	The Amaru Rescue Center will work with the Jambatu Center to co-implement the *ex situ* conservation component, to rescue and breed one of the target species in captivity (*Atelopus nanay*). In addition, it will help with searching for and gathering species in the southern part of the country to use in the Genetic Bank.
Private sector	The engagement with the private sector, specifically the pharmaceutical industry, is intended to channel basic investment processes in order to attain profitability for those products that do have commercial potential.
Molecular Therapeutics Laboratory of Queen's University	The Queen's University of Belfast will be in charge of carrying out research on the skin secretions of amphibians in order to synthesize chemical compounds to be analyzed by bio-medicine professionals, and will play a decisive role in transferring technologies and building research capacities in the field of amphibian bioprospecting.

2) Objectives and Aims of the Stakeholder Participation Plan

The formulation of the stakeholder plan has the following objectives:

i. Clearly identify the basic roles and responsibilities of the main participants in this Project.
ii. Through the participation mechanisms previously defined: (i) ensure full knowledge of those involved concerning the progress and barriers in Project development, (ii) take advantage of the experience and skills of the participants to enhance project activities.
iii. Establish short, medium and long-term goals by generating spaces of social and political dialogue to support the informed decision-making processes that will guarantee the implementation of the project.

The Stakeholder Participation Plan has been designed to facilitate the participatory creation and implementation of management mechanisms among the various stakeholders, using a preventive approach, which involves creating or strengthening spaces for social and political dialogue, in order to achieve agreements and alternatives to positively transform these types of situations.

The design of the Plan includes principles and values that will help to strengthen the components of the project, including the following approaches:

(1) The systematic approach in which participants address the dynamics and contexts that the project will face from a holistic perspective that integrates political, economic, social, cultural and environmental aspects.

(2) In an effort to avoid practices that reproduce inequality and inequity in the performance of gender roles, gender equity will be assumed as a cross-cutting element.

(3) The intercultural approach seeks to achieve dynamic processes of socio-political interaction among the different stakeholders, which are based on respect for diversity and difference, through coordination mechanism that foster peaceful co-existence and a recognition of interculturalism.

(4) Citizen participation as a right to be a part of making planning and management decisions in the public sphere. In this sense, the participation mechanisms will strengthen the decision-making processes, within the context of public administration, and will encourage mechanisms of peaceful co-existence among stakeholders.

(5) Finally, a dialogue-based approach, which is conceived of as a set of strategies that encourage an exchange of knowledge, experiences and proposals among stakeholders to achieve mutually beneficial agreements, which will help to establish horizontal relationships among them.

In addition, the project will define and establish basic criteria and conditions that support and guarantee the fulfillment of the project objectives. To do this, three guidelines have been established, intended to facilitate stakeholder engagement:

(1) Linkages with public policy in order to strengthen spaces of analysis that make it possible to clearly establish how sectorial public policies are conceived of in the framework of the conservation of biodiversity and the utilization of genetic resources, and where the project's scope of action fits in.

(2) Decentralized socio-political management, which involves designing management mechanisms in which the territory is considered to be a strategic axis for the implementation of public environmental policy, in order to promote the active participation of public, private and social actors within the territory. For this, the project will seek establish spaces of dialogue with a political-territorial focus, to create suitable conditions to establish direct channels of communication and deliberation in order to prevent possible conflicts.

(3) Strategic management of communication as a sphere of action based on experience, reality and projection. Communication will facilitate the process of transmitting and receiving information, unifying content, creating experiences and resolving problems, as a clearinghouse of processes at the national and local levels.

Finally, a set of coherent actions will be adaptable to the dynamics and contexts that the project will face in its execution, which must be implemented in a systematic and orderly way by the project team:

(1) Strengthening of stakeholder / strategic partner capacities to guarantee sustainability, by building skills and attitudes that foster participation, the exercise of rights, leadership, dialogue, negotiation, the importance of capable and sustainable management of biological diversity,

national and international rules and legislation (with a special emphasis on ABS mechanisms), among others.

(2) Identification and prioritization of issues to discuss to establish an initial agenda.

(3) Once the main issues to discuss have been determined, a national and territorial-based dialogue agenda will be prepared, which must be shared with and validated by the project's stakeholders. The design of the dialogue agenda should consider:

(a) The objectives to be achieved through the dialogue process;

(b) Thematic areas to work on and the ground rules of the process;

(c) Identify the order in which the issues should be addressed, and estimate the time needed for each step of the agenda;

(d) Define the expected results from the discussion of each topic and the process as a whole; and

(e) Identify the resources or information necessary to feed into the discussions of each topic.

(4) Within the framework of implementing the dialogue agenda, it will be necessary to establish and facilitate a process that can balance the power relationships among the participants, and build sustainable and equitable relationships. For this reason, the process of dialogue should be structured around three key methodological moments:

(a) Build territorial spaces of dialogue to specifically attend to the needs and interests of stakeholders according to their own social, cultural, political, economic and environmental contexts and dynamics;

(b) Create a national dialogue through which to establish short, medium and long-term agreements, a step which will require a road map that contains the agreements reached through the dialogue process, which all stakeholders have accepted and committed to.

(c) Establish a methodology for documenting the experience of the national and territorial dialogue, which captures the lessons learned and serves as a historical record of the process.

(5) For the implementation of the Plan, monitoring and evaluation mechanisms will assess progress, for which quantitative and qualitative indicators must be developed to verify the effectiveness of the dialogue processes. These indicators should be related to the fulfillment of the project objectives, and to the strategic approaches and guidelines of the Plans. From this perspective, these indicators should include ways to measure gender inclusion and interculturalism, as well as to quantify the agreements that are reached at the national and territorial levels.

(6) Communication and dissemination of the process. It is important to remember that in process of dialogue, the participants seek to promote their positions and interests, and the need for exposure in the media and among the public is the same for all stakeholders, and therefore it will

be necessary to plan ahead of time the mechanisms and systems that will guide the flow of information, to ensure that each of the stakeholders in the process can have their voice heard.

The ultimate purpose of the Stakeholder Plan will be the long-term sustainability of the project achievements, based on transparency and the empowerment of the key stakeholders.

3) Participation Mechanisms

To implement this plan, the project will engage in the development and/or strengthening of the following participation mechanisms:

Local PA Committees
The project aims at establishing 2 Provincial GAD protected areas and accompanying their formal incorporation within the SNAP. As such, the GAD PAs will be charged with establishing their respective PA Committee. To this end, the project will provide support to organize and facilitate multi-stakeholder meetings involving participatory exercises of stakeholder mapping (in order to confirm the identity of the stakeholders to be taken into account, and to characterize the relations of communication and power between them), to agree on the objectives and functioning of the committees, and to develop strategic plans for their strengthening and operation as part of the Alternative Use Studies.

Key actors whose involvement will be promoted in the PA Committees (in addition to PA managers in MAE) will include provincial GADs; civil society organizations (of community members, indigenous/Afro-ecuadorian groups); the police; and representatives of NGOs and projects active in each area. As far as possible, it is intended that the civil society organizations will function as channels for representing the interests of community-level stakeholders; however additional participatory analyses will help to define to what degree this is the case and to identify complementary mechanisms for promoting the participation of those who are not attached to these organizations.

Project staff will participate actively in an advisory capacity to the PA Committees, particularly with regards to amphibian conservation criteria (while avoiding a position of dominance or leadership which might inhibit the effective participation of local stakeholders). Their principal role will be to provide the committees and their members with information and interpretation materials (covering issues such as the location and status of amphibian species and critical habitat, the nature and magnitude of threats, the range of management options which are available, and current or potential institutional initiatives), which will assist them in coming to balanced and informed decisions on PA management issues.

It is recognized that PA Committees have limitations as mechanisms for participation: their remit is limited to the PAs themselves (rather than adjacent landscapes of importance as buffer or for connectivity) and it may be some time before the PA Committees are established and/or sufficiently strengthened to be effective as channels for participation. They will therefore be complemented by a range of other participation mechanisms.

Existing civil society organizations
There is a wide diversity of civil society organizations present in the areas targeted for *ex situ* and *in situ* conservation. The project will interact directly with these organizations, as well as promote their involvement in PA Committees. This will take advantage of the fact that these organizations already have clearly identified constituency groups and experience in defining and articulating their needs and interests. It will consult with and otherwise involve them in, for example, the identification and promotion of amphibian conservation interventions.

Dialogue Platforms

The project will support the formation of multi-stakeholder "dialogue platforms" to formulate and coordinate strategies for addressing amphibian conservation-related issues in both *ex-situ* and *in-situ* conservation interventions. The project will engage local stakeholders (i.e. Rio Blanco Community, ETAPA) in search and rescue operations and as such will train them to ensure their strict adherence to the protocol described in Section IV Part I. In turn, technical capacity will be transferred and strengthened, in parallel to the coordination and participation mechanimsms supported through PA Committees. The project will provide advisory and facilitation support to dialogue platforms in the same way as proposed for PA Committees (see above). These will provide the opportunity for project staff to keep these stakeholders informed of project advances, strategies and goals, and for stakeholders in turn to express their concerns and suggestions.

Project Board
Formal participation by institutional stakeholders in project decisions will be furthered through the Project Board, the composition and functioning of which is proposed in Section II, Part III: Management Arrangements. As a minimum, the Board will include representatives of MAE, IKIAM Regional Amazonic University, and UNDP, with the possibility of additional members to be determined at the Inception Workshop.

Dissemination materials
In order to promote understanding and acceptance of the goals and strategies of the project, information materials will be developed and disseminated throughout its life. The focus of these will gradually evolve from an initial emphasis on raising awareness of the objectives, strategies, geographical focus and institutional arrangements of the project, to socialization of lessons learnt. These 'hard-copy' materials will be complemented by the establishment of a joint web-based platform between MAE and Jambatu Center providing, in addition to general information on the project, information on activities, a directory of the organizations involved, data on amphibian species, best practices, as well as links to electronic versions of project publications.

Local and regional seminars
As appropriate, seminars will be held in the target areas of the project, particularly aimed at representatives of local NGOs, Socio Bosques and other project partners, with the aim of disseminating, exchanging and discussing information on methodologies, experiences and lessons learnt of relevance to amphibian conservation and the promotion of technical capacities related to conservation, bioprospecting and ABS for genetic resources.

Section II Part III outlines a management arrangement between the following structures: i) Project Board, ii) Project Coordination Unit, iii) National Project Director, and iv) National Project Coordinator. The confirmation of these structures during the Inception Workshop is also expected to confirm and provide mechanisms for stakeholder participation.

PART V. Terms of References for key project staff and main sub-contracts

National Project Coordinator

Under the overall supervision of the National Project Director (NPD the Director of Biodiversity of MAE) and programme specialist of the National Officer of the UNDP, the Coordinator will have the following responsibilities:

- Implementation of project actions, in compliance with Annual Work Plans and Budgets (APWBs).
- Supervision of the activities of the technical members of the Project Implementation Unit (PIU), thereby ensuring their relevance, effectiveness and efficiency.
- Supervision and collaborate with technical assistance in the design of terms of reference.
- Supervision and coordination of external consultants work, includes reviewing and approving products.
- Ensuring that the project is implemented with the full participation of local actors, implementing mechanisms that assure that their interests are taken into account, communicated and reflected in the implementation of the project.
- Coordinate the participation of all project stakeholders, which include Governmental institutions and NGOs, at central and local levels, for project implementation.
- Continuous and periodic monitoring of project impacts, in relation to the achievements foreseen in the APWBs and the impacts foreseen in the project results framework.
- In communication with the NPD, ensuring that the project is implemented in accordance with the policies and plans of the MAE, as Implementing Partner.
- In communication with the Programme Official of UNDP, ensuring that the project is implemented in accordance with the UNDP Assistance Framework (UNDAF) in Ecuador.
- Ensuring that a gender focus is incorporated into the actions of the project.
- Prepare Project Implementation Reports (PIRs), detailing project progress, to be presented to GEF with support for UNDP.
- Together with UNDP and the project team and in discussion with local stakeholders, preparation of APWBs for approval by the Project Board and the GEF.
- With support from the project administrative team, ensuring efficient and transparent execution of financial and physical resources, in conformity with the rules of the Government, GEF and UNDP.
- Design and implementation of professional development plans for the members for the PIU.
- Identification of risks that could affect expected results of the project, and the identification and implementation of mitigation strategies.
- Implementation of the UNDP and GEF operational manuals.
- Supervise and implement activities necessary for data collection, key for project results monitoring and evaluation, in project intervention areas and for strategic planning. Strong coordination must be established with government and non-government organizations to maximize efficiencies for data collection and reporting;
- Organization and support of projects midterm and final external evaluations of the project.
- Supervision and validation of the Otonga Foundation´s implementation and reports.

The NPC will play a vital role in ensuring technical quality; relevance and harmonization and integration of the project's activities by MAE, UNDP and Otonga Foundation. Thus part of his/her time will be invested in providing technical input in all components and projects management.

Required Qualifications:

- University degree in biology, ecology, biotechnology, environmental science, environmental project management or related. Will be given preference to professionals with degrees in related disciplines to the objective of the Project.
- Skills in environmental project management and administration (at least 5 years) with experience in monitoring and evaluation and supervision of technical and administrative personal.
- Working experience in multidisciplinary projects, including planning, monitoring and implementation, at least 3 years.
- Experience and practical understanding of the logical framework or similar methodologies in project management. Prefered experience managing large projects involving various and diverse stakeholders.
- Proven skills coordinating and reaching working and implementation agreements in a multicultural and interdisciplinary environment, involving interaction with government counterparts and various national and international actors.
- Experience in coordinating actions of NGOs, research institutions, and institutions of public and / or private sectors.
- Ability to coordinate, lead and manage groups, including skills for conflict resolution and reconciliation.
- Excellent verbal and writing communication skills in Spanish and English.
- Availability for travel within and outside the country.

Additional skills

- Knowledge on genetic resources and/or ABS, protected area management, scientific research, wildlife management, amphibians biology and conservation.
- Desirable experience and / or familiarity with GEF funded projects.

Project Administrative Assistant

The Project Administrative Assistant is responsible for the financial and administrative management of the project activities, seeks additional funds and assists in the preparation of annual work plans and progress reports for review and monitoring by MAE. Under the overall supervision of the National Coordinator Project (NCP), the Project Administrative Assistant will have the following responsibilities:

Financial management:

- Responsible for providing general financial support to the project;
- Assist project management in performing budget cycle: planning, preparation, revisions, and budget execution;
- Ensure compliance with budgeted costs in line with UNDP and Government of Ecuador policies and procedures;
- Monitor project expenditures, ensuring that no expenditure is incurred before it has been authorized;
- Responsible for the development of periodic monitoring reports, with information of implemented activities from the projects implementing areas which summarize field activities funded with GEF resources according to Annual Operational Plans (AOPs);
- Assistance to project team in drafting project progress reports concerning financial issues;
- Prepare mandatory and general budget revisions, annual physical inventory and auditing, and assist external evaluators in fulfilling their mission;
- Ensure the proper use and care of the instruments and equipment used on the project;
- Ensure the project invests the financial resources in an efficient and transparent manner;
- Ensure that all project financial and administrative activities are carried out on schedule and within budget to achieve the project outputs;
- Contribute to the resolution of financial issues that might arise during the project;
- Support in the preparation of TORs of technical consultants aligns with national procedure.
- Manage all the activities related to contact with providers, consultancies, etc.
- Periodical co-financing reports from co-executing stakeholders.

