University of Azuay

Faculty of Legal Sciences

School of International Studies

ANALYSIS OF DEFORESTATION IN PROHIBITED AREAS OF THE ECUADORIAN AND PERUVIAN AMAZON AND ITS CONSEQUENCE AT THE LOCAL AND GLOBAL LEVEL

Authors:

Anahi Cardenas Ortega; Patricio Ortiz Gomez

Director:

Ana Maria Bustos Cordero

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DEDICATION

To my mother, Johanna, for being my guide, my light and the person who supports me the most, for trusting me and for being with me in my most difficult moments.
To my dad, Miguel, for being the person who supports me to improve myself, for working hard all these years so that I can graduate and for loving me very much.
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SUMMARY:

El presente trabajo de titulación se centra en el análisis comparativo de la deforestación y el impacto ambiental global que esta actividad tiene en la Amazonía de Perú y Ecuador. Es así, que se abordan las características principales sobre los dos países en las regiones de Ucayali y Morona Santiago, sus problemas ambientales, y cómo estos provienen de la deforestación con el objetivo de comprender su impacto ambiental y climático local y global.

Para la investigación se recopilan y analizan datos provenientes de una investigación doctrinaria, complementados con entrevistas a expertos, a través de lo cual se logra identificar similitudes y diferencias entre los casos analizados y así responder a la pregunta de investigación.

Palabras clave: Amazonía, crisis ambiental, deforestación, Morona Santiago, Ucayali.

ABSTRACT:

This degree work focused on the comparative analysis of deforestation and the global environmental impact that this activity has on the Peruvian and Ecuadorian Amazon. Thus, the main characteristics of the two countries in the regions of Ucayali and Morona Santiago, their environmental problems, and how these problems derive from deforestation were addressed to understand their local and global impact on the environment and climate. For the research, data from doctrinal research was compiled and analyzed. The information obtained was complemented by interviews with experts, through which similarities and differences between the analyzed cases were identified in order to answer the research question.

Keywords: Amazon, Deforestation, Environmental Crisis, Morona Santiago, Ucayali

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INTRODUCTION

The environmental crisis facing our planet is a challenge that requires deep understanding and decisive action. Currently, we are witnessing a series of environmental problems that threaten the stability and sustainability of ecosystems around the world (Reynosa Navarro, 2015). One of the most prominent challenges is deforestation, a fundamental component of the environmental crisis we face today (Reynosa Navarro, 2015). Its causes and consequences are complex and demand urgent attention.

This thesis will explore in greater detail the key aspects of deforestation, analyzing its impact in different dimensions and proposing possible solutions to address this global challenge. A comparative analysis will be carried out between two regions: Morona Santiago, in Ecuador, and Ucayali, in Peru. The main objective is to examine the effect of deforestation in both regions, as well as its contribution to the global environmental crisis, in order to explain the similarities and differences between these two areas in terms of deforestation drivers and outcomes.

This thesis is divided into three chapters that cover different aspects related to the environmental crisis, the Amazon, deforestation and its impacts on the two specific regions. In the first part, an overview of the global environmental crisis is generated, addressing theoretical concepts. Likewise, highlighting the importance of addressing this problem urgently and effectively in the Amazon. After that, we focus on the analysis of the characteristics of the Ecuadorian and Peruvian Amazon, examining in depth the problem of deforestation in this Amazonian territory in both countries. Finally, we present an in-depth analysis of deforestation in Ucayali, Peru, and Morona Santiago, Ecuador.

By understanding in detail the causes and consequences of deforestation in Morona Santiago and Ucayali, a solid foundation is established for the formulation of effective strategies and policies that address this environmental challenge. Furthermore, this comparative study contributes to a more comprehensive understanding of the regional factors that influence deforestation, and how these regions contribute to the larger picture of the environmental crisis.

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CHAPTER 1

1. GLOBAL ENVIRONMENTAL CRISIS AND THE IMPORTANCE OF THE AMAZON

1.1. Origin of the environmental crisis

The environmental crisis is nothing more than the footprint that humans have left for thousands of years. But if we look back, the environmental impact caused by the first human beings was minimal and insignificant. According to (Reynosa Navarro, 2015), this is because humans lived with enough natural resources to meet their needs. They adapted to what nature provided them: fruits, vegetables, fishing, hunting, etc. In short, they were simple beings that adapted to what was there, something important to highlight here was the nomadism in which they lived, as they constantly migrated, this allowed the soil and its resources to regenerate naturally and this wear and tear did not exist.

The problem begins as a result of the appearance of agriculture, domestication of animals, new hunting methods, language and sedentary lifestyle (Reynosa Navarro, 2015). Humans no longer had the need to migrate or look for food, since they got it from animals and agriculture directly, progressively, they created much better living conditions. Here begins the well-known "development" in which the environmental impact begins to be noticed (Reynosa Navarro, 2015). Said "development" is part of the history of humanity and, social, cultural, and political advances allowed to form communities and settle in a delimited place, forming cities, giving access to greater tranquility and comfort in the lifestyle of human beings, since food, housing, natural resources, etc. were more accessible, and this is when we began to exploit these resources for our interests, but without deeply analyzing the impact on the environment that this "development" was causing (Reynosa Navarro, 2015).

The environmental crisis is a topic constantly addressed today. But what are the motivates to return to this problem? Well, the need to look for its causes, consequences and what we can do to collaborate as humanity to stop this phenomenon from advancing and to seek stability, balance and intergenerational responsibility, this which refers to the responsibility that we have as society to care for the environment for generations (Armenteras Cabot, 2021, p. 2).

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1.2. The environmental crisis

The environmental crises according to Arriols (2021), can be defined as any crisis that affects the environment and all the forms of life that inhabit it. In other words, when the environment of a species or population is affected and begins to undergo critical changes both in the environment and in the continuity of the life of living beings, is when there is already an environmental crisis.

The industrial revolution, globalization, post-war scenarios, served to alter the balance of nature and its environment, and are part of the causes of the global environmental crisis that we are going through. According to (Reynosa Navarro, 2015):

> It is the result of the use of heavy machinery, the depredation of forests, both formal and informal mining, the misuse of soils, and indolence in the face of the disappearance of abiotic and biotic elements. It is also evidenced by overpopulation, the depredation of non-renewable fossil fuels, the misuse or deficient use and/or exploitation of renewable resources. As well as the effects left by wars and the unsustainable growth of aggressive industries towards the environment (Reynosa Navarro, 2015, p. 11).

1.3. Causes and examples of the environmental crisis

If we analyze correctly, all these actions have a common denominator and it is the human being and his lack of awareness and responsibility. That is why, throughout the history of humanity there have been environmental disasters that have unbalanced the way we live. Just to give an example: the disaster at the Vladimir Ilich Lenin plant in Chernobyl in 1986, along with the Fukushima disaster in 2011, are considered the worst nuclear catastrophes that humanity has ever experienced, according to the INES scale (Muerza, 2014). In summary, according to Muerza (2014), on April 26, 1986, reactor number four of the plant exploded, expelling toxic and radioactive materials, directly affecting the population of people, animals, and vegetation that existed there. It is estimated that it was 500 times more damaging and stronger than the explosion of the Hiroshima and Nagasaki nuclear bombs that occurred in World War II.

Another specific example of human lack of environmental responsibility was the 2010 Gulf of Mexico oil spill. More than 4.9 million barrels of oil spilled some 75 kilometers off the

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Louisiana coast and was caused by the British Petroleum's Deepwater Horizon oil rig. It is considered the largest accidental oil spill caused by this industry (Fernandez Muerza, 2014).

The chemical leak in Bhopal, on December 2, 1984 an Indian pesticide plant called Union Carbide India Limited (UCIL) suffered a toxic gas and chemical leak accident. More than 4,000 people died and some 50,000 people suffered from diseases related to toxic gases (Fernandez Muerza, 2014). These are just a few examples of what human beings have caused to the planet, and all these carelessness and "accidents" have caused great consequences at a global level and encouraged the growth of the general environmental crisis.

1.4. Consequences of the global environmental crisis

According to Arriols, there are three types of consequences of the global environmental crisis. The ecological, social and climatic. The ecological ones refer to those that directly affect the ecosystems and their living organisms. For example, the extinction of both flora and fauna species, the degradation of ecosystem biodiversity, the proliferation of invasive species and the alterations of natural biological cycles (2021). The social ones refer to the consequences that directly or indirectly affect human beings or their properties. For example, crop losses or soil degradation, the inability to find enough fresh water to meet human demand, migration of population groups in search of geographic areas with greater resources, and the proliferation of diseases linked to pollution (Arriols, 2021). Finally, the climatic consequences imply the negative modification of the climate and are the main causes of the other two types of consequences (ecological and social). For example, desertification, deforestation, acidification of the sea and the increase in the number of natural phenomena such as hurricanes or typhoons (Arriols, 2021).

1.4.1. Environmental crisis: deforestation

Deforestation is the specific climate consequence analyzed in this research paper. It can be defined as the massive reduction of the forest surface territory (Garrett, 2022) which happens, when massive territories of trees are cut down or lost naturally due to catastrophes.

- **Causes of deforestation**

There are two types of deforestation, which can also be considered as the causes of deforestation. First, there are the natural causes, which include: forest fires that, in addition to destroying forests and biodiversity, release enormous amounts of CO2 into the atmosphere, as

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well as diseases that affect trees and parasites (Garrett, 2022). In both cases there is no human intervention, and unfortunately, they are the ones that affect the general environmental crisis the least, and they are not responsible for the greatest amount of deforestation in the world (Garrett, 2022). On the other hand, human-caused deforestation is primarily responsible for the large rates of global deforestation. These activities include: Agriculture, and logging for sale in the timber industry, logging for mining, construction of infrastructures and urbanizations (Garrett, 2022).

- **Consequences of deforestation**

It is necessary to understand that the loss of trees is the basis of deforestation and is one of the main causes of climate change worldwide, since

> The presence of trees produces new oxygen and captures carbon dioxide to ensure its biomass and form the branches, trunk and leaves; the other part they keep. When these are felled, the carbon in their structure is released and becomes a source of CO2, one of the greenhouse gases (García Marín, 2016, p. 2).

The main consequences of deforestation, (Soto, 2020) estimates by the Intergovernmental Panel on Climate Change (IPCC), in 2015 global deforestation contributed 17% of total emissions of greenhouse gases (GHG) into the atmosphere, after the generation of energy produced by fossil fuels and industrial activities (Soto, 2020). In addition, in 2019 the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES) global assessment report on biodiversity and ecosystem services warned that one million species are threatened with extinction, more than at any time in the history of mankind, much of it due to deforestation that destroys their ecosystems and habitats due to changes in land use (Díaz et al., 2019, p. 14). Finally, the preservation of forests is also key to ending social inequality, since according to the Food and Agriculture Organization of the United Nations (FAO, 2023), deforestation caused mainly by the conversion of forest land to agriculture and ranching, threatens not only the livelihoods of foresters, forest communities and indigenous peoples, but also the variety of life on our planet. Approximately 40% of the rural population that suffers from extreme poverty, that is, some 250 million people, lives in forested or savannah areas (Soto, 2020).

On the other hand, there are also factors unrelated to the natural issue that are affected, such as the economic-productive one, such as what is explained to us by (Garcia Marin, 2016)

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in his article when he says that there is a lack of production due to its limitation and therefore lack of quality in food, a deficit in food security, the cost of products varies due to their import and export to distant places, thus generating a problem that contributes negatively to the increase in extreme poverty and world famine.

Deforestation is generating an impact that affects globally and this can be evidenced, for example, in that "the planet lost an area of tree cover larger than the United Kingdom in 2020, including more than 4.2 million hectares of forests primary tropical, according to data published by the University of Maryland" (Butler Rhett, 2021).

1.5. The Amazon

The Amazon Biome is majestic and virtuous because within the Amazon is the largest tropical forest in the entire globe; with 7.4 million km2, it represents 4.9% of the world's continental area, and covers extensions of Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela.(WWF, 2023)The Amazon River basin is the largest in the world with an average of 230,000 m3 of water per second, which corresponds to approximately 20% of the fresh water on the world's land surface.(ECLAC and Natural Heritage, 2013, p. 12)Among the most important factors of the Amazon, it should be emphasized that it is the home of at least 10% of all the biodiversity known up to now and in its fluvial currents they come to represent almost 16% of the discharge to all the oceans.

In addition, it is also essential to understand that there is great diversity in the Amazon because "everybody knows that the Amazon is unique: unique for its size, for its natural diversity and for the human societies it hosts, as well as for the cultural significance that it possesses in the global consciousness"(WWF International, 2016, p. 4) and it is also important to know that "34 million people live in the Amazon, including more than 350 indigenous groups, some of them in voluntary isolation. Despite the fact that 17% of the forest has been destroyed, large areas remain in good condition (WWF International, 2016, p. 5).

1.5.1. Origin of the Amazon River

The Amazon River is one of the largest and longest in the world, with an approximate length of 6,400 kilometers. There are two theories about its origin. Rodríguez, (2010) suggests that the Amazon River was formed about 10 million years ago, during the Miocene. It was then when the Andes Mountain range emerged from the earth's crust. Growing up, the mountains

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created a barrier that prevented water from flowing west into the Pacific Ocean. Instead, the water flowed eastward, forming a vast inland sea that covered much of South America. Over time, this sea began to drain into what is now known as the Atlantic Ocean through a network of rivers that ended up converging in the Amazon River.

Another theory suggests that tectonic activity caused by plate movements led to the formation of the Amazon Basin. According to this theory, about 110 million years ago, during the Cretaceous, South America was part of a supercontinent called Gondwana. When Gondwana began to break apart and move north into what is now North America, it caused the formation of the Amazon Basin (Rodríguez, 2010).

The Amazon River collects water from various tributaries and flows through different countries, including Ecuador.

Figure 1

Location of the Amazon River

Source: Retrieved from Wikipedia (2023).

1.5.2. Environmental problems and deforestation in the Amazon

The Amazon is highly ambitious due to its natural, biological and also productive mega diversity, because, according to Lovejoy (2019), in the economic-productive field, the creation of infrastructure projects is a very important threat, and that, by not carrying out joint work

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with the government in a sustainable manner, represent a threat. On the economic-productive issue, mining within the Amazon has also become a very lucrative process that has generated processes that are not very responsible with the environmental crisis within the community, not only local but global, since

> Mining has increased and is one of the main threats to the stability of ecosystems and biodiversity. The areas with the greatest impact from mining are the Guyanese Shield, the Andean mountains of Bolivia and Peru, the Colombian foothills, and the border region between Colombia, Venezuela, and Brazil (ECLAC and Natural Heritage, 2013, p. 12).

1.5.3. Deforestation in the Amazon

One of the problems of deforestation within the Amazon, in addition to affecting globally and attributing to climate change and the economic-productive sector, as mentioned above, has specifically affected all the countries that are part of its extent and population. A specific environmental-natural factor that could be evidenced about the importance of the Amazon, for these countries, would be the fact that:

> Half of the rainfall in the Andes comes from the Amazon, and supplies water to cities such as Bogotá, Quito and La Paz. The exceptional fertility of the Argentine pampa also depends on the clouds coming from the Amazon (Larrea C, 2021, p. 2).

Another factor that could be taken into account when talking about the problems of deforestation would also be the political and economic-productive issue, within these countries, which affects, as explained by (Larrea C, 2021) in a way in which for many of the governments of the Amazon basin, they have seen this area as an "empty space" and as an "unlimited source" of natural resources and raw materials to exploit it, thus violating another important point that would be the social-cultural one with regarding the rights of the populations that live in these areas, “thus ignoring the millennial presence of indigenous peoples, the intrinsic and strategic value of biodiversity, and the benefits of the forest in the provision of water and climate regulation in South America and the world” (Larrea, 2021, p. 4)

Finally, another very important factor that can be taken into account when talking about deforestation is when it is related to the economic factor, within which the profitability of oil and gas can be taken into account, and how great these can generate for companies, but at the same time how they can directly affect the issue of the environmental crisis, since an

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immeasurable number of tree species has to be cut down to reach the extraction sites. "Given the wealth of the Amazon region in oil and gas reserves, many of which are still unexploited, oil exploration has increased considerably (CEPAL and Natural Heritage, 2013, p. 14)

When talking about deforestation, you have to talk about countries such as Brazil, Bolivia and the Republic of the Congo, since these countries have generally been the most problematic in relation to the subject. In recent years they have registered the greatest number of problems in relation to deforestation, as he explains (Jong H, 2022), the places where deforestation is most critical and at greatest risk worldwide, identified by the analysis carried out by Global Forest Watch, are in the territories of Brazil, the Republic Congo and Bolivia, where it can be seen that two of the three countries are in Latin America, so it can be understood that the country with the greatest loss of primary forests is Brazil, and it is explained because, as we says Jong H (2022), Brazil, in the world, It has the largest amount of primary tropical forest and is first on the deforestation list, because in 2021, it was once again at the top of the list for the amounts of forest they dumped, since within Brazil the loss of 40% of all the forest was generated. global loss of "tropical primary forests".

As can be seen in the following figure, the order of the countries in which there has been a greater loss of forests in the year 2021, as well as the number of areas that have been lost in each country, is presented. With these data it is possible to verify the amount of tree species that has been lost in just one year, as it can also be evidenced that of the 10 countries where there has been a greatest loss of forests, 4 of them are South American countries, finding Bolivia, Peru and Colombia, with a particularity in the last country where it can be seen that almost half of its Amazon territory has already been intervened as established in the book of (CEPAL and Natural Heritage, 2013) where it is explained that :

> The Colombian Amazon represents more than 40% of the Colombian territory, almost 20% has already been intervened. Today it has protection figures such as indigenous reservations, national parks and forest reserve areas, while the threats derived from extractives and unproductive economic dynamics do not generate the expected quality of life and progressively destroy ecosystems and their wealth (ECLAC and Natural Heritage, 2013, p. 11).

