BIOSPHERE

MACIZO DEL CAJAS

EXPERIENCES IN SUSTAINABLE DEVELOPMENT FOR A GOOD LIVING

Human being, productivity and conservation

A TERRITORY FOR THE CREATION OF NEW VALUES

FOR DEVELOPMENT AND GOOD LIVING PRACTICES

CREDITS

BIOSPHERE AREA “MACIZO DEL CAJAS”, EXPERIENCES OF SUSTAINABLE DEVELOPMENT FOR GOOD LIFE

This book is produced in commemoration of the Declaration of the Biosphere Area “Macizo del Cajas” as World Biosphere Reserve, granted by UNESCO on May 29, 2013 at its headquarters in Paris - France.

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WELCOME

We invite you to tour this wonderful and immensely productive, biodiverse area through the visual and entertaining testimony offered in this book.

We sincerely hope, that like us, you will share our experience and vision of sustainability which includes becoming aware of our cultural, natural and productive values at the same time as we work day by day to make human activities truly sustainable.

The challenge is to meet our current needs in a way that also ensures the livability of future generations.

From your role as a responsible citizen, we invite you to join us in our work of implementing good living practices in the same way that you perform small daily actions of love and dedication at home and work. This will transform "good living" into a practice which will become part of our everyday experience, and eventually be transmitted to the joint and solitary work of our organizations, enterprises, institutions and last but not least our nation.

The need to achieve the true practice of sustainable development is crucial to our survival on the planet, to which humankind owes everything, and for which we must be willing to make our development more harmonious.

PROMOTIONAL COMMITTEE FOR THE DECLARATION OF THE CAJAS MASSIF BIOSPHERE AREA

Secretaría Nacional de Planificación y Desarrollo

Ministerio de Relaciones Exteriores y Movilidad Humana

Ministerio del Ambiente

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MEMBERS OF THE PROMOTIONAL COMMITTEE FOR THE DECLARATION OF THE CAJAS MASSIF BIOSPHERE AREA

ACKNOWLEDGEMENT

The Declaration of the Cajas Massif Biosphere Area was finalized by UNESCO's Man and the Biosphere Programme (MAB) on May 28, 2013 at its headquarters in Paris, France. It was an extensively nationalised process that took nearly three years to complete. This declaration was supported by many actors from various levels in our society, including the formal support of 58 institutions and the backing of the Ecuadorian State to obtain official recognition in the international community, represented by the United Nations (UN).

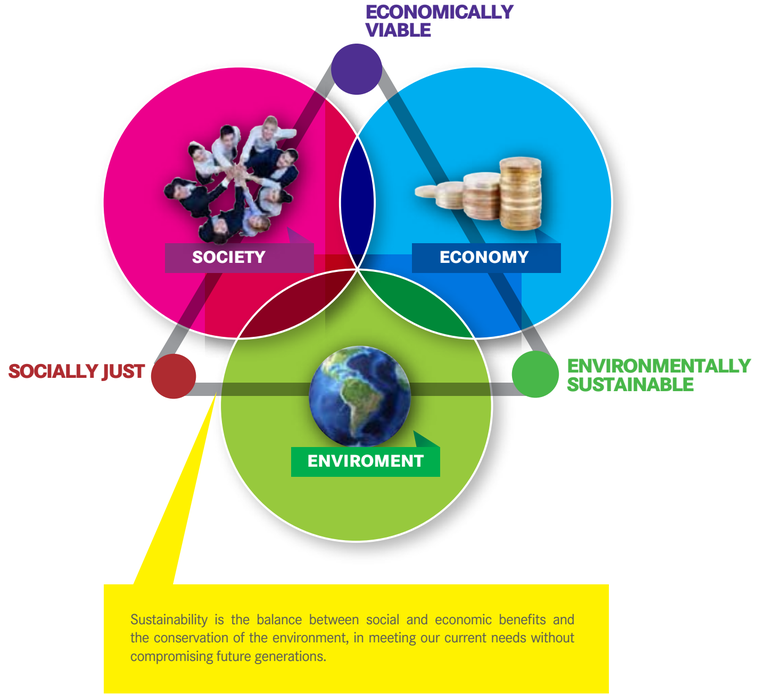
The Promotion Committee wants to specially recognize and give thanks to all the actors in the territory, including the subsecretaries, prefectures, municipalities, parochial boards, public and private companies, associations and guilds of producers, non-governmental organizations, academies, communication media and professionals, that on an institutional or individual level collaborated in terms of formal endorsement or in an anonymous manner, to achieve this great goal, which apart from the global recognition, includes a strong local commitment to respond with practical measures to meet the challenge of sustainable development.

In the same way that this recognition was approved by the authorities of the Central Ecuadorian State, their ministries, representatives, technicians and officials, so it was possible to channel this proposal through the highest level, so that it could be successfully submitted and finally accepted with pleasure by UNESCO.

To all those colleagues who participated in the ongoing process but due to circumstances had to withdraw before accomplishing its goal, to all those who knew how to encourage and navigate this long and complex path, but above all, the inhabitants of the Cajas Massif biosphere, because they are the ones who have turned this area into a global model, we thank you very much! This Declaration is in recognition for you and your exemplary lives!

SUSTAINABILITY

WHAT IS SUSTAINABILITY?



Sustainability is the balance between social and economic benefits and the conservation of the environment, in meeting our current needs without compromising future generations.

INTRODUCTION

INTRODUCTION TO THE WORLD NETWORK OF BIOSPHERE RESERVES OF UNESCO

MAB PROGRAM (MAN AND THE BIOSPHERE)

Biosphere reserves are efficient tools for orchestrating land management because they align national, regional and local development plans with conservation of the area's biological and cultural diversity. Biosphere reserves also further the goals of sustainable social and economic development as well as the pursuit of good living principles.

Biosphere reserves are ideal places to promote compliance with international commitments assumed by individual states, such as the Convention on Biological Diversity (CBD), the UN Framework Convention on Climate Change and the UN Convention to fight desertification. Each biosphere reserve must be an exemplary site for the fulfilment of the United Nations Millennium Development Goals. In particular MDG 1 and 7 on the eradication of poverty and environmental sustainability, respectively.

Given its wonderful biological and cultural diversity, Latin America in general, and the Amazon and Andean countries in particular, have immense potential for designating biosphere reserves to be managed in this way. This includes Ecuador, as one of the 17 megadiverse countries of the planet and the first country in the world to recognize and codify Rights of Nature in its Constitution.

Traditionally, biosphere reserves are longitudinal sites of excellence, in other words coastal, Andean and Amazonian areas. The area of the Cajas Massif biosphere on the other hand, breaks with this model and takes us across the paramos from approximately 4500 meters above sea level to marine mangrove swamps and coastal ecosystems. This presents a very interesting challenge for the authorities and stakeholders involved. This project will generate successful experiences and good practices, one that was revitalized was the National Network of Biosphere Reserves of Ecuador, which will develop practices that will benefit the exchange of lessons learned in the bosom of the MAB committees network and biosphere reserves in Latin America and the Caribbean (IberoMAB), and the world network of biosphere reserves.

Jorge Ellis Ph.D.
Man and the Biosphere Programme - MAB UNESCO Quito

OTHER BIOSPHERE AREAS

BIOSPHERE

WHAT IS A BIOSPHERE RESERVE?

- CORE ZONE
- BUFFER ZONE
- TRANSITION ZONE
- HUMAN SETTLEMENT

Learning laboratories for sustainable development

As of 2013, there are 621 reserves in 117 countries

Biosphere reserves are UNESCO designated sites of excellence where innovative sustainable development approaches and scientific knowledge and governance modalities are tested in order to:
- Reduce biodiversity loss
- Improve living conditions
- Promote the social, economic and cultural conditions for fostering environmental sustainability

Of special importance is the inclusion of local communities and counterparts interested in the planning and management of the area in its entirety.

Biosphere reserves seek to integrate three main functions:

Las reservas de biosfera procuran integrar tres funciones principales:

1. Conservation of biodiversity and cultural diversity
2. Economic development that is socioculturally and environmentally sustainable
3. Logistical support for research, monitoring, environmental education and training.

Each biosphere reserve is divided into three main areas:

- Core zone of conservation, monitoring and non-destructive research
- Buffer zone around the core zone's surrounding and adjacent areas for encouraging compatible activities with good environmental practices
- Transition zone for joint activities of stakeholders with regard to the sustainable management of the resources in the area.

Biosphere reserves are sites for learning and demonstration. The UN World Network of Biosphere Reserves shares and exchanges information, experiences and ideas on a subregional, regional and international level.

THE MASSIF

MACIZO DEL CAJAS BIOSPHERE AREA

LIMITS OF THE DECLARED AREA

- *North = Río Cañar*
- *West = Gulfo of Guayaquil*
- *South = Río Jubones*
- *East = Interandine Valley*

Río Cañar

Gulf of Guayaquil

Cajas National Park

Quimsacocha National Recreation Area

Río Jubones

Interandine Valley

Cantón: **Naranjal**
Pop. within Biosphere:: **58.226**
Province: **Guayas**

Cantón: **Cañar**
Pop. within Biosphere:**33.465**
Province: **Caña**

Cantón: **Balao**
Pop. within Biosphere:: **20.523**
Province: **Guayas**

Cantón: **Biblián**
Pop. within Biosphere:: **20.817**
Province: **Cañar**

Cantón: **Déleg**
Pop. within Biosphere:: **6.100**
Province: **Cañar**

Cantón: **Azogues**
Province: **Cañar**
Pob. en Biosfera: **64.782**

Cantón: **Cuenca**
Pop. within Biosphere:: **505.585**
Province: **Azuay**

Cantón: **Camilo Ponce Enríquez**
Pop. within Biosphere:: **21.998**
Province: **Azuay**

Parrish: **Tenguel**
Cantón: **Guayaquil**
Pop. within Biosphere: **11.936**
Province: **Guayas**

Parrish: **El Guabo**
Pop. within Biosphere: **44.533**
Province: **El Oro**

Cantón: **Pucará**
Pop. within Biosphere:: **10.052**
Province: **Azuay**

Cantón: **San Fernando**
Pop. within Biosphere: **3.993**
Province: **Azuay**

Parris: **El Progreso y Caña Quemada**
Cantón: **Pasaje**
Pop. within Biosphere:: **5.806**
Province: **El Oro**

Cantón: **Girón**
Pop. within Biosphere:: **12.607**
Province: **Azuay**

Cantón: **Santa Isabel**
Pop. within Biosphere: **18.393**
Province: **Azuay**

POPULATION

The information on the population in this chart only includes data from within the limits of the Cajas Massif biosphere area.

TOTAL POPULATION = 838.816 PEOPLE
(Census on Population and Housing INEC 2010)

- HEAD OF CANTON
- PARISHES WHICH HAVE THEIR CANTON SEAT OUTSIDE OF THE BIOSPHERE AREA

TOTAL AREA = 976.600,82 HECTARES

TERRESTRIAL CORE ZONES	= 31.761,12 hectares
TERRESTRIAL BUFFER ZONES	= 390.596,38 hectares
TERRESTRIAL TRANSITION ZONES	= 469.804,02 hectares
MARINE CORE ZONE	= 12.395,00 hectares
MARINE BUFFER ZONE	= 72.044,30 hectares

Territory declared by UNESCO As Macizo del Cajas Biosphere Area

SIMBOLOGY

- CANTONAL HEADS
- CITY OF CUENCA
- ROAD
- TERRESTRIAL CORE ZONE
- TERRESTRIAL BUFFER ZONE
- TERRESTRIAL TRANSITION ZONE
- MARINE CORE ZONE
- MARINE BUFFER ZONE

THE MACIZO DEL CAJAS BIOSPHERE, A LARGE ECOLOGICAL AND PRODUCTIVE UNIT:

1 Due to the effect of high temperatures the moisture from the Pacific coast (0 masl), Interandean Valley (2500 masl) and the Amazon Basin (1000 masl) evaporates.