Qualifications:

Considering the nature of the work, it would be desirable that this position was taken by an individual that comply with the following:

- Person with at least an Associate's Degree in finance, business sciences, or related fields, or proven 8 year experience in such areas;
- Experience in administrative work, preferably in an organization or related to project implementation;
- A demonstrated ability in the financial management of projects that involve cooperation with government officials, NGOs, etc.;
- Flexible and willing to attend meetings (including travel, if needed) as required;
- Verbal and writing communication skills;

- Knowledge of Word, Outlook, Excel, and Internet browsers is required;
- Previous experience working with a GEF-supported project is considered an asset;
- Knowledge and experience in public procurement procedures.

ABS Specialist (support to the MAE Genetic Resources Unit)

The ABS specialist will provide technical support to the Project Implementation Unit and will implement genetic resources research activities in accordance with international conventions and treaties. Under the overall supervision of the National Project Director and National Project Coordinator, the ABS specialist will have the following responsibilities:

Outputs

- Collaborate to generate the periodical reports on progress in committed co-financing from co-executing agencies;
- Make reports on all activities related to the management plans, programs and projects on genetic resources being implemented;
- Develop technical documents related to genetic access resources;
- Design TOR for external consultants, supervise and validate products related to genetic resources and ABS

Qualifications

- Bachelor in Biology, biotechnology, with 4 years' experience in molecular biology, genetic and bioinformatics methodologies.
- Knowledge on regional biodiversity regional and international legislation, statistics programs, bioinformatics and scientific research methodologies.
- Proven ability to work with multi-disciplinary teams and multiple indicators;
- Self-motivated and ability to work under the pressure;
- Flexible and willing to travel as required;
- Analytical and synthesis skills;
- Comfortable working both in the office and in the field;
- Excellent verbal and writing communication skills in Spanish;
- Previous experience working with a GEF-supported project and English proficiency is considered an asset.

* Other technical staff will be hired to strengthen the two selected GAD Natural Reserves to be developed by the project, in accordance with the results and recommendations of PPG analyses.

PART VI. Direct Project Costs and Letter of Agreement (Signed version will be included by Project's Signature)

LETTER OF AGREEMENT BETWEEN UNDP AND THE MINISTRY OF ENVIRONMENT OF ECUADOR FOR THE PROVISION OF SUPPORT SERVICES TO THE IMPLEMENTATION OF THE PROJECT "CONSERVATION OF ECUADORIAN AMPHIBIAN DIVERSITY AND SUSTAINABLE USE OF ITS GENETIC RESOURCES"

1. Within the context of the project "Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources" UNDP and the Ministry of Environment of Ecuador (hereinafter referred to as "the counterpart") agree that the UNDP country office may provide support services for the implementation of the project, at the request of the counterpart and in accordance with the Project Document signed by both parties.

2. The UNDP country office may provide implementation support services without affecting the strengthening of the capacities of the counterpart and the direct ejecution of the activities described in the Project Document. The costs incurred by the UNDP country office shall be recovered in accordance with the relevant policy.

3. The UNDP country office may provide, at the request of the counterpart, the following support services for the implementation of the project:
   a. Identification and/or recruitment of personnel;
   b. Identification and facilitation of training activities;
   c. Procurement of goods and services;

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the Project Document, in the form provided in Annex 1 to this letter, and, if the requirements for support change during the life of the project, they will be revised and modified in mutual agreement between the parties.

5. All of the privileges and immunities described in the Basic Cooperation Agreement between UNDP and the Government of Ecuador of 19th January 2005, shall apply to the provision of the support services described in this letter. The Government shall retain overall responsibility for the execution of the project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the Project Document.

6. Any claim or dispute arising under in relation to the provisions of this letter shall be handled pursuant to the relevant provisions of the Basic Cooperation Agreement referred to under point 5 above.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above are specified in the Project Document. The cost-recovery policy of UNDP determines that the direct projects implementation costs incurred by UNDP (previously referred to as Implementation Support Services or ISS) shall be recovered in accordance with the real costs that are expected to be incurred, or on the base of each transaction (using the Universal Price List or the Local Price List form as reference costs) and should be charged directly to the project budget.

8. The UNDP country office shall submit progress reports on the support services provided, as well as the costs incurred.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. This letter forms part of the Project Document entered into between the parties and is included as an annex to said document.

11. The parties hereby state their mutual agreement to the points stipulated in this letter, by signing two copies of equal validity.

Yours sincerely,

_____

Signed on behalf of UNDP

_____

For the Government

Attachment

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between the Ministry of Natural Resources and Environment, the institution designated by the Government of Ecuador and representatives of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project 00094106 **Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources** (award 00086955) "the Project".

2. In accordance with the provisions of the letter of agreement signed on *Date of signature (LOA)* and the project document, the UNDP country office shall provide support services for the Project as described below.

3. Support services to be provided:

Support services* (insert description)	**Schedule for the provision of the support services**	**Cost to UNDP of providing such support services (where appropriate)**	**Amount and method of reimbursement of UNDP (where appropriate)**
1. Payments, disbursements and other financial transactions	During project implementation	Universal Price List	Support Services
2. Recruitment of staff, project personnel, and consultants	During project implementation	Universal Price List	Support Services
3. Procurement of services and equipment, and disposal/sale of equipment	During project implementation	Universal Price List	Support Services
4. Organization of training activities, conferences, and workshops, including fellowships	During project implementation	Universal Price List	Support Services
5. Travel authorizations, visa requests, ticketing, and travel arrangements	During project implementation	Universal Price List	Support Services
6. Shipment, custom clearance, vehicle registration, and accreditation	During project implementation	Universal Price List	Support Services

* UNDP direct project support services will be defined yearly, and for those executed during the period, direct project costs will be charged at the end of each year based on the UNDP Universal Pricelist (UPL) or the actual corresponding service cost

PART VII. ABS Capacity Scorecard

Strategic Area of Support	No.	Issue	Scorecard	Initial Evaluation
1. Capacity to conceptualize and formulate policies, laws, strategies and programmes	1	The Access and Benefit-Sharing (ABS) agenda is being effectively championed / driven forward	0 -- There is essentially no ABS agenda; 1 -- There are some persons or institutions actively pursuing an ABS agenda but they have little effect or influence; 2 -- There are a number of ABS champions that drive the ABS agenda, but more is needed; 3 -- There are an adequate number of able "champions" and "leaders" effectively driving forwards an ABS agenda	2
	2	There is a legally designated institution(s) responsible for ABS with the capacity to develop a national ABS framework (i.e., laws, policies and/or regulations)	0 -- There is no institution(s) responsible for ABS; 1 – The institution(s) has financial resources but has limited personnel and expertise; 2 – The institution(s) has financial resources and personnel but limited expertise; 3 – The institution(s) has sufficient financial resources, personnel and expertise.	1
2. Capacity to implement policies, legislation, strategies and programmes	3	There is a legally designated ABS institution(s) responsible for ABS that can facilitate the implementation of the national ABS framework.	0 – The institution(s) does not have the financial resources, personnel, and planning/management skills; 1 – The institution(s) has financial resources but has limited personnel and planning/management skills; 2 – The institution(s) has financial resources and personnel but limited planning/management skills; 3 – The institution(s) has sufficient financial resources, personnel and planning/management skills.	1
	4	The ABS institution (s) is effectively led	0 – The ABS institution(s) has a total lack of leadership; 1 – The ABS institution(s) has weak leadership and provides little guidance; 2 – The ABS institution(s) has a reasonably strong leadership but there is still need for improvement; 3 – The ABS institution(s) is effectively led	1
	5	Human resources for ABS management are well qualified and motivated	0 -- Human resources are poorly qualified and unmotivated; 1 -- Human resources qualification is spotty, with some well qualified, but many only poorly and in general unmotivated; 2 – Human Resources in general reasonably qualified, but many lack in motivation, or those that are motivated are not sufficiently qualified; 3 -- Human resources are well qualified and motivated.	2

Strategic Area of Support	No.	Issue	Scorecard	Initial Evaluation
	6	The ABS institution(s) is audited and publicly accountable	0 – The ABS institution(s) is not being held accountable and not audited; 1 – The ABS institution(s) is occasionally audited without being held publicly accountable; 2 – The ABS institution(s) is regularly audited and there is a fair degree of public accountability but the system is not fully transparent; 3 – The ABS institution(s) is highly fully audited, and publicly accountable.	1
	7	Enforcement of ABS regulations	0 -- No enforcement of regulations is taking place; 1 -- Some enforcement of regulations is taking place but it is largely ineffective; 2 -- ABS regulations are regularly enforced but are not fully effective; 3 -- ABS regulations are highly effectively enforced.	2
	8	Individuals are able to advance and develop professionally	0 -- No career tracks are developed and no training opportunities are provided; 1 -- Career tracks are weak and training possibilities are few and not managed transparently; 2 -- Clear career tracks developed and training available; HR management however has inadequate performance measurement system; 3 -- Individuals are able to advance and develop professionally.	1
	9	Individuals are appropriately skilled for their jobs	0 -- Skills of individuals do not match job requirements; 1 -- Individuals have some or poor skills for their jobs; 2 -- Individuals are reasonably skilled but could further improve for optimum match with job requirement; 3 -- Individuals are appropriately skilled for their jobs	2
	10	Individuals are highly motivated	0 -- No motivation at all; 1 -- Motivation uneven, some are but most are not; 2 -- Many individuals are motivated but not all; 3 -- Individuals are highly motivated	2

Strategic Area of Support	No.	Issue	Scorecard	Initial Evaluation
	11	There are appropriate mechanisms of training, mentoring, and learning in place to maintain a continuous flow of new staff	0 -- No mechanisms exist; 1 -- Some mechanisms exist but unable to develop enough and unable to provide the full range of skills needed; 2 -- Mechanisms generally exist to develop skilled professionals, but either not enough of them or unable to cover the full range of skills required; 3 -- There are mechanisms for developing adequate numbers of the full range of highly skilled ABS professionals	2
3. Capacity to engage and build consensus among all stakeholders	12	ABS has the political commitment	0 -- There is no political will at all, or worse, the prevailing political will runs counter to the interests of ABS; 1 -- Some political will exists, but is not strong enough to make a difference; 2 -- Reasonable political will exists, but is not always strong enough to fully support ABS; 3 -- There are very high levels of political will to support ABS.	2
	13	Degree of public support on ABS issues	0 -- The public has little interest in ABS and there is no significant lobby for ABS; 1 -- There is limited support for ABS; 2 -- There is general public support for ABS and there are various lobby groups strongly pushing them; 3 -- There is tremendous public support in the country for ABS.	1
	14	The ABS institution(s) is mission oriented	0 -- Institutional mission is not defined; 1 -- Institutional mission is poorly defined and generally not known and internalized at all levels; 2 -- Institutional mission well defined and internalized but not fully embraced; 3 – Institutional mission is fully internalized and embraced.	2
	15	The ABS institution(s) can facilitate the partnerships needed to achieve its objectives	0 – The ABS institution(s) operate in isolation; 1 – The ABS institution(s) has facilitated some partnerships but significant gaps and existing partnerships achieve little; 2 – The ABS institution(s) has facilitated many partnerships with a wide range of national and local agencies, private sector and NGOs but there are some gaps and partnerships, are not always effective and do not always enable efficient achievement of ABS objectives; 3 – The ABS institution(s) has facilitated effective partnerships with national and local agencies, private sector and NGOs to enable achievement of ABS objectives in an efficient and effective manner.	2

Strategic Area of Support	No.	Issue	Scorecard	Initial Evaluation
4. Capacity to mobilize information and knowledge	16	The ABS institution(s) has the information it needs to enforce the national legal/policy ABS framework and to facilitate ABS deals	0 -- Information is virtually lacking; 1 – The ABS institution(s) has access to some information, but is of poor quality, is of limited usefulness, or is very difficult to access; 2 – The ABS institution(s) has access to a lot of information which is mostly of good quality, but there remain some gaps in quality, coverage and availability; 3 – The ABS institution(s) has the information it needs to enforce the national legal/policy framework and facilitate ABS deals.	2
	17	Individuals from the ABS institution(s) work effectively together as a team	0 -- Individuals work in isolation and don't interact; 1 -- Individuals interact in limited way and sometimes in teams but this is rarely effective and functional; 2 -- Individuals interact regularly and form teams, but this is not always fully effective or functional; 3 -- Individuals interact effectively and form functional teams.	2
5. Capacity to monitor, evaluate, report and learn	18	There is a legally designated institution(s) responsible for ABS and able to update the ABS national framework	0 – The institution(s) does not have the financial resources, personnel, and expertise; 1 – The institution(s) has financial resources but has limited personnel and expertise; 2 – The institution(s) has financial resources and personnel but limited expertise; 3 – The institution(s) has sufficient financial resources, personnel and expertise.	1
	19	ABS policy or law is continually reviewed and updated	0 -- There is no policy or law or it is old and not reviewed regularly; 1 -- Policy or law is only reviewed at irregular intervals; 2 – Policy or law is reviewed regularly but not annually; 3 -- Policy or law is reviewed annually.	1
	20	Society monitors ABS projects	0 -- There is no dialogue at all; 1 -- There is some dialogue going on, but not in the wider public and restricted to specialized circles; 2 -- There is a reasonably open public dialogue going on but certain issues remain taboo; 3 -- There is an open and transparent public dialogue about the state of the ABS projects.	1

Strategic Area of Support	No.	Issue	Scorecard	Initial Evaluation
	21	Institutions are highly adaptive, responding effectively and immediately to change promoted by implementation of the national ABS framework (i.e., laws, policies and/or regulations).	0 – There is no implementation of the national ABS framework at the moment; 1 -- Institutions do change but only very slowly; 2 -- Institutions tend to adapt in response to change but not always very effectively or with some delay; 3 -- Institutions are highly adaptive, responding effectively and immediately to change.	2
	22	The ABS institution(s) has effective internal mechanisms for monitoring, evaluation, reporting and learning on ABS projects	0 -- There are no mechanisms for monitoring, evaluation, reporting or learning; 1 -- There are some mechanisms for monitoring, evaluation, reporting and learning but they are limited and weak; 2 -- Reasonable mechanisms for monitoring, evaluation, reporting and learning are in place but are not as strong or comprehensive as they could be; 3 -- Institutions have effective internal mechanisms for monitoring, evaluation, reporting and learning.	1
	23	Individuals from ABS institutions are adaptive and continue to learn	0 -- There is no measurement of performance or adaptive feedback; 1 -- Performance is irregularly and poorly measured and there is little use of feedback; 2 -- There is significant measurement of performance and some feedback but this is not as thorough or comprehensive as it might be; 3 -- Performance is effectively measured and adaptive feedback utilized	1
			TOTAL SCORE	35
				50.7%

PART VIII. UNDP Social and Environmental Screening Tool

The completed template, which constitutes the Social and Environmental Screening Report, must be included as an annex to the Project Document. Please refer to the Social and Environmental Screening Procedure for guidance on how to answer the 6 questions.]

Project Information

Project Information	
1. Project Title	Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources
2. Project Number	PIMS S314
3. Location (Global/Region/Country)	Ecuador

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?