Figure 2

Ten countries with the greatest loss of tropical primary forests in 2021

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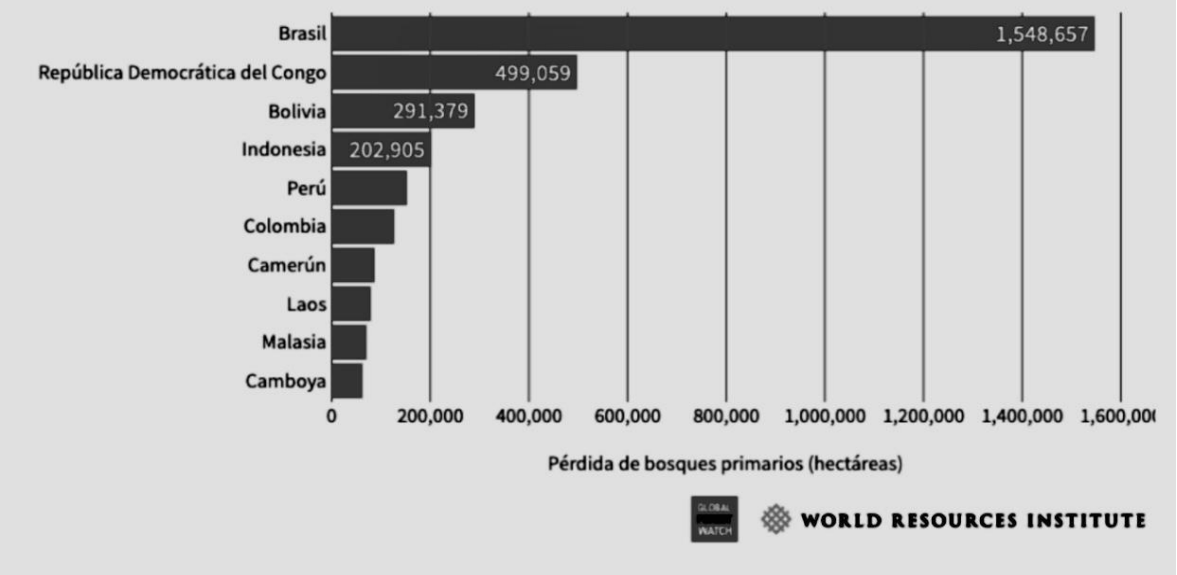

Source: Retrieved from Mongabay Latam (sp)

So, as Jong H, (2022) explains, when trees in tropical forests are felled, rainfall at the regional level decreases and, on the other hand, extreme heat increases at the local level, and this generates a consequence of a global temperature increase of 0.5 degrees Celsius higher. Therefore, it can be understood that the loss of forests within these countries is generating negative consequences and contributing to the environmental crisis, and that the countries, as well as the companies, are not making the sufficient efforts that should be made to improve the conditions of their forests. "The destruction of the current Amazon resource would generate considerable negative externalities, or, from another angle, its conservation would produce positive externalities." (ECLAC and Natural Heritage, 2013, p. 13)

According to the FAO (2023), the consequences of deforestation can be very serious, since it could threaten culture and the survival of indigenous peoples, as well as weaken the local and national economy. It could also increase natural disasters, social conflicts, and in consequence, generate a displacement of the inhabitants, which means that deforestation threatens life directly.

Deforestation has consequences that can be defined as environmental or natural; however, there are other types of sociocultural and economic consequences, such as:

The escalation of international prices of food, metals, precious minerals, hydrocarbons, among others, are a reflection of a very strong demand for these resources. In this

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scenario, the Amazon has a potential reserve that is still being measured (ECLAC and Natural Heritage, 2013, p. 25).

That they are big problems and that they can be understood as part of the reasons why deforestation has taken place in the Amazon. This has to do directly with the issue of scarcity of resources, where it is understood that,

> The two essential factors for food production, such as water and land, are found in large quantities in the region. The scarcity of these resources and the increasing competition between large nations for strategic control may put pressure on Amazonian countries to exploit these resources (ECLAC and Natural Heritage, 2013, p. 25).

So, it can be understood that the consequences go beyond the natural, since this is already becoming an economic and productive problem where nations are competing to have the greatest number of resources in order to survive the crisis. environment and to be able to survive economically, which generates a progression of both the environmental problem and the economic-productive problem, and this triggers social problems.

1.5.4. Importance and benefits of the Amazon

The importance of the Amazon has unfortunately been conditioned by subjectivities from the point of view of the person who talks about it. Its importance will depend on many factors, but it is necessary to understand that the Amazon is essential for the best development of the environment and of the human being. The Amazon, as explained by (Larrea, 2021) despite having been very important biologically, culturally and climatically over the years, remained isolated and forgotten after the conquest. However, currently, it has been seen as a productive means to generate economic benefit, and, therefore, its overexploitation is causing a threat to its integrity, since,

Despite the environmental services and global advantages of the Amazon rainforest, about 20% of the region's forests have been felled, which is expressed in the increase of extinct and threatened species, particularly mammals, birds, amphibians, fish and plants (ECLAC and Natural Heritage, 2013, p. 13)

When talking about the benefits of the Amazon, we can talk about factors such as its biodiversity.

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> One in ten species in the world inhabits it, as well as 30% of the planet's vascular plants. It is estimated that 3 million species can be found in the Amazon, with a high degree of endemism, most of which have not yet been identified (Larrea C, 2021, p. 2).

The biological factor is also worth highlighting, since, as explained by Larrea (2021), the part of the Andean Amazon is the rainiest and richest, taking into account that the upper basin of the Napo River, where we can find the Yasuní National Park and the Cuyabeno Reserve, have come to be cataloged within the places Westerners with the greatest diversity on the planet. On the other hand, we can talk about the cultural factor, where:

> The human presence in the region has existed for 12,000 years, the population of the Amazon basin reached 10 million people, who spoke approximately 1,000 different languages. The indigenous peoples conserved and enriched the biodiversity of the forest, as carriers and distributors of seeds (Larrea, 2021, p. 2).

The importance of this at a global level is very great because as stated by Lovejoy (2019), the biological diversity of the Amazon plays a fundamental role as a part of natural global systems, thus influencing the carbon cycle, the hydrological systems, and as a fundamental part of the climate in general, due to rainfall, and therefore in all the climate change that has developed globally.

Finally, why is the Amazon so important to the world? The conservation and preservation of the Amazon is very important to have a better, sustainable, responsible and intergenerational development for human beings, as for a whole called environment. The Amazon is very important for all the countries that make it up and also for the international community,

The Amazon has great national and international geopolitical relevance, due to the international scarcity of strategic resources, its environmental and ecological importance, its condition as a cross-border region, and its cultural heritage. Its enormous importance as a generator of water and provider of vital ecosystem services of planetary scope, is greater as soon as the effects of climate change become more noticeable (ECLAC and Natural Heritage, 2013, p. 24).

Thanks to the evidence, it can be understood that the Amazon is very important due to a series of factors. According to experts, its biodiversity is important worldwide, since, as explained by Lovejoy (2019), the species of flora and fauna that surround this diverse system represent "solutions" for biological challenges with the ability to transform them into benefits

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for human beings, as well as for the better development of the environment, also tells us that the biodiversity that is has in the Amazon have a fundamental role within the world ecosystem, since this influence on all environmental processes at the level of South America. On the other hand, Larrea (2021), maintains that the Amazon is important, since Amazonian trees can store at least an amount of 150 billion tons of carbon, which allows the collection of greenhouse gases, which if released in the atmosphere, could have catastrophic events as a consequence on the development of the planet. He states that "Even more important is the role of the forest as a carbon reserve and sink, absorbing a fraction of the human CO2 emissions that have created the global problem of climate change, thus threatening the survival of human civilization." (Larrea, 2021, p. 3), and this makes it clear to us that the Amazon plays a fundamental role in the development of clean air both locally and globally.

After understanding the generalities presented and after going through all the characteristics and important factors of the Amazon and the problems that have arisen within it, in relation to deforestation, it is necessary to express that the Amazon, as its natural biodiversity - biological, economic-productive, and social-cultural are important.

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EPISODE 2

2. THE ECUADORIAN AND PERUVIAN AMAZON: CHARACTERISTICS, ENVIRONMENTAL PROBLEMS AND DEFORESTATION.

2.1. Ecuadorian Amazon

The Ecuadorian Amazon is a geographical and cultural region located in the east of the country, which covers the provinces of Sucumbíos, Orellana, Napo, Pastaza, Morona Santiago and Zamora Chinchipe and extends for 120,000 km², which represents 42% of the national territory (Lopez, 2019). This region is home to rich biodiversity, with a wide variety of plant and animal species that have adapted to the unique conditions of the rainforest (Rodríguez, 2019).

In addition, the history of the Ecuadorian Amazon is necessarily linked to the indigenous cultures that have inhabited the region for thousands of years and have developed a deep relationship with nature and the natural resources of the jungle. The Amazon River, therefore, has played a fundamental role in providing water and the necessary nutrients to maintain the rich biodiversity and the way of life of the native communities.

2.1.1. The history of the Ecuadorian Amazon

The history of the Ecuadorian Amazon is marked by the presence of indigenous peoples who have inhabited the region for thousands of years, since approximately 2450 BC, and by the arrival of the Spanish conquerors in the 16th century.

Before the arrival of the Spanish, the region was inhabited by various indigenous groups, such as the Huaorani, the Shuar, the Achuar, the Cofán and the Siona. These peoples had their own cultures and ways of life, living by hunting, fishing, and farming in the Amazon jungle (Valarezo, 2002).

In the 16th century, the Spanish began exploring the region in search of gold and other natural resources. In 1542, Francisco de Orellana, one of the captains of Gonzalo Pizarro's

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expedition, sailed down the Amazon River and reached the Atlantic, discovering the immensity of the jungle and the largest river in the world (Valarezo, 2002).

During colonial times, the Amazon was a territory little explored and controlled by the Spanish, but it served as a source of rubber, timber, cocoa, and other natural resources (Valarezo, 2002). However, the exploitation of these resources was done at the expense of the indigenous peoples, who were forced to work in slave-like conditions and suffered diseases and epidemics brought by the colonizers.

In the 19th century, the Ecuadorian Amazon became a frontier region, where settlers and missionaries arrived from the United States of America in search of new lands and opportunities (Valarezo, 2002). Despite this, the region remained underdeveloped and isolated from the rest of the country.

In the 1960s, according to Praise (2000), the Ecuadorian government began a process of accelerated colonization of the Amazon, known as the "Green Revolution". New cities and highways were created to connect the region with the rest of the country, and the migration of peasants from the highlands to the jungle was encouraged. However, this process had serious consequences for indigenous peoples and the environment, as large areas of the jungle were deforested and natural ecosystems were destroyed (Praise, 2000).

In recent decades, the Ecuadorian Amazon has been the scene of conflicts between indigenous peoples, extractive companies, and the government. The indigenous people have fought for the defense of their territories and the protection of the environment, facing violence and repression by the security forces and extractive companies (Praise, 2000). Despite this, the region continues to be an important green lung of the planet and is home to a great diversity of animal and plant species.

2.1.2. Characteristics of the Ecuadorian Amazon

The Ecuadorian Amazon is a region rich in biodiversity and culture. Some of its main features are:

1. **Rain forest:**

The Ecuadorian Amazon is made up of dense tropical jungle. According to Rodríguez, (2019), 80% of Ecuador's biodiversity is located in this region, together with one of the main freshwater points, large extensions of virgin forests, and one of the most important oil fields in Latin America.

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2. Climate:

The climate of the Ecuadorian Amazon is typically hot and humid, with temperatures ranging between 25 and 30 degrees Celsius throughout the year. Relative humidity is very high, with levels that can exceed 90%. The rains are abundant and are distributed throughout the year, although the period of greatest precipitation is usually from March to July (Varela & Ron, 2019).

The Ecuadorian Amazon is located in the equatorial zone, where easterly winds and warm ocean currents from the Pacific interact with the Andes Mountain range and the Amazon River basin, generating the area's characteristic climate. This climate favors the growth of exuberant vegetation and a great diversity of animal and plant species.

It is important to note that the climate can vary slightly in different parts of the Ecuadorian Amazon region, depending on altitude, topography, and distance from the coast. In general, however, the Ecuadorian Amazon is a hot and humid region with abundant rainfall throughout the year (Varela & Ron, 2019).

3. Biodiversity:

The Ecuadorian Amazon is home to an enormous number of plant and animal species, many of them endemic. The Amazon is vital to the environment. The rainforest plays an important role in mitigating climate change, as it affects the global climate by absorbing large amounts of carbon from the atmosphere. It is also important for maintaining the dynamics of the water cycle, which affects the Amazon Basin and surrounding regions (Jordão, 2019). The weather conditions allow the flora and fauna to be extensive in the Ecuadorian Amazon. In the flora we find the famous lotus flower, epiphytes, orchids, heliconias, fungi, lianas and bromeliads (Ecuadorian Amazon, 2022). In its fauna, the best known are the black caiman, the macaws, the harpy eagle, the black dolphin, the green anaconda, the capybara, the jaguar, and the green frog (Ecuadorian Amazon, 2022).

5. Population:

According to the projections of the National Institute of Statistics and Censuses (INEC), the population in the Ecuadorian Amazon by 2020 will reach 956,699 people, with an average annual growth rate of 3.28%. The Amazonian population density is 9.04 Inhab/Km2. The Amazonian provinces with the highest population density are Sucumbíos (17.22 Inhab/Km2) and Zamora Chinchipe (15.37 Inhab/Km2). Sucumbíos is the province with the highest

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concentration of population, with 24% of the total; and Pastaza, the province with the least population with 12% (CTEA Public Investment Directorate, 2013)

6. **Indigenous villages:**

The Amazon is also a vital cultural resource. The indigenous population has a unique way of life, language and customs, which add diversity to Ecuador's cultural heritage. The conservation of the Amazon is vital for the cultural and economic survival of these groups (Cartay, 2022).

According to the Council of Nationalities and Peoples of Ecuador (CODENPE), "there are 14 nationalities and 18 indigenous peoples in the country," which add up to more than 1 million people and are brought together in a group of local, regional and national organizations (CONDENPE et al., 2022). "Nationalities and indigenous peoples are inhabiting the mountains 68.20%, followed by the Amazon (24.06%), and only 7.56% are found on the coast." (Ortiz, 2022)

The Ecuadorian Amazon has ten indigenous nationalities and three indigenous villages (Intercultural Laboratory of Flacso Ecuador - CARE Ecuador, 2023), which are detailed below:

- **indigenous nationalities:**

1. **Achuar:** They are located in Pastaza and Morona; their current population is 12,628 people.
2. **Andoa:** They are located in Pastaza; its population is 800 inhabitants.
3. **Cofán:** They are located in Sucumbíos; its population is 1100 people.
4. **Huaorani:** They are located in Orellana, Pastaza and Napo, their population is 2000 inhabitants.
5. **Secoya:** They are located in Sucumbíos and its population is 478 inhabitants.
6. **Shiwiar:** They are located in Pastaza; its population is 697 people.
7. **Shuar:** They are located in Morona, Zamora, Pastaza, Napo, Orellana, Sucumbíos, Guayas, Esmeraldas, their population is 110,000 inhabitants.
8. **Siona:** They are located in Sucumbíos; their population is between 350 and 400 people approximately.
9. **Zápara:** They are located in Pastaza; its population is 1300 inhabitants.
10. **Kichwa (Amazon):** They are located in Sucumbíos, Orellana, Napo and Pastaza, their population is 55,000 inhabitants.

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- **Indigenous villages:**

11. **Secoya:** They are located in Sucumbíos and its population is 478 inhabitants.
12. **Siona:** They are located in Sucumbíos; their population is between 350 and 400 people approximately.
13. **Cofán:** They are located in Sucumbíos; its population is 1100 people.

7. Tourism:

Tourism in Ecuador has had an incredible improvement in 2022 compared to last year. According to EFE, (2023) "Tourism in Ecuador achieved a record collection figure during the festive periods (holidays) of 2022, with estimated income of 480 million dollars, 94 million more than in the same periods of 2019, before the pandemic." (p. 1).

The Ecuadorian Amazon led the figures, “last year, 1,072,027 foreign tourists arrived in the country; This means a growth of 85% compared to 2021. A large percentage of visitors come from the United States” (Zambrano, 2023, p. 2). This is due to the recognition of Aguarico, Orellana with the "Best Tourism Villages 2022" award, granted by the World Tourism Organization (Zambrano, 2023).

At present, the Ecuadorian Amazon has become the center of ecotourism, where visitors carry out activities such as bird and butterfly observation and visits to indigenous communities, as well as visiting waterfalls, hiking through the forest, camping, shopping a stone bath, get to know nature reserves, visit the monkey house, do canopy, enjoy a giant seesaw, among other activities (Calderon, 2023).

According to the Ministry of Ecuador, in the country, 39 community tourism centers are registered, of which 20 are in four provinces of the Amazon. That is, 51.28% of the country's community tourism centers are located in this region (Ecuador Checks, 2023).

From 2015 to 2022, activities related to tourism have managed to raise a total of $1,100.92 throughout the Amazon. Orellana was the province that generated the most income from tourism with a total of $305,000. It is followed by the province of Sucumbíos with $279,000, Napo with $183,000, Pastaza with $137,000, Morona Santiago with $105,000 and Zamora Chinchipe with $90,000 (Ecuador Checks, 2023).

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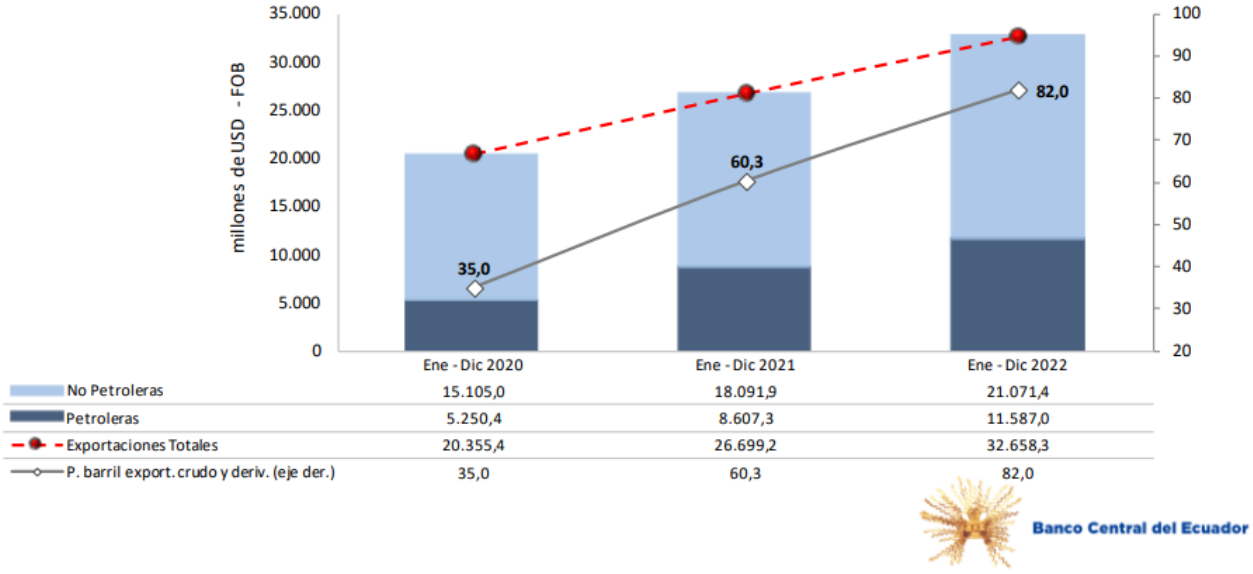
8. Exports:

The region is rich in natural resources and they contribute to the country's economy. "Between January and December 2022, total exports reached USD 32,658.3 million, 22.3% higher than the 2021 period" (Central Bank of Ecuador, 2022). In Ecuador there are 3 types of exports that give income to the country.

