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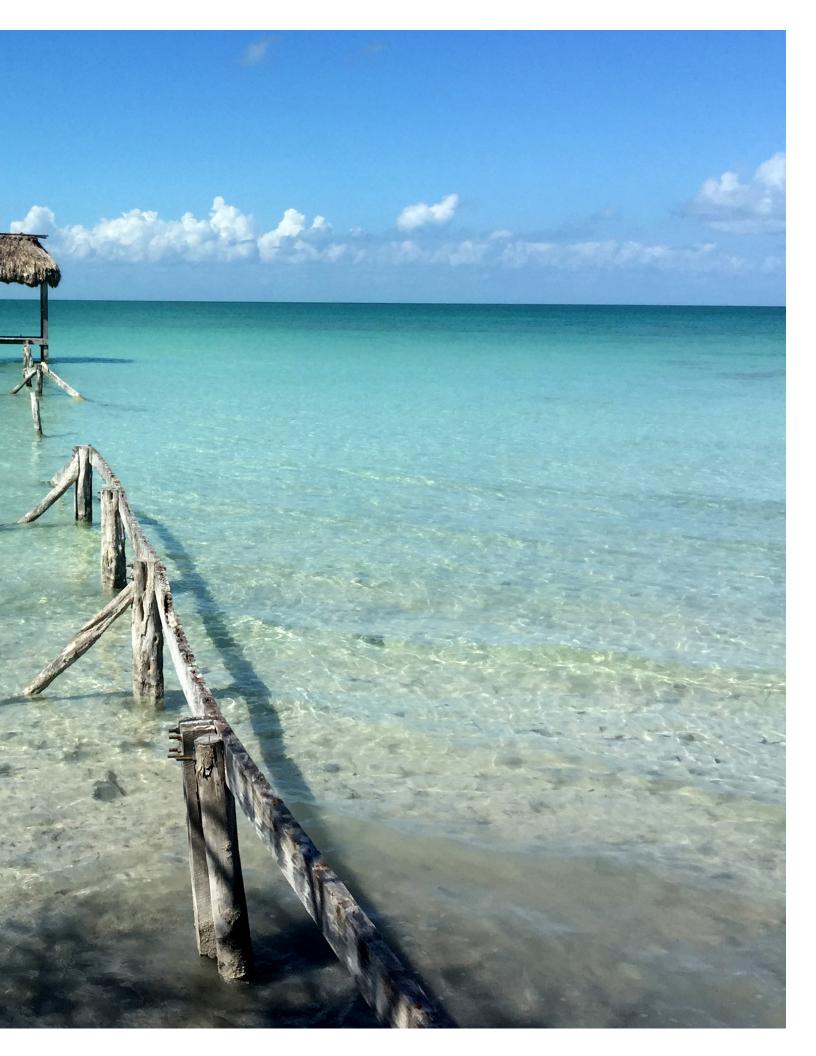




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### INTRODUCTION

Field projects supported by the Mesoamerican Reef Fund (MAR Fund) require systematization, documentation, and its corresponding narrative to disseminate the stories of success and share the lessons learned from failure. The scope of activities carried out in protected areas has been greater than expected, and key stakeholders have identified its benefits and the contribution to the development of their areas.

Sharing success stories through the eyes of the people present in the area (field implementers) is key, since it is a way of creatively communicating all the project's achievements. So, with the support of the German Cooperation, through KfW, the German Development Bank, MAR Fund hired the services of an expert on social and environmental narrative, Adriana Navarro Ramírez. She traveled to the four countries where Phase I of the project Conservation of Marine Resources in Central America was carried out and interviewed key stakeholders during June and July of 2017. Based on the interviews she conducted and her experience in the areas, she embodied, in the form of stories, the outcomes and the effects the project has left in those who are responsible for the management of the Mesoamerican Reef System (MAR). These stories were published in the book Written with Blue Ink in 2018. Later on, in 2019, we repeated the process of Phase I in order to document the experiences and achievements of Phase II.

The compilation of stories from the five protected areas supported by Phase II of the project in Mexico, Guatemala, Belize, and Honduras. A testimonial of the journey to the geographies that frame the Continental Caribbean, representing, for readers, a fascinating testimony of hope and an example of change.

As human beings, it is in our nature to share what we achieve, what we love, what gives us pride, and what brings us closer to Mexico, Guatemala, Belize, and Honduras.

This work leaves no doubt of the many and diverse positive effects of providing an intelligent, disciplined, and sensible support to those who are deeply involved in the Mesoamerican Reef System ecoregion, a natural treasure that goes beyond time and borders.

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## WRITTEN WITH BLUE INK 2



I am Mexican. Daughter of educators. She, a rhapsodist; he, a painter. I was born in February, on a leap year. I came here searching for the edge of freedom. Longing for the path, thirsty for the journey. Urging for the voyage.

I've always known I wanted to be a journalist and have never wanted to do anything else.

Telling real experiences that sound like stories is a privilege to me. It is like going into a laboratory and concoct words to make sense of reality.

I inhale words, breathe them in and sigh them out. I see them forming in the lips of others and get transformed into land, into rights, into humanity, into compassion, but also into hate, into death, and into lies.