Briefly describe in the space below how the Project mainstreams the human-rights based approach

The project upholds the generic concept of centrality of human rights to sustainable development, poverty alleviation and ensuring fair distribution of development opportunities and benefits. The project actively pursues building capacity in Ecuador for implementing the Access and Benefit Sharing – (ABS) System, which is part of the Convention on Biological Diversity (CBD, 1992) and the subsequent Nagoya Protocol on Access and Benefit-sharing. This is an innovative multilateral environmental agreement that has significantly developed the international biodiversity regime and that has positive implications for the rights of indigenous peoples and local communities. It lays out the conditions and needs for establishing national processes that govern access to genetic resources and the sharing of benefits arising from their use. A central aspect of the project is to establish the procedures and laws for protecting these rights in Ecuador and building capacities for their implementation.

Another component of the project will support research of active compounds derived from the skin secretion of Ecuadorian amphibians with potential applications in biomedicine. During the project a permit will be granted for access to genetic material for research and not for developing products that would provide any immediate monetary benefits from the use of the genetic material and as such no benefit sharing would be negotiated. The permit for access to genetic resources for research would include a clause that calls for a new negotiation process the development of another agreement if as a result of this research, commercially valuable products are generated. In this case this second permit/ agreement will be defined where local communities and institutions of research and conservation of amphibians could be considered as beneficiaries of economic resources generated from the commercial use of the compounds of amphibians for conservation purposes. In this case the negotiation of the sharing of such benefits would be undertaken according to national law on ABS and following all relevant procedures on prior informed consent, thereby further upholding the human rights based approach. Some non-monetary benefits will occur in the project life

time and these include joint open access publications, training and technology transfer through the installation of a bioprospecting laboratory in the Centro Jambatu (Ecuador).

A third approach of the project will be to support conservation of critical habitats of 4 unique species at high risk of extinction by setting up protected areas in decentralized governments (GAD) and support their incorporation into the National Protected Area System. The Project will support the development of the Management Plan for each GAD Reserve. These Management Plans will be designed to ensure the participation of resident communities to facilitate gender- and intercultural-sensitive management of critical habitat: The project will support efforts to ensure these community stakeholders are consulted and engaged in the elaboration of the Management Plan and conservation activities

In this and broadly across all components the project will uphold the principle of Participation and inclusion and uphold equality and non-discrimination: At the local and region, the project will engage multiple and diverse governmental institutions, organizations and stakeholder groups. Their current and expected roles are summarized in Stakeholder Annex in the UNDP Prodoc . The project will also uphold The principal of accountability and rule of law will also be upheld by following all standard UNDP policies on monitoring, evaluation, audits, and transparency in project implementation. The legal context of the project is defined by the CPAP signed by the Government and UNDP and which includes reference to "ensure the inclusion of sustainable development approach... promotion of sustainable livelihoods, conservation equitable and sustainable use of biodiversity and ecosystems...". All CPAP provisions apply to this document.

Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment

The project does not specifically embark on activities to address gender equality and women's empowerment, rather the activities are designed for open participation regardless of gender. Efforts will be made to ensure equal representation of men and women in the project's seminars, workshops, training-of-trainers and other educational and awareness raising events of the project. Once implementation starts records will be kept on a number of parameters including 1) Total number of project staff full time female; 2) Total number of project staff full-time gender; 3) Total number of female and male members on the Project Steering Committee; 4) Number of jobs created by the project and aimed at women and men. The UNDP Gender Marker, requires that each project be qualified according to their relevance to gender. This will include an analysis of how the project will achieve its environmental objective considering the differences in the roles and needs of women and men.

Briefly describe in the space below how the Project mainstreams environmental sustainability

The project recognizes that sustainable management, protection, conservation, maintenance and rehabilitation of natural habitats and their associated biodiversity and ecosystem functions are fundamental to UNDP's efforts to develop and implement sustainable development pathways. The Government of Ecuador has requested UNDP and GEF incremental assistance to implement integrated emergency actions to conserve the diversity of amphibians and use its genetic resources in a sustainable way. Ecuador's amphibians are highly endangered and 50% fall outside existing protected areas. The project includes different approaches for conservation including in situ by closing the gaps in amphibian habitat conserved through the National Protected Area System. It also includes captive breeding programmes and bioprospecting given the potential for chemical compounds in amphibian skills that may have medicinal properties. Underlying these approach is the strengthening of national levels for ABS as the driver for conservation in which bio-prospecting could render incentives to conserve biodiversity in specific locations in the long-term through the negotiation of monetary and non-monetary benefits derived from potential products - in this case

decentralized government (GAD) Reserves. The project will also mainstream environmental sustainability by updating and implementing the Strategic Action Plan for Ecuadorian amphibians re-enforcing conservation in situ and ex situ in the country. In turn this will deliver global environmental benefits –GEBs- over a larger range of amphibian species and their habitats. It will also undertake an economic assessment of Ecuadorian amphibians as a strategic resource and mainstream this into national policies to provide alternative options for economic strategies and models reducing the need for emergency actions in the future and sustaining the GEB value of existing amphibian populations in situ. Similarly by improving capacities of the National Competent Authority and related agencies on Prior Informed Consent & Mutually Agreed Terms, the project will increased the delivery of GEBs in future bioprospecting negotiations. Finally, by strengthening the ABS framework in Ecuador in general, the project will provide an effective conservation mechanism for this megadiverse country, laying the foundation for generating further GEBs over the long term while safeguarding sustainable development options for the future.

Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks? *Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any "Yes" responses)*	**QUESTION 3: What is the level of significance of the potential social and environmental risks?** *Note: Respond to Questions 4 and 5 below before proceeding to Question 6*			**QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?**
Risk Description	***Impact and Probability (1-5)***	***Significance (Low, Moderate, High)***	***Comments***	***Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note thot the assessment should consider all potential impacts and risks.***
<u>Biodiversity and Sustainable use Related Standard:</u> Risk 1: Project activities proposed will include the collection of endangered species and their breeding in captivity. It also includes bio-prospecting. If correct protocols are not followed there is a risk of over extraction of natural populations and high mortality rates in captive breeding programmes undermining the planned conservation gains.	1	Low		The Project will undertake emergency rescue operations for 3 amphibian species in areas that consist of habitat that has been identified as critical for conservation in areas not protected and particularly where there are large-scale mining concessions that present eminent danger to the long term survival of these areas and hence a threat to natural populations. The collection and rescue of the target species and later breeding in captivity is thus considered an emergency and precautionary action without which native populations are likely to be lost. Emergency expeditions will be carried out by professionals with extensive field experience using local guides in inventory teams prioritizing areas with high compliance to habitat requirements for these species thereby increasing possibilities for encountering healthy individuals that will be transferred to prepared laboratories for captive breeding.

				In terms of reducing mortality risks in captive breeding programmes, the project has incorporated protocol to be implemented when carrying out the ex situ conservation efforts that consists of (i) Strict hygiene procedures, including the use of protective clothing, gloves, shoe covers and masks; (ii) Sterilization and disinfection of all equipment and terrariums that might come in contact with the frogs; and (iii) Zoo-sanitary methods for frogs that might have parasites, infections and diseases that must be controlled, prevented and treated. Rescue operations will be undertaken once both centers are ready to receive and maintain optimal conditions for the survival of genetically-viable populations. Furthermore for one of these species *Atelopus nanay* previously-rescued "founding" individuals eexists in Centro Jambatu and/or Amaru Amphibian Rescue Center and the conditions for captive breeding are increased. In terms of bioprospecting the project has selected different amphibian species. Three (*Agolychnis spurrelli, Cruziohyla calcarifer, Hypsiboas picturatus*) of the four species are already bred in captivity for biocommerce and no specimens from native populations will be used for the research. In the case of the fourth species *Atelopus nonay* as indicated above there have been some cases of successful breeding in captivity and hence the need to use specimens from native populations will be kept to a minimum.
<u>Biodiversity and Sustainable use Related Standard:</u> Risk 2: Numbers of individuals collected for captive breeding programmes and ex situ collections are insufficient to maintain genetically viable populations and provide the basis for future bioprospecting.	I = 3 P =3	**Moderate to low**		In order to increase the success of captive breeding, the project will collect at least 22 to 25 of each gender of each species. Rescued individuals must be F1, i.e. individuals resulting from random crossings of unrelated individuals (i.e. no siblings. The successful breeding means maintaining 80% survival rate of the 22 to 25 individuals collected of each gender of each species to ensure sufficient genetic variation in the population, which is necessary to maintain genetically viable populations, i.e. without problems of inbreeding depression. MAE is expediting the permit processes in recognition of the urgency of the threats facing these species. No collection should proceed without this permit. Emergency expeditions will be carried out by professionals with extensive field experience using local guides in inventory teams prioritizing areas with high compliance to habitat

				requirements for these species: for example the Cordillera del Cóndor, is very rich in biodiversity with a high level of amphibian endemism and is characterized by montane forest in good condition. On the other hand in Quimsacocha the paramo ecosystem, home of endemic amphibians has higher levels of intervention. Captivity programmes will build on the proven experience of the Centro Jambatu and will be further strengthened to ensure work under high standards of biosecurity and control of hazards to reduce mortality from accidents and to optimize breeding and feeding mechanisms.
<u>Biodiversity and Sustainable use Related Standard:</u> Risk 3 Project activities of component 1 are within or adjacent to critical habitats and may cause habitat disruption	1	Low		The project strategy includes specific actions to conserve critical habitat through its in situ approaches that will cover conservation gaps identified for amphibians not covered in the existing SNAP by creating new reserve areas with Provincial GADs. A gap analysis of critical habitat covered within the Natural Protected Areas Heritage of Ecuador (PANE) calculates that 8,328 hectares of critical habitat to the project's target species (A. balios, A. coynei and Atelopus sp. aff. longirostris) are unprotected. Efforts to protect critical habitat of 3 highly endangered Ecuadorian Amphibians will be supported by working with provincial government authorities to establish GAD reserves and integrate them in the SNAP. The steps to be followed in each are the following: Creation ordinance; Demarcating boundaries; Elaborating a Management Plan with a Program for Financial Sustainability; and incorporation into SNAP. To increase the chances of survival of target species, the in situ conservation work will ensure the inclusion of habitat enrichment and restoration measures in the Management Plans of new GAD reserves, as well as financial mechanisms in the Program for Financial Sustainability to cover the costs associated with pursuing these conservation measures. To accomplish this, experience and observations acquired by Centro Jambatu and MAE will be bolstered by biological monitoring of each species' habitat preferences beginning in Year 1 and continuing throughout the project's lifetime. In addition, given amphibians' association with water sources, the project will work with GAD Reserve management units to engage local farmers to adopt cleaner agricultural practices and reduce contaminants derived from agrochemicals. It is hoped that through the GADs, best practices in local development activities will be promoted, ultimately ensuring a safer environment for both

				amphibians and humans.
Standard 2: Climate Change Mitigation and Adaptation Risk 4: Extreme effects of *chytridiomycosis* and climate change accelerate impacts to amphibian populations at risk of extinction	I = 3 P =3	**Moderate**		The project strategy has been designed to pre-empt this risk recognizing the synergistic relationship of climate change and *chytridiomycosis* underlying amphibian decline- namely it will support an integrated strategy that combines emergency collection, and captivity breeding integrated with enhanced in-situ conservation. It must be underscored that chytridiomycosis is nearly impossible to be controlled in nature. Nevertheless, it can be completely removed from specimens in lab conditions. This is one of the key activities to be carried out as part of the ex-situ conservation activities of Component 1. In addition project actions will develop vulnerability indexes that incorporate climate data to guide priority action for amphibian conservation. This will be coordinated with relevant programs and projects that generate climate information including Adaptation to Climate Change through an Effective Water Governance in Ecuador which gathers climate data that is relevant to endangered and/or endemic amphibian species.

	QUESTION 4: What is the overall Project risk categorization?		
	Select one (see SESP for guidance)		**Comments**
	Low Risk	☐	
	Moderate Risk	X	The project takes an innovative and multi-pronged strategy to conserving highly endangered amphibian species. The underlying principal is to use ABS as a driver of this conservation and to protect options and existence value of these species for the benefit of future generations. This is a new area of conservation science. The project includes rescue operations of native populations and later captive breeding of some species; bio-prospection of others and in situ conservation of yet others. As such there are multiple and diverse actions. Each has had specific risk assessment and procedures developed to optimize benefits however as with all new area of works these will need to be carefully monitored as the project unfolds. As such a rating of moderate has been allocated to ensure that a strict framework is established for monitoring the risk reduction approaches during the implementation. This will include the

			hiring of experts to at the mid term review.
	High Risk	☐	
	QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?		
	Check all that apply		**Comments**
	Principle 1: Human Rights	☐	
	Principle 2: Gender Equality and Women's Empowerment	☐	
	1. Biodiversity Conservation and Natural Resource Management	X	
	2. Climate Change Mitigation and Adaptation	X	
	3. Community Health, Safety and Working Conditions	☐	
	4. Cultural Heritage	☐	
	5. Displacement and Resettlement	☐	
	6. Indigenous Peoples	☐	
	7. Pollution Prevention and Resource Efficiency	☐	

Final Sign Off

Signature	*Date*	*Description*
QA Assessor		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair		UNDP chair of the PAC. In some cases PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the project appraisal and considered in recommendations of the PAC.