Figure 3

Ecuador oil exports 2020-2022



Source: Retrieved from the Central Bank of Ecuador (2023)

- **Oil exports:**

Oil exports contributed USD 11,587.0 million, and the FOB value increased by 34.6%. The oil and gas industry provides revenue, Ecuador produces more than 160 million barrels of oil annually, and the country rakes in billions of dollars from its oil sector. The oil sector typically accounts for up to 60 percent of the country's export earnings (Juicio Crudo, 2022).

- **Non-oil exports (traditional):**

Non-oil exports in the analysis period increased 16.5% in value (-1.8% in volume), reaching USD 21,071.4 million.

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- **Non-oil exports (non-traditional):**

Non-traditional external sales reached an average monthly FOB value of USD 704.5 million (Central Bank of Ecuador, 2022). As of 2021, the Ecuadorian Amazon is one of the largest producers of plantains, coffee, cacao, and cacao in South America. The trade of milk, honey and agriculture are popular economic activities in the region (Ecuadorian Amazon, 2022).

2.1.3. Amazon, Ecuador's main income

According to (Vogliano, 2009), oil exploration began in the fifties, and in the seventies, oil exploitation already became the basis of the local Ecuadorian economy. In this sense, the importance that oil has had in recent years, and how it has been essential for the economic and productive development of the country are considered., However, according to Guaranda (n.d.), within the last 40 years of exploitation, this process has had "disastrous" history in relation to economic benefit, as well as the degradation that this activity has caused in the environment. In fact, Vogliano (2009) highlights that these conditions have caused the poor regulation of the activity within the country, generating social and environmental consequences of "enormous dimensions", which has shown discontent and struggle for society in large cases such as the Texaco trial and the expulsion of Occidental (OXY) of Ecuador.

Table 1

Environmental problems of Ecuador

Gas emissions	Expansion of the agricultural frontier	Mining
According to the current Ecuadorian Ministry of the Environment, Water and Ecological Transition (MAATE). Ecuador has been responsible, up to the year 2016, for 0.15% of all emissions that are globally related to climate change.	In Ecuador, the agricultural frontier is expanded by the "poor settlers" who emigrate from the mountains and the coast to the Amazon, since they begin to sow in order to survive, generating a negative consequence in the environmental crisis.	In 2020, when Ecuador was going through the COVID 19 pandemic, both oil extraction and mining activities continued to be the main way of generating resources for Ecuador.

Note: Adapted from Ministry of the Environment (2016), Brik (2019) and Castro (2021)

2.1.4. Deforestation in the Ecuadorian Amazon

In the case of deforestation, there is a very big problem, considering that the oil, mining, agricultural, and livestock industries, to carry out their activities, generally have to deforest the areas. This becomes a problem on a large scale and with greater consequences in the

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Ecuadorian Amazon, as well as in the environment. The issue of deforestation in the Ecuadorian Amazon is a problem that has grown and is increasingly affecting more and more because as explained by Paz,

> The Ecuadorian Amazon represents 1.6% of the entire Amazon biome, but almost half of the total area of the country. Between 2001 and 2020, the country had a deforestation rate of 623,510 hectares, according to data analyzed by Mapbiomas Amazonía, which in Ecuador is represented by the EcoCiencia Foundation. This loss occurred at a rate of five soccer fields per hour, which represents approximately 31,000 hectares on average per year (Paz, 2022, p. 1).

Deforestation in the Ecuadorian Amazon such a serious problem, since, according to Paz (2022), the Ecuadorian Amazon is in fifth place in terms of deforested extension, after Brazil, Bolivia, Peru and Colombia, which should not be too alarming at the level of Latin America and worldwide, but which happens to proportional level.

> Ecuador does not always stand out as a country that deforests because it is a small country in itself, so its figures usually do not stand out when compared to much larger nations such as Brazil and Bolivia. But it does attract our attention in Ecuador because, in proportional terms, we are one of the countries that loses its forests at the highest rate, says María Olga Borja, technical coordinator of Mapbiomas for Ecuador at Fundación EcoCiencia (Paz, 2022, p. 3)

On the other hand, according to National Geographic (2023), deforestation affect the Amazon when the vegetation layer of the forests and jungles is removed, so it loses its mantles, which means that the sun's rays are not blocked during the day so the heat is not maintained at night, which in turn generates imbalances in temperature, which can become extreme for flora and fauna. On the other hand, trees absorb greenhouse gases, thus slowing global warming, so deforestation not only reduces the tree mass of the Ecuadorian Amazon, but also contributes to a faster increase in global warming.

Within Ecuador, deforestation has negative effects; for example, as explained by Amazon Frontlines (2023), the main consequence of deforestation as such, is that mercury is released from the soil of the jungle, and unfortunately, it infects the air and water, and therefore, the fauna, such as freshwater fish in the Amazon regions, which in turn, are the basis of the diet of the inhabitants and of animals. Mercury is a neurotoxin that, even with very low concentrations,

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can damage the nervous system of those who consume it, thus becoming a problem throughout the food chain from fish to a human and wildlife problem.

Ecuadorian deforestation, as explained by Paz (2022), has concentrated in four specific provinces; the most affected area is Morona Santiago, followed by Sucumbíos, Orellana, and the province of Zamora Chinchipe with 77% of the total deforestation in the country. Among the most worrying issues is the fact that, of the six provinces most affected by deforestation, 46% of all this is concentrated in the provinces of Morona Santiago, with more than 158,000 hectares, and Sucumbíos with 129,000 hectares from 2001 to 2020, which is mainly caused by the high activity of mining and extraction of hydrocarbons.

According to Roasting, within the province of Morona Santiago there is worrying deforestation because today, this area is highly coveted and occupies the second place in places where most deforestation occurs within the country, with a figure greater than nine thousand hectares per year. The territory, which is relatively extensive and connects several highways with the center of the country, has many native tree species, which are no longer easily available, and are therefore highly sought after by the country's logging companies. On the other hand, small cattle farming has begun to expand among the indigenous people, since in Morona Santiago there are some 200,000 head of cattle in almost half a million hectares of pasture, which at the moment becomes the second cause of deforestation within area (2019).

The problems described above are directly affecting the issue of the Ecuadorian and therefore global environmental crisis, so it can be understood that deforestation in the Ecuadorian Amazon is a serious problem that is affecting the Amazonian territories.

2.2. The Peruvian Amazon

The territorial extension of the Peruvian Amazon is 782,880 km2(Etecé Editorial, 2021). The Amazonian population represents 14.2% of the entire Peruvian population in general. These figures include the inhabitants of the departments of Loreto, San Martín, Ucayali, Madre de Dios and Amazonas, as well as the Amazonian territories of Ayacucho, Cajamarca, Cusco, Huánuco, Junín, Pasco, Puno, Huancavelica, La Libertad and Piura (Credit Bank of Lima-Peru, 2015).

The Amazon within Peru has the uniqueness of covering territories with different altitudinal floors, which is why it has different types of relief, climates and a very varied diversity, which are divided between the high jungle (jungle of the mountain range) and low

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or tropical jungle (jungle on the plain) (Etecé Editorial, 2021). Additionally, the presence of different reliefs allows the existence of many very important tributaries, which are very important for the vital development of its vegetation and its fauna (Santillan Ramirez & Pinedo Estrada, 2013).

2.2.1. History of the Peruvian Amazon

The history of the Peruvian Amazon begins when the first groups of settlers arrived approximately 20,000 years BC, bringing the elements of the Upper Paleolithic culture, until the arrival of the first European settlers in the 16th century (Santillan Ramirez & Pinedo Estrada, 2013). Both the Portuguese and the Spanish were the first to arrive in these lands, arousing the imagination and also the greed of the populations of Europe (Credit Bank of Lima-Peru, 2015).

These native peoples became a fundamental reference for the Amazon basin. However, we cannot fail to mention the different migratory waves that the Amazon had after the arrival of the Europeans (Credit Bank of Lima-Peru, 2015). These migratory waves brought with them the Catholic Church to the Amazon, which, since colonial times, has been very relevant, since the missionaries have made these new territories known to the world since then (Credit Bank of Lima-Peru, 2015). In the midst of this period of the Spanish conquest and colonization in America, this territory was used very intensively for the exploitation of the rubber tree (Etecé Editorial, 2021), and in addition to evangelizing the native peoples, they carried out studies in cartography, ethnography, and the flora and fauna in the region (Credit Bank of Lima-Peru, 2015).

After this, in the year 1864, the regions had several migratory waves of very different and contrasting nationalities such as China, various European countries and Sephardic Jews. This made the new towns very cosmopolitan. These migrants then navigated up the Marañón, Huallaga and Ucayali rivers, to what is now known as Yurimaguas, Tarapoto, Moyobamba, Rioja, Chachapoyas, Lamas or Pucallpa. Therefore, in general, surnames of Portuguese, Chinese or Jewish origin are common throughout the territory. Over the years, the generations that managed to adapt to this environment, little by little, knew how to combine the knowledge and customs brought from their territories of origin, with those that they learned from the ancestral inhabitants of this Amazonian world, creating a new culture. and very diverse in knowledge (Credit Bank of Lima-Peru, 2015).

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2.2.2. Characteristics of the Peruvian Amazon

The Peruvian Amazon is very rich and with varied diversity and culture, some of its main characteristics are:

1. **Biodiversity:**

The diversity of flora and fauna in the Peruvian Amazon is very high, since it is estimated that the Amazon contains at least 20% of the known plant species on the entire planet. More than 300 plants are widely used by indigenous populations for their medicinal, nutritional and productive uses, and almost 4,000 species are timber (Santillan Ramirez & Pinedo Estrada, 2013). Among the most characteristic plants are the water lily, the jungle orchid, the heliconia, the red pineapple, and the elephant ear, among others (Arriols, 2022). Just as the Peruvian flora is particular and autochthonous, the fauna is very diverse and is found throughout the entire area. Within the Amazon you can find majestic species such as the jaguar, the anaconda, and the Peruvian cock of the rocks, among others (Arriols, 2022). The fauna has a great variety of aquatic species that exceed 2,000 species of fish, reptiles and amphibians (Santillan Ramírez & Pinedo Estrada, 2013).

2. **Relief:**

The relief of the Peruvian Amazon is divided by its location. Within the high jungle there is a mountainous relief, with many ravines and narrow valleys, which is covered by an impenetrable jungle. On the other hand, there is the low jungle where heterogeneous soils and abundant rivers can be seen (Etecé Editorial, 2021).

3. **Climate:**

The climate of the Peruvian Amazon is directly affected by its location, and due to its extension, it can vary according to the area:

Within the Selva Alta, located at an average between 800 and 3,000 meters above sea level, you can see warm temperatures in the lower part and cooler temperatures as you ascend

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to the upper part, accompanied by rainfall levels of up to 5,000 millimeters per year (Etecé Editorial, 2021).

On the other hand, the Selva Baja, which is located between 800 and 80 meters above sea level, is a tropical forest that can be extremely hot, with annual averages of up to 28 degrees Celsius and very high humidity with levels above 75%, due to its very frequent rainfall (Etecé Editorial, 2021).

4. Population:

When the census was carried out in 2005, the result was a population of 3,872,318 inhabitants. This population is more concentrated in large cities such as Iquitos, Pucallpa and Tarapoto (Credit Bank of Lima-Peru, 2015).

5. Indigenous villages:

The indigenous groups or peoples of Amazonian origin, also called as natives in Peru, are made up of an estimated population of 300,000 to 400,000 inhabitants, which are scattered throughout the Peruvian Amazon territory (Credit Bank of Lima-Peru, 2015). In the last census carried out in the year 2007 on the Amazonian indigenous populations, it was indicated that there is a division of 13 ethnolinguistic families and within it there are 60 ethnic groups (Credit Bank of Lima-Peru, 2015).

> Amazonian indigenous populations are characterized by a greater diversity of languages and situations of greater or lesser contact with Western society. There are many indigenous peoples of the Amazon that have been in a situation of relative isolation until a few decades ago because they are in areas of difficult access (Mayor Aparicio & Bodmer, 2009, p. 32).

6. Ethnic groups of the Peruvian Amazon:

Santillan Ramirez & Pinedo Estrada (2013) explain that, within the Peruvian Amazon, ethnic groups have been classified by basic elements and characteristics, such as language, dialect, culture and territorial settlement, as shown in Table 2.

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Table 2 Indigenous population of Peru

FAMILIA	LENGUAS y DIALECTOS	POBLACIÓN TOTAL (%)	NÚMERO DE COMUNIDADES (%)	LOCALIZACIÓN
ARAWAK MAIPUREN	Culina	417 (0.1%)	7 (0.4%)	Ríos Purús y Santa Rosa, cerca de la frontera con Brasil.
	Asháninka	88.703 (26.6%)	462 (25.7%)	Río Bajo Apurímac, Ene, Tambo, Satipo, Pichis, Bajo Urubamba, Alto Ucayali, Pachitea y Yurúa.
	Asheninka	8.774 (2.6%)		
	Caquinte	439 (0.1%)		
	Chamicuro	439 (0.1%)	1 (0.1%)	Pampa Hermosa, Bajo Ucayali. en extinción.
	Matsiguenga	11.279 (3.4%)	40 (2.2%)	Ríos Camisea, Picha, Manu, Urubamba, Mishagua.
	Nomatsiguenga	6.147 (2.31%)	22 (1.2%)	San Martín de Pangoa, en Satipo, Junin.
	Yanesha Amuesha	8.016 (2.4%)	42 (2.3%)	Junín, Pasco (cabeceras de los ríos Pachitea y Perené).
	Piro / Yine	3.261 (1.0%)	17 (0.9%)	Ríos Bajo Urubamba y Ucayali medio (Coshibiatay).
	Resígaro	37 (0.0%)	1 (0.1%)	
BORA HUITOTO	Bora	748 (0.2%)	6 (0.3%)	Ríos Putumayo, Ampiyacu.
	Huitoto	1.864 (0.6%)	22 (1.2%)	Ríos Ampiyacu, Putumayo, Napo.
	Ocaina	97 (0.0%)	2 (0.1%)	Ríos Yaguasyacu, Ampuyacu y Putumayo.
CAHUAPANA	Chayahuita	21.776 (6.4%)	124 (6.9%)	Ríos Paranapura, Cahuapanas, Sillay y Shanusi.
	Jebero	126 (0.0%)	1 (0.1%)	Distrito de Jeberos.
HARAKMBUT	Amarakaeri	1.043 (0.3%)	5 (0.3%)	Ríos Madre de Dios y Colorado.
	Arasaeri	317 (0.1%)	2 (0.1%)	Río Arasa, Cuzco, Madre de Dios.
	Toyoeri	125 (0.1%)	NO HAY DATOS	Cuenca del Toyo, Madre de Dios.
	Wachipaeri	392 (0.1%)	3 (0.2%)	Ríos Madre de Dios y Keros.
JIBARO	Achual - Achuar	10.919 (3.3%)	57 (3.2%)	Ríos Morona, Macusari, Tigre, Huasaga, Corrientes.
	Awajun	55.366 (16.6%)	281 (15.6%)	Area del río Marañón. Ríos Potro, Mayo y Cahuapanas.
	Kandozi	3.255 (1.0%)	46 (2.6%)	Ríos Morona, Pastaza, Chitoyacu, Chapuli.
	Jíbaro	168 (0.1%)	1 (0.1%)	Ríos Tigre, Corrientes y Macusari.
	Huambisa	10.163 (3.1%)	61 (3.4%)	Ríos Morona y Santiago.
PANO	Amahuaca	301 (0.1%)	6 (0.3%)	Ríos Sepahua, Curiuja, Alto Ucayali, Inuya, Purús.
	Capanahua	384 (0.1%)	4 (0.2%)	Área de los ríos Tapiche -Buncuya.
	Cashibo - Cacataibo	1.879 (0.6%)	8 (0.4%)	Ríos Aguaytía y San Alejandro.
	Cashinahua	2.419 (0.7%)	19 (1.1%)	Ríos Curanja y Purús.
	Mayoruna - Matsés	1.724 (0.5%)	16 (0.9%)	Distrito Yaquerana, Loreto.
	Nahua - Morunahua	450 (0.17%)	NO HAY DATOS	Cabeceras del río Embin.
	Sharanahua	565 (0.18%)	13 (0.8%)	Río Alto Purús.
	Shipibo - Conibo	22.517 (6.8%)	104 (5.8%)	Río Medio Ucayali.
	Yaminahua	600 (0.2%)	5 (0.3%)	Huacapishtea y Mayupa.
PEBA YAGUA	Yagua	5.679 (1.7%)	41 (2.3%)	Noreste del río Amazonas, de Iquitos a la frontera con Brasil.
KICHWA	Kichwa, Lamas	16.929 (5.1%)	71 (3.9%)	Yanahuanca, Vilcabamba, Tapoc, Chacayán, Páucar, Goyllarisquizga.
	Kichwa, Pastaza y Tigre	116 (0.0%)	131 (7.3%)	Ríos Pastaza, Tigre, Huasaga, Urituyacu.
	Kichwa, Napo	19.118 (5.7%)		Región del río Napo.
SHIMACO	Urarina	4.854 (1.5%)	53 (2.9%)	Ríos Pucayacu, Chambira, Urituyacu y Corrientes.
TACANA	Ese' Ejja	588 (0.2%)	3 (0.2%)	Ríos Tambopata y Heath.
TIKUNA	Tikuna	6.982 (2.1%)	25 (1.4%)	Noreste del río Amazonas.
TUKANO	Orejon	190 (0.1%)	4 (0.2%)	Ríos Yanayacu, Sucusari, Algodón y Putumayo.
	Secoya	921 (0.3%)	9 (0.5)	Boca de Angusillay Santa Marta, Río Napo.
TUPÍ GUARANI	Kukama-Kukamiria	11.307 (3.4%)	59 (3.3%)	Áreas de los ríos Ucayali, Marañón y Huallaga.
ZÁPARO	Arabela	403 (0.1%)	2 (0.1%)	Río Arabela (tributario del Napo).
	Iquito	519 (0.2%)	3 (0.2%)	Río Nanay.
TOTAL		332.975	1786 (100%)	AMAZONÍA PERUANA
TOTAL		4.295.931		ESTADO PERUANO

Source: Retrieved from Mayor Aparicio and Bodmer (2009).