Injustice infuriates me. Corruption and farce fill me with horror. The pits where the dead are hiding hurt me.

I'm interested in narrative journalism and also a journalism about a peace that brings hope, awareness, and tools to make better decisions. I believe in promoting environmental and human rights. I also believe in the democratization of art and culture. I speak out to transform Latin America to avoid the perpetuity of unjust dictatorships that poison it.

I have 21 years of experience in journalism, and I have had the privilege to work with the Mesoamerican Reef Fund (MAR Fund) in recent years to write about the communities and the people who take care of the coral barrier reef that stretches a thousand kilometers across the coasts of Mexico, Guatemala, Belize, and Honduras, especially to give a voice to those who live in natural protected areas.

I witnessed how MAR Fund's work displayed the virtues of towns and natural territories, all because it believed in technical and human growth.

I saw how people were able to make their territories flourish despite the economic, political, and social hurdles. I also saw how they brought the sea back to life despite the abuse of time and poor decisions. How education and awareness on conservation generate cultural changes and new ways to relate sustainably with their environment.

I had the chance to see how it is possible to fulfill dreams, how networks of hope, humanity, courage, and strength are built.

This publication is an approach to women, men, institutions, scientists, politicians, fishermen, organizations, and towns that have great talent and infinite love for their land.





### **CUMBIA FOR A MANATEE**

Friends. Nobody else. The rest is jungle.

Jorge Guillén

"Heladio, do you want to look after a manatee?" some biologists asked him. He agreed without hesitation. For 14 years, Mr. Heladio Juárez García, known as don Heladio, a farmer and fisherman of the ejido¹ Laguna Guerrero, in Chetumal, Quintana Roo, looked after Daniel, an orphaned manatee who was found in the estuary shores, with support from the community.

Don Heladio would leave his house at dawn, cross the dirt road surrounded by a thick jungle in the south of Mexico and arrive at the hut of the Marine Mammals Care and Rehabilitation Center (CARMA, for its initials in Spanish) set in the heart of the Santuario del Manatí-Bahía de Chetumal State Reserve. Then he would prepare the first feeding bottle for Daniel, who would drink it quietly. The farmer fed the calf every three hours, who early in 2004, was 97 centimeters long, and weighed 100 kilograms.

"Our coexistence helped us accept and understand each other. When the calf would swim further than a hundred meters, I would holler, 'Daniel, where are you going?', and he would turn back. I would give him fruits and vegetables. His species is one hundred percent herbivore. He feeds on plants and consumes the equivalent of 10% of his body weight. Dani would eat 10 to 15 kilograms per day. I taught him how to live in the wild because nobody should live in captivity. I would open his gate and swim so that he would follow me. And said to him, 'Hey, Daniel, come here.' He is very clever. So, he knew that it was his little door to swim out of his crib."

Daniel and don Heladio were together for 14 years. They are an excellent example that friendship can be built between manatees and human beings. Later on, Daniel liberated himself and adapted successfully to his natural environment. Today, he is able to find food and fend for himself. He is now 15 years old, measures approximately 2.4 meters long, and weighs over 550 kilograms.

### ADOPTING A MARINE MAMMAL

Daniel's story begins on September 14, 2003, when two kids who were playing on the shores of Laguna Guerrero saw a small manatee trapped in the mangrove. Neighbors of the area notified the Secretariat of Ecology and Environment (SEMA, for its initials in Spanish) of Quintana Roo and the Colegio de la Frontera Sur (Ecosur). Doctor Benjamín Morales Vela, a researcher at the school, went to see the newly born calf and waited several hours for the mother to come, but she never came.



When the night fell, Doctor Morales moved Daniel to Ecosur to stabilize him and designed a volunteering program to feed him every three hours. Immediately, high school students of the Technology Institute of Chetumal were eager to collaborate, as well as children and parents, to bottle feed the new resident.

The news that they had found a calf traveled from mouth to mouth. Social networks were filled with images of the baby manatee. Some businessmen sponsored his food, and public consultation to find him a name was held, and so he was named Daniel. The local media spread the story nationally and internationally, and Daniel was designated Conservation Ambassador. The community of the *ejido* Laguna Guerrero adopted his image as their logo, and he became a symbol of pride, identity, and culture.

The event drew the attention of the importance of the two natural protected areas shared by México and Belize: The Santuario del Manatí-Bahía de Chetumal State Reserve (initially established in 1996) and the Corozal Bay Wildlife Sanctuary (protected since 1998). Both are the most important habitats of Caribbean manatees.

Before Daniel's case, there were few records of stranded manatees in Chetumal Bay since few boats sail in the area. That is why a space dedicated to the recovery and rehabilitation of marine fauna did not exist before. Inspired in Daniel's case, Víctor Manuel Hernández, the chief of the Department of Natural Areas of the South Zone, of the SEMA, created the CARMA. First, he found a place to build it. He then spoke with the ejido holders of Laguna Guerrero, a jungle with huge palm trees, where the sun that hangs from the deep blue sky makes you sweat profusely. When the local neighbors found out that Daniel needed to be near his habitat, they lent part of the land and a dock. Don Heladio and his friend and neighbor, Daniel Robelo, built an aquatic crib to accommodate the manatee.