SESP Attachment 1. Social and Environmental Risk Screening Checklist

Checklist Potential Social and Environmental Risks		
Principles 1: Human Rights		**Answer (Yes/No)**
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	No
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? [146]	No
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	No
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	No
5.	Are there measures or mechanisms in place to respond to local community grievances?	No
6.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	No
7.	Is there a risk that rights-holders do not have the capacity to claim their rights?	No
8.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	No
9.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to project-affected communities and individuals?	No
Principle 2: Gender Equality and Women's Empowerment		
1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	No
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	No
3.	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	No
3.	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? *For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being*	No
Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below		
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management		

[146] Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

Checklist Potential Social and Environmental Risks		
1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? *For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes*	No
1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	Yes
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	No
1.4	Would Project activities pose risks to endangered species?	No
1.5	Would the Project pose a risk of introducing invasive alien species?	No
1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	No
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	No
1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater extraction*	No
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	Yes
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	No
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? *For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.*	No
Standard 2: Climate Change Mitigation and Adaptation		
2.1	Will the proposed Project result in significant[147] greenhouse gas emissions or may exacerbate climate change?	No
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	Yes
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? *For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding*	No
Standard 3: Community Health, Safety and Working Conditions		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	No

[147] In regards to CO_2, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

Checklist Potential Social and Environmental Risks		
3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	No
3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	No
3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	No
3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No
3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	No
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	No
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labor standards (i.e. principles and standards of ILO fundamental conventions)?	No
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	No
Standard 4: Cultural Heritage		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may also have inadvertent adverse impacts)	No
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	No
Standard 5: Displacement and Resettlement		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	No
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	No
5.3	Is there a risk that the Project would lead to forced evictions?[148]	No
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	No
Standard 6: Indigenous Peoples		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	No
6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	No
6.3	Would the proposed Project potentially affect the rights, lands and territories of indigenous peoples (regardless of whether Indigenous Peoples possess the legal titles to such areas)?	No

[148] Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

Checklist Potential Social and Environmental Risks		
6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	No
6.4	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No
6.5	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	No
6.6	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	No
6.7	Would the Project potentially affect the traditional livelihoods, physical and cultural survival of indigenous peoples?	No
6.8	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	No
Standard 7: Pollution Prevention and Resource Efficiency		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	No
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	No
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol*	No
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	No
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	No

D. Sign Off

Project Manager	**Gabriel Jaramillo, Programme Specialist, UNDP Ecuador** **Date April 1, 2015**
Programme Manager	**Diego Zorrilla, Resident Representative, UNDP Ecuador** **Date April 1, 2015**

PART IV. Management Effectiveness Tracking Tool (See separate file)

PART X. CoFinancing Letters (See separate file)

PART XI. UNDP Risk Matrix

OFFLINE RISK LOG

(see Deliverable Description for the Risk Log regarding its purpose and use)

Project Title: Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources	Award ID:00086955	Date:03/12/2015

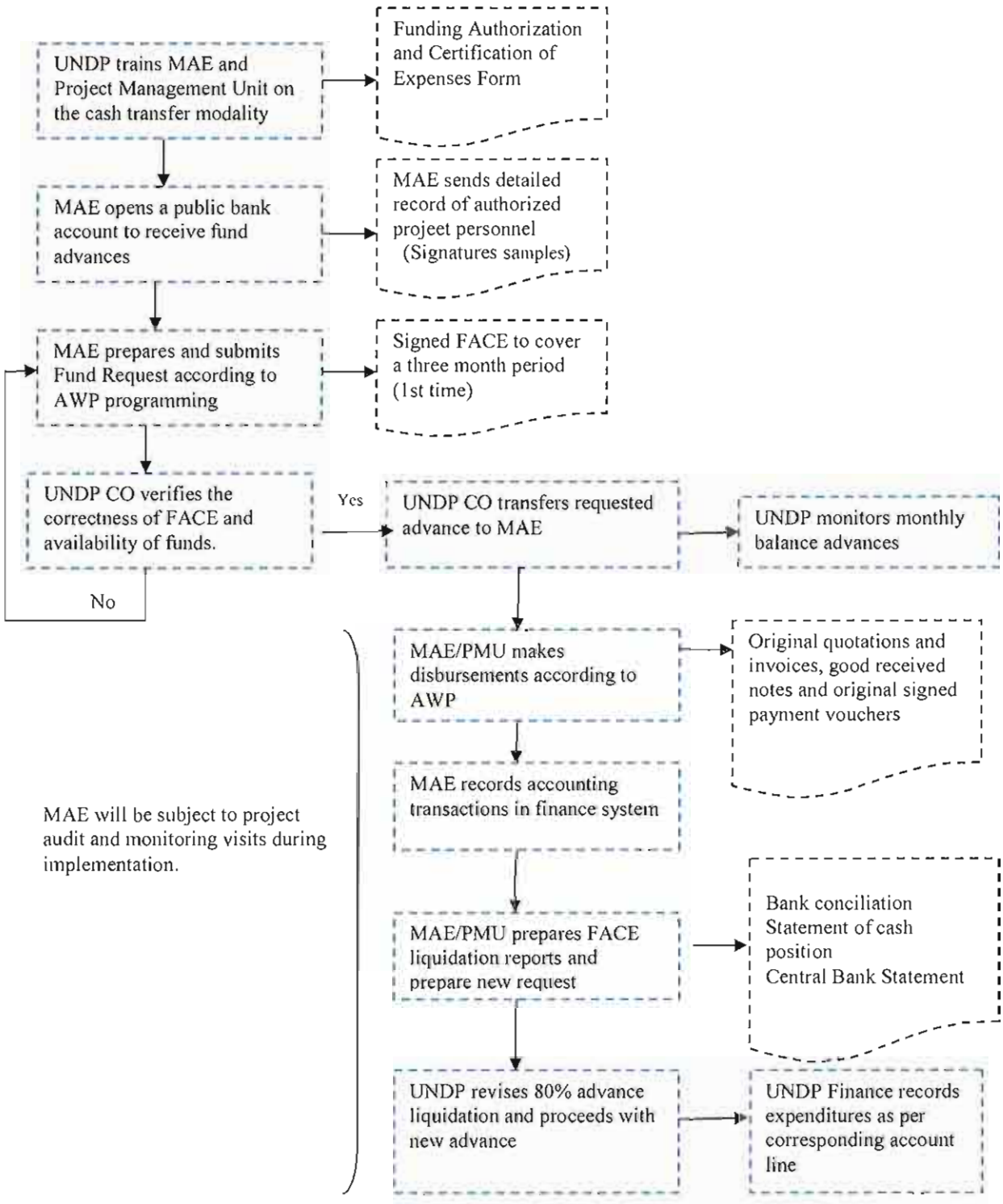
#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
1	Numbers of individuals collected for captive breeding programmes and ex situ collections are insufficient to maintain genetically viable populations and provide the basis for future bioprospecting. Key factors for the reproduction and maintenance of captive breeding species cannot be identified	*03/12/2015*	**Environmental**	P = 2 I = 3	Emergency expeditions will be carried out by professionals with extensive field experience using local guides in inventory teams prioritising areas with high compliance to habitat requirements for these species. Captivity programmes will build on the proven experience of the Centro Jambatu and will be further strengthened to ensure work under high standards of biosecurity and control of hazards to reduce mortality.	Gabriel Jaramillo, Programme Specialist	*Carla Chacon, Associate Programme*	November 2014	*Increasing*
2	Extreme effects of chytridiomycosis	03/12/2015	**Environmental**	P = 5	An integrated strategy that combines emergency collection (life and genetic	Gabriel Jaramillo, Programme	Carla Chacon, Associate	November 2014	Increasing

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
	and climate change accelerate impacts to amphibian populations at risk of extinction			I = 4	bank) and captivity breeding integrated with enhanced in-situ conservation. It must be underscored that chytridiomycosis is nearly impossible to be controlled in nature. Nevertheless, it can be completely removed from specimens in lab conditions. In addition project actions will develop vulnerability indexes that incorporate climate data to guide priority action for amphibian conservation.	Specialist	Programme		
3	Skin secretions of target species for bioprospecting studies do not contain new peptides to test bioactive activity and advance ABS contracts	03/12/2015	**Environmental** Financial Operational Organizational Political Regulatory Strategic Other	P = 1 I = 3	Association with Queens University Laboratory that has a high technology and previous scientific analysis on three species would be an advantage to find new peptide in this project.	Gabriel Jaramillo, Programme Specialist	Carla Chacon, Associate Programme	February 2015	No change
5	Lack of qualified candidates apply for scholarships to pursue graduate-level studies in bioprospecting and ABS-related topics	03/12/2015	**Other**	P= 3 I= 4	The project will support SENESCYT's efforts to promote scholarship opportunities. Interaction with national universities and research centres is expected to generate interest in qualified candidates.	Gabriel Jaramillo, Programme Specialist	Carla Chacon, Associate Programme	January 2015	No change
6	Construction of Hydroelectric Plant in Carchi Province	03/12/2015	**Strategic**	P=4 I=2	The project will coordinate with MICSE and MAE throughout the lifetime of the project to ensure construction does not impact on endangered species' habitat.	Gabriel Jaramillo, Programme Specialist	Carla Chacon, Associate Programme	January 2015	No change

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
7	Lack of political will to ratify the Nagoya Protocol	03/12/2015	**Political**	P= 4 I=3	Outcome 3 will support the updating of the regulations on ABS associated with the Protocol	Gabriel Jaramillo, Programme Specialist	Carla Chacon, Associate Programme	January 2015	No change
8	Lack of political will and funding hinders local municipal authorities to conserve amphibian species at risk of extinction	03/12/2015	**Political**	P= 2 I=3	Decentralized Autonomous Governments are interested in developing local conservation plans. Project will coordinate with MAE and local authorities to accomplish agreements.	Gabriel Jaramillo, Programme Specialist	Carla Chacon, Associate Programme	January 2015	Reducing

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PART XII. Cash Transfer Modality Workflow



PART XIII. References

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United Nations Development Programme

Ecuador

PROJECT DOCUMENT

PIMS 5314

Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources

CoFinancing Letters

Table of Contents

Letter 1.:	Ministry of Environment	3
Letter 2.:	SENESCYT	8
Letter 3.:	IKIAM	12
Letter 4.:	Province of Carchi	16
Letter 5.:	Province of Guayas	18
Letter 6.:	ETAPA	22
Letter 7.:	Queen's University	29
Letter 8.:	JAMBATU / FUNDACION OTONGA	32
Letter 9.:	BIOPARQUE AMARU ZOOLOGICO CUENCA	37
Letter 10.:	UNDP	42
Letter 11.:	Letter of Agreement (LoA)	43
Letter 12.:	UICN	46

Letter 1.: Ministry of Environment

Ministerio del Ambiente

Oficio Nro. MAE-D-2015-0152

Quito, D.M., 11 de marzo de 2015

Asunto: MUY URGENTE carta de cofinanciamiento al proyecto GEF "Conservación de la Biodiversidad de Anfibios Ecuatorianos y Uso Sostenible de sus Recursos Genéticos"

Ms.
Adriana Dinu
Undp/gef Deputy Executive Coordinator
EEG/BDP UNDP

Economista
Diego Zorrilla
Representante Residente
PROGRAMA DE LAS NACIONES UNIDAS PARA EL DESARROLLO
En su Despacho

De mi consideración:

El Ministerio de Ambiente del Ecuador, en calidad de Punto Operativo para el Ecuador y como socio en la preparación e implementación del proyecto "Conservación de la Biodiversidad de Anfibios Ecuatorianos y Uso Sostenible de sus Recursos Genéticos", a ser financiado por el Fondo para el Medio Ambiente Mundial (GEF por sus siglas en inglés), que cuenta con el apoyo de la Organización de las Naciones Unidas para el Desarrollo (PNUD) como agencia implementadora GEF; y el cual está enmarcado dentro de las prioridades nacionales del estado ecuatoriano, confirma que las líneas de co-financiamiento de esta Cartera de Estado, se distribuyen de la siguiente manera.

Componente 1. Acciones de emergencia para garantizar la supervivencia de las especies de anfibios en peligro de extinción de Ecuador para la conservación y fines de bioprospección

En efectivo: USD $ 3'061.205.68 En especie: USD $ 233.528

Componente 3. Fortalecimiento institucional para la implementación de las medidas de conservación de la biodiversidad y el uso sostenible de sus recursos genéticos en Ecuador, utilizando anfibios como estudio de caso piloto.

En efectivo: USD$ 392.914,24 En especie: USD$ 265.951.24

Es así que el monto total de cofinanciamiento será de USD$ 3'454.119,24 en efectivo y USD$ 499.479,24 en especie, para los cinco años de duración del proyecto. No obstante,

Ministerio del Ambiente

Oficio Nro. MAE-D-2015-0152

Quito, D.M., 11 de marzo de 2015

actualmente el Ministerio del Ambiente se encuentra en el proceso de creación del Instituto Nacional de Biodiversidad, cuyo objetivo es planificar, promover, coordinar y ejecutar procesos de investigación relacionados al campo de la biodiversidad, orientados a la conservación y aprovechamiento sostenible de este recurso estratégico, de acuerdo a las políticas ambientales existentes. Por tal motivo, debido a que esta iniciativa y el instituto coinciden en alcanzar el mismo objetivo, una vez que arranquen las actividades de este último, se apalancarían recursos de cofinanciamiento.

Atentamente,

Documento firmado electrónicamente

Mgs. Lorena Tapia Núñez
MINISTRA DEL AMBIENTE

Copia:

Señora Ingeniera
Ximena Alexandra Ulloa Loza
Coordinadora General de Planificación Ambiental

Señora Doctora
Carla Ximena Cárdenas Monroy
Subsecretaria de Patrimonio Natural

Señor
Francisco José Prieto Albuja
Director Nacional de Biodiversidad

Señor
Alfonso Wilson Rojas
Especialista en Recursos Genéticos - Dirección Nacional de Biodiversidad

Magister
Gabriel Jaramillo
Especialista de Programa
PROGRAMA DE LAS NACIONES UNIDAS PARA EL DESARROLLO

Señorita
Sofía Cristina Panchi Robles
Responsable de Cooperación Internacional

Señorita
Adriana Alexandra Matamoros Vargas
Analista de Planificación e Inversión 1

Translated version:

Ministerio del Ambiente

Document Number: MAE-D-2015-0152

Quito, March 11th 2015

Subject: URGENT co-financing letter to the GEF project "Conservation of the Biodiversity of Ecuadorian Amphibians and Sustainable Use of Genetic Resources"

Ms
Adriana Dinu
UNDP/GEF Deputy Executive Coordinator
EEG/BDP UNDP

Economist
Diego Zorrilla
Resident Representative
UNITED NATIONS DEVELOPMENT PROGRAM

(Hand-delivered).

Dear Sir / Madam,

The Ministry of the Environment of Ecuador, as the Operating Point for Ecuador and as an associate in the preparation and implementation of the project "Conservation of the Biodiversity of Ecuadorian Amphibians and Sustainable Use of their Genetic Resources", to be financed by the Global Environment Fund (GEF), with the support of the United Nations Development Program (UNDP), with GEF being the implementing agency, and which is framed within the national priorities of the Ecuadorian State, confirms that the lines of co-financing of this Ministry are distributed as follows:

Component 1. Emergency action to ensure the survival of amphibian species in danger of extinction in Ecuador for conservation and bioprospecting purposes.

In grant: USD $ 3,061,205.68 In kind: USD $ 233,528

Component 3. Institutional strengthening for the implementation of the measures of biodiversity conservation and sustainable use of genetic resources in Ecuador, using amphibians as a pilot case study.

In grant: USD $ 393,914.24 In kind: USD $ 265,951.24

Ministerio del Ambiente

GOBIERNO NACIONAL DE LA REPÚBLICA DEL ECUADOR

Thus, the total amount of co-financing will be USD $ 3,454,119.24 in cash and USD $ 499,479.24 in kind, for the five years of the duration of the project. Nevertheless, the Ministry of the Environment is currently in the process of creating the National Biodiversity Institute; which aims to plan, promote, coordinate and implement research processes related to the field of biodiversity, oriented to conservation and sustainable use of this strategic resource, according to existing environmental policies. Therefore, owing to the fact that this initiative and the Institute agree to achieve the same goal, once the activities of the latter start, co-financing resources will apply.

Best regards,

Electronically signed document

Lorena Tapia Núñez
Minister of Environment
MINISTRY OF ENVIRONMENT

With copies to:

Engineer Ximena Alexandra Ulloa Loza
General Coordinator of Environmental Planning

Dr Carla Ximena Cárdenas Monroy
Head of the Secretariat of Natural Heritage

Mr Francisco José Prieto Albuja
National Director of Biodiversity

Mr Alfonso Wilson Rojas
Genetic Resources Specialist - National Biodiversity

Magister Gabriel Jaramillo
Programme Specialist
UNITED NATIONS DEVELOPMENT PROGRAM

Ms Sofía Cristina Panchi Robles
Head of International Cooperation

Ms Adriana Alexandra Matamoros Vargas
Planning and Investment Analyst 1

Papel Ecológico

Calle Madrid 1159 y Andalucía
Quito - Ecuador
Código Postal: 170150

Ministerio del Ambiente

GOBIERNO NACIONAL DE LA REPÚBLICA DEL ECUADOR

Thus, the total amount of co-financing will be USD $ 3,454,119.24 in cash and USD $ 499,479.24 in kind, for the five years of the duration of the project. Nevertheless, the Ministry of the Environment is currently in the process of creating the National Biodiversity Institute; which aims to plan, promote, coordinate and implement research processes related to the field of biodiversity, oriented to conservation and sustainable use of this strategic resource, according to existing environmental policies. Therefore, owing to the fact that this initiative and the Institute agree to achieve the same goal, once the activities of the latter start, co-financing resources will apply.