7. Exports:

Taking into account that the extension of the Peruvian Amazonian territory is very large, the reference export data used will only be from the departments of Loreto and Lacayo.

Loreto is the second oil producer in the country and the first agricultural producer of products such as camu camu, which is a tropical fruit. Loreto owns 88% of the production of this fruit (Ministry of Foreign Trade and Tourism, 2017). "The main activity in the region is trade (20%). In the first half of 2017, Loreto grew 1.7% thanks to oil extraction (+29%), electricity (+26%), construction (+9%) in the second quarter" (Ministry of Foreign Trade and Tourism, 2017, p. 1).

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

On the other hand, Ucayali, which is considered by the Ministry of Foreign Trade and Tourism (2017) as one of the largest regions in the country with an 8% surface area, has concentrated 0.5% of oil exports, and has grown at a slower rate than the rest of the country. The timber sector within the region is leading exports with 81% up to 2017, but its poor performance has affected exports in recent years. However, in the agricultural sector, the shipment of cocoa beans and seeds forage grew by 29% in 2017, which benefited the region.

> Ucayali's economy is based on agro-industrial and commercial activities, which concentrate more than 40% of its GDP. Ucayali is also the third region with the highest production of sawn wood (concentrates 18% of the national total). However, Ucayali is one of the regions most affected by deforestation, in 2016 almost 30 thousand hectares of forests were deforested in the region (Ministry of Foreign Trade and Tourism, 2017, p. 1).

8. Economy of Peru

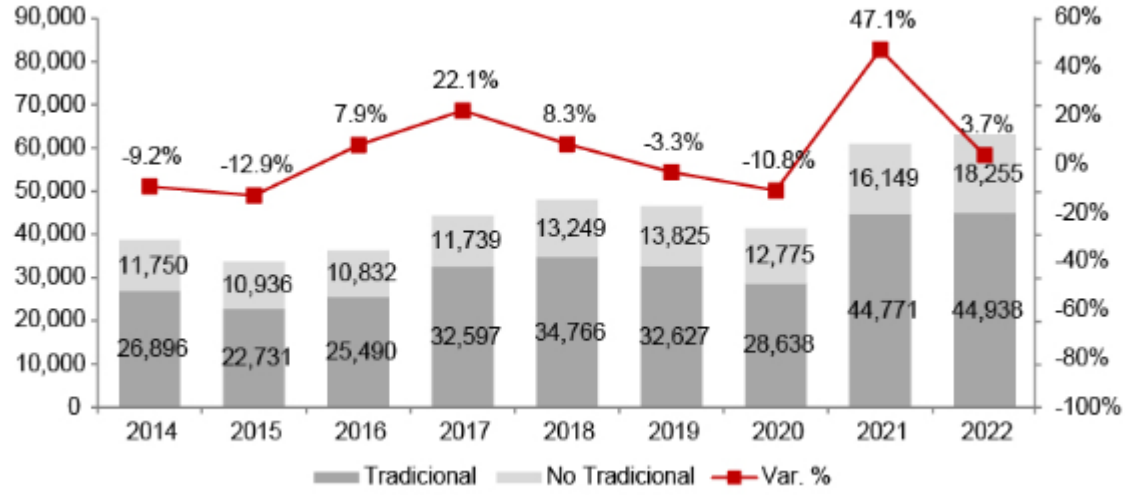
Environmental pollution is a growing problem throughout the world, and Peru is no exception. The general panorama of Peru does not start in the best way this 2023. There is political instability, changes in regional authorities, threats in the Amazon and the impacts on the sea caused by the largest oil spill in the history of Peru in the year 2022 (Praeli, 2023).

According to figures from the National Superintendency of Customs and Tax Administration (SUNAT), as can be seen in Figure 5, total exports from Peru in 2022 were US $63,193 million, 3.7% more than in 2021. Of the total, 71% were of the traditional category, while the remaining 29% correspond to the non-traditional. In addition, the former registered an increase of 0.3% and the latter, 13% (ComexPeru, 2023).

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

Figure 5

Evaluation of Peruvian exports 2014-2022



Source: Retrieved from ComexPerú, (2023)

According to ComexPerú (2023), within the main sectors of the traditional sector, mining registered shipments for a total of US $35,069 million. Oil and derivatives reached US $6,151 million; (+57.8%), fishing US $2,381 million; (+1.9%) and agriculture US $1,335 million; (+57.2%).

On the other hand, in shipments of the non-traditional items, the agricultural sector registered an exported value of US$ 8,526 million in 2022, followed by the chemical sector, with US$ 2,344 million, and the fishing sector, with US$ 1,568 million (+6.2%, 8.6%).

Additionally, according to ComexPeru, Peru's main exports are Copper Mine ($15.3MM), Gold ($7.74MM), Refined Copper ($2.29MM), Animal Meal and Granules ($1.85MM), and Iron Ore ($1.78MM), exporting mainly to China ($17.7 million), the United States ($7.39 million), South Korea ($2.82 million), Japan ($2.78 million), and Canada ($2.76 million) (2023).

As the country continues to experience rapid economic growth and urban development, it has become increasingly difficult to balance progress with protecting the environment. As a result, pollution has reached significantly throughout the country, with serious consequences for public health and the ecosystem.

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

2.2.3. Peru's environmental challenges

In 2023, some of the most significant sectors of the economy that could affect the environment in Peru include: mining, fishing, deforestation, and agriculture. It is important to highlight that measures are taken to minimize these impacts and protect the country's biodiversity and natural resources.

Table 3

Environmental problems in Peru

Mining	Agriculture	Fishing
It represents 10% of the country's total production and two thirds of the value of exports. Mining production in Peru would grow 7.8% in 2023 (BBVA, 2022).	In 2022, a gross production value of 8,375.03 million dollars was registered, considered a record figure, and a growth of 4.1%. The agricultural and livestock subsectors grew 5.2% and 2.2%, respectively (Vinelli, 2022).	The production of the Fishing sector grew 32.96% in January 2023, as announced by the National Institute of Statistics and Informatics (INEI) in the technical report Situational Advance of Economic Activity (INEN, 2023).
The country has an important mining corridor, which is more than 400 km long, and in which there are some of the most important copper mines on the planet, such as Las Bambas, which represents 2% of the world supply of this mineral (Andina, 2022).	Agricultural exports also grew by 21.3% in 2022 (Vinelli, 2022). It is estimated that agricultural activity will grow by 3.5% during 2023.	With a greater extraction of species of maritime origin (37.27%), reaching an extraction of 546,831 tons, compared to 111,127 tons in January 2022, registering an increase of 392.08% (INEN, 2023).
The country is the second global producer of copper. It is the main Peruvian product. It represents 30% of its total exports (Cruz, 2023).	In the livestock sector, growth of 3% is also expected, with greater relevance in the poultry subsector, due to the production of chickens and eggs (Vinelli, 2022).	"New scientific research revealed that, in Peru, the growth of artisanal fishing in recent decades has been explosive and unsustainable, driving various fish populations to overexploitation and fishermen to poverty" (Carrere, 2020).
Environmental impact: release of chemical residues, tailings, toxic gases, dust, acid drainage, surface and groundwater contamination, and irreversible destruction of ecosystems (Moreno, 2022).	**Environmental impact:** unsustainable techniques are used that cause the depletion of natural resources and soil contamination (Agroinvest, 2022). The regeneration cycle of natural resources is altered, leading to the felling of trees and the loss of primary forests in the Peruvian jungle (Agroinvest, 2022).	**Environmental impact:** illegal fishing has serious consequences for aquatic ecosystems, including direct overexploitation of fish, invertebrates, and algae for food and the aquarium trade (The Natural Conservancy, 2023). In addition, species removal impacts multiple trophic levels, as well as non-target species bycatch and mortality. In addition, the reduction of herbivores can lead to changes in coral reefs, where algae can dominate in place of corals (The Natural Conservancy, 2023).

Source: Adapted from BBVA (2022), The Nature Conservancy (2023), Vinelli (2022), Carrere (2020), INEN (2023), Moreno (2022), Cruz (2023), Andina (2022) and Agroinvest, (2022).

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

Nevertheless, the economic activity that is of interest to us is deforestation. Clearing of forests for agriculture, mining, and urban sprawl is a problem in Peru, that leads to loss of natural habitats and land degradation.

2.2.4. Deforestation in Peru

The loss of forests in the Amazon has been a constant in recent years. Although in 2021 deforestation was lower than that registered in 2020, the data places Peru among the countries with the highest deforestation in Latin America.

In 2020, the Peruvian Amazon suffered the worst deforestation figure in the last 20 years. More than 203,272 hectares were felled according to Vera (2023), a figure that is 54,846 more than the number of forests lost the previous year.

According to Alvitres (2023), between 1985 and 2021, more than 3 million hectares of forest were lost nationwide: 2,600,400 hectares in the Amazon and more than 1 million in the Andean zone.

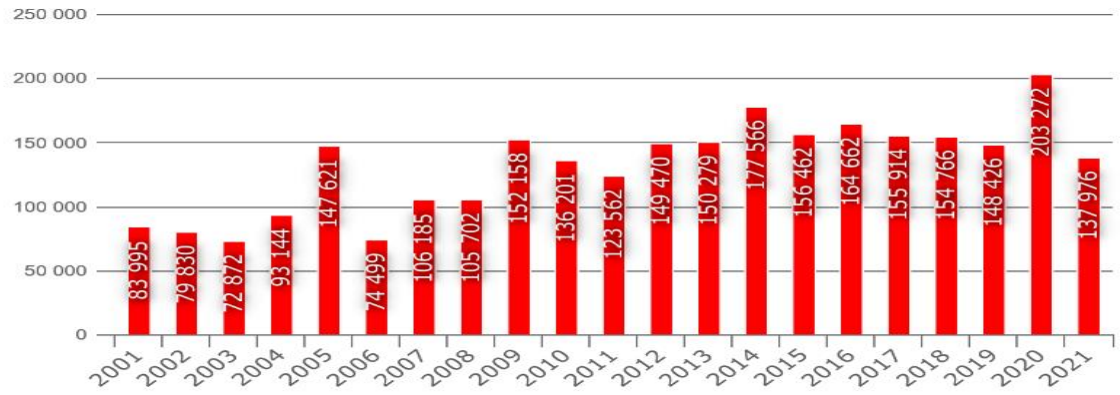
In the Amazon biome, the loss of plant surface reached the figure of 2.2 million hectares in 37 years, according to the results presented. Nicole Moreno, a Map Biomas Peru specialist and one of those responsible for the project, points out that, in recent years, especially in the midst of the COVID-19 pandemic, deforestation has skyrocketed due to logging, mining, and agricultural growth (Alvitres, 2023).

Alvitres attributes one of the main causes of deforestation to the increase in mining in the Amazon, which grew by more than 8,000%, especially in the region of Madre de Dios. Regarding the growth of the agricultural frontier, the figures show an increase of 73.29%, which implies an increase in cultivation activities in areas where there were forests or native species (2023).

Figure 6

Forest loss in Peru

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).



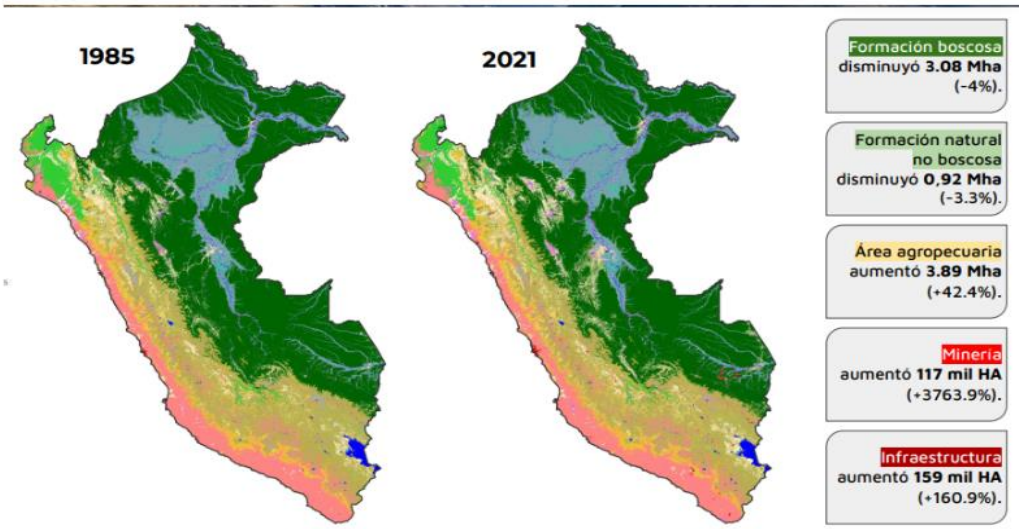
Source: Retrieved from Alvitres (2023)

Ucayali, with 36,305 deforested hectares, heads the list of regions with the most lost forests, followed by Madre de Dios with 23,142 hectares and Loreto with 19,829 hectares. Behind them are Huánuco with 15,021 hectares, San Martín with 13,080 hectares and Junín with 12,082 hectares. There are also Pasco with 5,597, Cusco with 5,349, Amazonas with 4,330 and Puno with 1,891 hectares (Sierra Praeli, 2019).

Figure 7 shows the loss of vegetation cover by comparing the years 1985 and 2021 in Peru.

Figure 7

Panorama of vegetation cover Peru 1985-2021 [forest formation decreased 3.08 mha (-4%), non-forested natural formation decreased 0.92 mha (-3.3%), agricultural area increased 3.89 kha (+42.4%), mining increased 117 thousand ha (+3763.9%), infrastructure increase 159 thousand hectares (+160.9%)]



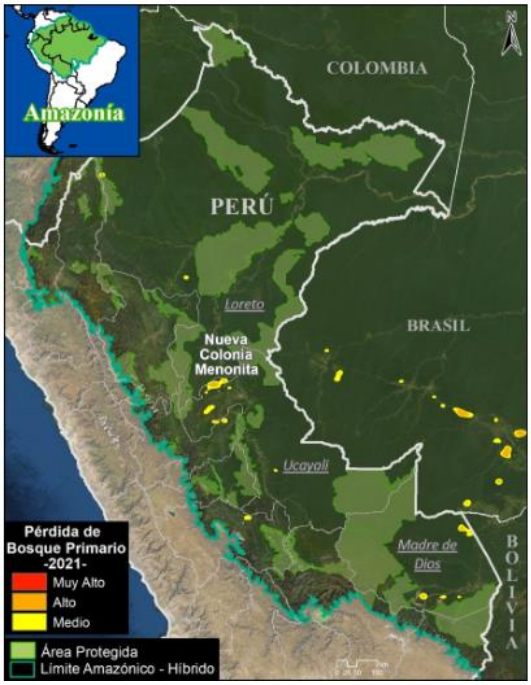
En los mapas que se obtienen en la Plataforma se puede observar cómo se va perdiendo la cobertura vegetal y en contraparte aumentan actividades agrícolas, minería e infraestructura.

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

Source: Retrieved from Mongabay (2023)

Figure 8

Panorama of vegetation cover Peru 1985-2021(Loss of primary forest 2021. Very high, high, medium. Protected area, amazon limit-hybrid)



Source: Recovered from Monitoring of the Andean Amazon Project, 2022

In addition, last year, the dispute between indigenous leaders and interested sectors has left several deaths, mainly caused by drug trafficking, illegal mining, and illegal felling of trees. Sectors as the valleys of the Pichis and Palcazú rivers are used for growing coca leaves and transporting drugs (MAAP, 2022).

It was in Huánuco where the first murder of an indigenous leader occurred just a month after the quarantine was decreed in 2020. According to Praeli, (2023), "On April 12, they assassinated Arbildo Meléndez, head of the Unipacuyacu native community, of the Kakataibo indigenous people, who was facing invasions of their territory and the advance of illegal coca crops on communal lands." (para. 1)

In the following months, four Kakataibo indigenous people were murdered in the territory between Ucayali and Huánuco. In all cases, the deaths were related to the presence of drug trafficking (Praeli, 2023).

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

According to the annual report of the White House Office of National Drug Control Policy (ONDCP), Peru reached a historical record of 88,200 hectares of illegal coca crops in 2020; a figure that exceeds 16,000 hectares reported in 2019 (Praeli, 2023).

- **Protected areas in Peru**

Finally, despite the fact that deforestation rates are high in the Peruvian Amazon, there are some protected areas within the country. In Peru there are currently 158 Private Conservation Areas (ACP) created with the objective of preserving the ecosystem and biodiversity. The last 5 were added in 2022 and all these zones represent 16.93% of the national geography.

Within the Department of Ucayali, which is the area of interest for this research, according to the Ministry of Tourism, with updated data for 2023, there are 10 protected areas, which include national parks, regional and private conservation areas, as well as communal reserves:

1. Cordillera Azul National Park
2. Alto Purus National Park
3. Sierra del Divisor National Park
4. El Sira communal reserve
5. Púrus Communal Reserve
6. Imiria Regional Conservation Area
7. Alto Tamaya Communal Conservation Area - Abujao
8. Fundo Miguel I private conservation area
9. Campo Verde Private Conservation Area
10. Pablito II private conservation area

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

CHAPTER 3

3. DEFORESTATION IN MORONA SANTIAGO (ECUADOR) AND UCAYALI (PERU)

3.1. Morona Santiago Province

Morona Santiago is a province of Ecuador located in the Amazon region of the country, bordering to the north with the province of Azuay, to the east with the province of Zamora Chinchipe, to the south with the province of Loja and to the west with the province of Azuay. It is one of the largest provinces of Ecuador, with a territorial extension of 25,690 km² (Prefecture of Morona Santiago, 2019)

The population of Morona Santiago is approximately 196,535 inhabitants. According to the census carried out by the INEC-2010, two large groups stand out: people self-identified as indigenous (48.36%) and mestizos (46.58%)" (Prefecture of Morona Santiago, 2019)

Its climate depends on the height of the terrain, with an average temperature of 18°Cat 24°C. There are cold areas such as the top of Sangay, and warmer areas such as the valleys of Santiago and Yaupi (Quichimbo, 2013).