Daniel spent seven months in Ecosur, and then he was transferred to the crib in CARMA on April 14, 2004, when don Heladio decided to look after him. He did it altruistically for a year, and then he received a small allowance. And in 2007, don Heladio was hired by CARMA. Also, his wife Ángela García and his son Benito Juárez, named as the distinguished Outstanding Patriot of the Americas, adopted the manatee as family member and took care of him every day for more than a decade. During this process, Heladio had the support from the community, who participated voluntarily.

Now that Daniel is free to swim in the bay, don Heladio uses his time to carve wooden sculptures depicting the famous manatee. And he even composed a cumbia song that he sings with his musical friends on weekends at the entrance of his house. "Now I come to sing you the rhythm that I here bring. It is the lively cumbia of Daniel, the manatee. In Laguna Guerrero, very close to Chetumal, we are proud of looking after this animal," the party melody goes and makes people want to dance when they listen to it.

"If you ask me, I prefer to take care of manatees, rather than kids, dogs, or cats, because of their kindness and friendliness and because they are harmless," says this 63-year old Veracruzean, who arrived at the *ejidos* of Chetumal four decades ago.

### A CHARISMATIC SPECIES

Daniel became highly popular from 2007 to May 2016, when he self-liberated. During the holidays of December, Holy Week, and summer, some three thousand people went over to see him. The manatee, an endangered species, with 35 million years of evolution, raised an amazing curiosity and interest among the population.

Doctor Benjamín Morales, from Ecosur, explains that Chetumal and Corozal bays make up the most important manatee habitat in the great Caribbean, holding an average population of 150 individuals that travel hundreds of kilometers between the two bays, according to the monitoring records.

Manatees are harmless, curious, gentle, and peaceful. They live up to 60 years. They inhabit shallow waters (less than 4 or 5 meters deep), close to coasts, and they feed on aquatic plants in rivers and lagoons. They spend eight hours feeding and resting under the shade of the vegetation. They travel

alone, mostly. The only formal relationship they establish is by the females with their calves. They are quiet, which is why it is difficult to see them. They are primary consumers, a condition that allows them to return the energy back to the system rapidly and efficiently. They turn out to be essential in the control of the water hyacinth, an invasive plant that affects the integrity of ecosystems.

"In the past, it was common to see manatees in small coves and cenotes, but they were driven away due to the excessive tourism," doctor Benjamín Morales points out. He has been one of the strongest promoters for the creation of the Santuario del Manatí-Bahía de Chetumal State Reserve. Poaching was a threat to the species. Bones were used for carving handicrafts that were sold as ivory pieces. Today, the risks come from the contamination and the use of agrochemicals and pesticides. An example of this was the death of 42 manatees between August and September of 2018, in the state of Tabasco (some 550 kilometers from Chetumal), a vital habitat for these marine mammals in Mexico.

"We will shortly find out the cause of this mortality, but we now know that there was an outbreak of toxic cyanobacteria, strong presence of metal compounds, high amounts of fecal coliforms, and organochlorine pesticides; that is, toxic chemical compounds. "Scientific research is critical to propose conservation strategies, persuade the authorities for its implementation, and avoid biodiversity loss, just like it happened in Tabasco," argues Morales.

In addition, the biologist, Víctor Manuel Hernández, adds that the collaboration and support of international organizations dedicated to conservation, such as the Mesoamerican Reef Fund (MAR Fund), have been fundamental for the protection of the manatee's habitat in Chetumal and Corozal, and to prevent more deaths like those in Tabasco.

### THE CONSERVATION OF THE RESERVE

The success of Daniel's case and the conservation of species and ecosystems of the Santuario del Manatí-Bahía de Chetumal State Reserve is possible because the goodwill and the intelligence and strength from its guardians were joined to overcome the lack of communication and the hurdles.

The reserve encompasses 277,733 hectares, of which 180,000 are marine, and the rest is land; that is, 15% of the surface of the state of Quintana Roo. It has mangroves, wetlands, water holes, and lagoons.



Residents claim that jaguars can be seen crossing the roads at night. It is a space where communities have learned to coexist and take care of natural resources. Before it was declared a reserve, in 1996, and the addition of Belize, in 1998, with the protection of Corozal, it was necessary to align and harmonize individual, political, and economic interests in the zone.

Of the 11 protected state reserves in Quintana Roo, the Santuario del Manatí-Bahía de Chetumal State Reserve is the most significant for its area and biological diversity, including endangered flora and fauna. It has fresh and seawater, and the water is drained out from the center of the peninsula. Its value also lies in the connectivity with Belize and the migration of species between the two countries. However, in order to take better care of it, it is necessary to have a higher budget and more personnel, a stronger boost to environmental awareness, and solve the problems produced by the bureaucracy and the lack of coordination between government entities in charge of the environment. Responsibilities divided into sectors, both from federal and state authorities, hinders good management of natural areas in Quintana Roo, Mexico, and Latin America.