2 This steam rises on the slopes of the Western Mountain Range until reaching the paramo (4500 masl) .

3 At this height vapour returns to condense and turns back into liquid in the form of rain .

4 Finally, gravity causes the water to finds its path to the Pacific lowlands, the Interandean Valley and the Amazon River basin, forming rivers, lagoons and waterfalls, and then returning to feed the different ecosystems on its way back towards the Pacific Ocean

POTENTIALS AND COMPETENCES:

5 These environmental conditions within the biosphere have supported the livelihoods of many people and their diverse and productive activities, including agriculture, livestock, fishing, various industries, hydroelectric generation, trade and more

6 All of these productive activities enabled the development of urban centres and created regions with authorities and their respective powers divided into units such as parishes, boards, cantons and provinces

1 Pacific Coast

6 Balao

Camilo Ponce Enríquez

6 Guabo

6 Naranjal

6 Pucará

6 San Fernando

6 Girón

6 Santa Isabel

6 Cañar

6 Biblián

Déleg 6

6 Azogues

Cuenca 6

1 Amazon Basin

1 Interandine Valley

Why did we seek the declaration of the cajas massif as a unesco biosphere area?

OUR MAJOR GOAL IS SUSTAINABLE DEVELOPMENT:

However, the wealth of natural resources, range of productive activities and the diversity of public and private stakeholders generate opportunities but also great challenges. How do we carry out human activities to meet our current needs without threatening the survival of future generations?

Sustainable development aims to find and execute the best possible practices that make human activities productive and at the same time environmentally sustainable, socially just and economically viable

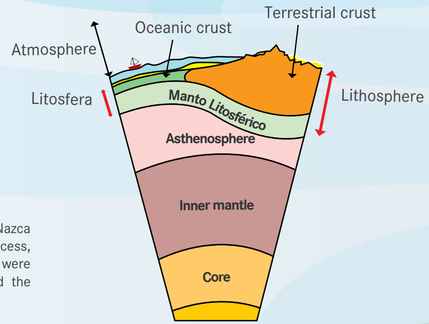
THE BENEFITS OF A BIOSPHERE AREA:

The declaration and management of any territory as a biosphere area produces, among others, the following benefits for sustainable development:

- Regional cooperation between stakeholders on the basis of common objectives.
- Regional and international transfer of technologies and successful experiences.
- Opportunities for access to new human, logistical and financial resources.
- Possible access to consumer markets with preferential prices.
- Regional strategies for the conservation of biodiversity.
- Fight against global climate change.

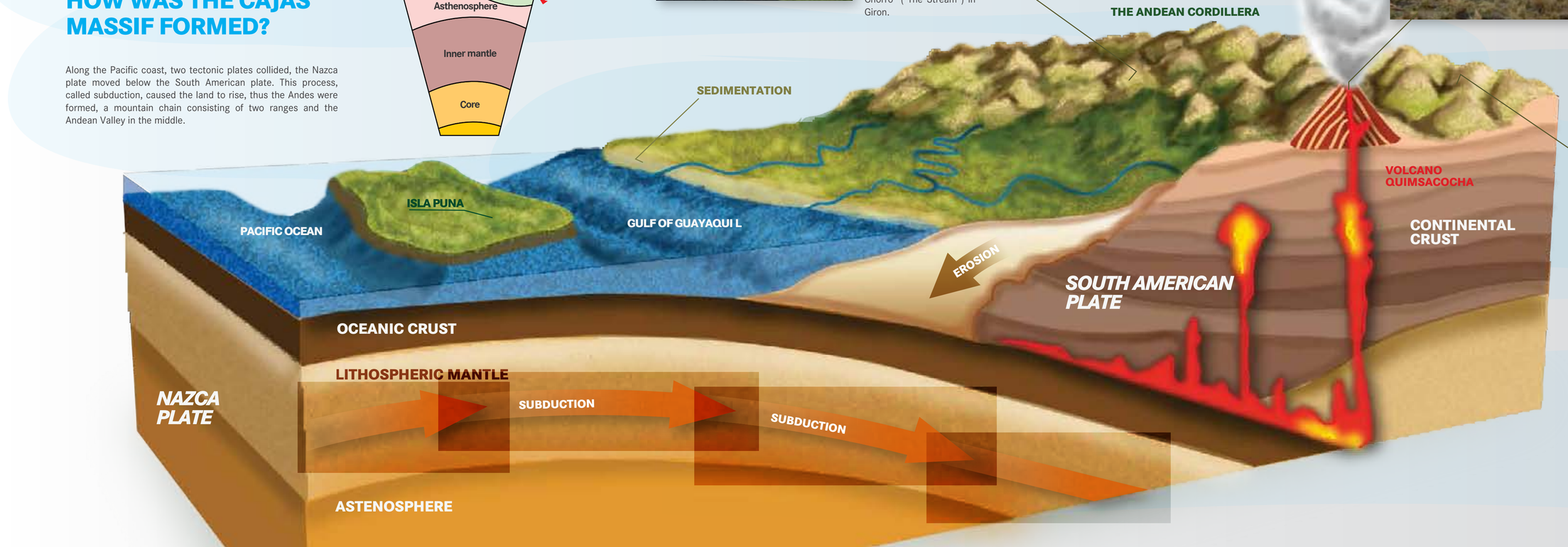
HOW WAS THE CAJAS MASSIF FORMED?

Along the Pacific coast, two tectonic plates collided, the Nazca plate moved below the South American plate. This process, called subduction, caused the land to rise, thus the Andes were formed, a mountain chain consisting of two ranges and the Andean Valley in the middle.



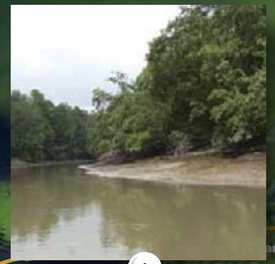
The Cajas Massif falls sharply towards the valleys that surround it. The photograph below was taken from the area of the protected forest called "El Chorro" ("The Stream") in Giron.

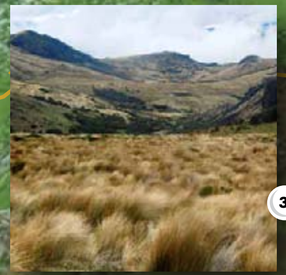
The North and Central Ecuador stands out for its great number of volcanoes. In the South, only one extinct volcano, Quimsacocha, exists. The photo shows the crater of the volcano, 5 kilometers in diameter, which was polished by glaciers during the Ice Age. Today, it is covered by paramo.

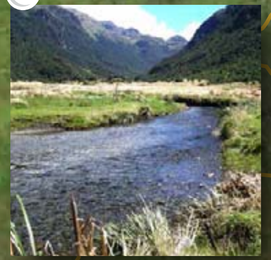


Subduction has created many geological faults in the area of the Cajas Massif. For example, the Bulubulu fault that runs parallel to the foothills of the Massif, near Tamarindo, is an outstanding example. In Baños of Cuenca, a wall of almost 10 meters long was created over a fault line. Here the water used in the city's famous thermal baths comes out of a large crack.

CURRENT RELIEF AND LANDSCAPE OF THE CAJAS MASSIF







Gulf of Guayaquil

Balao

Camilo Ponce Enríquez

Guabo

San Fernando

Girón

Santa Isabel

Inter-andean Valley

Cañar

Biblián

Déleg

Azogues

Cuenca

Amazon Basin

1 MANGROVES

Along the coast of the Gulf of Guayaquil, marine and terrestrial influences meet. Rivers bring sediment from the mountains and deposit it in the Gulf of Guayaquil. On the other side, the Guayas River and Pacific ocean tidal waters have created a complex system of mangroves and estuaries along the coast.

2 COASTAL PLAIN

The coastal plain was formed by deposits from sediments carried down by the rivers from the high elevations of the Cajas Massif.

3 ANDEAN PLATEAUS

During the last glaciation, which ended 10,000 years ago, the plateaus were created in the higher parts of the Massif; today these areas are mainly occupied by the paramo ecosystem.

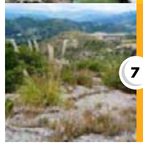
4 "U" SHAPED VALLEYS

The glaciers of the Ice Age valleys continually polished the rocks of the Massif, creating the typical "U" shaped valleys such as the Yanuncay, the Tomebamba and Machángara.

5 CANYONS IN THE CORDILLERA (Río Cañar, north)

The mountain rivers Cañar to the North and Jubones to the South have dug deep canyons on their way to the sea, leaving the Cajas Massif, isolated from the rest of the Western range.

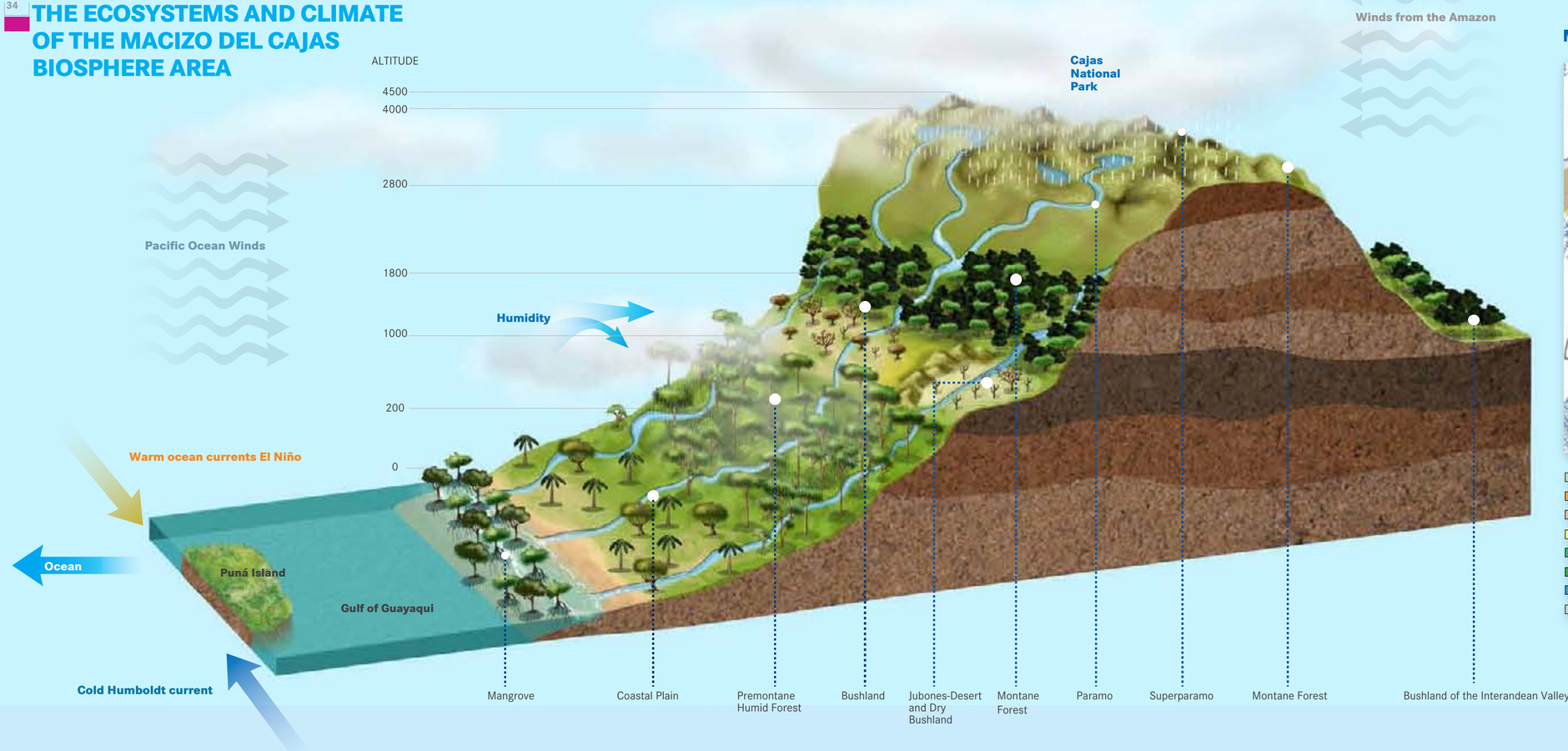
6 (Río Jubones, south)



7 INTER-ANDEAN VALLEY

In the past the Cuenca and Azogues valleys were covered by a lake. In the area of El Plateado you can see the bottom of this ancient lake. Over time, the water cut through the mountains of the eastern range, draining through La Josefina to the Amazon, but eventually the lake dried up.