The economy of Morona Santiago is based mainly on the extraction of natural resources such as oil, gold, and wood. In the agricultural sector, the cultivation of oil palm, cassava, banana, coffee, and cocoa stand out, as well as cattle ranching, which is also important for the local economy, especially for the indigenous groups that practice traditional agriculture and fishing. In recent years, tourism has become an important source of income for the province, thanks to its rich biodiversity and cultural heritage (Prefecture of Morona Santiago, 2019).

According to the Morona Santiago Territorial Development and Planning Plan (2019), the flora of the province is based on ceibos, guayacanes, laurels, cedars, and the chonta palm, orchids, among others. Its fauna is based on the yellow-eared parrot, the rainbow-billed toucan, the scarlet macaw, the harpy eagle, the jaguar, the giant anteater, the tapir, the squirrel monkey, the puma, the white-tailed deer, snakes, iguanas, turtles, and alligators, among other species (Prefecture of Morona Santiago, 2019).

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

It is important to highlight that, although Morona Santiago has a great wealth of flora and fauna, it is threatened by activities such as deforestation, hunting and trafficking of species, so it is essential to take measures to protect and conserve it (Prefecture of Morona Santiago, 2019).

3.1.1. Protected natural areas of the province

According to the Morona Santiago Territorial Development and Planning Plan (2019), Morona Santiago has a series of protected natural areas that reflect the rich biodiversity and unique ecosystems of the Ecuadorian Amazon region. These protected natural areas are vital for the conservation of flora and fauna, as well as for the protection of local communities and their cultural heritage (Rafael Antuni et al., 2023). Some of the most outstanding natural protected areas of Morona Santiago can be seen in Figure 9.

Figure 9

Location of natural areas of Morona Santiago

Source: Recovered from the National System of Protected Areas of Ecuador (2023).

The Sangay National Park located in the provinces of Chimborazo, Tungurahua and Morona Santiago, is one of the largest in the country and was declared a World Heritage Site by UNESCO in 1983. It extends over more than 364,000 hectares. The park is home to numerous endangered species of animals and plants.

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

There are many other protected areas, such as El Quimi Biological Reserve, El Cóndor Binational Park, and Siete Iglesias. So, the province is rich in biodiversity and tourism (Prefecture of Morona Santiago, 2019).

3.1.2. Deforestation in Morona Santiago

Deforestation is a serious problem in Morona Santiago, Ecuador. The expansion of agriculture, livestock and logging are the main causes of deforestation in the region (Prefecture of Morona Santiago, 2019). This has led to the loss of natural habitats, soil degradation and a decline in biodiversity.

According to data from the Ecuadorian Ministry of the Environment, Morona Santiago has experienced a deforestation rate of 1.4% between 2000 and 2018, which is equivalent to the loss of around 85,000 hectares of forests in that period. In addition, it is estimated that the deforestation rate in the region has increased in recent years. According to Paz, 77% of deforestation in the Amazon is concentrated in four provinces. The most affected is Morona Santiago and followed by Sucumbíos, Orellana, and Zamora Chinchipe (2022).

> One of the most worrying data is that only two of the six Ecuadorian Amazon provinces concentrated 46% (287,000 hectares) of all deforestation detected between 2001 and 2020. In Morona Santiago, more than 158,000 hectares of forest were lost (25%) and in Sucumbíos about 129,000 hectares (21%). In both provinces there is a wide presence of extractive activities such as mining and hydrocarbons (Paz, 2022, para. 6).

It is important to highlight that deforestation is a serious problem throughout the Ecuadorian territory and that it affects not only biodiversity, but also local communities and the climate. Furthermore, deforestation can contribute to climate change by releasing large amounts of carbon stored in forests.

3.1.2.1. Causes of deforestation

In Morona Santiago, Ecuador, deforestation is mainly due to human activities. Paz (2022) states that some of the most common causes of deforestation in the region are:

1. Agriculture and livestock: The expansion of agriculture and livestock is one of the main causes of deforestation in Morona Santiago. The felling of trees to create new crop and grazing land has led to the loss of large tracts of forest.

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

2. Logging: The felling of trees for timber production is another of the main causes of deforestation in Morona Santiago. Trees are often felled without regard to their growth or ability to regenerate, leading to the loss of valuable forests.

3. Mining: Mining activity has also contributed to deforestation in Morona Santiago. Mineral extraction often involves the destruction of large areas of forests and the contamination of rivers and soils.

4. Forest fires: Forest fires, often caused by human activities such as burning land for agriculture, also contribute to deforestation in Morona Santiago.

To address this problem, the Ecuadorian government has implemented various conservation and reforestation initiatives in the region. For example, the Socio Bosque Program seeks to protect forests through voluntary agreements and economic incentives with local communities. It has restored and protected more than 1,668,970.67 hectares of native ecosystems and is present in 23 of 24 provinces of Ecuador (Ministry of the Environment, Water and Ecological Transition, 2023). The Amazon region has benefited more than 46,000 people. The program expects "by 2025, to be the institution that guarantees the quality of ecosystem services, through efficient institutional processes and services that promote the conservation, remediation and use of natural resources."(Government of Ecuador, 2023). The program protects 30.6% percent of the province's forests.

Table 4

Provinces with the highest number of prioritized hectares

prioritized provinces	Area in hectares	Percentage of the national total
Morona Santiago	951,514	16.2%
pasta	839,237	14.3%
Loja and Zamora Chinchipe	515,372	7.5% each

Source: Adapted from the Government of Ecuador (2019).

3.1.2.2. Areas most affected by deforestation

In Morona Santiago, Ecuador, the areas most affected by deforestation are those where human activities such as agriculture, livestock, and logging take place. The following are some of the most affected areas:

Cordillera del Condor:

It is a mountainous area located on the border between Ecuador and Peru. It is in the system of National Protected Areas of the Ecuador.

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

The Ecuadorian government created four reserves along the Cordillera, each one in charge of protecting a different altitudinal range and which together preserve the best of this place. There are three biological reserves: El Cóndor, El Quimi, and Cerro Plateado, and a Wildlife Refuge: El Zarza. Added together, the four areas protect more than 41,000 hectares of one of the least known areas of Ecuador (Mongabay Latam, 2020).

This region is rich in biodiversity and is home to several endemic species. However, according to Mongabay Latam (2020), several illegal miners have been witnessed deforesting the area for this activity, which has led to deforestation and forest degradation. On one side of the Quimi River is Tundayme, a small community where 600 people live and where dozens of dump trucks enter each day to dig holes more than 1.2 km deep (Perez, 2019). According to the Chinese company Ecuacorriente, more than 15 hectares of forests have been cleared for this mining project. It is the first project of this type in Ecuador that began in 2019. The exploitation phase, scheduled to begin in December of this year, will extract 3.18 million tons of copper, plus gold and silver, over 30 years (Perez, 2019).

> The lucrative business of illegal timber trafficking has engineered an astonishing level of organization to circumvent the law. "They go in convoys of four or five trucks," says Rivera. They even have satellite phones that not even the Ministry of the Environment has dreamed of having; They have 'bell ringers' who see that the road is cleared. They falsify or duplicate the timber circulation guides authorized by the ministry. They even 'clone' the trucks; for example, they have three white trucks with the same license plates, with the same bucket, the same tent, and thus, with the same guide, three trucks with wood pass by (Roast, 2019).

Sangay National Park:

Sangay National Park is one of the largest protected areas in Ecuador and is home to a large number of endemic species. “The main threats facing the Sangay National Park are conflicts of illegal land tenure, inappropriate use of natural resources by the communities located in the buffer zone, poaching and deforestation.” (Ministry of the Environment, Water and Ecological Transition, 2023)

But, despite this, certain conservation measures have been implemented in the area, which include working with the communities that live inside the park to reduce cattle and sheep in the ecosystems. In addition, the community is encouraged to enter the Socio Páramo

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

Program. Finally, the improvement of signage is sought in the Guarguallá community, which is the main access to the Shangay volcano, to encourage community tourism (Ministry of the Environment, Water and Ecological Transition, 2023).

Upano River Valley:

The Upano River Valley is a region rich in humid tropical forests and is home to several indigenous communities. In addition, it is home to one of the best rivers in the world for rafting; even National Geographic, in its book 'Journeys of a Lifetime' published in 2007, ranked it fourth. But in the last 5 years the crystal-clear waters of the river have been cloudy and dark. The inhabitants of the area believe that it is due to the private hydroelectric plant located a few kilometers away called Hidro Normandía, since waste accumulates in its water reservoir and then its floodgates open and reach the river. It is also an area of interest for agriculture and livestock, which has led to deforestation and soil degradation (Paz, 2019).

3.1.3. Environmental Reforms in the Province

A reform according to the RAE can be defined as "a procedure that is carried out in order to modify, improve, amend, update or innovate something." If we talk about environmental reforms, we refer to the implementation of measures to improve, protect, and amend the environment, the ecosystems, and living beings that live there. The main way of conservation and protection are protected areas, which are

> … defined territorial spaces, legally recognized and managed through legal mechanisms and effective strategies to ensure the conservation of biodiversity, the maintenance of ecosystem services and the protection of associated cultural values. These areas are part of a national system that is administered by the Ministry of Environment and Water-MAATE (Ministerio del Ambiente, Agua y Transicion Ecologica) Technical Secretariat of the Amazon Special Territorial Circumscription, 2019, p. 11).

Figure 11

Priority areas for forest restoration

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

PROVINCIAS	SUPERFICIE PROVINCIA (ha)	ÁREA PRIORIZADA (ha)				TOTAL
		MUY ALTO	ALTO	MEDIO	BAJO	
AZUAY	817.395	23.292	88.604	88.518	57.284	257.698
BOLÍVAR	390.151	23.099	24.871	25.635	15.139	88.743
CAÑAR	315.497	10.660	34.409	33.783	15.904	94.756
CARCHI	378.256	15.743	19.178	20.804	23.162	78.886
CHIMBORAZO	592.872	4.779	35.890	44.423	72.875	157.968
COTOPAXI	617.698	14.758	39.659	48.530	45.771	148.718
EL ORO	586.973	53.264	85.337	46.706	13.046	198.354
ESMERALDAS	1´583.653	31.863	138.134	145.081	60.396	375.474
GUAYAS	1´581.062	12.530	96.389	84.156	62.949	256.024
IMBABURA	464.290	6.182	16.364	10.969	6.827	40.343
ISLA	1.102	-	-	-	105	105
LOJA	1´106.547	45.405	119.196	103.988	41.805	310.394
LOS RÍOS	725.601	2.180	16.432	30.361	65.695	114.668
MANABÍ	1´949.646	28.764	431.877	172.978	187.586	821.206
MORONA SANTIAGO	2´401.453	158.827	192.291	33.194	23.615	407.926
NAPO	1´253.313	30.824	85.293	10.797	5.647	132.561
ORELLANA	2´173.005	18.003	102.444	2.842	15.183	138.472
PASTAZA	2´964.333	24.591	84.017	2.654	3.157	114.419

Source: Retrieved from the National Forest Restoration Plan 2019 – 2030 (2019).

The country's main in situ conservation strategies are found in the Comprehensive Plan for the Amazon 2021-2025. These include,

1. National System of Protected Areas (SNAP), which has protected more than 3.2 million hectares in the Amazon area of Ecuador alone.
2. Forest and Protective Vegetation System, with 975,718 protected hectares in the Amazon region.
3. Socio Bosque voluntary conservation mechanism, which protects approximately 1.3 million hectares in the Amazon.
4. Biosphere Reserves: Sumaco, Yasuní and Podocarpus - El Cóndor and the Cuyabeno – Lagartococha – Yasuní Wetlands Complex, which is the largest Ramsar site in the country with an extension of 776,116 ha.
5. The Sangay – Podocarpus Connectivity Corridor, where more than 500,000 hectares that delimit the corridor are protected.
6. Cuyabeno and Yasuní Conservation Areas, which is one of the most biodiverse places in the world and comprises more than 603,380 hectares that are protected.

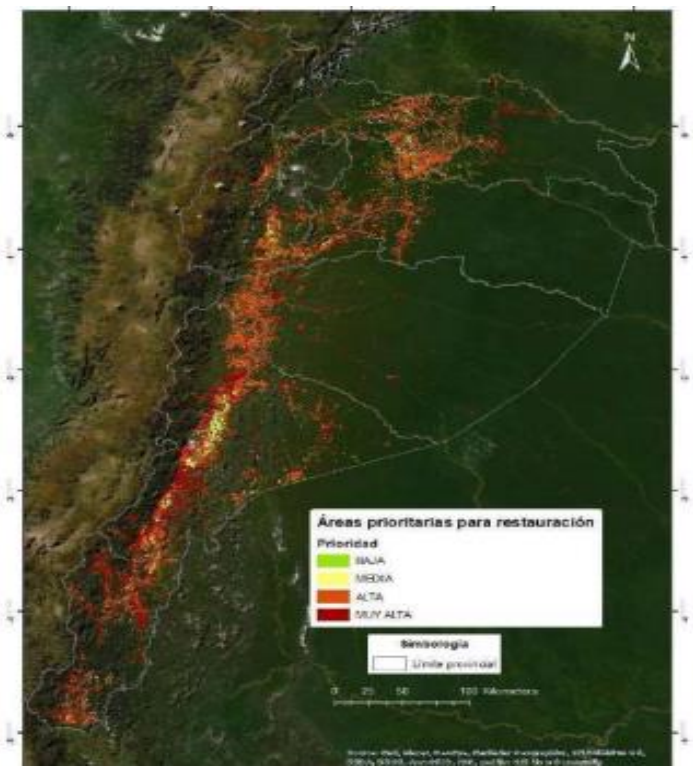
Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

7. Fan of Pastaza, which has an extension of more than 3.8 million hectares of forests, representing more than half (56%) of all Ramsar Sites in the country.
8. Forest Restoration Plan 2019-2030, which will allow the restoration of 30 thousand hectares of degraded ecosystems and the National Government, with the support of international cooperation, foresees an investment of USD 30 million. This Restoration Plan is important because: "Of the priority areas at the province level, Morona Santiago has a very high category with 14%, being the highest percentage, followed by Zamora Chinchipe with 13% and Gold with 8%." (TECHNICAL SECRETARIAT OF THE CTEA, 2020)

Of the registered area of the prioritized areas with the "Very High" category, as shown in Figure 5, 651,648 are registered at the national level and 348,918 regional ha. for forest restoration.

Figure 11

Prioritized areas for reforestation (priority areas for restoration, priority, low, medium, high, very high,



Source: Retrieved from the National Forest Restoration Plan 2019 – 2030 (2019).

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

These environmental reforms are essential to ensure sustainable development in Morona Santiago and protect the region's unique biodiversity. However, it is important to continue working on awareness and education to promote the active participation of local communities in environmental conservation and the implementation of sustainable practices.

3.1.3.1. Policies on private property and deforestation

The use of private lands for deforestation in Ecuador is regulated by the Organic Code of the Environment (CODA), Article 95:

> The National Environmental Authority has the power to order, on site and in a precautionary manner, the immediate suspension of actions that may cause the degradation and deforestation of the National Forest Heritage in coordination with the National Police and the Armed Forces. Coordination will be regulated in secondary regulations (Correa Delgado, 2017).

According to article 19 of the Organic Code of the Environment, any land that was private property and now belongs to a protected area will have the limitations to the right of use, enjoyment, and disposal in accordance with the management plan of the protected area and their zoning. The National Environmental Authority may enter into use and exploitation agreements with its owners that are compatible with the category of the area. In addition, article 49 of the Organic Code of the Environment states that to conserve and protect the biodiversity of a protected area, public or private land may be expropriated.

In chapter III of the Environmental Regulation, article 173, states that the operator, whether public, private, or mixed, will have the obligation to prevent, avoid, reduce and, where possible, eliminate the environmental impacts and risks that their activity may generate. When some type of affectation to the environment occurs, the operator will establish all the necessary mechanisms for its restoration. In the same chapter there is the section on environmental control and monitoring, which in its article 200 establishes that the competent environmental authority will control and monitor all the activities carried out or being carried out by the operators.

Chapter V of the Organic Environmental Code refers to the management and conservation of natural forests. Article 120 states that any forest conservation program may be carried out on state lands or on private lands that ensure the purposes of this activity.

Finally, the Organic Environmental Code contains certain incentives for the private sector (article 280). Article 159 states that the private sector can participate in conservation,

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management, maintenance, and growth activities of the country's forest reserves. In addition, in article 202, it recognizes and encourages support in control and monitoring activities. Whether natural or legal persons, communes, communities, peoples or nationalities, public or private organizations, in environmental control and monitoring activities, anyone who is aware of the non-compliance with an environmental standard may inform the Competent Environmental Authority.

3.2. Ucayali Department

The Ucayali Region is located in the central eastern part of Peru. It has an area of 102,410.55 km^2, which is equivalent in percentage to 7.97% of the entire national territory and 19.6% of the Peruvian Amazon, becoming the second largest region, after Loreto. The Ucayali region is limited to the east by the Republic of Brazil, to the west by the Paseo and Huánuco regions, to the north by the Loreto region, and to the south by the Madre de Dios, Cusco and Junín regions (Walls R, 2005). Between 2016 and 2021, the population of the department of Ucayali has experienced an increase, going from 527,717 to 602,400 inhabitants, which represents an increase of 14.15%. The Callería district has the largest number of inhabitants, reaching 184,899, followed by the Yarinacocha district with 118,434 inhabitants (Regional Government of Ucayali, 2022).

The region is divided into four provinces: Coronel Portillo, Atalaya, Padre Abad and Purús, being Coronel Portillo, with its capital Pucallpa, the province with the highest concentration of inhabitants in the region (74.40%). It is followed by Padre Abad (13.87%), Atalaya (10.88%) and finally Purús (0.89%) (Walls R, 2005). Table 4 shows the political division of the department of Ucayali by its provinces and districts.