Best regards,

Electronically signed document

Lorena Tapia Núñez
Minister of Environment
MINISTRY OF ENVIRONMENT

With copies to.

Engineer Ximena Alexandra Ulloa Loza
General Coordinator of Environmental Planning

Dr Carla Ximena Cárdenas Monroy
Head of the Secretariat of Natural Heritage

Mr Francisco José Prieto Albuja
National Director of Biodiversity

Mr Alfonso Wilson Rojas
Genetic Resources Specialist - National Biodiversity

Magister Gabriel Jaramillo
Programme Specialist
UNITED NATIONS DEVELOPMENT PROGRAM

Ms Sofía Cristina Panchi Robles
Head of International Cooperation

Ms Adriana Alexandra Matamoros Vargas
Planning and Investment Analyst 1

Letter 2.: SENESCYT

Secretaría de Educación Superior, Ciencia, Tecnología e Innovación

Oficio Nro. SENESCYT-SESCT-2015-0139-CO

Quito, D.M., 20 de febrero de 2015

Asunto: Respuesta solicitud de apoyo para cofinanciamiento proyecto GEF Anfibios

Señora Magister
Lorena Tapia Nuñez
Ministra del Ambiente
MINISTERIO DEL AMBIENTE

Señora Ingeniera
Ximena Alexandra Ulloa Loza
Coordinadora General de Planificación Ambiental
MINISTERIO DEL AMBIENTE

Señorita
Sofía Cristina Pinchi Robles
Responsable de Cooperación Internacional
MINISTERIO DEL AMBIENTE

Señorita
Adriana Alexandra Matamoros Vargas
Analista de Planificación e Inversión 1
MINISTERIO DEL AMBIENTE
En su Despacho

De mi consideración:

En atención al Oficio No. MAE-D-2015-0059, de 27 de enero de 2014, me permito manifestar que la Secretaría de Educación Superior, Ciencia, Tecnología e Innovación, conoce sobre la propuesta del proyecto *"Conservación de la Diversidad de Anfibios Ecuatorianos y uso sostenible de sus recursos genéticos"*, mismo que está siendo impulsado por el Ministerio del Ambiente en calidad de socio ejecutor, en coordinación con otros socios estratégicos; a ser financiado por el Fondo para el Medio Ambiente Mundial GEF (por sus siglas en inglés) e implementado por la organización de las Naciones Unidas para el Desarrollo (PNUD).

Al respecto, me permito confirmar que la Secretaría de Educación Superior, Ciencia, Tecnología e Innovación, comparte con el objetivo que persigue esta iniciativa que es implementar acciones integrales de emergencia para conservar la diversidad de anfibios del Ecuador y utilizar sus recursos genéticos de manera sostenible y que algunas de sus actividades contribuyen con este fin.

Ante lo expuesto, esta Secretaría de Estado en el marco de sus competencias y atribuciones, tiene a bien indicar que ha colaborado con esta iniciativa, a través de los diferentes programas de becas de pregrado y posgrado para estudios de maestría y doctorado en carreras relacionadas a las ciencias biológicas, conservación y ecología de la siguiente manera:

ESTADO	No. BECARIOS	MONTO COMPROMETIDO
ADJUDICATARIOS	74	$1.235.263,44
EN ESTUDIOS	114	19.887.062,18
RETORNADOS	60	3.770.968,65
Total general	248	$ 34.893.294,28

Adicionalmente, la Secretaría de Educación Superior, Ciencia, Tecnología e Innovación ha financiado estudios para caracterizar, inventariar y preservar la biodiversidad del Ecuador, lo cual ha permitido generar los insumos

Secretaría de
Educación Superior,
Ciencia, Tecnología e Innovación

Oficio Nro. SENESCYT-SESCT-2015-0139-CO

Quito, D.M., 20 de febrero de 2015

necesarios para el desarrollo de política pública en investigación que favorezca el cambio de matriz productiva basada en el aprovechamiento sustentable de los recursos naturales del país.

Entre los estudios financiados constan:

Asimismo, desde el año 2012 se han financiado 8 proyectos en áreas temáticas de biodiversidad y ecosistemas a través de las convocatorias dirigidas a universidades, escuelas politécnicas, institutos públicos de investigación y empresas públicas (EP), con un monto total de $ 5.971.144,14.

Con estos antecedentes, la Secretaría de Educación Superior, Ciencia, Tecnología e Innovación en el ámbito de sus competencias, está puesta a colaborar con esta iniciativa a través de los diferentes programas de becas de posgrado, de conformidad con los requisitos y parámetros para su acceso, postulación y selección establecidos en la normativa vigente.

Con sentimientos de distinguida consideración.

Atentamente,

Documento firmado electrónicamente

René Ramírez Gallegos
SECRETARIO DE EDUCACIÓN SUPERIOR, CIENCIA, TECNOLOGÍA E INNOVACIÓN

Referencias:
- SENESCYT-SESCT-2015-0129-EX

ar/ir/fv/jm/mp/jv

Translated version:

Secretaría de Educación Superior, Ciencia, Tecnología e Innovación

Document Number: SENESCYT-SESCT-2015-0139-CO

Quito, February 20th 2015

Subject: Response to request for co-financing support of GEF Amphibians project.

Lorena Tapia Núñez
Minister of Environment
MINISTRY OF ENVIRONMENT

Ximena Alexandra Ulloa Loza
General Coordinator of Environmental Planning
MINISTRY OF ENVIRONMENT

Sofía Cristina Panchi Robles
Head of International Cooperation
MINISTRY OF ENVIRONMENT

Adriana Alexandra Matamoros Vargas
Planning and Investment Analyst 1
MINISTRY OF ENVIRONMENT
(Hand-delivered)

Dear Ms/Mrs:

In response to Document Number MAE-D-2015-0059, of January 27, 2014, I wish to state that that the Ministry of Higher Education, Science, Technology and Innovation, is aware of the project "Conservation of Ecuadorian Amphibian Diversity and sustainable use of Genetic Resources", which is being promoted by the Ministry of Environment as implemeaning partner, in coordinstion with other strategic partners, and which is to be funded by the Global Environment Facility GEF and implemented by the United Nations Development Programme (UNDP)

In this regard, I wish to confirm that the Ministry of Higher Education, Science, Technology and Innovation, consistent with the objective of this initiative to implement comprehensive emergency actions to conserve the diversity of amphibians of Ecuador and use their genetic resources sustainably, and that several of its activities contribute to this end.

Given the above, the Secretary of State in the framework of its powers and duties, must indicate its contribution to the initiative through various programs of undergraduate and graduate scholarships for master's and doctoral degrees in life sciences, conservation and ecology as follows:

STATUS	Number of Scholarship holders	Committed amount
AWARDEES	74	11,235,263.44
IN PROGRESS	114	19,887,063.18
RETURNED	60	3,770,968.66
Total general	248	$ 34,893,294.28

Additionally, the Ministry of Higher Education, Science, Technology and Innovation has funded studies to characterize, inventory and preserve the biodiversity of Ecuador, which has generated the necessary inputs for the development of public policy research, which promotes productive exchange matrix based on the sustainable use of natural resources.

Among the studies financed are the following:

STUDY	AMOUNT	STATUS
Genetic characterization and bioinformatic analysis of the biodiversity of Yasuní National Park.	457,237.00	Completed
Consultancy for the study to estimate the diversity of fish, amphibians, reptiles, mammals, birds and insects that inhabit little investigated read of the Yasuni National Park.	286,230.56	Completed
Genetic characterization and bioinformatic analysis of the biodiversity of Podocarpus National Park, Sangay National Park, Llanganates National Park and Yacuri National Park.	3,193,344.00	In progress
Assessing the impact of the oil industry on the state of conservation of aquatic ecosystems and the health of populations, located in the lower stretches of the Napo River.	658,600.00	Awarded
TOTAL	$ 4,595,411.56	

Furthermore, since 2012, 8 projects have been financed in thematic areas of biodiversity and ecosystems through invitations addressed to universities, polytechnics, research institutes and publicly owned enterprises (SOEs), with a total amount of $ 5,971,144 .14.

With this background, the Ministry of Higher Education, Science, Technology and Innovation in the scope of its powers, is prepared to contribute to this initiative through various programs of postgraduate scholarships, in accordance with the conditions and parameters for access, application and selection established in the regulations.

Yours Faithfully,

Electronically signed document
René Ramírez Gallegos
Head of the Secretariat of Higher Education, Science, Technology and Innovation (Senescyt)

Referencias:
- SENESCYT-SESCT-2015-0129-EX

/lo/fvjm/tpjv

Letter 3.: IKIAM



REF: Carta de cofinanciamiento GEF (Universidad Regional Amazónica IKIAM)

Ms. Adriana Dinu.
UNDP/GEF Executive Coordinator
United Nations Development Programme (UNDP)
304 East 45th Street, 9th Floor
New York, NY 10017 USA

La Universidad Regional Amazónica IKIAM, expresa su interés y compromiso con el proyecto "Conservación de la Biodiversidad de Anfibios Ecuatorianos y Uso Sostenible de sus Recursos Genéticos", GEF Project ID 5534, que será ejecutado por el Ministerio del Ambiente del Ecuador en conjunto con el Centro Jambatu de Investigación y Conservación de Anfibios y apoyado por el Programa de las Naciones Unidas para el Desarrollo (PNUD), como agencia implementadora del Fondo Mundial para el Medio Ambiente (GEF por sus siglas en inglés).

Al respecto, me permito ratificar que las actividades/proyectos de la Universidad Regional Amazónica IKIAM contribuyen a alcanzar los objetivos que busca esta iniciativa (conservación de anfibios y usos sostenible de sus recursos genéticos) y por tal motivo me permito confirmar que las líneas de apoyo en co-financiamiento se distribuyen de la siguiente manera:

Componente 1: Acciones de emergencia para garantizar la supervivencia de las especies de anfibios en peligro de extinción de Ecuador para la conservación y fines de bioprospección: En efectivo o dinero presupuestado $USD _____ En especie $USD_____

Componente 2: Descubrimiento de compuestos activos derivados de la secreción de la piel de anfibios ecuatorianos con potenciales aplicaciones en biomedicina. IKIAM desarrollará la infraestructura de laboratorios de investigación y los equipará con la tecnología necesaria para llevar a cabo investigación. Adicionalmente contratará investigadoras/es que ejecuten el proyecto y que garanticen que la trasferencia tecnológica en la universidad ecuatoriana para Mejorar las capacidades técnicas y científicas para la bioprospección a través de transferencia de tecnología en una relación con la Universidad de Queens en Belfast. Adicionalmente, IKIAM participará en la fortalecimiento del banco de vida de los anfibios.
En efectivo o dinero presupuestado **$USD 1,491,325.01** En especie $USD 00

Componente 3: Fortalecimiento institucional para la implementación de las medidas de conservación de la biodiversidad y el uso sostenible de sus recursos genéticos en Ecuador, utilizando anfibios como estudio de caso piloto. IKIAM se involucrará en este componente del proyecto en la generación de información respecto a los anfibios ecuatorianos para alcanzar mayor concientización a los ciudadanos sobre la

riqueza de anfibios en Ecuador y el Acceso a los Recursos Genéticos y Participación Justa y Equitativa en los Beneficios que se deriven de su utilización (ABS).
En efectivo o dinero presupuestado **$USD 446,000**. En especie $USD___

Es importante mencionar que la Universidad Regional Amazónica IKIAM está en proceso de creación, por ello el aporte en especies es nulo. De otro lado, el carácter de universidad nueva estimula a IKIAM a orientar su infraestructura, y procesos de investigación hacia las líneas de investigación comprendidas en el proyecto. Durante los próximos cinco años, duración de este proyecto, IKIAM se compromete a trabajar en el sentido de los componentes 2 y 3 de esta iniciativa. De esta manera IKIAM busca desarrollar la investigación y complementar así sus modelos de enseñanza aprendizaje e inserción en la nueva matriz productiva del Ecuador.

En total el apoyo en cofinanciamiento será de **USD 1,937,325.01** en efectivo.

Con sentimiento de alta consideración, le saluda atentamente,

Carlos Ávila, PhD
Miembro Designado de la Comisión Gestora
Universidad Regional Amazónica IKIAM
Quito, febrero 6 de 2015

CC: Ximena Ulloa, Coordinadora General de Planificación Ambiental del Ministerio del Ambiente
Sofía Panchi, Responsable de Gestión Internacional del Ministerio del Ambiente
Adriana Matamoros, Analista en Gestión Internacional del Ministerio del Ambiente

Translated version:

IKIAM
UNIVERSIDAD REGIONAL AMAZÓNICA

Reference: Cofinancing Letter GEF (Amazonica Regional University IKIAM)

Ms. Adriana Dinu
UNDP/GEF Executive Coordinator
United Nations Development Programme (UNDP)
304 E at 45th Street, 9th Floor
New York, NY 10017 USA

The Amazonica Regional University IKIAM, express its interest and commitment with the project ***"Conservation of Amphibian Diversity in Ecuador and sustainable use of genetic resources"*** GEF Project ID 5534, which will be executed by the Ministry of Environment of Ecuador in jointly coordination with the Jambatu Center for Research and Amphibian Conservation and with the support of the United Nations Development Programme (UNDP), as the implementing ag ency for the Global Environment Fund (GEF).

In this context, I hereby ratify that the activities/projects of the Amazonica Regional University contribute to achieve the objectives sought by this initiative (amphibian conservation and sustainable use of genetic resources) and therefore I confirm that the line support for co financing is the following:

Outcome 1: Emergency actions to ensure the survival of amphibians' species in danger of extinction of Ecuador for conservation and with bioprospecting purposes: In budgeted cash or money $ USD _____ In kind $ USD _____

Outcome 2: Discovery of active compounds derived from the skin secretion of Ecuadorian amphibians with biomedicine potential applications.

IKIAM will develop the infrastructure for research labs and they will be equipped with the necessary technology to carry out this research. Likewise, researches will be hired to execute the project and to ensure technological transfer to the University in order to improve technical and scientific capacities for bio prospection through technological transfer in close collaboration with the University of Queens in Belfast. Additionally, IKIAM will participate in the strengthening of the bank of living amphibians.

In budgeted cash or money: **$ USD 1'491.325,01**

Letter 5.: Province of Guayas

REPUBLICA DEL ECUADOR
GOBIERNO AUTÓNOMO DESCENTRALIZADO
PROVINCIAL DEL GUAYAS
PREFECTURA

Oficio No. 02572-PG-JJV-2015
Guayaquil, 14 de abril del 2015

Ms. ADRIANA DINU
UNDP/GEF Executive Coordinator
United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017
USA

De mis Consideraciones:

El Gobierno Autónomo Descentralizado Provincial del Guayas, expresa su interés y compromiso con el proyecto **"Conservación de la Biodiversidad de Anfibios Ecuatorianos y Uso Sostenible de sus Recursos Genéticos"** GEF Project ID 5534, que será ejecutado por el Ministerio del Ambiente del Ecuador, en conjunto con el Centro Jambatu de Investigación y Conservación de Anfibios y apoyado por el Programa de las Naciones Unidas para el Desarrollo (PNUD), en los siguientes componentes:

Componente 1. Acciones de emergencia para garantizar la supervivencia de las especies de anfibios en peligro de extinción de Ecuador para la conservación y fines de bioprospección. **Total:**USD$57.024,73; **Especie**:US$40.578,93; **Dinero presupuestado**: US$16.445,80.