THE ECOSYSTEMS AND CLIMATE OF THE MACIZO DEL CAJAS BIOSPHERE AREA



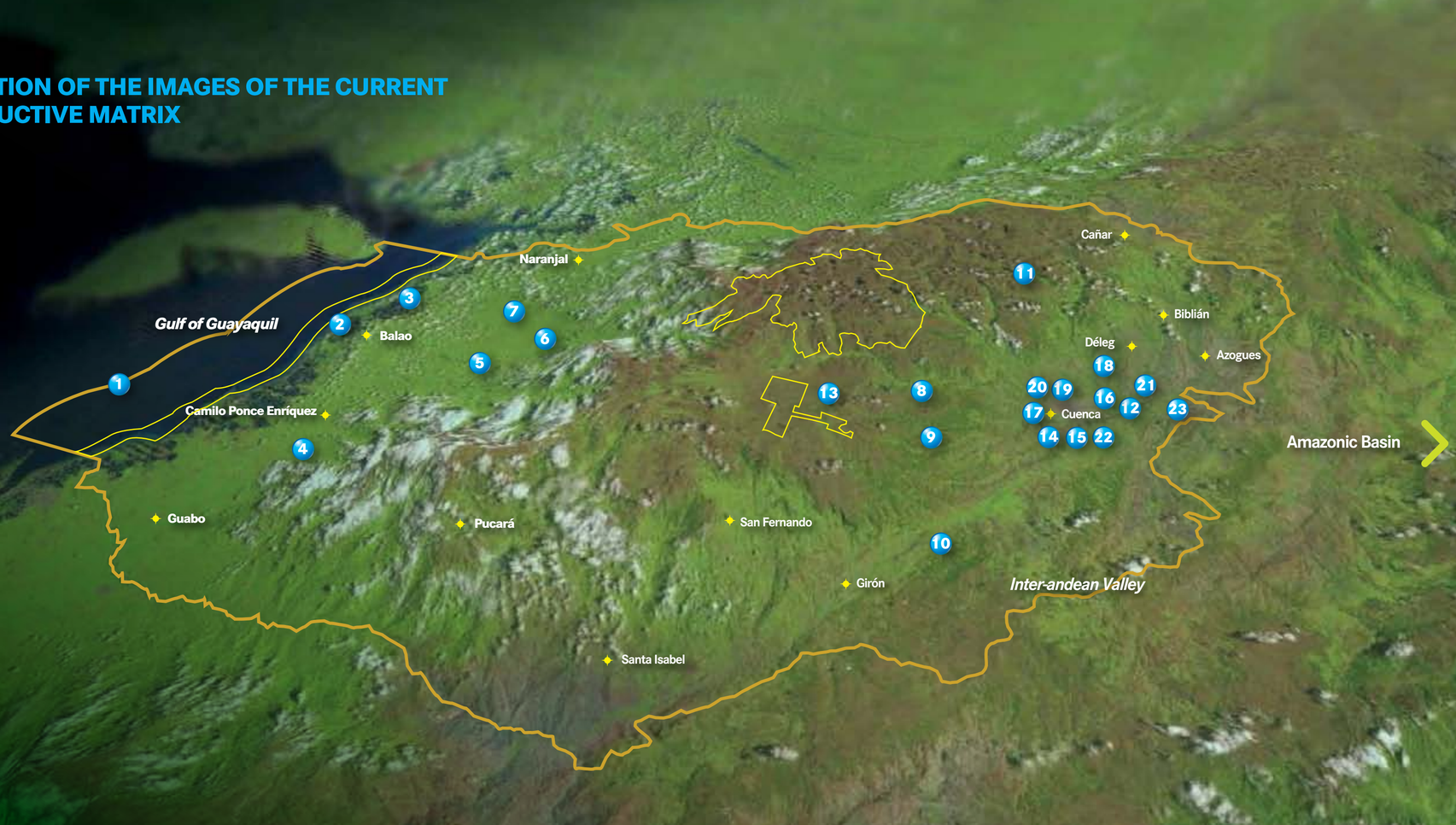
MAP OF THE REMAINING ECOSYSTEMS

- MOUNTAIN BUSHLAND
- PARAMO
- ARID BUSHLAND AND DESERT
- SEMIDECIDUOS FOREST
- PREMONTANE FOREST
- MONTANE FOREST
- MANGROVE
- INTERVENED AREA

PRODUCTION

PRESENT PRODUCTIVE MATRIX OF THE CAJAS MASSIF BIOSPHERE AREA

LOCATION OF THE IMAGES OF THE CURRENT PRODUCTIVE MATRIX



In this chapter we offer a visual tour of some examples of the main productive activities present in the Cajas Massif Biosphere Area.

1. Fishing
2. Shrimp production
3. Crab collection
4. Mining
5. Banana plantations
6. Cocoa
7. Livestock raising
8. Drinking water production
9. Agriculture
10. Eucalyptus
11. Hydro power
12. Sanitation
13. Pine plantations
14. Blacksmith
15. Construction
16. Tire factory
17. Ceramics
18. Panama Hats
19. Telecommunications
20. White line
21. Furniture
22. Textile
23. Jewellery
24. Cement
25. Paper

LIVESTOCK Cattle raising is widespread both in the coastal zone and in the mountainous part of the Cajas Massif. It is one of the main sources of income for rural people, although it is a major cause in the loss of biodiversity and ecosystems

CRABS In the mangroves, several associations of crab fishers have permits to catch and collect shellfish in specific areas concessioned by the Ministry of the Environment.

SHRIMP: The coastal zone of the biosphere area is one of the most important areas of shrimp production in Ecuador, with approximately 25,000 hectares of shrimp ponds.

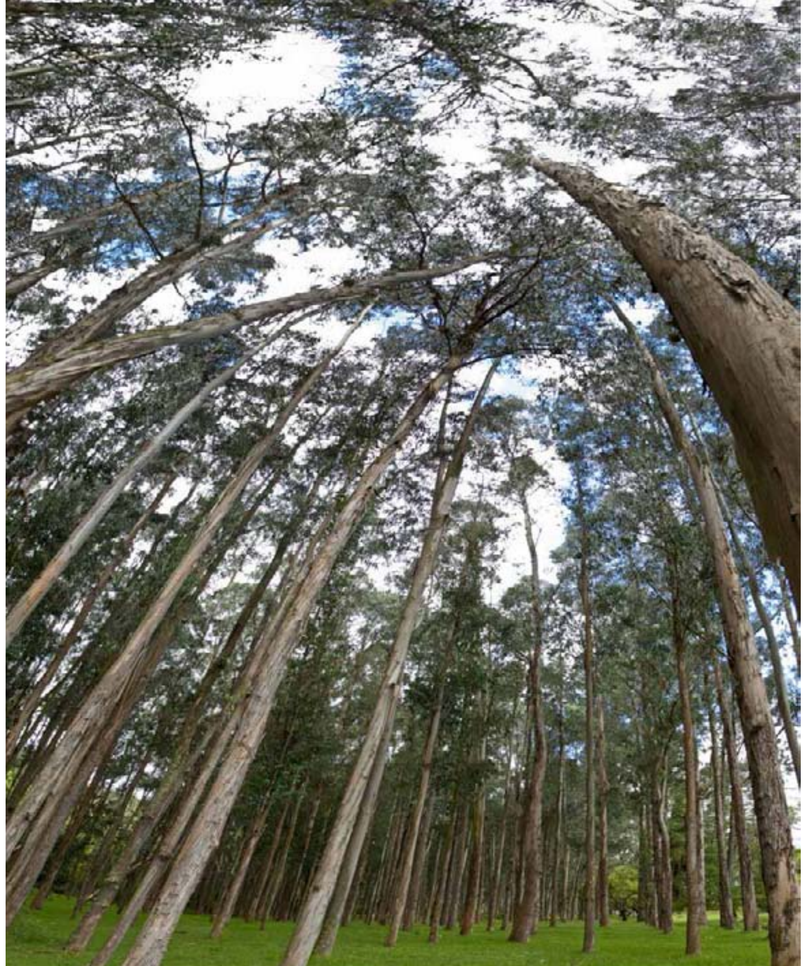
FISHING:

It is only permitted to use artisanal fishing methods in the marine part of the Macizo del Cajas Biosphere. The absence of major fishing vessels is highly beneficial to the economic livelihood of local residents.

NATIONAL COCOA:

The national cocoa of "fine aroma" called "Arriba Nacional" and the clone CCN51 are the main varieties planted in the tropical zone of the biosphere.

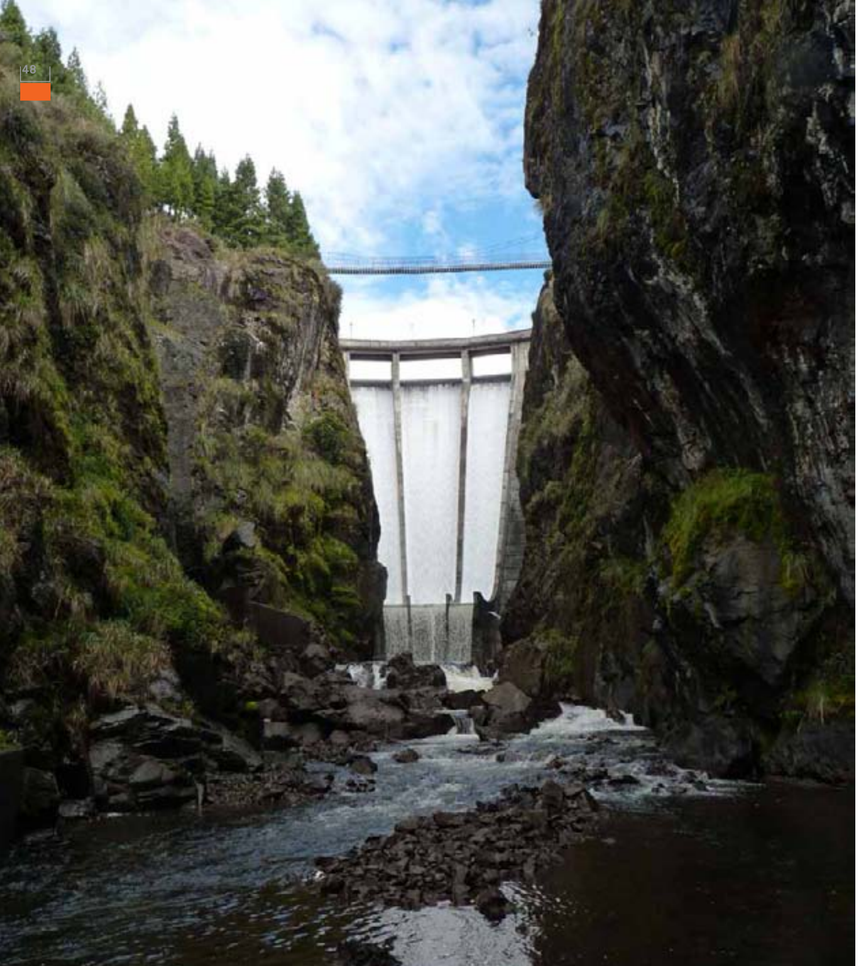
BANANAS: The fertile soils of the coastal plains of the Cajas Massif are traditionally used for the cultivation of bananas for export.



EUCALYPTUS PLANTATIONS:

Although native to Australia, this tree has adapted very well to the conditions in the Interandine Valley and today provides one of the most important types of wood for construction.

PINE PLANTATIONS: State policies implemented between 1980 and 1990 launched pine plantations in the paramo, which altered the Andean landscape. It has a negative impact on the biodiversity and natural conditions of the Cajas Massif.