Table 5

Political division of districts

Province	districts
Colonel Portilla	
	1 Callaria (pucallpa)
	2 Green field
	3 Iparia
	4 Maisea
	5 Yarinacocha (callao port)
	6 New Requena
Watchtower	
	1 Raymondi

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	2	Sepahua
	3	Tahuania (Bolognese)
	4	Yurua
Father Abbot		
	1	Father Abbot (Aguaytia)
	2	Irazola (San Alejandro)
	3	Curimana
Purus		
	1	Purus (Hope)

Note: Adapted from Paredes Gutiérrez (2005)

The economy of the Ucayali region is based on agricultural activity and the extraction of natural resources. The city of Pucallpa, as the regional capital, is the collection center for products from rural areas, both to supply the national market and for internal consumption. In addition, there is a timber industry that processes and transports resources out of the region (Paredes, 2005). Regarding commercial activity, the Ucayali region relies mainly on the sectors of agriculture and forestry, energy and mineral resources, industry, commerce and manufacturing, and fisheries, among others, as fundamental productive activities. Agriculture and forestry are important sources of income and employment in the region. On the other hand, Industry and manufacturing process and transform raw materials for their subsequent distribution and sale. Trade is also a relevant sector for the region, since it facilitates the movement of products to other markets and regions. Finally, fishery is also an important economic activity that contributes to the development of the region (Paredes, 2005).

3.2.1. Protection zones and ecological conservation of Ucayali

The department of Ucayali has six Protected Natural Areas (ANP) that are part of the National System of Protected Natural Areas, these are: Alto Purús National Park, Cordillera Azul National Park, Sierra del Divisor Reserved Zone, Purús Communal Reserve, Conservation Area Regional Imiria. These areas occupy an area of 2,366,972,297 hectares, which represents 22,513% of the department's territory. These zones have as main objective to protect biodiversity and natural ecosystems, promote the sustainable use of natural resources and the development of economic activities compatible with environmental conservation (Regional Government of Ucayali, 2017)

3.2.2. Important Forest Species of the Ucayali area

Within the Department of Ucayali, it is important to express that there are forest species that are characteristic of the region and are part of the Tropical Humid Forest. In the following

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list we can find the types of forests, their extension, the relief where they develop, and some of the most representative examples of each one together with their specified number of trees per hectare (arb/ha) (Regional Government of Ucayali, 2017).

a) Low hill forest: It is the largest forest with 5,382,339.9 ha, representing 51.2% of the total area of the department of Ucayali, developed on physiographic landscapes from hills to low hills, with relative elevations of the terrain that can reach up to 15 m in the case of hills and up to 80 m, measured from its base to the top, with slopes that can reach a 25% slope. Its best-known specimens are the Camitillo (12.9 arb/ha) and the Ochavaja (1.0 arb/ha),

b) Middle terrace forest It is the second largest forest with 1,368,198.79 ha, representing 13.5% of the total area of the department of Ucayali, developed on mid-terrace physiographic landscapes. Its best-known specimens are the Shimbillo (20.9 arb/ha) and the Cumala (20.5 arb/ha),

c) High terrace forest. It is the third largest forest with 1,086,249.11 ha, representing 10.7% of the total area of the department of Ucayali, developed on high terrace physiographic landscapes. Its best-known specimens are the Chimicua (36.0 arb/ha) and the Camitillo (31.8 arb/ha),

d) Mountain forest. It is a forest with 704,658.12 ha, which represents 6.9% of the total area of the department of Ucayali, developed on physiographic landscapes of mountains. Its best-known specimens are the Cumala (25.3 arb/ha) and the Cetico (24.5 arb/ha),

e) Low terrace forest. It is a forest with 527,074.11 ha, representing 5.2% of the total area of the department of Ucayali, developed on low terrace physiographic landscapes. Its best-known specimens are the Shimbillo (38.8 arb/ha) and the Cumala (18.5 arb/ha),

f) Shore complex forest. It is a forest with 330,296.aha, representing 3.2% of the total area of the department of Ucayali, developed on shore complex physiographic landscapes. Its best-known specimens are the Shimbillo (20.0 arb/ha) and the Cumala (23.0 arb/ha)

g) medium hill forest. It is a forest with 157,013.71 ha, representing 1.5% of the total area of the department of Ucayali, developed on physiographic landscapes of medium hills. Its best-known specimens are the Masha Rubber (19.0 arb/ha) and the Moena (20.0 arb/ha),

h) Aguajal/palm grove forest. It is a forest with 25,533.12 ha, representing 0.3% of the total area of the department of Ucayali, developed on physiographic landscapes of aguajal/palm

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grove. Its best-known specimens are the Aguaje (18.8 arb/ha) and the Shebon (24.0 arb/ha) (Regional Government of Ucayali, 2017).

3.2.3. Deforestation and Environmental Impact Ucayali

The Ucayali region, located in the center of Peru, is known for its rich biodiversity and its tropical forests, as it encompasses different ecosystems such as humid forests, hydromorphic forests (a type of forest that develops in floodplains or with a high presence of water, either permanently or temporarily), aguajales, among others, which represent important areas for conservation and give rise to a very high biodiversity (Regional Government of Ucayali, 2017). However, in recent years, deforestation has been a growing concern in the region, due to the expansion of agriculture, cattle ranching, mining, and logging. The increase in deforestation was mostly due to anthropic activities such as migratory cultivation, illegal logging and road construction. The increase between 2005 and 2009 alone reached 126,563.08 hectares, which represented 1.20% of the total forest area (Walls R, 2005).

3.2.3.1. Causes

Deforestation, as well as the loss of biodiversity within the department, has been caused by the felling of trees, forest fires, acid rain and pests. (Ramirez J, 2018). In areas where crop production has intensified, such as oil palm and rice, and areas used for mining and cattle ranching, they have suffered significant soil losses and environmental damage due to inappropriate use of water resources and the use of chemicals in agriculture. These areas are found mainly in the districts of Calleria, Campoverde, Curimana, Iparia, Manantay, Masisea, Nueva Requen, Yarinacocha and Irazola (Regional Government of Ucayali, 2017). On the other hand, the disorderly occupation and the irrational use of resources, as well as the issue of the immigration of settlers of Andean origin have generated a process of changes in the landscape within the province of Padre Abad since 2014. The agricultural frontier has increased due to the cultivation of cocoa, coffee, bananas, smooth cayenne pineapple, among others (Ramirez Vazquez, 2018).

3.2.3.2. Consequences

In recent years, within the Amazon zone of the department of Ucayali, deforestation has had a series of important consequences, such as soil erosion, water and air pollution, the emission of carbon dioxide into the atmosphere, the loss of biodiversity due to the extinction of plants and animals, the increasing threat of global warming, the annihilation of Amazonian tribes, as well as the possibility of massive floods (Ramirez J, 2018).

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On the other hand, the intensification of cultivation within the area is causing rapid erosion and soil degradation due to inappropriate use of these areas. As a result, significant nutrient losses are taking place that are almost impossible to recover. In addition, this activity has negative effects on flora, wildlife, water quality and other aspects of the environment (Regional Government of Ucayali, 2017).

3.2.4. Legal Instruments and Public Policy Implemented

According to the Regional Government of Ucuyali, the Concerted Regional Development Plan of the Department of Ucayali, within its component of development and identification of good practices, has taken into account the problems derived from deforestation in the area and its impact on the quality of life of the population, as well as the loss of natural resources. In this sense, with the objective of combating deforestation and promoting the sustainable use of natural resources, it has decided to take measures to reduce its impact in the region. To this end, a series of reforms have been prepared that allow the orderly occupation of the area of influence of the Federico Basadre highway and the protection of protected natural areas in the department of Ucayali (Regional Government of Ucayali, 2022).

- **Feasible actions by development Components:**

1. Environment, biological diversity and disaster risk management
2. Conserve and sustainably use the renewable and non-renewable natural resources and biological diversity of the territory.
3. Encourage the population to reforest, cut down a tree and plant 10.
4. Empower forest surveillance committees, oversight committees and others, training and providing them with equipment and tools that allow them to carry out their activities in the field.
5. Formulate a public investment project aimed at environmental supervision, education and certification actions.
6. Increase the operating budget for Biological Diversity, environmental management and land management.

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Methodology

Rodríguez (2010) defines the methodology as the set of processes that a man must follow in the process of investigation and demonstration of the truth, which will allow applying knowledge and arriving at the observation, description and explanation of reality.

For this research work, the qualitative research method was used. According to Lopez (2011), this method is mainly used to answer research questions; in our specific case: How does deforestation affect the Ecuadorian and Peruvian Amazon and what is its consequence locally and globally? Additionally, according to Qualtrics, qualitative research can be used when the interest of the researcher is to understand the opinions, motives, behaviors, expectations or consequences of actions, instead of numbers and concrete facts (2023), which is the case of this investigation that sought to identify how illegal logging in the Ecuadorian and Peruvian Amazon has contributed to the global and local environmental crisis in the last 5 years. In addition, it should be noted that specifically, an inductive research approach (Vine, 2023) was used to analyze this phenomenon.

A comparative case study was carried out to analyze and summarize the similarities, differences and patterns of deforestation in Ecuador (Morona Santiago) and Peru (Ucuyali), which according to Goodrick (2014), allows to compare two or more cases that share a common goal.

Secondary sources were studied to understand data already collected by some experts (Stein, 1982) However, two interviews were carried out, one to a professional who works at the local government of Ucayali, Peru, and the other to an expert biologist in Morona Santiago (See Appendix A). These interviews were conducted in order to obtain primary sources of information at the end of the discussion of this research work.

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Results and discussion

Deforestation is an environmental problem that affects various regions of the world. In this research we focused on studying and investigating the effects of deforestation in the specific cases of Ucayali, Peru; and, Morona Santiago, Ecuador, since these regions have experienced a significant deterioration of their forests in the last decades. These areas, rich in biodiversity and ecosystems, have been threatened.

Causes

The results obtained reveal the main causes of deforestation in Ucayali. The exploitation of natural resources is the first. There is a great demand for the timber sector, since in Ucayali there are more than 89 commercial species (Miranda Ruiz et al., 2011). The region is home to the aguano tree, which provides very fine and important wood for the construction of furniture. In addition, the Tropical Cedar is another type of tree that is widely traded internationally. Its productive forestry sector is essential in the economic development of Ucayali (Miranda Ruiz et al., 2011).

Deforestation in Ucayali is also caused by the extraction of oil and hydrocarbons. There are more than 4 oil companies that seek to take over the Ucayali area. Among these are: Minera Chinalco Perú, MINSUR, Perúpetro, and Petroperú (Mining Course, 2021). Likewise, since 2020, Ucayali had a supercharge in the oil sector of more than 22 million soles. It is one of the most representative economic activities in the region, representing more than 5% of GDP (National Society of Mining, Oil and Energy, 2021).

Illegal drug trafficking is also essential in the causes of this problem. Between 2020 and 2021, illegal coca leaf crops tripled, and with this, also the invasion of indigenous territories. Since 2014, seven indigenous leaders have been assassinated by mafias dedicated to drug trafficking and illegal logging. Illegal coca crops in Ucayali went from 3,822 to 10,151 hectares, only between 2020 and 2021. This 266% increase has made it the region with the highest growth in illegally planted area (Stolen, 2023).

Finally, another of the main causes of deforestation in Ucayali is the construction of roads in the region. For example, in 2022, an extensive highway, more than 4 kilometers long, was built that connects the San José Populated Center and the Callao Port. In addition, 9 culverts, construction walls, a bridge more than 8 meters long were built (Meneses, 2022). The great

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advance of the construction of highways is due to the fact that the little investment prevents the development of Ucayali (Daily Now, 2019).

In an interview, Vanessa Rodríguez, a professional who works for the GAD in Ucuyali, (See Appendix A), when asked about the main causes of deforestation, stated:

> Of the realities that I know, they have a lot to do with legal or illegal productive activities, but above all illegal. In the areas where we work, it has to do with the expansion of the agricultural frontier, because there is occupation by migrants. This can be seen as a change of land use. They are looking for livestock, crops and in some cases crops such as rice, which have other impacts. So, that is one, and the other I think has to do with also occupying the land for housing, generating new centers, human settlements. And in recent times there has been a very particular phenomenon, especially in Loreto and Ucayali, that has to do with the issue of the advance of drug trafficking in the area. Equally, there is the issue of roads, which must be deforested, and the issue of the presence of monocultures. And another of the important causes in Peru is the advance of mining, mainly by informal miners. I don't know if you are familiar with the experience of the Mother of God, but that is dramatic, it is reality. Those would be like my causes, at least the ones that I can see, the ones that I close every day at work (Rodríguez, 2023).

In the other region studied, Morona Santiago, the causes of this problem are similar. And this is also caused mainly because the economy of the province is based on the extraction of natural resources, such as gold, oil, and wood. "The problem of deforestation in Morona is aggravated by the 820 mining concessions in the province, which cover 489,754.53 hectares, equivalent to 20.78%"(Plan V Magazine, 2022). In the timber sector, there is a lot of illegality. In 2019, it was detected that illegal tree fellers used satellite phones to avoid detection. They also falsified documents, and even cloned trucks with the same license plate (Roasting, 2019). This is because there are trees in the province that are already extinct in other areas and are coveted by real estate producers in Cuenca and Ambato. It is estimated that more than 80% of the wood that arrives to Cuenca is illegal (Roasting, 2019).

In addition, agriculture is essential in the economy of Morona Santiago since the soil cover has a high drainage capacity due to its organic components. It is used to produce fruits and certain vegetables, such as corn, cassava, beans, sugarcane, pineapple, plantain, Chinese potato, and peanuts (Antuni & Cabrera, 2019). In addition, the Government of Ecuador,

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together with the Ministry of Agriculture, Livestock, Aquaculture and Fisheries, since 2016 have delivered more than 1,900 kits with cocoa and coffee seeds to local producers, which encourages greater use of land for this activity, therefore, affecting the soil directly (Government of Ecuador, 2016).

Finally, deforestation in Morona Santiago is caused by the huge number of cattle in the region. According to Roasting (2019), there are more than 200,000 head of cattle that affect almost half a million hectares. Morona Santiago is positioned as the fifth province of Ecuador that produces the most cattle on its lands. This activity represents their main economic income for 77% of the population. Its main cattle are Charolais, originally from France. The province has specialized in breeding these animals, which are highly in demand in the market (Teleamazonas, 2022).

According to the interview we conducted with Freddy Nugra, an expert biologist in Morona Santiago, the causes of deforestation in the province are due to many causes. In his words:

> Deforestation occurs in various ways. There is even natural deforestation due to climate change; due to heavy rains many places are being deforested, as you can see in the areas of the eastern foothills due to landslides. This may be due to strong rains. And there is other anthropogenic deforestation that is caused by us humans due to the dependence on agriculture and livestock, where there are water sources, and that has been going on for years, and that continues. We know that when there is a lot of rain, we lose the vegetation cover through landslides, and, when there is a dry season, it is due to indiscriminate burning and to the extraction of wood, expansion of pastures, mining. Today [it is due to] roads, construction, urbanization, airports. (Nugra, 2023)

Consequences

The consequences of deforestation in both regions are similar. Both in Morona Santiago and Ucayali, very important and significant forest areas for the Amazon have been lost. Morona Santiago has lost more than 158 thousand hectares according to data from the year 2022 (Paz, 2022). In Ucayali, more than 100,085.15 hectares of forests were lost in 20 years and the most critical years were 2019 (8,216 hectares) and 2020 (9,701 hectares) (Vera, 2021).

Deforestation has led to the loss of natural habitats, and the loss of native species of flora and fauna. In the Ecuadorian Amazon, there are already animals in danger of extinction due to

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deforestation. Green Macaw, Amazon Tapir, Equatorial Capuchin Monkey are just a few examples. In addition, more than 5 thousand types of native flora of the Amazon are in danger of extinction (Mountain, 2021). In Ucayali, the white-winged guan, the yellow-tailed woolly monkey, the Peruvian tree-cutter, the Titicaca frog, among others, are in danger of extinction (Mountain, 2021).

In both regions, one of the main consequences is the direct impact on indigenous peoples who live in the most affected areas. In Morona Santiago,

> The Shuar indigenous people are evicted by the Public Force from a remote area in the province of Morona Santiago, where a Chinese mining company has a concession to search for and exploit a large copper deposit. The indigenous movement denounces the violence of the Army and the Police, while the Government blames the peasants for it (Plan V, 2016, p. 1).

In the case of Ucayali, the main conditions are due to drug trafficking. Indigenous leaders have been assassinated. “Between 2016 and 2021, according to information collected from 11 environmental and human rights organizations, 58 indigenous leaders and residents were murdered in the Amazon of Brazil, Colombia, Ecuador, and Peru” (Romo, 2022, p. 40).

According to Vanessa Rodríguez, the main consequences in Ucayali include changes in the rivers, which affect the soil, the fish, and the population. In her words:

> Look, in the matter of Ucayali, there is a river there called the Pachitea River. The rivers in Ucayali, which is where I work the most, the rivers are super changeable. So, in fact, about five years ago there was a papaya boom in Ucayali. And since the preferred places for these crops are the banks of the river, it means that there are a series of transformations in the river. The processes of change in the rivers are much faster, but also in other areas of Peru, where I have been, and reforesting the high areas has terrible impacts on the low areas because the accumulation of sediments is enormous. So, there are a series of transformations also in the population dynamics of the fish. Other consequences, I suppose as well, although I'm not sure, I don't know if it's correct, but the populations of the Amazon, in their knowledge they, they point out that there are many changes at the climatic level that cannot be predicted. In other words, a highway arrives, a population contingent arrives, but there is no planning in the construction of the urban center, none of that. So, those would be like the power plants (Rodríguez, 2023).

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As it was possible to show, there are similar causes of deforestation in both regions, but also particular ones. In both cases there are serious effects on the environment, its population and biodiversity, thus corroborating the contribution that deforestation in both regions has in the global environmental crisis we are experiencing today.

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Conclusions

This research focused on examining the consequences of deforestation in Morona Santiago, Ecuador, and Ucayali, Peru, with the purpose of analyzing its contribution to the global environmental crisis. After an exhaustive analysis of the literature and the collection of relevant information, it can be affirmed that the research question posed has been met, demonstrating that deforestation in both regions is effectively affecting the global environmental crisis.

In the first place, it was evidenced that deforestation in Morona Santiago and Ucayali has important ecological repercussions. The loss of forests in these areas has led to the extinction of numerous species of flora and fauna, resulting in a significant degradation of the biodiversity of the ecosystems. In addition, an alteration of the natural biological cycles has been observed, which negatively affects the stability of ecosystems and their ability to provide essential environmental services.

Second, deforestation in both regions has generated significant social consequences. The social impacts derived from the loss of forests include the loss of crops, soil degradation and the scarcity of fresh water. These factors contribute to decreased food security and the quality of life of local communities. Likewise, deforestation has caused migration of population groups in search of new resources, generating social and economic tensions.