Alfredo Arellano, the director of SEMA who has spent several years dedicated to conservation, points out that the work coordinated between regions and countries for the protection of the environment is sometimes disrupted due to political agendas. He explains that international organizations such as MAR Fund are a middle ground for restoration because they generate transnational policies such as in Mexico, Belize, Guatemala, and Honduras, in order to maintain continuity of protection and conservation of Mesoamerican ecosystems. Thanks to the technical skills and the infrastructure fostered by MAR Fund in the Santuario del Manatí-Bahía de Chetumal State Reserve, the operation has had a greater flexibility with a long-term vision.

Víctor Manuel Hernández says that, thanks to the investment on the reserve, it is now possible to see many more manatees, and also residents have learned more about these species. Additionally, water has



maintained acceptable quality levels, since Chetumal committed to the treatment of 90% of wastewater from domestic use in the city.

### **FREEDOM**

Don Heladio and Ángel Gómez, both keepers and heroes of the natural reserve, prepare the boat that will take us to see Daniel. They tell me that it will be easy to find him because he is carrying a radio transmitter that shows all his movements and swimming trajectory. Before we set out, I take a look at a photograph of Daniel, and I notice that he is wearing a belt around his tale, with a string holding a transmitter (a kind of black can) that provides his coordinates, with a margin error of 10 meters. It produces biological data that has helped Mexican scientists to understand his behavior.

The device was attached to Daniel in 2015 when he was undergoing his liberation process. Back then, the famous marine mammal was already used to getting lost in the Chetumal Bay looking for females, because he became sexually mature when he turned 10. Daniel, with a good memory and being as clever as elephants, would jam his tracking device in the dock, perhaps playfully or just to feel more independent. Still, he definitely kept everyone concerned during his short disappearances.

It was in 2016 when Daniel didn't return. One, two, three months went by. The residents were very anxious. Water and air search teams were put together. Fishermen and tourists looked for the precious manatee in lagoons, rivers, and the sea. Some people would say that they had spotted him in the Chetumal Bay. Others that they had seen him going to Belize since Daniel, being a more sociable kind of manatee, would sometimes approach the boats.

Fortunately, with a close collaboration between biologists of both countries, they tracked him on his way back to Chetumal and placed the transmitter on him again. Today, Daniel swims freely with his belt and device.

At noon, at the end of October, we are ready to track him. The heat is dense in the horizon. Don Heladio holds a metal rod in his hands like a receiver, while Ángel drives the boat. We sail for an hour in Laguna Guerrero, among mangroves. The sun, burning deep into our skin, casts an infinity of hues of green and blue colors on the water. Suddenly, a sound like a broken radio is perceived by the rod that don Heladio is holding.

"Daniel is around here. Stop." Ángel shuts the engine off. A long shadow is swimming in the water near the boat. "Come, Daniel," don Heladio says, and the manatee comes out of the water to greet his friends. They introduce him to me. I can see that his dark skin has a thin fur over it. "That fur makes them very sensitive and allows them to move around in places with no visibility. An interesting fact is that they come out to breathe every five to seven minutes when they are young, and every ten or fifteen when they are adults. Even when they are asleep, they come up to the surface to breathe," don Heladio explains.

From the recorded routes that Daniel has traveled, biologists are able to know that individuals of his species have trouble with temperatures below 20 degrees Celsius, because they can suffer from severe physiological disorders. They may even die in water as cold as 16 degrees Celsius. When cold winds set, they instead take shelter in thermal waters and remain there for long periods.

Don Heladio says, "How have you been, Daniel? Oh, dear Daniel! I forgot to bring you a carrot!" And so, the mammal approaches his buddy. Before we leave, don Heladio fixes his eyes at the bottom of the water and says, "I can see some of Daniel's droppings down there. I am going to collect them because they are useful to biologists." He leans forward and bags them.

Ángel bids Daniel goodbye, don Heladio smiles, and I thank him for having emerged to the surface. The manatee submerges down where nature insists on being turquoise-blue and deep green.



# THE EYES OF THE RESERVE

Brother tree, that nailed by brown hooks on the ground, the clear forehead you have raised in an intense thirst for heaven

### **Gabriel Mistral**

"They went into the territory to kill deer or simply to practice their aim. Sometimes they would leave the animals wounded. We would find their corpses lying in the forest. They came at night and cut the orchids. They would also cut down mahoganies, cedars, aguano and palo de monte. They would assemble the wood together, and the next day, they would bring trucks to transport it and sell it in the city. They would steal our tools and break into our houses to see what they could take. Until we got tired of the killing and stealing," says don Isidro Carranza Hernández.

Don Isidro lives in Úrsulo Galván, an ejidal community south of Mexico, in the state of Quintana Roo, one of the forests where people began settling since the 1940s and which today is part of the natural protected area, the Santuario del Manatí-Bahía de Chetumal State Reserve. Early on, the *ejido* holders settled precariously in these places, with no water, electricity, medical care, nor schools. They would endure the heat and the torture of mosquitoes. They got used to hearing the roaring of animals, to see jaguars, mountain lions, tapirs, and deer up close, and not fear the shadows cast by immense ceiba trees. After some years, essential services were introduced in some communities. The residents of Úrsulo Galván lived peacefully until they lost their patience from all the plundering.