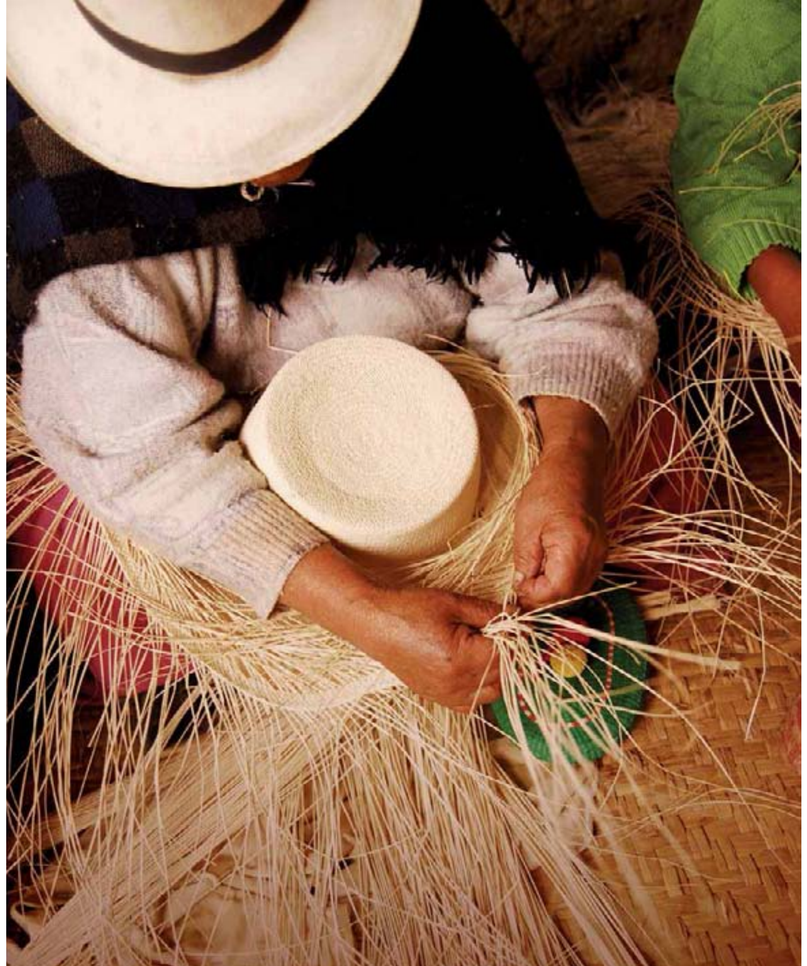
HYDROELECTRIC POWER

The country's hydroelectric production depends highly on water originating from the Cajas Massif. There are more than 2700 MW coming from the Saucay hydro-power plant (24 MW); Saymirín (14.4 MW) in the upper part of the Paute River basin; and the Integral Paute hydroelectric complex composed of Mazar (170 MW), and Molino (1100 MW). Additionally, the hydroelectric plants Sopladora* (487 MW), and Cardenillo ** (593 MW), which are located in the lower part of the Paute basin, outside the biosphere area, and Ocaña (26 MW) and Ocaña II – La Union ** (24 MW) in the basin of the Cañar River; and the hydroelectric project Minas-San Francisco *(270 MW) in the basin of the Jubones River will be operational in the near future.

* Power plants under construction.
** Power plants at planning level

TIRE INDUSTRY : Since 1955, the only tire factory in Ecuador has been located within the Macizo del Cajas Biosphere. It is currently one of the most important tire factories in the whole Andean region.

CERAMIC INDUSTRY: Inside of the Cajas Massif, there are a number of ceramics industries, as well as artisanal crafts and artistic production. For this reason the city of Cuenca is recognized as the ceramic capital of Ecuador. PHOTO ARTESA



PANAMA HATS:

Toquilla straw hats, or Panama Hats, were one of the main items of export in Ecuador during the first half of the 20th century. Within the Macizo del Cajas Biosphere Area there are important centres of production and distribution. To date, there are several companies that produce Panama hats, meeting exportation quality.

TOURISM:

Cajas Massif preserves a great diversity of cultural manifestations, ecosystems and populations with tourist attraction potential. National tourists visit the area mainly during the holidays and while foreigners come here throughout the year, though to a lesser extent.

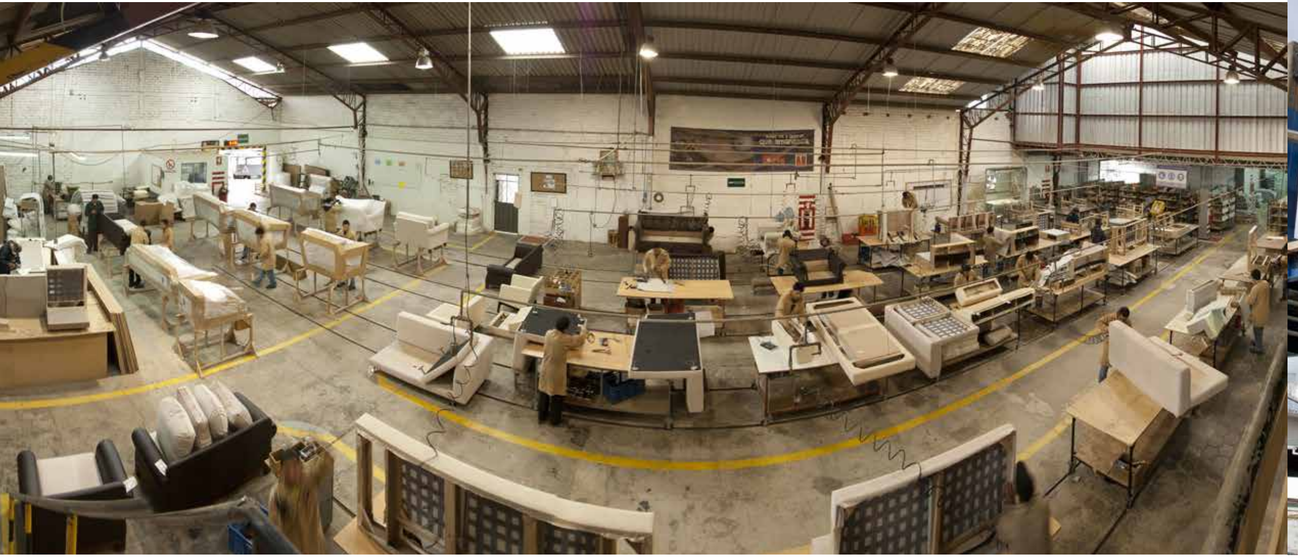
TELECOMMUNICATIONS: In the territory of the biosphere area, there exist diverse forms of telecommunication services provided by several private companies. However, a special case in innovation comes from a local supplier, the Municipal public company of Cuenca called ETAPA EP that developed free access to wireless Internet in certain public spaces.

DRINKING WATER: Access to safe drinking water is a critical factor for development. There are multiple types of provision for this service, from small and medium-sized community rural systems to large public companies in urban areas. Some of these have earned international prestige in the Macizo del Cajas Biosphere Area. Throughout the territory, there is the interest and effort to continuously improve the efficiency and quality of water supply systems.

SANITATION: In the Cajas Massif, there are several communities that have built sewage treatment systems before releasing them into the rivers. Cuenca is a pioneer city in Ecuador that implemented a complete treatment of natural cleansing methods through aerated artificial lagoons. These lagoons are located in the Ucubamba sector to protect the health of human populations downstream.

AGRICULTURE: Thanks to the variation of altitudes within the Massif (from 0 to 4480 meters), the territory encompasses a wide variety of agricultural production, from rice and cocoa along the coast to corn and potatoes in the highlands. These products are cultivated for subsistence, sale and provision to other areas of the country, and some are even exported.

WHITE LINE: In the city of Cuenca, one of the country's first electrical appliance plants opened and units and merchandise are distributed all over Ecuador and are exported.



FURNITURE: Large scale timber industry began in the region during the 1960's and became very important from 1992 to the present. According to the economic census, there are currently 482 factories in Cuenca that employ 3,017 workers and create 60 million dollars in revenue annually.

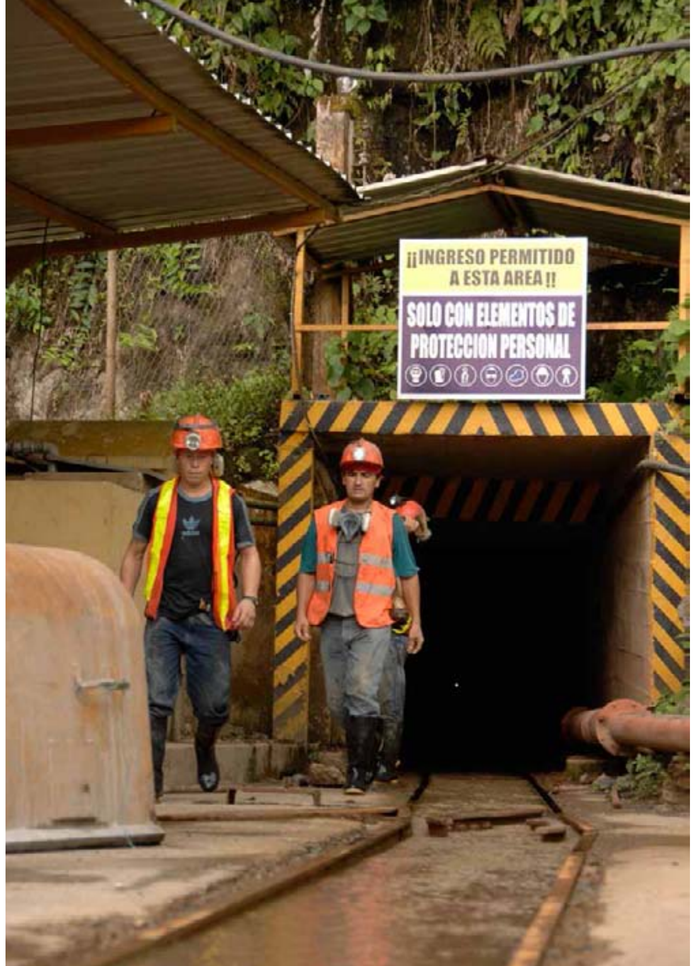
BUILDING: The villages and towns in the Cajas Massif are quite diverse. Inside the territory, there are thirteen different cities which are cantonal capitals. This has allowed the area to flourish with important economic activity in the construction sector (mainly in housing), industrial production, retail and public infrastructure.

TEXTILE: Textile production in Cuenca is one of its main industries and has become one of the most important job generators in southern Ecuador. Currently the manufacturing is equipped with the technology to produce high quality products while using environmentally friendly practices. There is also important artisanal textile production from small and medium-sized workshops.

JEWELRY & CRAFT WORK:

In the north-eastern part of the biosphere reserve, there is a long tradition of craftsmanship in the manufacture of jewellery with precious materials, especially gold and silver. Over time, the jewellery sector has become a notable category of production in this area.

BLACKSMITHING: Parts and components manufactured with iron fulfil different functions such as utilitarian, industrial, or decorative purposes. Within the biosphere, Las Herrerías, a traditional blacksmithing district in the city of Cuenca, is well-known for the manufacture of iron products.



MINING:

The Cajas Massif area is very rich in metallic and non-metallic minerals. One of the more traditional mining sectors is located in the Ponce Enriquez canton in the southwest quadrant of the biosphere. In the upper area of the Massif, the goldfields of Loma Larga and Rio Blanco are nationally strategic projects in the exploratory phase.

CEMENT INDUSTRY:

Due to its varied geology, the Cajas Massif contains many outcroppings of non-metallic minerals, such as limestone, which, since the mid-20th century, is used in the manufacture of cement in the Guapan parish of the Azogues canton.

PAPER INDUSTRY:

Since 1990, the paper products industry, milling and processing, has grown significantly. The main paper processing plant is located in the city of Cuenca and caters to domestic and international markets.

NATURE

NATURAL HERITAGE OF THE MACIZO DEL CAJAS BIOSPHERE

LOCATION OF THE IMAGES NATURAL HERITAGE OF THE MACIZO DEL CAJAS BIOSPHERE AREA

This chapter is a visual journey through the natural spaces of the Macizo del Cajas Biosphere.