The economic influence of deforestation has also been relevant in both cases. In Ucayali, the exploitation of resources such as oil and gas has been one of the main drivers of deforestation. On the other hand, in Morona Santiago, mining and the extraction of hydrocarbons have been activities that generate resources closely linked to the loss of forests. These intensive economic activities have contributed significantly to the deforestation process in both regions.

In addition, differences were identified in terms of the impact on indigenous culture. In Morona Santiago, it was observed that deforestation directly threatens the survival of indigenous peoples, as ecosystem degradation and habitat loss affect their lifestyle and connection to the land. On the other hand, although it was not specifically mentioned in Ucayali, it can be inferred that there is also an impact on indigenous culture, but possibly to a lesser extent or with different particularities.

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In conclusion, the results of this research support the claim that deforestation in Morona Santiago, Ecuador, and Ucayali, Peru, is affecting the global environmental crisis. The similarities found in terms of ecological and social consequences, as well as the differences related to economic and productive factors and the impact on indigenous culture, demonstrate the importance of addressing this problem from a regional and global perspective. It is essential to take effective measures to stop deforestation in these regions.

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Recommendations

Based on the sources provided and the feasible actions by development components mentioned in the report, the following final recommendations can be made to improve deforestation in Morona Santiago, Ecuador, and Ucayali, Peru:

1. Strengthening environmental management: It is essential that local and national governments in both regions continue to strengthen environmental management. This implies creating and protecting protected areas, promoting sustainable practices in logging activities, and strengthening environmental management at the local and national levels.

2. Promotion of sustainable agriculture: The implementation of sustainable agricultural practices should be encouraged to reduce the need to clear forests for agricultural expansion. This can be achieved through support programs for sustainable agriculture and biodiversity conservation.

3. Participation of local communities: It is essential to actively involve local communities in decision-making related to the use of natural resources. This implies empowering forest surveillance committees, oversight offices and other local actors, training them and providing them with the necessary equipment and tools.

4. Control and sanction of illegal activities: To address illegal logging, surveillance and control must be strengthened. It is necessary to increase efforts to detect and punish illegal activities, collaborating with the prosecution and law enforcement.

5. Promotion of sustainable economic alternatives: Sustainable economic alternatives that reduce pressure on forests should be promoted. This may include promoting sustainable tourism and the production of non-timber forest products as viable options for economic development.

In addition to these recommendations, it is suggested to carry out feasibility studies and environmental impact analysis before undertaking any development project in these regions. This will ensure that potential effects on forests are taken into account and appropriate mitigation measures are implemented.

It is important to bear in mind that tackling deforestation effectively will require close coordination between the different actors involved, including governments, local communities, non-governmental organizations and international cooperation. Likewise, it is essential to

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allocate adequate resources to implement and follow up on the proposed measures. Only through a comprehensive and sustained approach will it be possible to achieve a significant reduction in deforestation and promote responsible management of natural resources in Morona Santiago and Ucayali.

In terms of policies and measures to address deforestation, both countries face similar challenges. Greater environmental awareness, stricter regulations and the promotion of sustainable practices in human activities that affect forests are required. In addition, cooperation and the implementation of strategies at the national and international levels are essential to address deforestation effectively.

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El Universo

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

APPENDIX A

Para este trabajo de titulación se realizaron dos entrevistas a expertos en el tema de deforestación. A Vanessa Rodríguez, profesional que trabaja en el GAD de Ucayali, Perú y a Freddy Nugra, biólogo experto en Morona Santiago, Ecuador.

Las entrevistas se realizaron mediante la plataforma de ZOOM y la redacción del consentimiento se les leyó en ese momento, después se les pidió permiso para grabar la sesión y para utilizar su información para este trabajo con fines académicos.

Preguntas Entrevista

1. ¿Qué es la deforestación y cómo afecta a la Amazonía (ecuatoriana/peruana)?
2. ¿Cuáles son las causas y consecuencias principales de la deforestación?
3. ¿Qué está pasando en Ecuador/Perú al momento respecto a la deforestación?
4. ¿Conoce qué estrategias se han implementado para poder frenar la deforestación dentro de la Amazonía?
5. ¿En una escala de 1 al 10 (siendo uno lo peor y 10 lo mejor) cómo define las estrategias implementadas hasta ahora y por qué?
6. ¿Qué sugerencias se le podrían hacer a estas estrategias para que mejoren su rendimiento?
7. ¿Que se podría hacer al respecto para el futuro de la Amazonia con relación a la deforestación?
8. ¿Por qué le debería importar a la gente el tema de la deforestación y el cuidado del medio ambiente en nuestra sociedad?
9. Entendiendo que las consecuencias de la deforestación nos afectan a todos los seres humanos. ¿La responsabilidad intergeneracional sobre el tema debería ser tomada en cuenta? Si-No ¿Por qué?

Hoja informativa sobre el Trabajo de Titulación:

"Análisis de la deforestación en zonas prohibidas de la Amazonía ecuatoriana (Morona Santiago) y peruana (Ucayali), y su consecuencia a nivel local y global"

Sinopsis

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

El presente Trabajo de Titulación es realizado por Anahí Emilia Cardenas Ortega y Patricio Ismael Ortiz Gómez, estudiantes de la carrera de Estudios Internacionales de la Universidad del Azuay y dirigido por la abogada Ana María Bustos Cordero.

El objetivo general del presente trabajo es analizar cómo la tala ilegal en la Amazonía ecuatoriana y peruana ha contribuido a la crisis ambiental local y global en los últimos 5 años, identificando la importancia que tiene la Amazonia tanto de manera local, como de manera global, identificar consecuencias de la deforestación en la Amazonía Peruana y Ecuatoriana y tomando los casos específicos de la Provincia de Morona Santiago y del Departamento de Ucayali para poder analizar, en base a estos casos específicos, la realidad de los dos países. Esto sumado a la recopilación de información por medio de entrevistas.

De la persona entrevistada individualmente se espera que brinde su opinión sobre las causas y consecuencias de la deforestación y cómo estás afectan a la Amazonía Ecuatoriana y Peruana y dar su opinión sobre qué planes de acción se han tomado (que le parezca que han servido o no) y los que se deberían tomar para en la actualidad y el futuro para poder generar un verdadero cambio.

No será necesario que usted responda todas las preguntas, y puede retirarse de la entrevista en cualquier momento, sin necesidad de dar una explicación a los entrevistadores.

Se le pedirá autorización para grabar el audio de la entrevista. El propósito de la grabación es obtener un registro completo y preciso de la información que usted proporcione; sin embargo, usted puede solicitar que el dispositivo se apague en cualquier momento, o que no se utilice. Fragmentos de la entrevista podrían citarse en el Trabajo de Titulación. La información no será utilizada de ninguna otra manera.

Consentimiento de los entrevistados

Nosotros, Anahí Emilia Cardenas Ortega y Patricio Ismael Ortiz Gómez, como autores de este Trabajo de Titulación, deseamos asegurarnos de que las personas entrevistadas estén completamente informadas sobre su participación en este proyecto. Por favor, indique si está de acuerdo con las siguientes afirmaciones. Si no está de acuerdo con alguna afirmación y/o requiere aclaraciones, hágalo saber.

Ministry of Agriculture, Livestock, Aquaculture and Fisheries (2016), currently called the Ministry of Agriculture and Livestock (2023).

● He leído y comprendido la hoja informativa del Trabajo de Titulación.

● Se me ha dado la oportunidad de hacer preguntas sobre el Trabajo de Titulación.

● Estoy de acuerdo en participar en una entrevista personal.

● Estoy participando de forma totalmente voluntaria.

● Entiendo que puedo negarme a responder cualquier pregunta, sin necesidad de explicar el motivo.

● Entiendo que puedo retirarme de la entrevista en cualquier momento, sin necesidad de explicar el motivo.

● Autorizo que se grabe el audio de mi entrevista.

● Autorizo que se tomen notas durante la entrevista.

● Entiendo que mis palabras pueden ser citadas en el Trabajo de Titulación.

● Entiendo que la información proporcionada será utilizada exclusivamente para fines académicos.

Nombre: _____

Firma: _____

Fecha: _____

Transcripción de la entrevista con Vanessa Rodríguez

Hablante 1 Vanessa Rodríguez:
Bueno, primera pregunta, ¿qué entiendo por deforestación? O sea, en términos simples, deforestación sería retirar por una serie de mecanismos y toda la cobertura vegetal que cubre territorios, en este caso la Amazonía.

Hablante 2 Patricio Ortiz:
¿Usted cuál diría que son las causas y consecuencias principales de la deforestación dentro de su zona?

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Hablante 1 Vanessa Rodríguez:

Sobre causas. Yo pienso que, al menos en el lado de Amazonía, de las realidades que yo conozco, tienen mucho que ver con actividades productivas legales o ilegales, pero sobre todo ilegales. En las zonas donde nosotros trabajamos tiene que ver con la ampliación de la frontera agrícola, porque hay ocupación de los migrantes. Eso se puede ver como un cambio de uso en el suelo, ya no es más un suelo, no sé, como de estructura forestal, sino ya se está buscando para ganadería, para cultivos y en algunos casos cultivos como arroz, que tienen otros impactos. Donde nosotros trabajamos ahí, lagunas que desaparecen por cultivar arroz. Entonces, eso es uno y lo otro creo que tiene que ver con ocupar la tierra también para viviendas, generar nuevos centros, asentamientos humanos. Y en el último tiempo hay como un fenómeno bien particular, especialmente en Loreto y Ucayali, que son departamentos peruanos, y que ustedes creo que, ya no más los departamentos provinciales, tiene que ver con el tema del avance del narcotráfico en la zona. Igual está el tema de las carreteras, que hay que reforestar, el tema de la presencia de monocultivos. Y otra de las causas importantes en Perú es el avance de la minería, principalmente de los mineros informativos, no sé si ustedes conocen la experiencia de la Madre de Dios, pero eso es dramático, es la realidad.

Esas serían mis causas, al menos las que yo puedo ver, las que cerró todos los días en el trabajo.

Hablante 2 Patricio Ortiz:

¿Y usted me podría decir cuáles serían más o menos las consecuencias que están pasando tanto en la zona como en Perú en general?

Hablante 1 Vanessa Rodríguez:

Mira, en el tema de Ucayali, que es el tema que yo conozco un poquito más, ahí hay un río que se llama el río Pachitea. Los ríos en Ucayali, que es donde yo trabajo más la parte acuática, los ríos son súper cambiantes. Entonces, de hecho, hace como cinco años tuvo un boom de la papaya por Ucayali, la papaya, los frijoles, también algo del maní. Y como los lugares preferidos para estas siembras son las orillas del río. Pero hacer un río tan dinámico, de forestar un poquito ahí o portar la cobertura de Rivera, la cobertura forestal de Rivera, significa que hay una serie de transformaciones en el río, los procesos de cambio en los ríos son mucho más acelerados, pero también en otras zonas de Perú, donde yo he estado, y de forestar las zonas altas, tiene impactos terribles en las zonas bajas, porque la acumulación de sedimentos es enorme. Entonces, hay una serie de transformaciones también en las dinámicas poblacionales de los peces. Otras consecuencias, supongo que también, aunque no estoy segura, no sé si es

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correcto, pero las poblaciones de la Amazonía, en el conocimiento que tienen, señalan que hay muchas alteraciones a nivel climático, que no se pueden predecir.

Antes, ellos conocían como que las temporalidades para que inicie la estación seca, la estación de inundación, pero ahora todo eso está completamente transformado. Las consecuencias también es el que el semito demográfico desordenado. O sea, llega una carretera, llega un contingente de población, pero no hay planificación en la construcción del centro urbano, nada de eso. Entonces, esas serían como que tipo las centrales.

Hablante 2 Patricio Ortiz:

Okey, muy bien. Hablando directamente de esta parte que usted me dice de planificación, ¿usted qué estrategias cree que se han implementado para poder frenar la deforestación dentro de la Amazonía? ¿Existen? ¿No existen?

Hablante 1 Vanessa Rodríguez:

Mira, yo creo que no es que los Estados no estén haciendo esfuerzos por tratar de frenar la deforestación y de hecho es algo que les preocupa muchísimo. Se han tomado medidas un poco a nivel de sanciones, de infracciones, de penalizar un poco estas acciones, pero también a nivel de incentivos, promoviendo concesiones y una serie de elementos. Pero creo que todavía, igual, hay sistemas en las alertas tempranas para saber dónde está ocurriendo, pero creo que todavía hace falta un par de años para que eso funcione como un sistema, no como acciones aisladas.

Hablante 2 Patricio Ortiz:

Entonces, en ese caso, si le pongo yo en una escala del 1 al 10, siendo 1 lo peor y 10 lo mejor, estas estrategias implementadas hasta ahora, ¿en dónde las definiría y por qué más o menos?

Hablante 1 Vanessa Rodríguez:

Probablemente yo las pondría tipo 5, y por varias razones. Primero, porque existe un marco legal para atender el tema. O sea, no es que sea un asunto de poco interés o de bajo interés político. Entonces, el marco legal puede estar establecido, el marco legal tiene una... Al menos el peruano, ¿sabes? Okey. Es uno de los marcos más integrales, más participativos, aborda los tres niveles de gestión local, distinto al provincial, regional y nacional. Pero creo que, digamos, lo pondría en el cinco del seis, tal vez. Entonces, hay mecanismos, tipos, se está utilizando la tecnología para detectar estos temas mucho más rápidos, hay procedimientos para informar qué es lo que está pasando. Entonces, a ese nivel de tener los documentos, de tener los instrumentos, de tener los procedimientos, yo creo que sí está dando resultado. Pero todavía siento que hace falta un poco más cómo controlamos que esto pase en el nivel donde ocurren estos fenómenos. O sea, cómo estar presente en el territorio. Y entonces ahí sí siento que hace un poquito más

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de falta, tal vez, otro tipo de mecanismos de relacionamiento con los que viven en el territorio, como comunidades o los que están más cerca, tipo municipalidades. Y explorar, tal vez, otros mecanismos a nivel de incentivos.

Hablante 2 Patricio Ortiz:

Ahí va mi siguiente pregunta, desde su experticia y desde el conocimiento en la zona y a nivel acuático, como usted me dice, tal vez, ¿qué sugerencias tal vez le podría usted hacer a estas estrategias para que de alguna manera mejoren su rendimiento?

Hablante 1 Vanessa Rodríguez:

Una de las cosas que yo veo que funciona y probablemente sea una de las pocas que yo conozca y es algo que trabaja el Instituto del Bien Común donde yo trabajo, es este tema de que existe una preocupación real por gestionar las cabeceras de cuenca y las zonas bajas. Eso no está pasando. Todo el mundo está, o sea, la mirada está bien focalizada en un punto. Y también no se está mirando cómo el fenómeno, aunque hay algunas instituciones que ya sí están mirando el fenómeno de modo histórico, pero también de escala, de escalas más amplias. Hay pocas instituciones que todavía trabajan en eso. Entonces, una de las cosas sería, aún en la legislación y en el marco de políticas públicas, introducir realmente el concepto de gestión, ya sea de bosques, ya sea acuática, pero a nivel de cuenca. Entonces, eso implicaría tener instrumentos que manejan la parte alta y que también que manejan la parte baja, pero juntos. O sea, ahorita los tenemos como medio dispersos, ¿no? Juntos. Lo otro, que yo creo que está funcionando muchísimo y nosotros trabajamos, pero todavía se trabaja a muy pequeña escala, ya es el tema de trabajar estrategias o mecanismos.

Acá en Perú se llaman acuerdos principales de conservación, acuerdos recíprocos de conservación por el agua, que son trabajar con propietarios de predios que están ubicados en zonas de cabecera y que antes tenían ganadería. Entonces, una suerte de incentivos para que ellos ya no estén trabajando la ganadería, más bien reforestan, se les está dando... Pero esas instrucciones son solamente con ellos, se involucran a los propietarios, a las municipalidades y en este caso a la ONG. Lo otro que trabajamos muchísimo, porque, de hecho, como ya lo conté y nos interesa la parte acuática, es el tema de reforestación de rieleras. Hace años que trabajamos muchísimo en este tema. De hecho, acá en Perú también, muchos de ustedes lo saben, pero hay un instrumento, que se utiliza dentro de un programa que se llama Programa Nacional de Conservación de Bosques, que es como incentivos monetarios que se pagan las comunidades, especialmente en la Amazonía, por mantener el bosque bien. Entonces, de acuerdo a las hectáreas que ellos mantienen, les transfieren dinero, pero ese dinero tipo no se

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puede utilizar en lo que ellos quieren. Si no tienen una serie de ítems, de aspectos en las que invierten esa planta. Yo creo que estos instrumentos, aunque ahora recién están como que, en fases iniciales, funcionan como que, en algunas partes de la Amazonía, pero deberían ser mucho más integrales, deberían llegar a mayores espacios. Esas me parecen ser buenas propuestas.

Hablante 2 Patricio Ortiz:

Okey. Ya, sí, me parece bien. Entonces, viendo lo mismo desde este punto de vista, ¿cómo ve usted el futuro? El futuro de la Amazonía, tanto en Ucayali como la Amazonía peruana. ¿Cómo le ve de aquí a unos años?

Hablante 1 Vanessa Rodríguez:

Bueno, si yo pienso en el futuro, yo diría en términos simples que siempre va a haber una lucha entre tres sectores. El sector económico formal, el sector económico informal e ilícito, de hecho, y del otro lado, todas las iniciativas que están en pro de conservación. Entonces, lamentablemente acá, en nuestro caso, sigue siendo muy fuerte porque no se conoce bien cómo. No hay cómo negociar con el sector ilícito, ¿entiendes? Entonces, a ese sector solamente se le puede controlar. Pero un Estado que no tiene presencia, que es un Estado débil, que no se alía con las comunidades, difícilmente podría tener como que podría ganar como en esta lucha. Entonces, yo sigo creyendo y sigo viendo que todo el tiempo va a haber una contradicción entre las personas que están promoviendo instituciones, que están promoviendo iniciativas de manejo sostenible de recursos, participativa, de gobernanza, el Estado que más o menos puede llegar a estas zonas y poner su autoridad y este otro sector. Entonces, o sea, sería, tendría como que la esperanza de que en el futuro tanto el Estado cómo estas iniciativas de sostenibilidad sean mucho más fuertes que el resto de actividades. No creo, por ejemplo, en el caso peruano, una de las cosas que está pasando y es notorio, es que hay mucha migración del lado andino hacia la Amazonía.