So, don Isidro and nine of his neighbors –mostly farmers– including Francisco Juárez, Bersaín Cruz, Eliseo Cruz, Benigno Barrientos, José Domingo Rosales, Santos Cruz, Elio Cruz, Norberto Contreras, and Samuel López, got organized to watch over their lands. They were assembled as El Manatí Community Guardians Committee, to stop the robbery, illegal logging, and poaching, and to protect the species that live in the Santuario del Manatí-Bahía de Chetumal State Reserve. In terms of size and biological diversity, this is the most important zone in Quintana Roo.

In the Santuario del Manatí-Bahía de Chetumal State Reserve there are three *ejidos*: Úrsulo Galván, Calderas de Barlovento, and Tollocan, surrounded by five villages: Chetumal, Laguna Guerrero, Calderitas, La Península, and Pedro Antonio de los Santos.

Francisco Juárez, the former commissioner of Úrsulo Galván, persuaded his community to work together



and jointly with government authorities to not only prevent their houses to get burglarized but also prevent environmental tragedies. He had seen in his native Veracruz that streams, rivers, waterfalls, and forests became polluted or just disappeared, as well as some animals because the community didn't get involved. "I thought this could happen to us here in Quintana Roo. So, I approached the Secretariat of Ecology and Environment (SEMA, for its initials in Spanish) so that they could explain to us how we could care for the natural protected area."

It was difficult to connect the population with the government because there was a standoff between the 250 residents of Úrsulo Galván and the authorities since the residents felt neglected and angry for living inside the area. "Many families reject protected areas because the use of natural resources is restricted, instead of showing them how to use these resources," Francisco says.

Despite the standoff between the community and the government, they reconciled their interests to form the Community Guardians Committee, an example to follow. Thanks to its members, the robbery rate dropped, and now the habitat is a better place for the people and the species around them.

### JOINING FORCES

The Community Guardians Program was launched in 2014. The international organization Mesoamerican Reef Fund (MAR Fund) assigned resources to provide capacity building to the people involved and to contribute to the conservation of the ecosystems in the Santuario del Manatí-Bahía de Chetumal State Reserve.

Víctor Manuel Hernández, the chief of the Department of Natural Areas of the South Zone, of SEMA, led the project and involved the residents into caring, monitoring, and owning the natural heritage. This biologist, born under the Sagittarius sign, passionate about microbiology and with a profound social awareness, was appointed in 2002 to take charge of the Santuario del Manatí-Bahía de Chetumal State Reserve. He worked very hard to gradually persuade reluctant residents to

live harmoniously with their environment. At the same time, he established fruitful connections with international organizations and found additional funding to boost conservation projects.

As part of the Community Guardians Program, Víctor Manuel managed to train rangers on subjects such as management of protected areas, waste management, as well as environmental education, wildlife and forest life. He had them exchange their experiences with Guatemalan and Honduran rangers, and to meet with other *ejido* holders of the same region to share their work.

After talking with the biologist Mateo Sabido, both rangers and residents discovered that the Santuario del Manatí-Bahía de Chetumal State Reserve is essential to preserving the Mesoamerican reef; that is, the 1,000-kilometer coral reef barrier that stretches across the coasts of Mexico, Belize, Guatemala, and Honduras, given that its estuary regulates the exchange of nutrients, and mangrove forests help filtrate pollutants. The population values their village much more just in knowing that the reserve is critical to the life within the different ecosystems of the region.

MAR Fund, along with the Quintana Roo Office for Environmental Protection (PPA, in Spanish), also offered to supply equipment for community guardians, such as uniforms, bicycles, radios, badges, and trap cameras for monitoring. Additionally, MAR Fund provided support for building a control booth at the town's entrance to provide visitors with information and to control the movement of people and vehicles, as well as placing an antenna in the adjacent town, Laguna Guerrero, in order to have Internet access and GPS.

Either under a scorching sun or a mesmerizing moon, guardians make daily rounds through the thick vegetation. They go on foot, on bicycle, motorcycle, or by boat, depending on the transportation available. Sometimes, they buy fuel and use their own vehicles, or use, if available, those of SEMA, the Police, or the PPA.

They received threats from illegal loggers and poachers in the beginning. "We are going to kill

you,' they said. But when they saw that we were united and determined about our jobs, they stopped harassing us," these brave characters agreed.

"We haven't had any record of robbery in a year. We have made progress in preserving the species, yet we still need information campaigns to prove that our work benefits everybody," don Isidoro says.

"When it's time for my shift, I transform completely. I put on my uniform and my badge. I go to the woods, to the coast, or to the control booth, where I explain the visitors what is allowed and not allowed in the reserve. It has been nice because you get excited about conservation," Francisco Juárez shares from his carport, where the birds drink from a little water jug.

### HAND IN HAND WITH CARMA

Community guardians are in constant communication with technicians of the Marine Mammals Care and Rehabilitation Center (CARMA, for its initials in Spanish). The office is located within the reserve and depends on the Institute of Biodiversity and Natural Protected Areas of the State of Quintana Roo (Ibanqroo, in Spanish), as they support each other in surveillance activities.