1. Sea
2. Mangrove
3. Desert
4. Premontane
5. Urban
6. Montane
7. Paramo
8. Quinoa
9. Superparamo

MARINE ECOSYSTEM : The Cajas Massif extends to the Pacific Ocean to include 8 nautical miles. One mile borders the coast and forms part of the core zone. Here different species breed and fishing is restricted. However, it is allowed in the other seven miles. A panoramic view of the biosphere's coast allows us to see the breadth of these eight miles. In the background, one can see Puná island, which marks the limit of the marine area of the biosphere.

MANGROVE ECOSYSTEM: The intertidal zone of the biosphere's coastal region is naturally dominated by mangrove trees. Mangroves are coastal forest habitats where marine life dwells, mates and reproduces. Here the rivers meet the sea, producing brackish water, a mixture of freshwater and saltwater, and the direction of the current's flow changes throughout the day depending upon the tide. This ecosystem functions as a natural filter and a mechanism for controlling floods.

DESERT ECOSYSTEM : Topographic and weather conditions combined to form a desert in the Jubones River valley, which is located in the south-eastern part of the Cajas Massif. Here there are areas that receive less than 200 mm of rainfall a year. The ecosystem and species found here have adapted and evolved to resist a high degree of aridity.

HUMID PREMONTANE ECOSYSTEM: The western slope of the Cajas Massif is covered by rainforest, rich in flora and fauna, due to the condensation of humidity from the Pacific Ocean and its subsequent evaporation and transpiration over the coastal plains.

LANDSCAPE OF THE INTERANDEAN VALLEY:

Between the Western Cordillera and the Eastern Royal Cordillera, extends the Interandean Valley. Here the cities of Biblian, Azogues, Deleg, Cuenca and Giron are situated.

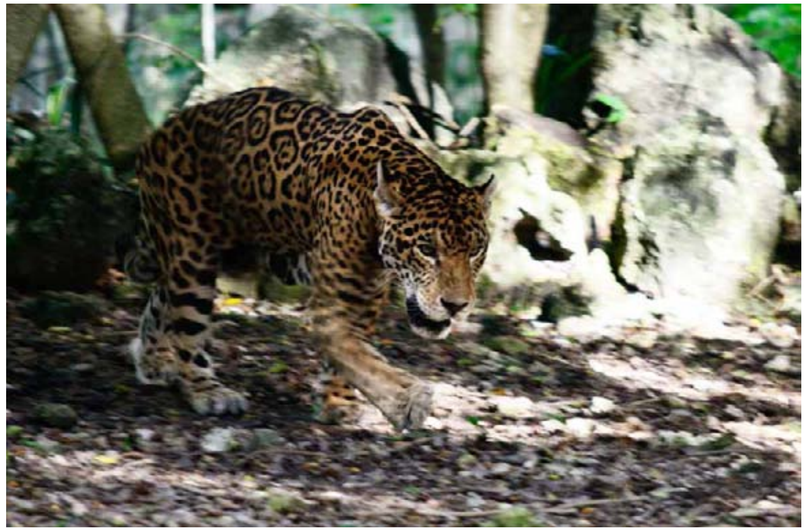
MONTANE FOREST ECOSYSTEM : In the north-eastern part of the Cajas Massif, in the basin of the Machangara River, montane forests create a rich ecosystem of flora and fauna that is of fundamental importance to water regulation in this area.

PARAMO ECOSYSTEM: The extensive paramos cover the central part of the Cajas Massif from North to South. They are mostly herbaceous and humid, dotted with hundreds of glacial lakes, wetlands, and deep soils which are fundamental for the production of water and for supporting a great abundance of biodiversity.

QUINOA FOREST: The Cajas Massif is the only place in the world where four species of Polylepis coexist, the so-called “quinoa” or “paper tree.” This species of tree grows within forest groves in combination with other plant species. The trees develop in a dispersed pattern within the paramo ecosystem which is found in the central zone of the biosphere reserve. They provide a habitat for many species of endemic birds such as the Cajas Hummingbird (Metallura baroni).

SUPERPARAMO: Intense winds, solar radiation, occasional ice formation and sudden frequent changes in temperature form an extreme habitat, known as the superparamo. The superparamo is a place where special flora and fauna have developed unique adaptations for survival. This ecosystem can be found in the higher elevations (reaching up to 4,480 meters) in the central part of the Cajas Massif.

BIRDS: Some fauna has evolved from the geographic isolation of the Cajas Massif, avian species such as the Cajas hummingbird (*Metallura baroni)* and the pale-headed bush finch (*Atlapetes pallidiceps*) are local endemic species whose habitat is exclusive to the biosphere. In addition to these, the Andean condor *(Vultur gryphus*), the red-faced parrot (*Hapalopsittaca pyrrhops*), carunculated caracara (*Caracara carunculatus*), rainbow starfrontlet (*Coeligena iris*), purple-throated solangel (*Heliangelus viola*), masked mountain-tanager (*Buthraupis wetmorei*) and approximately 500 more avian species can be found in the Cajas Massif



MAMMALS: In addition to the large and emblematic mammals like the spectacled bear (*Tremarctos ornatus*), the tapir (*Tapirus pinchaque*), the puma (*Puma concolor*), the ocelot (*Leopardus pardalis*), the howler monkey of the coast (*Alouatta palliata*) and the common dolphin (*Delphinus delphis*), tiny animals like the Cajas water mouse (*Chibchanomys orcesi*) and the Tate's shrew opossum (*Caenoelestes tatei*), inhabit the biosphere area. These small mammals are yet more endemic species that only exist in the Cajas Massif.

AMPHIBIANS AND REPTILES :

Los anfibios como el *Atelopus balios* en la costa, *Atelopus nanay* y *Atelopus exiguus* en los páramos, junto a al menos otras cuatro especies *Eleutherodactylus*, han encontrado refugio en la Biosfera Macizo del Cajas. Entre las muchas especies de reptiles se destacan el gran Cocodrilo americano (*Crocodylus acutus*) y una serpiente endémica (*Liophis*).

INSECTS: A wide range of insects can be found in the Cajas Massif due to the varying altitudes, habitat diversity and microclimates found in the biosphere. There are insect species specific to each type of forest and paramo.

FLORA: The paramo of the Cajas Massif shelters a large number of endemic plant species, especially since the flora has had to adapt to extreme conditions of high solar radiation, cold, and even freezing at certain times of the year. The few remaining premontane wet forests along the coast still display a wide range of biodiversity and unknown species to date, such as the genus Ecuadendron, new to science, which was recently discovered in the biosphere.

CULTURE

SOCIAL AND CULTURAL ASPECTS OF THE MACIZO DEL CAJAS BIOSPHERE AREA

LOCATION OF THE IMAGES OF CULTURAL AND SOCIAL ASPECTS OF THE BIOSPHERE AREA

This chapter is a visual journey visting some of the cultural highlights of the Macizo del Cajas biosphere area.

1. Pumapungo
2. Cojitambo
3. Qapaqñan
4. Cañaris
5. Shuar
6. Chola Cuencana
7. Mestizaje
8. Intiraymi
9. Panama Hats
10. Cuenca World Cultural Heritage Site
11. Azogues National Heritage Site
12. Giron National Heritage Site
13. Coastal Gastronomy
14. Crabs
15. Pampamesa
16. Hornado
17. Fried trout
18. Guinea Pig
19. The Passing of the Child
20. Carnival
21. Corpus Christi
22. Ecuavoley - Volleyball
23. Family life
24. Urban Life
25. Urban Space

PUMAPUNGO: East of the Cajas Massif holds important testimony from pre-Columbian cultures. One such case is the ancient ruins of the Incan city Tomebamba or Tumipamba, also known as Guapondelig in pre-Incan times. Remnants of this ancient city can be seen today in the district of Pumapungo, now an archaeological site and museum in the city of Cuenca.

COJITAMBO: The archaeological site of Cojitambo, located on top of the hill that bears its same name, is found near Azogues, Cañar province, in the northern part of the Cajas Massif. It is comprised of a significant collection of remains from the Cañari and Inca peoples who formerly settled in this territory.

QAPAQÑAN:

The Royal Andean Trail, popularly known as the Inca Trail, crosses the Cajas Massif running in a north-south direction. One of its branches, called Inga Ñan, served as the east-west connection to the coast. It crosses through strategically important summits in the Paredones sector from where one can view the Andean peaks to the east and the coastal plain to the west.

CAÑARIS:

The ancestral presence of the Cañari culture is found in the northern region of the biosphere's territory and corresponds to the current province of Cañar. Their culture has survived the passing of time and many social transformations since long before the Incas inhabited the present country of Ecuador.

SHUAR:

Shuar people are originally from the Ecuadorian Amazon. More than 100 years ago, a small group of Shuar left their land, crossed the sierra and settled in the Naranjal canton which is located in the foothills of the Cajas Massif. To this day, they keep their beliefs, customs, and language alive.

CHOLA CUENCANA: Cholas are women of the mestizo population who live in urban and rural areas, found throughout the biosphere in central, north-eastern and beyond its boundaries towards eastern cantons like Paute or Gualaceo. They wear traditional dress and are called cholas, a term which is accompanied by the name of their town of origin, for example, “chola cuencana” or “chola gualaceña.”

MISCEGENATION: According to the 2010 population census, 72% of Ecuadorians racially identify as mestizo or mestiza, meaning mixed race. This trend is the same for the Cajas Massif Biosphere Area, despite the tremendous range of ethnic and cultural diversity in the area.

INTIRAYMI:

Intiraymi is an ancient Andean ceremony in honour of the Inti or "Sun" in the Quechua language. Intiraymi translates to mean "Festival of the Sun", and is held in different locations throughout the biosphere area between the 20th and 23rd of June, to celebrate the summer solstice.

PANAMA HATS:

Panama straw hats are handcrafted using a special Ecuadorian knitting technique which was declared as Intangible Cultural Heritage by UNESCO in December 2012. The raw material for the toquilla straw hat comes from a palm called Carludovica palmata, or the toquilla palm. Internationally known as the "Panama Hat", they are actually of Ecuadorian origin and are manufactured in the Ecuadorian provinces of Manabí, Azuay and Cañar.

CUENCA CULTURAL HERITAGE OF HUMANITY:

Santa Ana de los Cuatro Ríos de Cuenca is a city officially founded in the former Spanish colony in 1557. Today, it is the third largest city in Ecuador. In 1999, its historic centre was declared an UNESCO World Heritage Site, thanks to its architectural significance and urban structure.

AZOGUES NATIONAL HERITAGE:

The city of San Francisco de Peleusi de Azogues, or simply Azogues, is located in the north-eastern part of the Cajas Massif. The city's layout, delineated by the historic district and protected areas, was declared as National Cultural and Urban Heritage of Ecuador in 2000.

GIRON NATIONAL HERITAGE: In 2006, the town of Giron was nationally declared an Ecuadorian Cultural Heritage site due to the 181 historic buildings inventoried in the city's centre, surrounding areas and the San Vicente district.

COASTAL GASTRONOMY:

The extensive Pacific region of the biosphere area–due to its rivers, mangroves and ocean–offers a generous variety of seafood. A typical dish, la bandeja de mariscos, or shellfish platter is a delight for locals and visitors.

CRABS: Crabs are highly prized culinary delicacies in the coastal region. They can be enjoyed in a tasty seafood dish, known as “cangrejada” (crab boil) or “lomo de cangrejo” where the meat is removed and prepared in a dish that is popular in the fishing village 6th of July, located in the coastal zone of the biosphere.

PAMPAMESA: Is the name for a communal way of sharing food and usually takes place in open spaces. Each guest brings a dish of traditional cuisine such as potatoes, cuy (roasted guinea pig), and mote (Andean corn) among others. This practice is most common in the Andean region of the Macizo del Cajas biosphere

"HORNADO": Is a traditional way of preparing pork in the Andean region. The whole animal is baked and after, the skin is torched to produce the coveted and crispy cascaritas (pork rind). Other outstanding delicacies such as stew, fried pork and morcilla (blood sausage), among others are prepared with the meat.

FRIED TROUT : Trout was introduced to the Andean region of the Cajas Massif in the middle of the 20th century. Since then, trout, especially whole, seasoned and fried, has turned into one of the culinary icons of the area.