Componente 3. Fortalecimiento institucional para la implementacion de las medidas de conservacion de la biodiversidad y el uso sostenible de sus recursos geneticos en Ecuador, utilizando anfibios como caso de estudio piloto: Total: USD$2.919,47; **Especie: USD$893,87; Dinero presupuestado**: USD$ 2.025,60.

Nuestra participación promovería localmente a través de los siguientes procesos:

1) **Fortalecer el Sistema Provincial de Áreas de Conservación(SPAC) en el cantón Naranjal de la provincia del Guayas, y**
2) **Conservar el área identificada como sitio prioritario de Conservación de acuerdo al Estudio de Analisis de Vacios de Conservación del Guayas.**

En virtud de lo anterior, es nuestro compromiso proporcionar fondos de co-financiación por un Total de USD$59.944,20, para los cinco años de duración del Proyecto, repartidos en: USD$18.471,40 en dinero presupuestado y USD$41.472,80 **dinero en especies**.

Cabe resaltar que ninguno de estos fondos correspondería a dinero en efectivo o transferencia alguna de la Prefectura del Guayas, a las instituciones participantes en este proyecto.

REPÚBLICA DEL ECUADOR
GOBIERNO AUTÓNOMO DESCENTRALIZADO
PROVINCIAL DEL GUAYAS
PREFECTURA

Las actividades del proyecto a ser cofinanciadas con nuestros fondos son las siguientes:

1. Visita previa al área
2. Socialización del SPAE
3. Levantamiento datos campo y Elaboración Informe Técnico Externo (Tiempo Pascual)
4. Socialización y Aprobación de Informe Técnico Externo
5. Participación Taller para Elaboración Plan de Sostenibilidad Financiera
6. Elaboración de Borrador de Ordenanza para declaratoria
7. Co-Participación en Plan de Manejo del Área de Conservación con enfoque de objetos de conservación: anfibios
8. Co-Participación en ejecución de medidas del Aplicación del Plan de Manejo
9. Actividades de socialización, del Plan de Acción Estratégico para los anfibios ecuatorianos actualizado

Con lo cual sería nuestro compromiso de aporte al cofinanciamiento requerido para cumplir con los objetivos del proyecto.

Con sentimiento de alta consideración, le saluda,

Atentamente,

Jimmy Jairala Vallejo
PREFECTO PROVINCIAL DEL GUAYAS

C.C.: Ing. Ceyda Herrera Villao, Directora de Gestión Ambiental del G.P.G.
Archivo

Translated version:

Republic of Ecuador
Decentralized Autonomous
Government of the province of Guayas

Document Number: 02572-PG-JJV-2015
Guayaquil, 14th April 2015

Ms. Adriana Dinu
UND/ GEF Executive Coordinator
United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017
USA

Dear Ms/Mrs:

The Decentralized Autonomous Government of the province of Guayas expresses its interest and commitment with the project "Conservation of Ecuadorian Amphibian Diversity and sustainable use of Genetic Resources", GEF Project ID 5534, which will be implemented by the Ministry of Environment of Ecuador in jointly coordination with the Jambatu Center for Research and Amphibian Conservation and with the support of the United Nations Development Programme (UNDP) in the following components:

Component 1: Emergency measures to ensure the survival of endangered amphibian species in Ecuador, for conservation and bioprospecting purposes. **Total:** USD$57,024.73; **Kind:** US$40,578.93; **Budgeted money**: US$16,445.80.

Component 3: Institutional strengthening for the implementation of the measures listed in the "Conservation of the Biodiversity of Ecuadorian Amphibians and Sustainable Use of their Genetic Resources", using amphibians as a pilot case study. **Total:** USD $2,919.47; **Kind:** USD$893.87; **Budgeted Money**: USD$ 2,025.60

Our participation will promote locally the following processes:

1) Strengthen the Provincial System of Conservation Areas (SPAC) in the Naranjal Canton of the province of Guayas.
2) Conserve the identified area as prioritized site for conservation according to the Analysis Study of Conservation Gaps of Guayas

In this sense, our commitment is to provide co- finance funds for a total of USD$ 59,944.20 for the five-year term of the project, divided in: USD$18,741.40 in budgeted money and USD$41,472.80 in kind.

It's worth noting that none of these funds correspond to cash contribution or any transfer from the Prefecture of Guayas to the participant institutions in this project.

The project activities to be co-financed with our own funds are the following:

1. Previous visit to the area
2. Communication and information of the SPAC
3. Collection of field data and elaboration of External Technical Report (Partial Time)
4. Communication and Approval of the External Technical Report
5. Participation in workshop for elaboration of Sustainable Financing Plan
6. Elaboration of Ordinance Draft for declaratory
7. Co-Participation in the Management Plan of the Conservation Area with a focus in the conservation individuals: amphibians
8. Co-Participation in the execution of application measures of the management plan
9. Promotion activities of the Updated Strategic Action Plan for the Ecuadorian Amphibians

With these activities, we cover the commitment of cofinance contribution required to accomplish with the project objectives.
With feeling of high consideration, yours faithfully,

Jimmy Jairala Vallaza
Prefect
Provincial Government of Guayas
c.c: Ing Cecilia Herrera Villao, Environment Management Director (GPG)
File

ANEXO 1. PRESUPUESTO DEL PROYECTO ANFIBIOS, PARA 5 AÑOS

		DESCRIPCION	PRESUPUESTO GEF	PRESUPUESTO GAD GUAYAS		Año 1	Año 2	Año 3	Año 4	Año 5
				Presupuestado	En especies	x				
1	Estudio de alternativas de manejo									
1.1	Visita previa al área	viaticos 2 días + sueldo 3 tecnicos/día		386,4	335,2	x				
1.1.1	Socialización SPAC	sueldo y viaticos 2 tecnicos/ dia		266,4	153,73					
1.2	Inicio de proceso de declararación del área de conservación					x				
1.2.1	Ingreso solicitud para declaratoria					x				
1.2.3	Levantamiento de información					x				
1.2.4	Definir Tenencia de tierra y uso del suelo	Consultoria (Equipo)	10.000,00			x				
1.2.5	Definición de límites					x				
1.2.6	Línea base biológica					x				
1.2.7	Aspectos Políticos Institucionales					x				
1.2.8	Diagnóstico Socioambiental					x				
1.2.9	Diagnóstico proyectos locales sustentables					x				
1.3	Informe Técnico Externo					x				
1.3.1	Levantamiento datos campo y Elaboración Informe Técnico Externo (Tiempo Parcial)	Sueldo 3 técnicos			20112,00	x				
1.3.1	Socialización y Aprobación de Informe Técnico Externo	Talleres, viaticos y sueldo		266,4	188,60	x				
1.3.2	Ingreso cartas de compromiso					x				
1.4	Participación Taller Elaboración Plan de Sostenibilidad Financiera	Talleres, viaticos y sueldo		266,4	188,60	x				
1.5	Elaboración de Borrador de Ordenanza para declaratoria				111,73	x				
2	Acompañamiento en el proceso participativo de declaración del área									
2.1	Técnico	Contrato servicios	50.888,00			x	x	x	x	x
2,2	Oficina									
2.2	Movilización									
3	Plan de manejo con enfoque de objetos de conservación: anfibios	Consultoria (Equipo)	15.000,00				x			
3.1	Diagnóstico				2234,67		x			
3.2	Planificación Estratégica				2234,67		x			
3.3	Zonificación				2234,67		x			
3.4	Estrategia de Sostenibilidad Financiera				558,67		x			
4	Aplicación del plan de manejo		25.000,00					x	x	x
4.1	Acciones Prioritariss de Manejo							x	x	x
4.1.2.	Control y Vigilancia (hitos, señalética, salidas de control)			5.980,20	4022,40			x	x	x
4.1.3	Restauración y Conservación de Ecosistemas	Reforestación, control, sueldos, subsistencias, combustible		1.732,00	3734,67			x	x	x
4.1.4	Educación Ambiental y Desarrollo Comunitario	Talleres, viaticos, combustible y sueldo		1.864,00	2234,67					
4.1.5	Investigación y Monitoreo	viaticos, sueldo y combustible		1.864,00	2234,67					
5	Reconocimiento del área de conservación dentro del Subsistema de GAD	Apoyo Técnico					x			
6	Apoyo para actividades locales						x	x	x	x
6,1	Evaluación de los proyecto diagnosticados	Consultorias					x			
6,2	Prácticas actuales						x			
6,3	Cómo mejorar para que sean amigables con el ambiente						x			
6,4	Plan de negocios							x		
6,5	Financiamiento para proyectos							x	x	x
7	Uso de equipos			3820						
8	Plan de Acción Estratégico para los anfibios ecuatorianos actualizado, formalizado e implementado por el MAE.									
8.1	Actividades de socialización	Participacion en talleres		2.025,60	893,87					
	SUBTOTAL		100.888,00	18.471,40	41.472,80					
	TOTAL				160.832,20					

PRESUPUESTO PREFECTURA DEL GUAYAS

Financiamiento	Componente 1	Componente 3	Total
Presupuestado	16.445,80	2.025,60	18.471,40
En especies	40.578,93	893,87	41.472,80
Total	57.024,73	2.919,47	59.944,20

- El Presupuesto GEF, para este proyecto es de USD$100.888,00 para los cinco (5) años.

RECOMENDACIÓN:

Se sugiere salvo su mejor criterio se recomienda la suscripción de la Carta de compromiso para el cofinanciamiento, de acuerdo a la matriz anexa para la ejecución y seguimiento del proyecto "Conservación de la diversidad de anfibios ecuatorianos y uso sostenible de sus recursos genéticos", promovido por el Ministerio de Ambiente, por un Total de USD$59.944,20, para los cinco años de duración del Proyecto, repartidos en: USD$18.471,40 en dinero presupuestado y USD$41.472,80 dinero en especies.

Ninguno de estos fondos correspondería a dinero en efectivo o transferencia alguna de la Prefectura del Guayas, a las instituciones participantes en este proyecto.

REFERENCIAS:

Coloma, L. A., *Frenkel*, C., Félix-Novoa, C., Quiguango-Ubillús, A., Ron, S. R. 2010. Atelopus balios.En: Ron, S. R., Guayasamin, J. M., Yanez-Muñoz, M. H., Merino-Viteri, A., Ortiz, D. A. y Nicolalde, D. A. 2014. AmphibiaWebEcuador. Version 2014.0. Museo de Zoología, Pontificia Universidad Católica del Ecuador. http://zoologia.puce.edu.ec/vertebrados/anfibios/FichaEspecie.aspx?Id=1142.

Peters, J. A. 1973. The frog genus *Atelopus* in Ecuador (Anura: Bufonidae). Smithsonian Contributions to Zoology 145:1-49.

Particular que se informa para los fines pertinentes,

Atentamente,

Blga. Catalina Domínguez Bazurto
SUBDIRECTORA DE GESTIÒN ÁREAS DE CONSERVACIÓN CUENCAS HIDROGRÁFICAS Y CAMBIO CLIMÁTICO
CDB

C.c.: Archivo

Componente 1. Acciones de emergencia para garantizar la supervivencia de las especies de anfibios en peligro de extinción de Ecuador para la conservación y fines de bioprospección

Resultado	Productos	Unidad o Proyecto MAE	Actividades	En dinero presupuestado (USD)	En especies (USD)
1.1. Especies de ranas alerquín y venenosa con alto riesgo de extinción, rescatadas de áreas impactadas por la minería y conservadas en cautiverio. Las especies y sitios de rescate incluyen: Atelopus nanay (Azuay), Atelopus sp. nov. aff. palmatus (Morona Santiago y Zamora Chicnchipe, Cordillera del Condor), Dendrobates condor (Morona Santiago y Zamora Chinchipe, Cordillera del Cóndor).	1. 1. Mantenimiento y manejo ex situ de poblaciones genéticamente viables de especies transferidas a las Instalaciones de cría en cautiverio.				
1.2 Hábitat crítico de 4 especies de anfibios ecuatorianos (Atelopus coynel, Atelopus sp. aff. longirostris, Atelopus balios y Atelopus nanay), altamente amenazados, conservados en: áreas nuevas de protección de Gobiernos Autónomos Descentralizados (Guayas, Carchi y Azuay) y una ya declarada del PANE (Azuay).	1.2. Conservación in situ de los hábitats críticos de especies únicas en alto riesgo de extinción en el Subsistema de Áreas de Conservación de Gobiernos Autónomos Descentralizados (GAD´s).	Prefectura del Guayas	1. Visita previa al área 2. Socialización del SPAC 3. Levantamiento datos campo y Elaboración Informe Técnico Externo (Tiempo Parcial) 4. Socialización y Aprobación de Informe Técnico Externo 5. Participación Taller para Elaboración Plan de Sostenibilidad Financiera 6. Elaboración de Borrador de Ordenanza para declaratoria 7. Co-Participación en Plan de Manejo del Área de Conservación con enfoque de objetos de conservación: anfibios 8. Co-Participación en ejecución de medidas del Aplicación del Plan de Manejo.	$16.445,80	$40.578,93
TOTAL				$16.445,80	$40.578,93

$57.024,73

Componente 2: Descubrimiento de compuestos activos derivados de la secreción de la piel de anfibios ecuatorianos con potenciales aplicaciones en biomedicina

Resultados	Productos	Unidad o Proyecto MAE	Descripción de la actividad	En dinero presupuestado	En especies
2.1 Recursos genéticos de anfibios en estudio para la aplicación en biomedicina y el acceso a los recursos genéticos de los anfibios concedidos a Universidad ecuatoriana o Instituto de investigación, a través de un contrato marco con fines de investigación.	2.1.1 Procedimientos institucionales completos para fomentar la investigación en bio - prospección de anfibios .				
2.2 Cuatro principios activos caracterizados y una nueva proteína pequeña (péptido) sintetizada y probada farmacológicamente a partir de la secreción de la piel de cuatro anfibios: (Agalychnis spurrelli, Cruziohyla calcarifer, Hypsiboas picturatus y *Atelopus nanay*).	2.2.1 100 péptidos aislados, 10--15 péptidos caracterizados molecularmente y al menos 4 péptidos caracterizados funcionalmente a partir de las pieles de las ranas objeto de estudio.				
	2.2.2 Actividad farmacológica comprobada de al menos un péptido sintético.				
2.3 La transferencia de conocimiento y tecnología mejora la capacidad de investigación en bio-prospección de Ecuador y permite el avance en el conocimiento de la ciencia sobre péptidos de la pieles de anfibios (10 publicaciones en revistas científicas arbitradas).	2.3.1 Mejora de las capacidades técnicas y científicas para la bioprospección				

Componente 2: Descubrimiento de compuestos activos derivados de la secreción de la piel de anfibios ecuatorianos con potenciales aplicaciones en biomedicina

Resultados	Productos	Unidad o Proyecto MAE	Descripción de la actividad	En dinero presupuestado	En especies
2.4 Los recursos genéticos de los anfibios de Ecuador en alto riesgo de extinción protegidos con fines de bioprospección y conservación: - Tejidos del 50% de especies de anfibios ecuatorianos almacenados. - Pieles (con sus compuestos químicos), del 40% de las especies ecuatorianas en la lista roja de UICN y pruebas en la preservación de gametos de 2 especies de anfibios.	2.4.1 Fortalecimiento del banco de vida de los anfibios, con etiquetas únicas registradas en una base de datos y metodologías de criopreservación optimizadas. - Criopreservación de esperma de una especie amenazada y dos especies modelo como ensayos piloto para optimizar los protocolos de criopreservación de estas células. - Tejidos preservados del 50% de las				
TOTAL				#¡REF!	#¡REF!