Ángel Gómez, a specialist from CARMA with 21 years of experience in conservation, recalls that five years ago, there was no infrastructure nor tools necessary to address the conflicts occurring within the reserve. "We came through when we received the support from MAR Fund and worked with the people. We broadened the communication range within the sanctuary. We purchased a 4x4 van, an 18-ft boat, and an ATV. We also purchased computer equipment for the investigation and a drone for surveillance purposes. We were able to maintain and renovate the infrastructure. We completed a certification course on governance which enable us to improve our relationship with the people. We exchanged experiences and strategies with other government institutions. We generated monitoring plans, surveillance programs, and mapped the control routes. I am very satisfied with the results because today we are able to see the wildlife that represents the site. Degraded ecosystems are beginning

to recover. High rates of contamination in the Chetumal bay have dropped, and the water quality has regenerated. Species that had disappeared or migrated in the past are coming back. You can now find 130- or 150-pound tarpons that may be up to two meters long," explains Ángel, who is passionate about social anthropology and administration.

While Ángel gazes up at the slight breeze that pushes the clouds out to the sea, he notes that the Santuario del Manatí-Bahía de Chetumal State Reserve is essential to the community, as it provides oxygen, water, and food. That is why it is necessary to take care of it. "We will not be here forever. We are just passing through, and we are not alone, so we have to learn how to coexist harmoniously with nature and its species."

### REPLICATING GOOD PRACTICES

The major hurdles that hinder conservation in Mexico are a low budget and few public staff, and the legal gaps that prevent enforcing laws against offenders. Also, the lack of long-term government programs as state and federal plans are modified every six years, under a new administration.

Juan Pastor Ramos, an engineer in the Environmental Surveillance Office of the PPA, explained that there are only nine rangers to protect 11 natural protected areas of Quintana Roo. "We don't have the capacity to cover emergencies. We need staff, equipment, and fuel." He affirms that the investment from international organizations like MAR Fund has been vital in improving the governance within the reserve.

The goal of the PPA plan is to replicate the Community Guardians Program in two natural protected areas of Quintana Roo per year, to protect species such as armadillos, deer, ocellated turkeys, and agoutis. These animals are at the highest risk of being poached for its tasty meat.

### **WORKING WITH THE RESIDENTS**

"Environmental overexploitation will continue as long as people lack basic services and haven't learned how to improve their use of natural resources in a mindful way," Elvira Carbajal Hinojosa says, a biologist and the director of Ibanqroo, a new administrative office of the SEMA that has been operating since 2018.

The strengthening of community development is necessary for improving conservation efforts and vice versa. In order to contribute to the economic, social and cultural development of communities using natural resources from the Santuario del Manatí-Bahía de Chetumal State Reserve , the Ibanqroo requested Suliana Canul Xix and Basilio Velázquez Chi, both community management experts, to work in Laguna Guerrero, Raudales, Úrsulo Galván, Luis Echeverría Álvarez, Calderas de Barlovento, and Nogales.

Their first action, in 2016, was to identify the reasons why projects financed by government institutions failed. They found that the problem stemmed from the absence of organized groups working towards a common and long-term goal. People only partnered to obtain the initial economic benefit, but without continuing their projects because they had no interest. They also lacked the capacity to follow through with their plans and did not trust each other, or faced internal conflicts within the organization. They even discovered that some projects were run by social managers that responded to certain political parties, which is why some financial support was given to community leaders related to a particular power group and not to the population in need.

Suliana and Basilio, both of Maya origin and experts in biology and business management, took *ejido* holders to other sites that have been successful in implementing sustainable tourism services and manufacturing artisanal products. For example, they were shown how three Maya women, who can barely read and write, established a pitaya jam company and signed trade agreements with six luxury hotels. "They live in a community without internet, yet they have electronic billing, bar code, and their own group

brand. They are also registered as suppliers and accept bank deposits," biologist Velázquez Chi says.

Ejido holders also learned about an ecotourism project developed within a protected natural area, in which the Maya learned English, expanded their company and managed a payroll of 200,000 pesos per month. "The reason for their success is that people know how to identify their dreams, their goals in life, what they like, and what they can do even without funding," Basilio says.

Suliana and Basilio held workshops to explain the processes of self-management, leadership, conflict management, group consolidation, and the construction of sustainable projects. They taught *ejido* holders to distinguish the role of each government institution, to anticipate the publication times of invitation for proposals, and to schedule appointments with the authorities to present their ideas. "The goal is to provide them with tools in order to consolidate their companies aligned with the Santuario del Manatí-Bahía de Chetumal State Reserve and to take advantage of the resources they already have (boats, vests, marine navigation skills) to charge what is fair."

Gerardo Castillo Ix, a rural development engineer with a 30-year-old trajectory in teaching, leads a tourism project in Calderas de Barlovento. He and eight of his neighbors organize tours on water and land to show visitors the beautiful fauna and flora of the region. "We have a boat and restrooms so people can change clothes. We are very excited because we know that we will make it. Suliana and Basilio encouraged us very much."

José Medel, the owner of the restaurant El Pez de Oro, will request funding to finish the cabins he designed with a spectacular view to the Chetumal Bay. Medel knows that tourists are captivated by sites with identity, cleanliness, safety, and beautiful natural landscapes. He used to plant trees for 15 years. He planted at least eight thousand, which now provide shade in the forest. "This region is very charming. That is why I think that tourists would come and stay in my cottages."