GUINEA PIG: Is a native rodent of the Andes mountains and was domesticated in pre-Incan times. Even now, cuy, or guinea pig, is an important part of the Andean culture and native cuisine, especially during national holidays and times of celebration.

EL PASE DEL NIÑO:

Is a popular manifestation of Catholic origin which takes place in various towns in the biosphere's Andean region during the months of December and January. The most massive and widespread festivity is the "Passing of the Child" in the city of Cuenca on December 24th. It is a great pilgrimage which brings together myriad children dressed up as different Biblical characters from the birth of Jesus Christ as well as modern characters from contemporary culture.

CARNIVAL: Is a celebration that takes place throughout the cities and towns located within the biosphere area. Traditionally, people “play” carnival by throwing water at either people they know or even casual passers-by as pranks. In recent years, alternative forms of the celebration were introduced, such as parades and concerts. A colourful mixture of spray foam and starch, especially sold for Carnival, is thrown at people as they walk by.

CORPUS CHRISTI: Or Septenario is a Christian celebration that lasts seven days. In this festivity, the devotion to the Holy Sacrament is demonstrated in daily processions and special sweets for sale. The festivity takes place at night and is highlighted by the use of pyrotechnics. It is carried out in different ways throughout the Andean region of the biosphere.

ECUAVOLEY - VOLLEYBALL: Ecuavoley is a form of volleyball, created in Ecuador, as a neighbourhood sport. It is widespread throughout the biosphere, though it is also played throughout the country. Due to migration, this sport has gone beyond national borders.

FAMILY LIFE: In the urban areas located within the borders of the Cajas Massif, there are many green spaces dedicated to promoting family leisure, recreation and entertainment. These sites have the perfect infrastructure and are a major contribution to promote productive use of leisure time in urban areas.

PROFESSIONAL URBAN LIFE : Various professional activities at micro, small, medium and large companies take place within the urban centres of the biosphere. For example, people work in agricultural production, manufacturing, service provisions, hydroelectric generation among other industries.

CONTEMPORARY URBAN SPACE:

Lush mountains and natural seascapes are not the only structures that stand in the Cajas Massif. Throughout the area, contemporary construction and design in private homes, shops, and condominiums showcase contemporary architectural style.

COMMERCIAL ACTIVITY:

There is intense commercial activity in the villages and towns of the coastal area of the biosphere and it is mainly focused around regionally manufactured products. A major feature of the area is its rich fruit production. It is very common to find a wide range of fresh fruit products along the coastal highway.

URBAN SETTLEMENTS OF THE COAST:

One of the predominant features of the coastal region's urban settlements is that they are situated in the middle of lush landscapes. These landscapes provide diverse and intense economic productivity. One of the flagship products of a productive area in the coastal region is the national cocoa "Fino de Aroma Arriba Ecuador", which is one of the most appreciated varieties in the world.











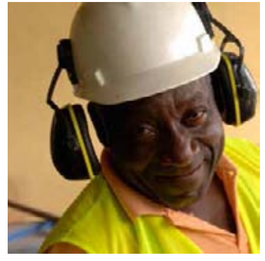


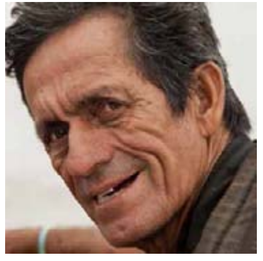










EXPERIENCES

EXPERIENCES TOWARD SUSTAINABLE DEVELOPMENT IN THE MACIZO DEL CAJAS BIOSPHERE AREA

LOCATION OF EXPERIENCES TOWARDS SUSTAINABLE DEVELOPMENT IN THE MACIZO DEL CAJAS BIOSPHERE

In the biosphere, there are public and private activities which, by their nature, can be considered as management models that can be replicated elsewhere in the territory. These experiences are:

Support to conservation: refers to practices that support conservation, recovery and protection of natural ecosystems.

Support to sustainable development: the principal aim is the use of natural, cultural and economic resources in a way that they will not be depleted, but maintained for future generations.

Logistical support: Refers to its utilization in education, demonstration, replication or research.
This chapter offers a visual tour of various experiences towards sustainable development in the Cajas Massif.

1. Crabs
2. Cocoa
3. Management of Protected Areas
4. Water monitoring
5. Waste water treatment
6. Alliance for the management of water resources
7. Banana
8. Solid waste management
9. Collection of oils and batteries
10. Sustainable livestock
11. Environmental promoters
12. Hydroelectric energy
13. Alpaca ranching
14. Combined environmental services
15. Innovative practices

SUSTAINABLE PRODUCTIVITY IN THE MANGROVES

SUSTAINABLE PRODUCTIVITY IN THE MANGROVES OF 6 DE JULIO

The Crab Association in the fishing village called 6 de Julio was created by its inhabitants in order to protect the mangroves, and to find environmentally sustainable income sources. The association works with 1,926 hectares of mangrove, granted by the Ministry of Environment.

The association dictates certain rules that each member must comply with in order to ensure conservation and sustainable production in crab fishing. Additionally, they have begun the reforestation of 40 hectares of mangrove.

After the stage of initial organization, the association aims to find technical and financial support for the production and sale of crab meat.

- **Beneficiaries:** 750 people.

Responsible institution: Association of Crab Fishers 6 de Julio.

- **Institutions involved:**
  - Ministry of the Environment
  - USAID
  - Ecological Foundation Jambelí
- **Location:** 37 km south of the city of Naranjal on the road between Machala - Naranjal - Guayaquil .
- **Beginning of the Practice:** 2000.

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH IS SUPPORTED BY THIS PRACTICE

Objective 4: ensure the rights of nature and promote a healthy and sustainable environment.

Objetivo 6: Ensuring stable, fair and decent work in its diverse forms.

NATIONALLY PRODUCED ORGANIC COCOA

CULTIVATION OF ORGANIC COCOA "ARRIBA NACIONAL FINO DE AROMA"

Production of this high quality chocolate is intended to drive cultivation based processes in a sustainable manner. The aim is that these efforts culminate in a transformation of the preparation and industrialization of primary, intermediate and finished cocoa products.

The objective is to improve living conditions for the women and men in the Azuay cocoa corridor, and promote equity, allowing the cocoa collective to benefit directly from the value chain in order to grow from a primary to a secondary agro-export model.

- **Responsible institution:**
  Provincial Government of Azuay.

- **Associated Institutions:**
  - National Autonomous Institute for Agrarian Investigations (INIAP)
  - Artisanal Network of Cocoa Producers from Azuay (REDCAZ).

- **Location:**
  Azuay Province with these cantons: Cuenca, Pucará, Camilo Ponce Enríquez. Access is reached the Machala – Naranjal – Guayaquil highway.

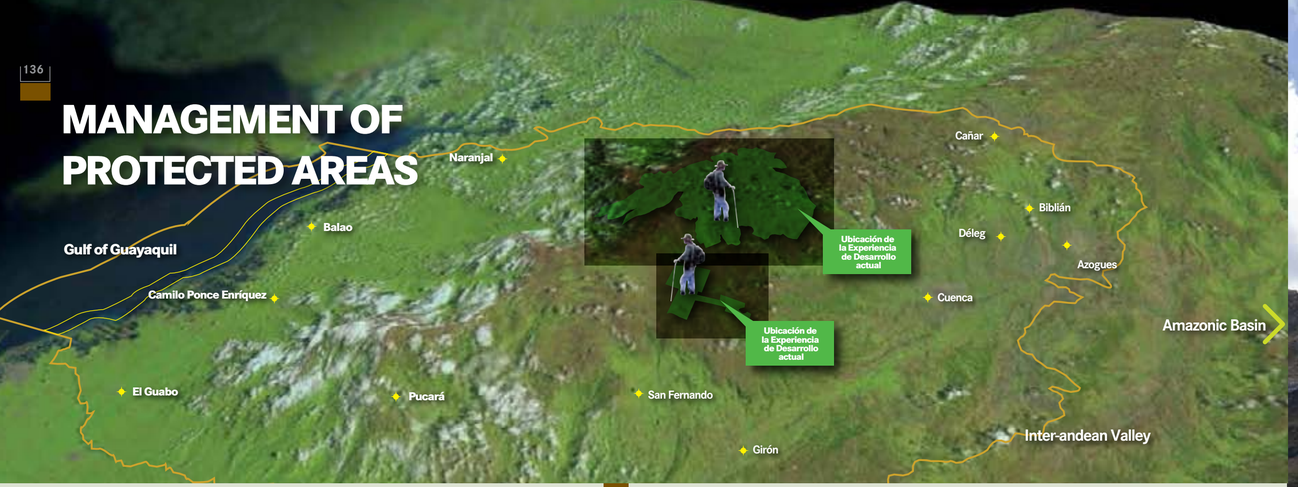
- **Beginning of the practice:**
  2010.

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING ARE SUPPORTED BY THIS SUSTAINABLE PRACTICE

Objective 4: Ensure the rights of nature and promoting a healthy and sustainable environment

Objective 6: Ensure stable, fair and decent work in its diversity of forms.

MANAGEMENT OF PROTECTED AREAS



ADMINISTRATION OF NATIONALLY PROTECTED HERITAGE AREAS

Cajas National Park and the Quimsacocha National Recreation Area are managed by the municipal government of Cuenca through its watershed management program at ETAPA EP, a municipal company.

They are the only national protected areas that belong to the country's declared national heritage but whose management is delegated by local governmental bodies. The results of this model have served as a reference for innovation in natural resource management. Decentralization was authorized in part by an agreement signed in 2000 between the federal Ecuadorian government and the municipality of Cuenca and was renewed again in 2010.

These Protected Areas generate water for close to 500,000 inhabitants in the canton of Cuenca, which is used for human consumption, agricultural irrigation, pasturelands, industrial purposes as well as the generation of hydroelectric energy.

- **Beneficiaries:**
  500,000 inhabitants
- **Managing institution:**
  - Municipality of Cuenca, ETAPA EP
- **Institutions involved:**
  - Ministry of the Environment.
- **Location:**
  - Cajas National Park: located at 33 km to the west of the city of Cuenca, reached by the road linking Cuenca –Molleturo – El Empalme.
  - Quimsachocha: Located to the southwest of Cuenca with access through the city of Giron
- **Beginning of the Practice:**
  2000.

* OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING THAT ARE SUPPORTED BY THIS PRACTICE:

Objetive 3: Improve life quality of the population.

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

HYDROLOGICAL MONITORING

PROGRAMA DE MONITOREO DE RECURSOS HÍDRICOS EN EL CANTÓN CUENCA

Hydrological monitoring aims to assess the state of conservation of water resources, in quality and quantity, within the canton of Cuenca and use the data for long term management and conservation of resources in the region.

There are two components: monitoring of the ecological integrity of rivers and lakes; and hydrological and climate monitoring with the purpose to:

- Evaluate the benefits of interception and river water purification facilities.
- Monitor the quality of water and alert when there are issues with pollution and contamination.
- Alert if pollution from industrial and productive activities occurs.
- Obtain management indicators within the protected areas of ETAPA EP.
- Record pollution in the lakes of the watersheds that supply water to the city.
- Determine the water balance in the watersheds that supply water to the Cuenca drinking water treatment plants.
- Alert when water levels are extremely high or low
- Establish performance indicators in the watersheds.
- Use the information for the design of potable drinking water plants, distribution of water supply networks and wastewater interceptors

- **Beneficiaries:**
  505,585 inhabitants.

Institution Responsible:
- Municipality of Cuenca.
- ETAPA - EP

- **Location:**
  - 83 stations for monitoring water quality (12 of them in Cajas National Park).
  - 75 stations of hydrometeorological monitoring, (limnimetric, meteorological and pluviometric stations, 18 in Cajas National Park).

- **Beginning of the practice:**
  - 1991 Water quality monitoring of rivers in the area.
  - 1998 Implementation of the hydrometeorological network
  - 2010 Incorporation of the water resources monitoring program in Cajas National Park.

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH IS SUPPORTED BY THIS PRACTICE

Objetive 3: Improve life quality of the population.