Componente 3.: Fortalecimiento institucional para la implementación de las medidas de conservación de la biodiversidad y el uso sostenible de sus recursos genéticos en Ecuador , utilizando anfibios como estudio de caso piloto.

Resultados	Productos	Unidad o Proyecto MAE	Actividades	En dinero presupuestado (USD)	En especies (USD)
3.1 Protocolo de Nagoya ratificado y regulaciones sobre ABS actualizadas, además de modelos de acuerdos de ABS y cláusulas contractuales para diferentes taxa.	3.1.1.Alineado el Reglamento nacional 905 con D 391 / Nagoya / ITPGR / Convemar.				
	3.1.2 Integradas estrategias y guías para conservar bioindicadores en un proyecto de minería sustentable dentro del Plan Nacional Minero.				
	3.1.3 Plan de Acción Estratégico para los anfibios ecuatorianos actualizado, formalizado e implementado por el MAE.	Prefectura Guayas		$ 2.025,60	$893,87
	3.1.4 Valoración económica de los anfibios del Ecuador como recurso estratégico a ser incluido dentro de las políticas nacionales como una oportunidad de estrategia económica.				
3.2. Mejoradas las capacidades de los organismos nacionales para la implementación del ABS	3.2.1 Mayor concienciación de los ciudadanos sobre ABS y la necesidad de preservar la diversidad de anfibios del país y de sus recursos genéticos.				
3.3. Mayor concientización a los ciudadanos sobre ABS y la necesidad de preservar la diversidad de anfibios del país y de sus recursos genéticos.	3.3.1 Estado de conservación de las especies de anfibios ecuatorianos actualizado mediante índices de vulnerabilidad que incluyan las variables de cambio climático y de patógenos emergentes.				
	3.3.2 Sistema de Información sobre Biodiversidad (SIB) del MAE mejorado y funcionando para: (i) proceso de obtención de permisos de investigación y permisos ABS sistematizado, eficiente e implementado en línea, (ii) plataforma del Centro Jambatu interconectada y entregando información de anfibios al MAE y (iii) Acceso a información de anfibios disponible en línea.				
	3.3.3 Proyecto de ciencia ciudadana en marcha para aumentar la actualización de los registros (y la información relacionada) de las especies de anfibios en el Ecuador.				
TOTAL				$2.025,60	$893,87

$2.919,47

Letter 6.: ETAPA

Oficio No. O-2015-0335-GG
Cuenca, 06 de Marzo de 2015

Doctora
Lorena Tapia Nuñez
MINISTRA DE AMBIENTE
Señora
Adriana Dinu
EXECUTIVE COORDINATOR AND DIRECTOR A.I. PNUD
Su despacho

De mi consideración:

En atención al Oficio MAE-D- 2015-0057 con fecha 27 de enero de 2015, y recibido el 27 de febrero, en el cual solicita el apoyo para el cofinanciamiento de ETAPA EP a través de la Subgerencia de Gestión Ambiental al proyecto: *"Conservación de la Biodiversidad de los Anfibios ecuatorianos y uso Sostenible de sus Recursos Genéticos"* envío en documento adjunto y en el formato requerido, la carta expresando el compromiso de la Empresa para tales fines.

Atentamente,

Ing. Iván Palacios Palacios
GERENTE GENERAL ETAPA EP

Asunto: Carta de cofinanciamiento GEF - ETAPA EP-MAE

AUT: ETAPAEP-2015-3070
EP/mmm/jco

3. Componente 3: Fortalecimiento institucional para la implementación de las medidas de conservación de la biodiversidad y el uso sostenible de sus recursos genéticos en Ecuador, utilizando anfibios como estudio de caso piloto

En efectivo o dinero presupuestado $USD _____ En especie $USD _____

En total el apoyo en cofinanciamiento será de **USD 2892535,75** en efectivo y **USD 264350** en especie.

Con sentimiento de alta consideración, le saluda atentamente,

Ing. Iván Palacios Palacios

Gerente General

EMPRESA PÚBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP

Fecha: Cuenca, 06, 03, 2015

Con copia a: Ximena Ulloa, Coordinadora General de Planificación Ambiental del Ministerio del Ambiente
Sofía Panchi, Responsable de Gestión Internacional del Ministerio del Ambiente
Adriana Matamoros, Analista en Gestión Internacional del Ministerio del Ambiente



REF: Carta de cofinanciamiento GEF - **EMPRESA PUBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP**

Ms. Adriana Dinu,

UNDP/GEF Executive Coordinator

United Nations Development Programme (UNDP)

304 East 45th Street, 9th Floor

New York, NY 10017 USA

La **EMPRESA PUBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP**, expresa su interés y compromiso con el proyecto "Conservación de la Biodiversidad de Anfibios Ecuatorianos y Uso Sostenible de sus Recursos Genéticos", GEF Project ID 5534, que será ejecutado por el Ministerio del Ambiente del Ecuador en conjunto con el Centro Jambatu de Investigación y Conservación de Anfibios y apoyado por el Programa de las Naciones Unidas para el Desarrollo (PNUD), como agencia implementadora del Fondo Mundial para el Medio Ambiente (GEF por sus siglas en inglés).

Al respecto, me permito ratificar que las actividades/proyectos de **EMPRESA PUBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP** contribuyen a alcanzar los objetivos que busca esta iniciativa (conservación de anfibios y usos sostenible de sus recursos genéticos) y por tal motivo me permito confirmar que las líneas de apoyo en co-financiamiento se distribuyen de la siguiente manera:

1. Componente 1: Acciones de emergencia para garantizar la supervivencia de las especies de anfibios en peligro de extinción de Ecuador para la conservación y fines de bioprospección

En efectivo o dinero presupuestado $USD 2892535,75_ En especie $USD 264350_

2. Componente 2: Descubrimiento de compuestos activos derivados de la secreción de la piel de anfibios ecuatorianos con potenciales aplicaciones en biomedicina

En efectivo o dinero presupuestado $USD _____ En especie $USD_____

Translated version:

Document Number: O-2015-0335-GO

Cuenca, March 6th, 2015

Dr Lorena Tapia Núñez
MINISTER FOR THE ENVIRONMENT

Mrs Adriana Dinu
EXECUTIVE COORDINATOR AND DIRECTOR A.I. UNDP

(Hand-delivered)

Dear Ms/Mrs,

Regarding Document: MAE-D-2015-0057 dated January 27th. 2015 and received on February 27th, 2015, in which support is requested for the co-financing of ETAPA EP through the Deputy Manager of Environmental Management to the project: " Conservation of the Biodiversity Ecuadorian Amphibians and the Sustainable Use of their Genetic Resources", an attachment file was sent, in the required format; the letter expressing the commitment of the Company for such purposes

Best Regards

Engineer Iván Palacios Palacios

ETAPA EP GENERAL MANAGER

REF: GEF Co-Fin letter – EMPRESA PUBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP (Public Municipal Company for Telecommunications, Drinking Water, Drainage and Sanitation of Cuenca)

Ms Adriana Dinu
UNDP/GEF Executive Coordinator
United Nations Development Program
304 East 45th Street, 9th Floor
New York, NY 10017 USA

The EMPRESA PÚBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP expresses its interest and commitment to the project "Conservation of the Biodiversity of Ecuadorian Amphibians and Sustainable Use of their Genetic Resources" GEF Project ID 5534, that will be implemented by the Ministry of the Environment of Ecuador in conjunction with the Jambatu Center for Research and Conservation of Amphibians, and with the support of the United Nations Development Program (UNDP), being the implementing agency of the Global Environment Facility (GEF).

In this matter I would confirm that the activities / projects of the EMPRESA PÚBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP, contribute to achieving the objectives sought by this initiative (Conservation of Amphibians and Sustainable Use of Their Genetic Resources) and for this reason I can confirm that the lines of support in co-financing are distributed as follows:

1. Component 1: Emergency measures to ensure the survival of endangered amphibian species in Ecuador, for conservation and bioprospecting purposes.

In grant or money budgeted: USD $ 2,892,535.75 In kind: USD $ 264,350

2. Component 2: Discovery of active compounds derived from the skin secretions of Ecuadorian amphibians with potential applications in biomedicine.

In grant or money budgeted USD _____ In kind USD_____

3. Component 3: Institutional strengthening for the implementation of the measures listed in the "Conservation of the Biodiversity of Ecuadorian Amphibians and Sustainable Use of their Genetic Resources", using amphibians as a pilot case study.

In grant or money budgeted USD _____ In kind USD_____

The total support in co-financing will be: USD $2,892,535.75 in grant and USD $264,350 in kind.

With highest regards,

Yours faithfully,

Engineer Iván Palacios Palacios

ETAPA EP GENERAL MANAGER

EMPRESA PÚBLICA MUNICIPAL DE TELECOMUNICACIONES, AGUA POTABLE, ALCANTARILLADO Y SANEAMIENTO DE CUENCA – ETAPA EP

Date: Cuenca, March 6th, 2015

With copies to:

Engineer Ximena Alexandra Ulloa Loza
General Coordinator of Environmental Planning

Ms Sofía Cristina Panchi Robles
Head of International Management of Ministry of Environment

Ms Adriana Alexandra Matamoros Vargas
International Management Analyst of Ministry of Environment

Letter 7.: Queen's University

Queen's University Belfast

School of Pharmacy

Queen's University Belfast
Medical Biology Centre
97 Lisburn Road
Belfast BT9 7BL
Tel 028 90972080
Fax 028 90247794

March 23, 2015

Ms. Adriana Dinu
UNDP/GEF Executive Coordinator
United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017 USA

Dear Ms. Dinu

The School of Pharmacy in Queen's University Belfast hereby confirms its interest in supporting the project **"Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources"** GEF Project ID 5534, to be executed by the Ministry of Environment of Ecuador (MAE), Centro Jambatu for Amphibian Research and Conservation, and Queen's University Belfast through the Natural Drug Discovery Laboratory in the School of Pharmacy

The aim of the project is to conserve amphibian diversity by strengthening the Ecuadorian Amphibian Life Bank, as well as raising awareness about the molecular richness and diversity of their genetic resources including the sustainable use of their gene products i.e. peptides and proteins. At the same time the project will improve the local capacities for scientific research in this field in Ecuador

As a contribution in kind to the project, the School of Pharmacy at Queen's will provide access to full laboratory facilities and state-of-the-art equipment in our Natural Drug Discovery Laboratory for students accepted onto the above programme, such facilities having a nominal value in excess of $2M.

The project activities to take place in the School of Pharmacy Natural Drug Discovery Laboratory are:

- Analysis of peptides from the skin secretions of four species of amphibians collected in Ecuador and associated research activities

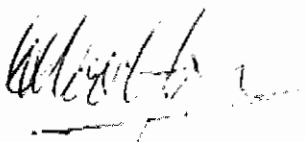
The Natural Drug Discovery Laboratory in the School of Pharmacy will provide high quality technical and intellectual training for students as part of PhD or MPhil research degrees. To be accepted as a student in the University, applicants must meet the educational and financial criteria for postgraduate research students normally required by Queen's University Belfast. It is understood that all students entering the programme will be fully financed (fees, living expenses, travel and project costs) by the Ecuadorian Government through SENESCYT or its associated sponsors

Athena SWAN Silver Award

The School of Pharmacy is always pleased to welcome, within the limits of available resources, suitably qualified scientific research visitors (self-funded) to the School, including those associated with the proposed project.

Should any intellectual property (IP) arise during the course of research funded under the programme, the exploitation of such IP will be discussed in good faith between the University (through the Research and Enterprise Directorate of the University) and the provider of the genetic resources, and according to the Ecuadorian national legislation on Access and Benefit Sharing (ABS).

Yours sincerely



Professor David Woolfson
Head of School

Letter 8.: JAMBATU / FUNDACION OTONGA

Fundación Otonga

Centro Jambatu

Investigación y Conservación de Anfibios

Giovanni Farina 566 e Isla Baltra, San Rafael, Quito, Ecuador

Telef.: 289 9688

fundacion@otonga.org

Nro. CJ 2015-61

REF: GEF CoFin Letter – Fundación Otonga

Quito, 10 Febrero 2015

Ms. Adriana Dinu,
UNDP/GEF Executive Coordinator
United Nations Development Programme (UNDP)
304 East 45th Street, 9th Floor
New York, NY 10017 USA

The Otonga Foundation through Centro Jambatu of Amphibian Research and Conservation ratifies its interest and commitment to support and lead the project "Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources" to be executed by the Ministry of Environment of Ecuador (MAE) with the support from the United Nations Program for Development (UNDP), with a contribution from the Global Environment Facility (GEF).

The Otonga Foundation has assumed a leadership role in the presentation of this project, based on the Foundation's experience in research and conservation of the diversity of Ecuadorian amphibians. The project aims to take emergency measures to have a positive influence on the conservation of amphibians through an integrative strategy that includes management *ex situ* and *in situ*, and storage and sustainable use of genetic resources. Under this Project, local capacities will be strengthened to cope with the extinction of amphibians and generate research and additional information that will provide the necessary tools to decision making and planning to direct appropriate actions.

By virtue of the above, we ratify our commitment to provide co-financing funds in the total amount of US$ 2,708,000.00 (US$1,708,000.00 grant and US$1,000,000.00 in kind).

Co-financing is distributed as follows:

Outcome 1. Emergency actions to ensure the survival of highly endangered amphibian species of Ecuador for conservation and bio-prospecting purposes. In kind USD 1,000,000.00 Grant USD

Fundación Otonga

Centro Jambatu

Investigación y Conservación de Anfibios

Giovanni Farina 566 y Isla Baltra, San Rafael, Quito, Ecuador

Telef.: 593 2 2868688

katarina@otonga.org

1.647.408,00

Outcome 2. Discovery of active compounds derived from the skin secretion of Ecuadorian amphibians with potential applications in biomedicine. Grant: USD 60.592,00

Best regards,

Lutz A. Coloma
President (Legal Representative)
Otonga Foundation

cc

Ing. Ximena Ulloa
Coordinadora General de Planificación Ambiental

Sofía Panchi,
Responsable de Gestión Internacional Daniela Reyes, Especialista en Recursos Genéticos

Adriana Matamoros,
Analista en Gestión Internacional

Translated version:

Fundación Otonga

Centro Jambatu

Investigación y Conservación de Anfibios

Geovanni Farina 566 e Isla Baltra, San Rafael. Quito, Ecuador

Telef.: 593-2-2866588

fundacion@otonga.org

Nro. CJ 2015-61

REF: GEF CoFin Letter – Fundación Otonga

Quito, 10 Febrero 2015

Ms. Adriana Dinu,
UNDP/GEF Executive Coordinator
United Nations Development Programme (UNDP)
304 East 45th Street, 9th Floor
New York, NY 10017 USA

The Otonga Foundation through Centro Jambatu of Amphibian Research and Conservation ratifies its interest and commitment to support and lead the project "Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources" to be executed by the Ministry of Environment of Ecuador (MAE) with the support from the United Nations Program for Development (UNDP), with a contribution from the Global Environment Facility (GEF).