### CHALLENGES: AN ENVIRONMENTAL AGENDA

Scientists and public officials agree that efforts to raise people's awareness of the advantages and benefits of being part of the Santuario del Manatí-Bahía de Chetumal State Reserve haven't been enough.

Dr. Benjamin Morales, a researcher at El Colegio de la Frontera Sur, believes that it is necessary to promote an environmental agenda in every community to introduce good practices, such as limiting the use of agrochemicals and pesticides that damage the ecosystem.

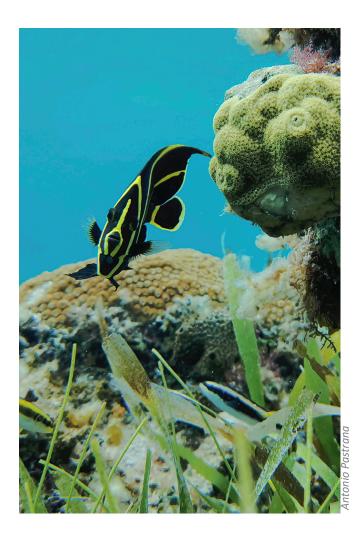
Joel Cauich Rosel, the leader of the *ejido* Commission of Laguna Guerrero, a community located very close to the reserve, agrees with Dr. Morales. One of his projects is to establish a commitment that prioritizes waste management, prohibits the burning of garbage, encourages clean streets, stimulates mangrove planting, avoids the use of agrochemicals, and promotes environmental education. "Our plan is to build a site museum where visitors can learn about the species within the natural protected area. We will use characterizations of bones, photographs, and documents in Spanish and Maya languages. We plan to have a trail behind the lagoon to promote birdwatching and highlight the importance of the mangrove."

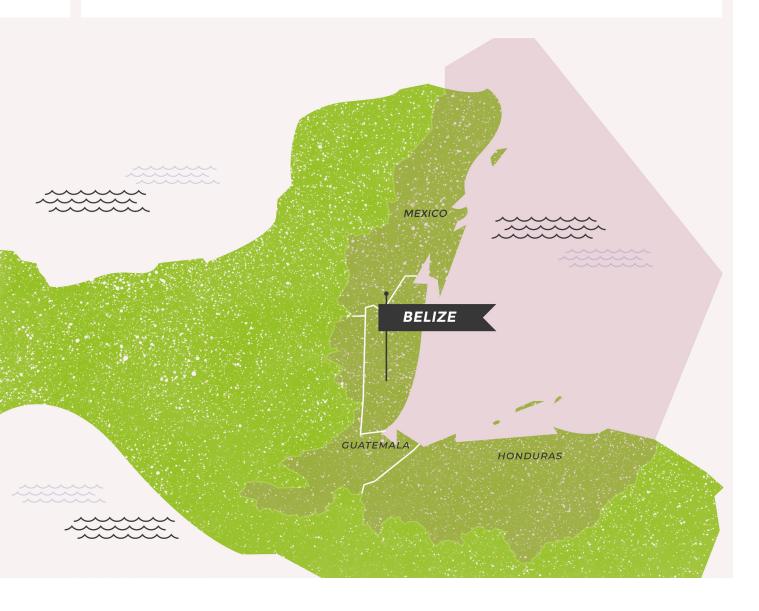
Joel indicates that the introduction of the internet has been very useful in his community, a service promoted by MAR Fund. The nearly six hundred people now have access to the web. It has been an essential tool for rural primary school students and has boosted research and basic environmental education.

Alfredo Arellano, the Secretary of Ecology and Environment of Quintana Roo, admits that it is necessary to strengthen the environmental awareness, not only in communities and in the state of Quintana Roo, but in all the region. He hopes that an agenda will be established involving several countries, as has the MAR Fund, which provides advice and funding to Mexico, Belize, Guatemala,

and Honduras in order to become custodians of the conservation of the Mesoamerican Reef System. "It would be a major challenge for the government sector in different countries to commit to a regional environmental agenda that generates a greater impact on conservation. For now, in Mexico, we are committed to plant 262,000 coral colonies in six years."

With experiences still fresh on me, I am leaving behind the hot jungle of southern Mexico on an October afternoon on my way to Guatemala. I am leaving this place where the sea has all the possible hues of blue, where communities survive under an unrelenting sun, and where the population is determined to preserve their lands, their natural treasures, and their identity.





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### AN ALLIANCE UNDER THE SARTENEJA SKY

I open my mouth and the sea rejoices And carries my words to its dark caves And it whispers them to the little seals The nights when the torture of man cries

In Belize, there is a small village facing the Caribbean Sea called Sarteneja. It is located in the district of Corozal, and its name comes from the Mayan words *Tza Ten A Ha*, which means "water that springs from the rocks." The place has archeological remains and pyramids, unexplored and eroded from the passage of time. Across the cornfields, there can be seen scrawny scarecrows bravely scaring jaguars away.

Most of the residents in Sarteneja know and greet each other when they walk the sandy and dirt streets. When an outsider arrives, he or she will be nicely questioned about his or her visit. There are foreigners who have decided to stay in this paradise and there are also passing visitors who are captivated with the clear blue-green water.