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

WASTEWATER TREATMENT

SANITARY WASTEWATER TREATMENT

In 1983, ETAPA initiated the planning process for water quality restoration of the four rivers that run through Cuenca. After the study and diagnosis was concluded in the first stage, a network of marginal interceptors and the waste water treatment plant (WWTP) of Ucubamba were built.
The Ucubamba plant is one of the country's most important and is one of the most important of its kind in all of South America.

The WWTP started to operate at the end of 1999 and consisted of stabilization ponds in two series, each with a primary aerated lagoon, and optional secondary and tertiary maturing lagoons with a surface area of 45 hectares and treatment capacity of 1860 litres per second.

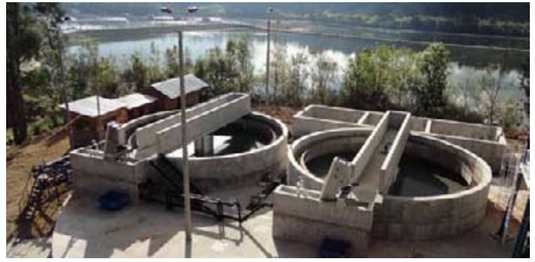
Due to Cuenca's population growth, ETAPA EP is presently planning the implementation of a new wastewater treatment plant, within the same treatment system model. The project launch is set for the year 2030 and will be a joint sanitation system (WWTP Ucubamba and WWTP Guangarcucho) with an expected total capacity of 3060 litres per second.

The WWTP Guangarcucho, in contrast to Ucubamba, will be a compact system, and will be the first regional wastewater treatment plant. In addition, the sewage from adjacent cities like Azogues will be treated, expanding the commitment to a pollution free environment in the Interandean valley.

- **Beneficiaries:**
  795 000 inhabitants.
- **Responsible Institution:**
  - Municipality of Cuenca
  - ETAPA - EP.
- **Involved institutions:**
  - Water Systems.
  - Parishes.
  - Private enterprises
- **Beginning of the practice:**
  November 1999.
- **Improvement:**
  December 2012 (WWTP Ucubamba).
  Projection for the beginning of WWTP Guangarcucho: 2015.

OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH IS SUPPORTED BY THIS PRACTICE:

Objetive 3: : Improve residents' quality of life.
Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.



PARTNERSHIPS FOR THE MANAGEMENT OF WATER RESOURCES

MODELS OF INSTITUTIONAL PARTNERSHIPS FOR THE MANAGEMENT OF WATER RESOURCES

The need to manage and preserve water resources from an ecological viewpoint, beyond political and administrative boundaries, was the impetus for constructing the Public Consortium of the Rio Jubones watershed. It consists of 37 autonomous local governments at different levels. The north-western part of the Jubones basin overlaps and is integrated into the biosphere of the Cajas Massif.

Since 2008, a group of public companies, with the support of foreign and national NGOs and a university, formed the FONAPA Trust for the conservation of water resources and the ecology of the Paute River watershed. The western part of the river basin also integrates into the Macizo del Cajas biosphere.

Both initiatives represent approaches and creative proposals driven by local agents in search of tools that encourage effective management and conservation of water resources through mutual cooperation.

- **Beneficiaries:**
  Approximately 500,000 inhabitants.

- **Responsible Institution:**
  - Public Consortium for the Río Jubones Watershed (CCRJ).
  - The water conservation trust fund for the Paute River Watershed (FONAPA).

- **Institutions involved:**
  - CCRJ: 37 local governments
  - FONAPA: ETAPA - EP, CELEC EP, ELECAUSTRO S.A., University of Cuenca, EMAPAL EP, The Nature Conservancy and Cordillera Tropical Foundation

Location:
- CCRJ: Access from Cuenca, using the roads Cuenca - Giron – Pasaje and Cuenca – Loja
  FONAPA: From Cuenca, using the road Cuenca – Paute – Sevilla de Oro

Beginning of the practice:
- 2000 CCRJ / 2008 FONAPA.

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS :

Objetive 3: Improve life quality of the population.

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

EXPORT OF ORGANIC BANANAS

ORGANIC BANANA PRODUCTION FOR EXPORT WITH CERTIFICATION "FAIR TRADE"

The Association of Small Banana Growers of El Guabo (ASOGUABO) has organized better access to international markets with regard to quotas for shipments and prices, which simultaneously encourage organic crop management. In this sense, it has worked to certify bananas by Fair Trade and Fair Trade Labelling Organization (FLO) seals, as well as some organic producers by other international certifiers. ASOGUABO is an exporter of approximately 35,000 cases per week, of which 7,000 are organic.

Organic bananas are planted in the foothills of the mountains and in spaces shared by fruit trees and cocoa in an agroforestry setup.

- **Beneficiaries:**
  351 direct partners.
- **Responsible institution:**
  - ASOGUABO
- **Involved institutions:**
  - 15 local communities in the provinces of El Oro, Azuay an Guayas
- **Location:**
  Sector El Paraíso, El Guabo canton, El Oro Province.
- **Beginning of the practice:**
  1997

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS GOOD PRACTICE :

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

Objetive 6: Ensure stable, fair and decent work in their diversity of forms


oké
oké
oké


FINCA LA CAIMITO

SOLID WASTE

MANAGEMENT OF LANDFILLS AND SOLID WASTE

After closing the landfill in the rural parish of El Valle, the municipality of Cuenca decided to create adequate management of solid waste and debris generated in the city in order to minimize environmental, social and economic impacts. They decided to build and operate the Pichacay Landfill with a projected lifespan of 20 years.

The area designated for filling covers 123 hectares and at end of the first stage will have received 800,000 tons of waste. The project is currently in its second phase, with six years remaining before its capacity is reached.

The landfill receives approximately 400 tons of waste per day including waste from rural parishes within the canton of Cuenca and other municipalities (Azuay province), and the cantons of Cañar and El Tambo (Cañar province).

Similar initiatives for solid waste management by well-organized landfills have been implemented in recent years and associations and municipalities were formed to do so. One landfill for example, is located in Santa Isabel where a public company works together with the town of Giron for solid waste management

- **Responsible Institution:**
  491,476 inhabitants.

- **Responsible Institution:**
  - Municipality of Cuenca.

- **Instituon Involved:**
  - Parishes
  - Neighbouring municipalities
  - Private enterprises

- **Location:**
  Canton Cuenca

- **Beginning of the practice:**
  2001.

***OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE :**

Objetive 3: Improve residents' quality of life.

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

RECOLLECTION OF BATTERIES AND OIL

PROGRAM FOR COLLECTION OF USED BATTERIES AND OIL

One litre of used vehicle lubricant can contaminate one million litres of water, about the quantity that fifty people consume in one year.

ETAPA-EP created this program for used battery and oil collection out of the need to control and protect the environment (water, soil and air) in the canton of Cuenca.

In 2013, the used oil collection program had received nearly 16,000 cubic meters, reaching a volume of about 160 cubic meters per month. In other words, ETAPA-EP has prevented the pollution of more than 15 billion cubic metres of water to date.

ETAPA-EP sought to implement environmental projects to reuse old batteries or at least place them in suitable spaces where they will not contaminate natural ecosystems.

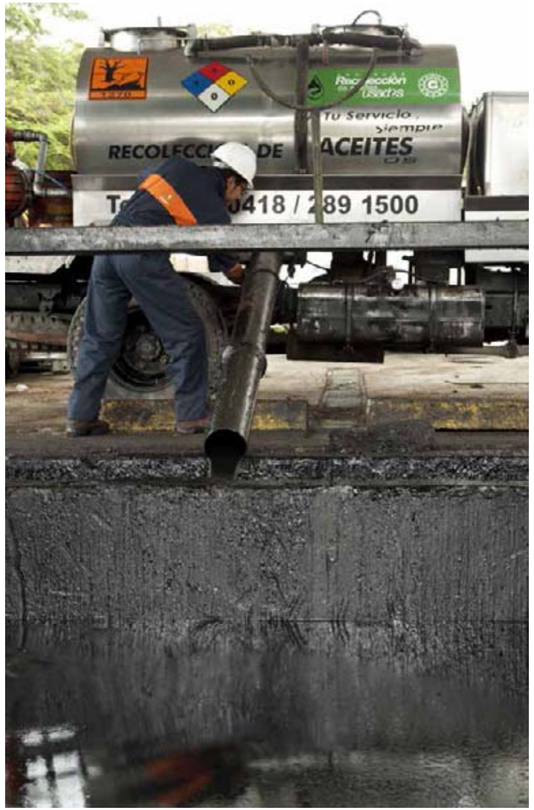
Accordingly, the used battery management program was born in 2003. The coverage of the program currently extends to the urban sector of Cuenca and part of its rural sectors. Since the start of the campaign to 2012, around 1,680,000 used batteries had been collected.

- **Beneficiaries:**
  504.888 habitantes.
- **Responsible institution:**
  - Municipality of Cuenca
  - ETAPA - EP
  - EMAC - EP
- **Involved Institution:**
  - Mechanics workshops, carwashes, lubrication and facilities generating hazardous liquid waste.
  - General public.
- **Location:**
  City of Cuenca (Azuay Province).
- **Beginning of the practice:**
  1998 (oil)
  2003 (batteries).

***OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE :**

Objetive 3: Improve life quality of the population.

Objetivo 4: Ensure the rights of nature and promoting a healthy and sustainable environment.




DEPOSITA
AQUÍ
TUS PILAS
USADAS
ETAPA
PROGRAMA DE
RECOLECCIÓN
PILAS
USADAS

SUSTAINABLE LIVESTOCK RAISING

STRENGTHENING OF SUSTAINABLE PRODUCTION IN THE DAIRY INDUSTRY

Charon Ventana is an indigenous community, known for its strong and supportive, community-based organization the Association of Agricultural Workers "3rd of May" which was legally created in 1982.

The main economic activity is cattle ranching, which in the last decade has resulted in significant loss of forests and natural chaparral for cattle grazing.

To stop and remedy these impacts, the community organized to come up with a proposal to continue with cattle production, but in an environmentally friendly way. The community of Charon Ventanas now has a collection centre for high quality raw milk with a fat content exceeding 3.5%. It also has a processing plant for balanced meals leading to a production capacity of 659 quintals per month.

To complete the production chain, the community signed an agreement with the dairy company San Antonio, which together with development organizations such as the FONAPA trust and the German Cooperation, co-financed the improvement of production processes in the community.

As a result, the dairy company buys the milk produced by Charon Ventanas at a preferential price, recognizing the effort for sustainable production process.

- **Beneficiaries:**
  215 people.

- **Responsible institution:**
  - The 3rd of May Farmworkers Association

- **Involved Institution:**
  - **Gualay Dairy Association**
  - **FONAPA**
  - **GIZ**
  - **San Antonio Dairy products**

- **Location:**
  Community Charón Ventanas, located 20 km north of the city of Azogues (Cañar Province).

- **Beginning of the practice:**
  2010.

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE :

Objetive 1: Support equality, cohesion and social and territorial integration in diversity.

Objetiv3 6: Ensure stable, fair and decent work in their diversity of forms.

ENVIRONMENTAL PROMOTERS

MICRO-ENTERPRISE ENVIRONMENTAL PROMOTERS OF THE PAUTE RIVER WATERSHED

Due to the need to manage and conserve water resources, institutions such as: the Ranger's Association of Microenterprises for Nature Conservation, CELEC EP - HidroPaute and the Cordillera Tropical Foundation, ETAPA EP, EMAPAL EP, and the FONAPA Trust, came together and signed two separate agreements to carry out the Program of Environmental Community Promoters. This program orchestrates and takes the necessary cooperative action to better protect the high altitude Andean forests and paramos. It therefore contributes to the output of high quality water at a stable volume within the Paute River watershed.

At the moment there are 15 environmental promoters in strategic locations: in the upper part of the Paute basin with one promoter in the Cancan sector; two in Culebrillas in the middle part of the basin with a promoter in the protected forest of Cubilán and another in the Pugioloma sector; and lastly in the lower basin with 10 promoters in the southern part of Sangay National Park.