The Otonga Foundation has assumed a leadership role in the presentation of this project, based on the Foundation's experience in research and conservation of the diversity of Ecuadorian amphibians. The project aims to take emergency measures to have a positive influence on the conservation of amphibians through an integrative strategy that includes management *ex situ* and *in situ*, and storage and sustainable use of genetic resources. Under this Project, local capacities will be strengthened to cope with the extinction of amphibians and generate research and additional information that will provide the necessary tools to decision making and planning to direct appropriate actions.

By virtue of the above, we ratify our commitment to provide co-financing funds in the total amount of US$ 2,708,000.00 (US$1,708,000.00 grant and US$1,000,000.00 in kind).

Co-financing is distributed as follows:

Outcome 1: Emergency actions to ensure the survival of highly endangered amphibian species of Ecuador for conservation and bio-prospecting purposes: In kind: USD 1,000,000.00 Grant: USD

Fundación Otonga

Centro Jambatu

Investigación y Conservación de Anfibios

Geovanni Farina 566 y
Bella Aire, San Rafael, Quito,
Ecuador

Telef.: 593 2 2869688

colomaa@otonga.org

1 647 408,00

Outcome 3. Discovery of active compounds derived from the skin secretion of Ecuadorian amphibians with potential applications in biomedicine. Grant: USD 60.592,00

Best regards,

Luis A. Coloma
President (Legal Representative)
Otonga Foundation

cc

Ing. Ximena Ulloa
Coordinadora General de Planificación Ambiental

Sofía Pazchi,
Responsable de Gestión Internacional Daniela Reyes, Especialista en Recursos Genéticos

Adriana Matamoros,
Analista en Gestión Internacional

Letter 9.: BIOPARQUE AMARU ZOOLOGICO CUENCA

Cuenca, 21 de Enero del 2015

Oficio No. AMARU 0003-2015

REF: GEF CoFin Letter – Centro Amaru.

Ms. Adriana Dinu,
UNDP/GEF Executive Coordinator
United Nations Development Programme
304 East 45th Street, 9th Floor
New York, NY 10017 USA

El Bioparque Amaru Zoológico Cuenca, expresa su interés y compromiso con el proyecto "Conservación de la Biodiversidad de Anfibios Ecuatorianos y Uso Sostenible de sus Recursos Genéticos" GEF Project ID 5534, que será ejecutado por el Ministerio del Ambiente del Ecuador en conjunto con el Centro Jambatu de Investigación y Conservación de Anfibios y apoyado por el Programa de las Naciones Unidas para el Desarrollo (PNUD).

Este proyecto promoverá a través de sus resultados, a la conservación de la biodiversidad de los anfibios y a generar conocimiento sobre la riqueza molecular y diversidad de sus recursos genéticos, incluidos sus productos génicos, es decir: péptidos y proteínas. Al mismo tiempo, el proyecto mejorará las capacidades locales del Ecuador para la investigación científica en este campo.

En virtud de lo anterior, es nuestro compromiso proporcionar fondos de cofinanciación en el orden de US $126.744: US $ 108.350 in grant y US $ 18.394 in kind.

Las actividades del proyecto a ser cofinanciadas con nuestros fondos son los siguientes:

1. Manejo, reproducción y protección en condiciones exsitu de una población de respaldo de la especie de sapos jambatos *Atelopus nanay* en condiciones de conservación ex-situ.

2. Mejora y ampliación de las instalaciones enfocadas al manejo asistido de la colonia viva de *Atelopus nanay* ubicadas en el Bioparque Amaru

3. Promover las operaciones y actividades técnicas laborales de un equipo de profesionales y asistentes enfocados a promover la reproducción y sobrevivencia de la colonia de *Atelopus nanay* mantenida en condiciones de cautiverio en el Bioparque Amaru.

Con lo cual sería nuestro compromiso de aporte al cofinanciamiento requerido para cumplir con los objetivos del proyecto,

Con sentimiento de alta consideración, le saluda atentamente,

Blgo. Ernesto Arbeláez Ortiz

Director Ejecutivo y de Conservación

Amaru Bioparque Zoológico Cuenca

Centro de Conservación de Anfibios – Amaru

Presidente de la Asociación Ecuatoriana de Parques Zoológicos y Acuarios, AEZA

Email: earbelaez1@gmail.com

Translated version:

Cuenca, January 21st, 2015

Document Number: AMARU 0003-2015

REF: GEF CoFin Letter - Centro Amaru

Ms Adriana Dinu
UNDP/GEF Executive Coordinator
United Nations Development Program
304 East 45th Street, 9th Floor
New York, NY 10017 USA

The Bioparque Amaru Zoo, Cuenca, expressed their interest and commitment to the "Conservation of the Biodiversity of Ecuadorian Amphibians and the Sustainable Use of their Genetic Resources" GEF Project ID 5534, which will be implemented by the Ministry of the Environment of Ecuador in conjunction with the Jambatu center for the Research and Conservation of Amphibians, supported by the United Nations Development Program (UNDP).

This project will promote, through their results, the conservation of biodiversity of amphibians and generate knowledge about the molecular richness and diversity of genetic resources; including their gene products, i.e. peptides and proteins. At the same time the project will improve local capacity within Ecuador for scientific research in this field.

Consequently, it is our commitment to provide co-financing of the following order: USD $126,744 : USD $108,350 in the form of a grant and USD $18,394 in kind.

The project activities to be financed with our funds are:

1. Management, reproduction and protection in ex-situ conditions of a population, supporting the species of Jambatu Toad Atelopus nanay in ex-situ conservation conditions.

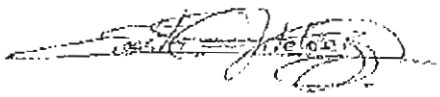
2. Improvement and expansion of facilities focused on the assisted management of the living colony of Atelopus nanay located in the Bioparque Amaru.

3. Promotion of the operations and technical activities of a team of professionals and assistants aimed at promoting the reproduction and survival of the colony of Atelopus nanay kept in captivity in the Bioparque Amaru.

The aforementioned would comprise our commitment of support to the co-financing required in order to achieve the project objectives.

With highest regards,

Yours faithfully,



Biologist, Ernesto Arbeláez Ortiz

Executive Director for Conservation

Amaru Bioparque Zoológico Cuenca

Center for Amphibian Conservation - Amaru

President of the Ecuadorian Association of Zoological Parks and Aquariums, AEZA

Email: earbelaezl@gmail.com

Letter 10.: UNDP

Programa de las Naciones Unidas para el Desarrollo

Al servicio de las personas y las naciones

155-00064
PRO/300/GEF/PIPELINE

Quito, 12th March 2015

Dear Adriana Dinu,

Subject: Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources

Through this letter, I would like to reaffirm UNDP Ecuador full support to the Project "Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources".

In its coordination role UNDP country office in Ecuador will ensure that this project serves to build capacity on access to Genetic Resources and Benefit Sharing and improve the sustainability of protected area systems.

Furthermore, in order to support this project UNDP country office in Ecuador will co-finance US$221,000.00 distributed as follows:

- In kind contribution of US$166,461.84 which includes resources channeled through other UNDP projects that aim to strengthen a participatory government process, forest conservation and conservation work in situ.
- In cash contribution of US$54,538.16 which represents 2% of total GEF cash contribution to the project of US$ 2,726,908.00.

We look forward to receiving the GEF approval to initiate the project activities.

Yours sincerely,

Diego Zorrilla
Resident Representative

Mrs. Adriana Dinu
UNDP/GEF Executive Coordinator and
Director a.i.
EEG/BDP UNDP
New York, NY

Letter 11.: **Letter of Agreement (LoA)**
Signed version will be included by Project's Signature

LETTER OF AGREEMENT BETWEEN UNDP AND THE MINISTRY OF ENVIRONMENT OF ECUADOR FOR THE PROVISION OF SUPPORT SERVICES TO THE IMPLEMENTATION OF THE PROJECT "CONSERVATION OF ECUADORIAN AMPHIBIAN DIVERSITY AND SUSTAINABLE USE OF ITS GENETIC RESOURCES"

1. Within the context of the project "Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources" UNDP and the Ministry of Environment of Ecuador (hereinafter referred to as "the counterpart") agree that the UNDP country office may provide support services for the implementation of the project, at the request of the counterpart and in accordance with the Project Document signed by both parties.

2. The UNDP country office may provide implementation support services without affecting the strengthening of the capacities of the counterpart and the direct execution of the activities described in the Project Document. The costs incurred by the UNDP country office shall be recovered in accordance with the relevant policy.

3. The UNDP country office may provide, at the request of the counterpart, the following support services for the implementation of the project:
   a. Identification and/or recruitment of personnel;
   b. Identification and facilitation of training activities;
   c. Procurement of goods and services;

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the Project Document, in the form provided in Annex 1 to this letter, and, if the requirements for support change during the life of the project, they will be revised and modified in mutual agreement between the parties.

5. All of the privileges and immunities described in the Basic Cooperation Agreement between UNDP and the Government of Ecuador of 19th January 2005, shall apply to the provision of the support services described in this letter. The Government shall retain overall responsibility for the execution of the project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the Project Document.

6. Any claim or dispute arising under in relation to the provisions of this letter shall be handled pursuant to the relevant provisions of the Basic Cooperation Agreement referred to under point 5 above.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above are specified in the Project Document. The cost-recovery policy of UNDP determines that the direct projects implementation costs incurred by UNDP (previously referred to as Implementation Support Services or ISS) shall be recovered in accordance with the real costs that are expected to be incurred, or on the base of each transaction (using the Universal Price List or the Local Price List form as reference costs) and should be charged directly to the project budget.

8. The UNDP country office shall submit progress reports on the support services provided, as well as the costs incurred.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. This letter forms part of the Project Document entered into between the parties and is included as an annex to said document.

11. The parties hereby state their mutual agreement to the points stipulated in this letter, by signing two copies of equal validity.

Yours sincerely,

_____

Signed on behalf of UNDP

_____

For the Government

Attachment

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between the Ministry of Natural Resources and Environment, the institution designated by the Government of Ecuador and representatives of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed project 00094106 **Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources** (award 00086955) "the Project".

2. In accordance with the provisions of the letter of agreement signed on *Date of signature (LOA)* and the project document, the UNDP country office shall provide support services for the Project as described below.

3. Support services to be provided:

Support services* (insert description)	**Schedule for the provision of the support services**	**Cost to UNDP of providing such support services (where appropriate)**	**Amount and method of reimbursement of UNDP (where appropriate)**
1. Payments, disbursements and other financial transactions	During project implementation	Universal Price List	Support Services
2. Recruitment of staff, project personnel, and consultants	During project implementation	Universal Price List	Support Services
3. Procurement of services and equipment, and disposal/sale of equipment	During project implementation	Universal Price List	Support Services
4. Organization of training activities, conferences, and workshops, including fellowships	During project implementation	Universal Price List	Support Services
5. Travel authorizations, visa requests, ticketing, and travel arrangements	During project implementation	Universal Price List	Support Services
6. Shipment, custom clearance, vehicle registration, and accreditation	During project implementation	Universal Price List	Support Services

* UNDP direct project support services will be defined yearly, and for those executed during the period, direct project costs will be charged at the end of each year based on the UNDP Universal Pricelist (UPL) or the actual corresponding service cost

Letter 12.: UICN

UICN
UICN-Sur
Quiteño Libre E16-12 y La Cumbre
Quito
Ecuador
Tel. +593 2 2261075
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samerica@uicn.org
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Quito, Enero 30 del 2015

Señora Ministra
Lorena Tapia Núñez
Ministerio del Ambiente
República del Ecuador

Estimada Señora Ministra Tapia,

Reciba un cordial saludo desde la Oficina Regional de UICN para América del Sur. La presente comunicación se enmarca en el Oficio Nro. MAE-D-2015-0059 enviado por el MAE con fecha 27 de enero del presente.

Al respecto nos gustaría informarle que UICN-Sur ha apoyado la preparación de la propuesta PIF, y la versión final a ser enviada al GEF para su aprobación, a través de su participación en los Talleres de Preparación de la Propuesta que han sido convocados por el MAE y por PNUD como agencia Implementadora del Proyecto.

Adicionalmente, se he indicado en estas reuniones la posibilidad de aprovechar los resultados del Proyecto GEF ABS LAC llevado a cabo en ocho países de la región, incluido Ecuador, que finalizó el año pasado 2014. Estos resultados brindan herramientas de análisis legal, técnico e institucional sobre el tema de ABS en el país que pueden ser aprovechados para el desarrollo del Proyecto actual a ser presentado al GEF (estos resultados pueden ser encontrados en www.adb.portalces.org).

En este contexto desafortunadamente, al haber concluido el Proyecto el año pasado y no mantener alguna iniciativa relacionada al momento desde nuestra Oficina Regional, no podríamos aportar con co-financiamiento formal para el desarrollo del proyecto indicado en su comunicado.

Sin embargo, reiteramos nuestro compromiso de colaboración con el MAE sobre este y otros temas a través del apoyo técnico que podamos dar para la ejecución del proyecto así como la difusión del mismo dentro de la Red de UICN en Ecuador.

Cordiales Saludos,

Victor Hugo Inchausty
Director Regional

Copia: Adriana Matamoros – MAE adriana.matamoros@ambiente.gob.ec

Translated version:

GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Naoko Ishii
CEO and Chairperson

May 20, 2015

Ms. Adriana Dinu
GEF Executive Coordinator
United Nations Development Programme
One United Nations Plaza
New York, NY 10017

Dear Ms. Dinu:

I am pleased to inform you that I have endorsed the full-sized project proposal detailed below:

Decision Sought:	**CEO Endorsement of Full-sized Project**
GEFSEC ID:	5534
Agency(ies):	UNDP
Agency ID:	5314 (UNDP)
Focal Area:	Biodiversity
Project Type:	Full Size Project
Country(ies):	Ecuador
Name of Project:	Conservation of Ecuadorian Amphibian Diversity and Sustainable Use of its Genetic Resources
GEF Project Grant:	$2,726,908
Agency Fee:	$259,056
Funding Source:	GEF Trust Fund

Break-down of Indicative Agency Fee				
Agency	**Trust Fund**	**Fees committed at Council Approval**	**Fees to be committed at CEO Endorsement**	**Total (US$)**
UNDP	GET	$103,622	$155,434	$259,056

I am endorsing this project on the understanding that the GEF Agency will have its internal approval of the project no later than four months after the CEO endorsement.

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www.thegef.org

This endorsement is subject to the comments made by the GEF Secretariat in the attached document. It is also based on the understanding that the project is in conformity with GEF focal areas strategies and in line with GEF policies and procedures.

Sincerely,

Naoko Ishii
Chief Executive Officer and Chairperson

Attachment: GEFSEC Project Review Document

cc: Country Operational Focal Point, GEF Agencies, STAP, Trustee