Hablante 1 Vanessa Rodríguez:

Entonces, vienen grupos poblacionales que viven en la sierra de Perú y pasan a ocupar espacios en Amazonía. Entonces, hay muchas invasiones de territorios comunales, hay tráfico de tierras. Entonces, se implanta también toda una cosmovisión diferente de aprovechamiento de recursos naturales en la Amazonía. Entonces, siento de verdad que la Amazonía va a tener en el futuro que enfrentar no solamente las presiones de ahora, sino que están muchísimas más presiones, pero ahí confío, o de recursos, de generar alianzas, redes, puedo hacerle, como puedo hacer un poco contrarrestar el balance.

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Hablante 2 Patricio Ortiz:

Okey. Bueno, para ir cerrando la entrevista, Vanessa, porque veo que sí nos ha podido ayudar mucho más de lo que pensaba, me imagino. ¿Por qué usted cree que debería importarle a la gente el tema de la deforestación, el cuidado del medio ambiente, no solo en la Amazonía peruana, sino en la Amazonía en general, dentro de nuestra sociedad?

Hablante 1 Vanessa Rodríguez:

Yo diría como una sola frase, porque definitivamente los bosques están asociados a nuestra propia existencia, no solamente en la Amazonía, sino de modo general. Los bosques, a nivel más técnico, tienen como un rol fundamental en la regulación del clima, proveen servicios. Entonces, si esos bosques desaparecen, se empiezan a disminuir tanto en cantidad como en calidad, definitivamente van a haber muchas alteraciones y esas alteraciones van a poner como que en riesgo nuestra existencia. Incluso hay contexto, o sea, más en el ámbito de mi trabajo, donde la gente relata hace 50 años, nosotros conseguimos animales de monte cerca. Ahora tenemos que entrar día a día. Ese es un impacto real sobre la vida de las personas, sobre su calidad alimentaria, sus posibilidades de desarrollo. Entonces, creo que nadie a estas alturas del partido, salvo algunas empresas gigantes que tienen intereses económicos, podría cuestionar la importancia de nuestros bosques en nuestra vida. Igual hace poco leí, vi un reportaje de, me parece que es una cadena alemana sobre los ríos voladores.

Y hablaban como en nivel técnico de cuál era la importancia de la Amazonía para el mantenimiento del clima global. O sea, no solamente de nosotros, no del resto del mundo. Y veía ahí unas cuestiones de cómo los brasileros, incluso algunos, un meteorólogo peruano que trabaja en Estados Unidos, o sea, tenía estudios de precipitación, de orientación de los vientos y todo, a nivel de toda la Amazonía. Y había estos científicos brasileños que estaban estudiando un poco el proceso de fotosíntesis en las plantas para hacer mediciones más reales sobre los procesos de captura de carbono. Entonces, me pareció genial. Es un reportaje corto, de hecho, que debe estar en la web. Me pareció genial que nuestros científicos, o sea, los científicos de este lado estén haciendo ese tipo de trabajos para seguir fundamentando, porque yo creo que en el futuro igual vamos a necesitar muchos más argumentos para poder mantener los bosques en pie en la Amazonía.

Hablante 2 Patricio Ortiz:

Okey, listo. Para finalizar esta entrevista, y como última pregunta, ¿ustedes como departamento dentro de Ucayali y como Perú, ¿están conscientes de que la deforestación está afectando a todos los seres humanos o la gente no encuentra inteligenciada sobre este tema? Y, por último,

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entendiendo que la responsabilidad intergeneracional es entender que lo que tengo les va a servir a mis generaciones futuras. ¿Entienden que la deforestación está afectando la Amazonía y que está afectando sus pueblos y sus tierras? ¿O esto no se está tomando en cuenta a la larga no?

Hablante 1 Vanessa Rodríguez:

O sea, depende de cómo miremos esa pregunta. O sea, si la pregunta es quién lo entiende y quién le preocupa, ¿quién lo entiende y quién le preocupa? Yo creo que es, o sea, y quién lo sufre, como que habría tres preguntas ahí. ¿Quién lo entiende, a quién le preocupa y quién sufre las consecuencias de estos fenómenos? No, quienes lo entienden en términos más generales son los académicos y les preocupa también a los académicos. Entonces, le preocupa un poco al Estado, en este caso Ucayali, cuando hay algún problema. O sea, cuando es un problema notorio, cuando entonces ahí quieren, le preocupa también porque tienen que cumplir funciones de alguna forma. Pero a quién le preocupa y quién lo sufre son sin duda las comunidades que se ven afectadas. Entonces, ahí hay una serie de transformaciones en sus estilos de vida. O sea, yo noto, o sea, en mi viaje de campo, que hay una preocupación, pero también hay una suerte de desesperación, especialmente por zonas donde no solamente los bosques están siendo afectados, sino también hay invasiones de territorio por parte de grupos migrantes. Entonces ahí hay una suerte. Me preocupa, me desespera, me siento, siento mucha incertidumbre, pero no hay como una a quién acudir. De hecho, yo conozco dos casos así, bien, bien significativos, y uno de esos casos está en La Laguna Pucallpillo, que es como que es además una zona de conservación regional y vivían ahí seis comunidades indígenas. Hay comunidades nativas de pueblo allá en Ica uno sabe que está vivo y este y detrás de su territorio se lo ocuparon una congregación religiosa que se llama Los menonitas. Entonces los menonitas quemaron y deforestaron, pero tanto. O sea, nunca he visto un este como. Como un espacio y un área forestal tan rápido y en tan poco tiempo, en tan poco tiempo y tan grande como el de los menonitas y este. Estas comunidades ya tenían procesos súper largos de asistir a las autoridades, de hacer reclamos, de presentar denuncias y no eran este no va a ser un proceso forzado. Seguían discutiendo ahí como una suerte de muerte lenta respecto de lo que realmente me preocupan. ¿No? Pero yo, yo, o sea, y puedo hacer como otra observación a lo que estamos haciendo sobre a quién le preocupa y lo entiende o lo sufre la a la gente, a la comunidad que ponga que le preocupa y lo sufre, pero la gente todavía no, esa gente que se le preocupa y sufre no está suficientemente consciente de cómo le va a afectar en el futuro y esa es su parte real. Así que este sería como que, o sea, cómo lo trabajamos o cómo. Cómo hacemos que en realidad

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ellos tengan información más técnica, información al respecto del tema. Pero también información sobre las futuras consecuencias.

Transcripción de la entrevista con Freddy Nugra

Hablante 1 Patricio Ortiz:

Bueno, primera pregunta, ¿para usted qué es la deforestación? Y ¿cómo cree que afecta a la Amazonía ecuatoriana?

Hablante 2 Freddy Nugra:

¿Qué es la deforestación? La deforestación se da de varias formas, hay incluso la deforestación natural por el cambio climático, por las lluvias fuertes se está deforestando muchos sitios como usted puede ver las zonas de las estribaciones orientales por los deslaves y los derrumbes, esto puede ser por las fuertes lluvias. Y hay otra deforestación antropogénica que es causada por nosotros los humanos debido a la dependencia de la agricultura y la ganadería, donde hay fuentes de agua, y eso ha sido por años, y eso sigue. Sigue básicamente en la parte alta y la parte baja de la Amazonia y también en Los Andes y la costa ecuatoriana. Sabemos que cuando hay muchas lluvias, perdemos la cobertura vegetal, derrumbes y cuando hay época seca es por las quemas indiscriminadas y también por la extracción de madera, expansión de pastos, minería. hoy en día: Vías, construcción, urbanización, aeropuertos. Entonces todo esto ha llevado a una deforestación por lo que así se entiende en nuestro país.

Hablante 1 Patricio Ortiz:

Respecto a la deforestación que existe ahora en el Ecuador, ¿Usted qué cree que está pasando ahora en el Ecuador con relación a la deforestación como tal?

Hablante 2 Freddy Nugra:

Depende de donde, si vamos a la Amazonia y nos centramos en la Amazonía baja, tenemos todavía cobertura vegetal buena pero los proyectos estratégicos como minería, proyectos hidroeléctricos, y algunos asociados al turismo también, las autoridades por desconocimiento apertura vías sin estudios a zonas núcleos de la Amazonia como el Yasuní, como el Cuyabeno, como el Morona, como la Cordillera del Cóndor, al norte el petróleo, dos proyectos grandes de gran envergadura abren caminos y los huaoranis, los jíbaras, los quichuas ya tienen vías para extraer madera y por los ríos, si hablamos al norte y al sur, la minería en la cordillera del Cóndor, zonas de gran biodiversidad, sitios realmente vulnerables se están abriendo vías, extrayendo madera para los mismos proyectos y la pérdida total de la cobertura vegetal, porque es a cielo abierto, también muchos proyectos hidroeléctricos, como sabemos el "zar" tiene 36 km de espejo de agua, se perdió toda la cobertura vegetal de la cuenca del paute y eso también afecta al cambio climático. entonces entran los daños humanos, ya sea para realizar ganadería,

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agricultura, minería o alguna urbanización, nuevos asentamientos humanos y se va perdiendo la cobertura vegetal, en sitios en donde realmente están intervenidos, tratamos de sacar hasta el último árbol, sin un plan de reforestación, no hablemos muy lejos: Limón, Gualaquiza, todo quieren ver bonito las ciudades con cemento, y no hay un plan de reforestación de cuidado de la vegetación de Rivera. No vayamos más allá, Cuenca mismo, tiene lleno de eucaliptos a los márgenes de rivera y llenos de especie, entonces hay árboles pero no son nuestros, la mayoría son especies invasoras y hay proyectos muy buenos como el "guara verde" que quiere tener la diversidad funcional, quiere tener especies nativas pero la política de los municipios es tener bonito verde, que me parece bien, pero debería zonificar y no en todos los sitios entonces la deforestación en la costa es altísima, debido a la ganadería, a las camaroneras, los mangles estamos perdiendo, las bananeras y también la minería por ejemplo, la Ponce Enríquez, todas esas zonas de la costa del Ecuador,

Esto hace que surja la deforestación altísima en nuestro país, entonces se nos viene un efecto del niño que no sabemos qué es lo que va a pasar por qué no tenemos bosques y no hay quien pare el talud ni mitigue un poco estos problemas.

Hablante 1 Patricio Ortiz:

¿Hablando directamente sobre el mismo tema, usted conoce estrategias que se han implementado para poder frenar la deforestación en la Amazonia?

Hablante 2 Freddy Nugra:

Hay muchísimas estrategias, el Ministerio del Ambiente siempre está llamando a concursos para reforestar, 5 mil, 10 mil hectáreas, pero para mí eso no es clave, porque si, a la Amazonia, le deja de trabajar 1 año, ya está de nuevo la vegetación crece, por lo que tiene que haber motivación, nuevas cosas, nuevos proyectos, por ejemplo hablamos del turismo rural, el turismo de naturaleza, de salud mental, emprendimientos, a partir de la naturaleza, entonces no han tenido éxito. Yo no conozco un proyecto en la Amazonia, al menos en los territorios que conozco, que hayan tenido éxito. Hay muchísimo dinero, hay muchísimo dinero para temas de reforestación, pero lamentablemente la gente que ejecuta solamente siembra de las 10 mil, digamos que siembra las 10 mil, se van a plantar tal vez solo mil, 2 mil, fracasan totalmente los proyectos por que la Amazonia no necesita ese tipo de reforestación, necesita una regeneración natural y más bien es hablar con la gente, educar a la gente y buscar nuevas oportunidades que no sea netamente la ganadería sino ya hablamos de turismo en la naturaleza, de los emprendimientos como mencione, entonces hay cosas en la Amazonia que se podrían hacer, pero para mí, no ha tenido éxito, yo no conozco un bosque con éxito

Hablante 1 Patricio Ortiz:

Entonces, ¿en una escala del 1 al 10 (siendo 1 lo peor y 10 lo mejor) estas estrategias implementadas, en qué puesto las definiría?

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Hablante 2 Freddy Nugra:

Pongámosle un 5 para no ser pesimistas, tal vez existan zonas con éxito y yo no las conozca, pero de 5 no sube

Hablante 1 Patricio Ortiz:

Y ¿qué sugerencias se le podría hacer a estas estrategias para que mejore su rendimiento? O ¿establecer otras estrategias?

Hablante 2 Freddy Nugra:

Básicamente dar los fondos a gente que sabe del tema, las ONGs dan dinero a la gente de Quito, y estos luego, dan a la gente que sabe del tema, un dinero que casi ya no alcanza, no está bien distribuido el dinero de los fondos que dona la gente. No puede ser que le den el dinero a gente que vive en Quito y todo el dinero se les va en logística y en movimiento de gente de Quito y que desconoce el territorio.

Cómo experiencia, llega el dinero de contratos a subcontratos y luego al campesino y este hace lo que puede y no se ven los resultados, no hay el seguimiento.

Yo en Morona Santiago he visto que se ha destinado muchos fondos y hasta ahora no veo árboles grandes, no veo bosque, yo he sembrado muchos árboles con la gente, y la propia naturaleza les gana a los árboles sembrados. Entonces cómo dije anteriormente, no es necesario reforestar, porque hay todavía en la Amazonía, hay muchas aves, muchos insectos.

Debería haber política pública de conservación, motivar a la gente que tiene, aunque sea un "parchecito" así tenga 10 metros de bosque, que sea tan importante como es el agua, un parche de vegetación. Entonces tenemos que trabajar cada uno en cada sitio, el que tenga una finca o una hectárea de bosque que sea reconocido o que sea identificado, hacer un inventario, por ejemplo. Hay mucha gente que tiene fincas y no trabajan todas las fincas, si usted le da una compensación por cuidar ese bosque, créame que hoy en día no lo toca, hoy en día está en boga el tema de la conservación y a partir de esta se está generando turismo, yo por ejemplo he visto la ruta de las brujas en Sigsig, qué bonito, qué hermoso, pero no he visto vegetación, pero si hubiera estos emprendedores turísticos que empiecen a sembrar la idea de hacer turismo de "avifauna" por ejemplo, ya no van a observar la parte sólo arqueológica sino también la flora y la fauna que existía en aquellos años, entonces por ahí va maso menos.

Hablante 1 Patricio Ortiz:

Hablando de esto y también por el mismo tema, ¿Cómo ve el futuro de la Amazonia? ¿Cómo ve el futuro de estas zonas? ¿Morona Santiago?

Hablante 2 Freddy Nugra:

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Morona Santiago está a los ojos de la Amazonia y del mundo, porque primero la Amazonia ha sido netamente ganadería Morona Santiago, muy poca minería, y también en los años 40 era sobre la extracción del oro y la cascarilla, pero era artesanal, y luego la maderera.

Pero hoy en día se vienen momentos más fuertes, proyectos estratégicos, hidroeléctricos, mineras y otros de gran envergadura, vías, pero también hay cosas muy buenas, genere mucho más consciente, jóvenes preparados que se preocupan, como ustedes, como yo mismo, estamos generando trincheras para conservar, hemos creado un espacio para estudiantes, turistas, investigadores, y eso es una muestra de que si se puede hacer otras cosas que no sea la ganadería, ni la minería, y esto se está duplicando en otros territorios.

Si vamos a Macas, a Limón, hay emprendimientos, entonces todos estos que no dañan a la naturaleza, hay que motivarlos, a ellos hay que darles los fondos.

Entonces me imagino unos 10 de estos proyectos en Morona Santiago, que den los espacios para que los jóvenes puedan hacer sus prácticas, investigaciones, comercio de plantas medicinales, artesanías, de todo lo que se genera y nuestra cultura, y que se venda a nivel internacional, si pagáramos lo que cuesta ver una ceremonia o una fiesta de la chompa por ejemplo, es muy costoso, pero nosotros no pagamos, nos quejamos por pagar lo que realmente vale. Entonces nos falta trabajar en eso, pero no estamos tan mal tampoco.

Hablante 1 Patricio Ortiz:

En el tema de Morona Santiago específicamente, ¿usted cómo ve la deforestación a futuro? ¿Crecerá o decrecerá? O ¿se mantendrá?

Hablante 2 Freddy Nugra:

Parece que se va a mantener, en ciertos lugares, cantones viejos como Gualaquiza, Méndez, Limón, Macas, se va a mantener, porque la gente ya está un poco más preparada, la gente está siendo más consciente, están generando más zonas protegidas, turismo de la naturaleza. En donde corremos riesgo, en las zonas bajas de la Amazonia, donde todavía tenemos nuestras comunidades Shuar, Achuar, Taisha, etc, en donde todavía no les ha llegado el dinero, recién les está llegando el tema del dinero, o los proyectos estratégicos, y cómo no saben qué hacer con el dinero, ellos compran carros, talan los bosques, venden la madera, dan para la minería, aquí podemos sufrir un poquito, pero ya en las zonas altas, en cantones grandes va a parar y veo que está parando, porque veo a gente preparada y que ya motivando, a la gente y al gobierno, a los políticos, a los técnicos de los GADS, de las juntas parroquiales y dentro de los planes de ordenamiento territorial consideran la parte ambiental, entonces se vienen buenos días en el tema de la naturaleza y del turismo también.

Hablante 1 Patricio Ortiz:

Me alegra Freddy el hecho de que nos diga esto, puesto que, en nuestro proyecto hemos encontrado muchas malas noticias, y esto nos ayuda a ver otro enfoque del proyecto. Y para

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terminar ¿Porque usted cree que debería importar a la gente el tema de la deforestación y el cuidado del medio ambiente en la sociedad ecuatoriana?

Hablante 2 Freddy Nugra:

Fácil, la gente a partir de la pandemia, abrió los ojos, se dieron cuenta de lo que los biólogos estábamos luchando, la conservación, la investigación, el turismo de naturaleza. Yo creo que nuestra casa nos cuidó a mucha gente y por lo tanto estamos vivos, tenemos donde refugiarnos, teníamos alimento fresco, y nos olvidamos de toda la tecnología y empezamos a unirnos y a recapacitar, a adorar a la naturaleza. Y eso es un punto focal que nos enseñó a todos, y que hoy en día, los planes de ordenamiento territorial, tienen que ser planificado espacialmente, además el tema del internet con responsabilidad y por ahí hay que cuidar para que la deforestación se tiene en los bosques y que algunas autoridades no se dan cuenta.

Hay muchos fondos, y dinero que ha llegado al MAATE, pero eso a veces se va a otros sitios como galápagos que no sabe qué hacer con tanta donación, entonces se vuelve un negocio la conservación, tiene que ser sin fines de lucro la conservación, con las ONGs que nos están ayudando y haciendo proyectos aquí.

Eso le puedo comentar. Muchas Gracias.

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