- **Beneficiaries:**
  Approximately 42,300 inhabitants

- **Responsible Institution:**
  - Microenterprise Association of Rangers for Nature Conservation

- **Involved institutions:**
  - Water conservation trust for the Paute River Watershed (FONAPA)
  - ETAPA EP
  - CELEC EP
  - EMAPAL EP
  - The Nature Conservancy.

- **Location:**
  From the city of Azogues using the road to Mazar, 90 minutes heading toward Rivera parish.

- **Beginning of the practice:**
  2009

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE :

Objetive 3: Improve quality of life for inhabitants.

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

HYDROELECTRIC ENERGY

GENERATION OF RENEWABLE ENERGY, HYDROELECTRIC SECTOR

In the higher altitude parts of the biosphere, there are the origins of the water sources that generate much of the hydroelectric power for the country. At present, approximately 52% of the electrical energy generated in Ecuador is from renewable sources. In recent years, the government of Ecuador has invested large sums of money toward changing the energy matrix to 90% from renewable sources.

The Macizo del Cajas biosphere contains two hydroelectric power projects within its territory. The Machángara hydroelectric complex, located north of Cuenca, generates 38.4 MW.

The second one, located toward the Pacific Ocean, was recently constructed in Ocaña in 2012 with a 26 MW output. In the basin of the Jubones River, another plant is under construction: the hydroelectric project Minas - San Francisco located southwest of Azuay Province. It is projected to generate 270 MW, when in operation.

East of the biosphere area, there are several integrated hydroelectric projects along the Paute River, consisting of the Mazar Dam and power plant with a 170 MW output, and the Daniel Palacios Dam and the Molinos power plant with 1100 MW output.

Further downstream on the Paute River a new project is under construction at Sopladora, it will generate 487 MW when operable. Moreover, there are future plans for a dam and power plant at Cardenillo with an expected output of 593 MW. By expanding hydroelectric power in Ecuador, the country embraces the correct use of water as a main source of renewable energy

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE

Objetive 3: Improve residents' quality of life.

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment

• **Hydroelectric Project**	Complex Machángara	Central Ocaña	Central Minas San Francisco	Complex Paute Integral
• **Generation**	38,4 MW	26 MW	Projected 270 MW	Today 1270 MW Projected 2350 MW
• **Responsible Institution**	Elecaustro S. A.	Elecaustro S. A.	CELEC Business Unity EnerJubones	CELEC Business Unity HidroPaute
• **Location**	Watershed of the Machángara 15 km northeast of the city of Cuenca	Parish Ducur, Ocaña Creek, in the Northwest of the town of Cañar	Southern limit of the province of Azuay, to the southwest of Santa Isabel	Downstream from the western foothills of the biosphere in the Basin of the Paute River
• **Year in which began the practice**	1956	2012	Previewed for 2016	Daniel Palacios 1983 Mazar 2010 Project Sopladora 2016 Cardenillo Study concluded
• **Beneficiaries:**	ALL USERS OF THE ELECTRIC SYSTEM OF ECUADOR			

BREEDING OF SOUTH AMERICAN CAMELIDS

CONSERVATION OF THE PARAMO BY BREEDING OF SOUTH AMERICAN CAMELIDS TO ACHIEVE SUSTAINABLE PRODUCTIVITY

Since the 1980s, alpacas have been reintroduced to areas in Cañar and Azuay provinces to improve the livelihoods of the rural population by replacing the business of cattle ranching in the paramos.

One of the most successful reintroductions is that of Cebadaloma in the upper part of the parish of Jerusalén in the canton Biblián. The herd is in good condition with a high breeding rate that has added 40 animals to the stock of the Association Cubilán.

Starting in 2013, the local community is receiving training and technical assistance on how to improve alpaca management, management of the herd, reproduction and genetics, shearing, selection and processing of fibre, as well as in craft production through the modernization of spinning yarn, which improves the quality of the final product. Additionally, important is how they have strengthened the organization in relation to the sale of products and marketing by creating a network of producers in order to receive higher prices in regional, national and international markets.

- **Beneficiaries:**
  150 direct and indirect beneficiaries

Responsible Institution:
- Farm Workers Association Tushín Burgay

- **Involved Institutions:**
  Parish of Jerusalén (canton Biblián),
  - Parish of Chorocopte (canton Cañar)
  - Provincial Government of Cañar.
  - Program for small Donations PPD (GEF – UN).
  - Ministry of Environment MAE.
  - German Cooperation – GIZ

- **Location:**
  From Biblián, head northwest on a dirt road which passes Nazón and Jerusalén, approximately 40 minutes.

- **Beginning of the practice:**
  2002.

*OBJECTIVES OF THE NATIONAL PLAN OF GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE

Objetive 1: Support equality, cohesion and social and territorial integration in diversity

Objetive 3: Improve people's quality of life.

COMBINED ENVIRONMENTAL SERVICES

GENERATION OF COMBINED SERVICES THROUGH COORDINATED MANAGEMENT IN THE MACHÁNGARA WATERSHED

The Machángara River watershed is located in the upper area of the Paute River basin. It occupies an area of 32,500 hectares, and is located in the parishes of Checa, Chiquintad, Sinincay, Sayausi, Octavio Cordero, Ricaurte, Sidcay, Jerusalén, Nazón, Turupamba, Cojitambo, Deleg, Javier Loyola and Solano. It has a population of approximately 69,000 inhabitants.

The conservation of the ecological wealth and the economic dimension of a watershed is essential, given the existing biodiversity in the Machangara – Tomebamba protected forest. This area covers the upper and middle parts of the watershed and is important for water regulation, and protection of the water source, the catchment area is known for its beautiful scenery, making ecological stability important. The Machángara River watershed is considered an important living space.

In this watershed, multiple uses of water are coordinated amongst several institutions who generate services, making it one of most important watersheds in the country because of its management model. Generated services include: conservation of ecosystems and biodiversity, generating hydroelectric power, provisions for potable drinking water, irrigation and industry.

- **Beneficiaries:**
  69,000 inhabitants.

- **Responsible institution:**
  - Council of the Machángara River Basin.

- **Involved institutions:**
  Municipality of Cuenca - ETAPA EP
  - ELECAUSTRO S.A.
  - University of Cuenca
  - National Secretary for Water SENAGUA
  - Ministry of Environment
  - Subsecretary of Irrigation and Drainage, Zone 6
  - Provincial Government of Azuay
  - Machángara Irrigation System Board of users

- **Location:**
  - 15 minutes north of Cuenca, using the road to Ochoa León

- **Beginning of the practice:**
  1998

*OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE :

Objetive 3: Improve residents' quality of life .
Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

COMMUNITY-BASED ECOTOURISM

COMMUNITY-BASED ECOTOURISM, OPPORTUNITY AS A PRODUCTIVE ALTERNATIVE.

The biosphere area is very important for tourist development due to its spectacular landscapes and biological and cultural diversity but the focus is placed on being a tool to create awareness among local communities and visitors.

In rural areas, more and more community-based tourism projects continue to arise. The most impressive one is the Shuar run thermal pools in the Balao Chico area of the Naranjal canton, where people can also visit the local waterfalls.

A special cultural attraction is the indigenous rituals based on the knowledge of Shuar cosmology. An interesting aspect is that the Shuar community is marketing its offerings directly without the use of intermediary agencies.

- **Beneficiaries:**
  Approximately 100 people.
- **Responsible Institution:**
  - Shuar community of Balao Chico.
- **Location:**
  Balao Chico, Naranjal Canton .
- **Beginning of the practice:**
  1977.

***OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE :**

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment.

Objetive 6: Ensure stable, fair and decent work in their diverse forms.

RESCUE OF AVIFAUNA

PRIVATE RESCUE AND CONSERVATION OF FAUNA PALE-HEADED BRUSH FINCH INITIATIVE

The Pale-headed Brush Finch (Atlapetes pallidiceps) lives in a habitat of chaparral, dominated by shrubs and open spaces. It is a bird that has lived in different bushland areas throughout the Jubones Valley Desert. Since 1969, the bird was reported extinct, until Danish ornithologist Niels Krabbe found it in the upper Yunguilla area.

In 1998, the Jocotoco Foundation began buying land in the area inhabited by the brush finch and created a private reserve. The bird's population rose to more than 200 individual specimens within just a few years. The status of the brush finch improved from "critically endangered" to just "endangered." Currently the reserve covers almost 150 hectares, facilitating the conservation of many other species of flora and fauna. Globally, the brush finch is one of the few species that has been saved from extinction by human activity.

This experience from Yunguilla and also from Buenaventura in El Oro province can be repeated in other areas. For example, the forests of Molleturo-Mollepungo are inhabited by the El Oro parakeet (Pyrrhura orcesi), another locally endemic and endangered species.

- **Responsible institution:**
  - Jocotoco Foundation.
- **Involved institutions:.**
  - Ministry of the Environment.
- **Location:**
  Yunguilla Valley near Santa Isabel.
- **Beginning of the practice:**
  1998.

***OBJECTIVES OF THE NATIONAL PLAN FOR GOOD LIVING WHICH ARE SUPPORTED BY THIS PRACTICE :**

Objetive 4: Ensure the rights of nature and promoting a healthy and sustainable environment

MEMORY

REMEMBERING THE PROCESS FOR THE DECLARATION OF THE MACIZO DEL CAJAS BIOSPHERE AREA

MEMORY OF THE PROCESS

- **Preliminary interagency technical meetings** — September 2010
- **Subscription to agreement of interagency Promotion Committee (designated coordination entity: ETAPA)** — February 2011

- **Work on technical level of the Committee to delineate proposed territory** — March to June 2011

- **Promotion Committee contact with the MAB focal point at the Ecuadorian UNESCO Office in Quito** — March to April 2011

- **Visits to the territory to verify existing work towards sustainable development in the proposed area** — June a December 2011

- **Contact with the MAB programme of UNESCO in Paris for guidance to progress in the process and determine next steps** — September 2011

- **Preparation of the dossier in the official format for UNESCO to achieve nomination** — June 2011 to April 2012

- **Socialization of the polished final proposal for the Declaration, obtaining letters of support from:**
  - Decentralized Autonomous Governments of the Territory
  - Related Subsecretaries and Ministries
  - Productive Actors and Academy

  — May to August 2012

- **Obtaining final signatures for the dossier from local authorities, as required by UNESCO** — August to sept 2012

- **Promotion Committee reports official referral of the dossier to UNESCO in Paris by the Ecuadorian State through the Foreign Ministry** — 16 October 2012

- **Assessment of the dossier by the Board of Advisors at the MAB program, UNESCO** — 12 april 2013

- **Official declaration of the biosphere reserve Macizo del Cajas in the annual session of the MAB programme at UNESCO in Paris** — 28 may 2013

- **Beginning of the second phase of the biosphere process: Promotional Committee begins to prepare the construction of a management model** — 18 june 2013

- **Construction and implementation of the management model for the Macizo del Cajas Biosphere Area** — Process currently underway

REQUIRED HUMAN RESOURCES
8 Part-time Institutional Technical Delegates, 1 Human Resources Coordinator
6 Interinstitutional Delegates , 1 Rapporteur

REQUIRED LOGISTICAL RESOURCES
A properly equipped session room for central planning; mobilization and travel expenses for meetings within and outside the country for an average of 6 people; a permanent Labour Office; computer equipment; database of geographic information of the region; a room for occasional workshops; a video conferencing system.

NUMBER OF SESSIONS OF THE COMMITTEE
52 session of the Promotional Committee (September 2010 - July 2012)

NUMBER OF TECHNICAL VISITS
Approximately 20 technical visits within and outside the country (2010-2012)

NUMBER OF LETTERS OF SUPPORT OBTAINED
24 letters or supporting documents from 58 actors:
7 members of the Promotion Committee; 5 ministries; 7 secretariats or ministry regional directors; 8 individually decentralized autonomous governments; 24 autonomous decentralized governments (through Consortium) 5 Institutions - guilds of the productive Sector; 2 Academic institutions.

COMITÉ PROMOTOR DE LA DECLARATORIA DEL ÁREA DE BIOSFERA

PUBLICACIÓN CON
EL APOYO DE