Tied up at the dock, a few sailboats sway in the Corozal Bay. At night, the stars shine so bright that you might touch them. Under this sky resides the largest community of Belize's fishermen. The Fisheries Department estimates that 30% of the 2,525 fishermen in the country reside in this town. Sarteneja depends on fishing resources and the ecological integrity of the reef. Fishing is part of their culture, their idiosyncrasy, their history, and their family heritage. Their memories are marked with the joy of bountiful fishing, with the terrors of shipwrecks, with the grief from losing a family member defeated by the waves, and with the

melancholic heart from a time when plenty of fish were caught. Some fishermen wear skin scars as badges of lacerations from the reef, or from the fishing gear.

Joel Verde, a 35-year old community leader, lives in Sarteneja. He runs the Sarteneja Alliance for Conservation and Development (SACD) in Belize, a civil organization that watches over 72,000 hectares in the ocean, the Corozal Bay Wildlife Sanctuary. Joel, like many members of his community, was born into a family of fishermen. As a child, he accompanied his father to collect lobsters and enjoyed seeing the



mena Flamenco



colorful fish. Until a tragedy took him away from the sea. His older 16-year old brother died in the ocean, and his father decided to keep his family away from the activity. It was when Joel, still a child, began growing corn and beans.

"My dad sold all his boats, including his sailboat, because he wanted his children to attend school. But, here in Sarteneja, there was no high school, so I went to school in Belize. Soon I realized that my dad was having a hard time providing for all nine members of the family, so that is when I went back to fishing and getting a job as a tour guide," Joel recalls. His parents and siblings were able to pull through with his support. There were favorable conditions until a hurricane came and destroyed docks, devastated villages, and obstructed access to the cities. Tour guides like him lost their jobs because boats with visitors were no longer coming into Belize. It was then when Joel had to reinvent himself and change his life plan.

### **CREATION OF THE SACD**

After the hurricane hit, Joel formalized a tour guide association together with his colleagues to be able to access different technical and financial supports. "We decided that in order to attract tourists, we needed to preserve, maintain, and manage well our natural resources and the access infrastructure. Without a well-preserved nature nor the basic infrastructure, tourists will not be interested in visiting the country."

SACD was formed in 2008, and members included tour guides and conservationists. In 2009, they obtained their first funding to undertake two new projects. One of them consisted of granting scholarships since 80% of students drop out of school because schools are limited and family incomes are not enough to send them out of their village. That is the reason why these children became fishermen, thus resulting in greater exploitation of increasingly scarce fishing resources. The other project was to establish guesthouses (in the homestay format), led by Joel.

He soon stood out for his commitment, his values, and his skills. The committee of SACD elected him as the director in 2010. "They thought I had the qualities and the drive to improve our community." He got a scholarship in the United States on the management of natural resources. He was then selected to be part of the Mesoamerican Reef Leadership Program an initiative of the Mexican Fund for the Conservation of Nature A. C. (FMCN, for its initials in Spanish) and The Summit Foundation that develops skills and boosts the talent of young leaders of the region to design and implement projects to contribute to the conservation of this unique ecosystem.

"This was my opportunity to finish high school, and also FMCN had given me support by assigning me a salary as director. After that, SACD had a tremendous growth and obtained many donations." The Mesoamerican Reef Fund (MAR Fund) was one of the main donors for SACD. It is an international, non-profit, civil organization, which founding partners are national environmental funds of Mexico, Belize, Guatemala, and Honduras. SACD sponsors long-term programs and projects for the conservation and protection of coral ecosystems of the region and to improve coastal marine practices for development and fisheries.

MAR Fund was part of the support for SACD to be able to hire more staff, set up an office, and acquire equipment and vehicles (a boat and a pick-up truck) for the implementation of education, monitoring, and surveillance programs. Staff was trained on technical

and administrative aspects. They received uniforms and resources to operate and to preserve the Corozal Bay Wildlife Sanctuary, a legally protected area since 1998, located across Sarteneja, which they manage in coordination with the Forest Department.

"SACD's goal is to promote a balance between the protection of natural resources and the needs of communities. We seek to conserve and develop economic alternatives, engage people in the good use of nature and promote research programs in order to make better decisions," Joel Verde explained, while not even a hint of wind is perceived outside the window. The trees remain motionless, like poles lushly draped in green.

### PROTECTING THE BAY

Sarteneja is cardinal for more than three hundred thousand residents in Belize since it is home to the largest number of fishermen in the country. Geographically, part of the Corozal Bay Wildlife Sanctuary is located there. The place covers 72,000 hectares of sea where manatees, dolphins, and bull sharks can be found. There are abundant commercial fish, such as snappers, mojarras, and striped mojarra, ingredients to the local diet and key resources for economic growth and social development. Also, a formidable diversity of birds that nest in the area can be seen, such as reddish egrets, curassows, and woodpeckers. Mangroves that grow in the area protect the community from wave surges caused by hurricanes. It also has stromatolites, which are ancient mineral structures with microorganisms that release oxygen and capture vast amounts of carbon dioxide.

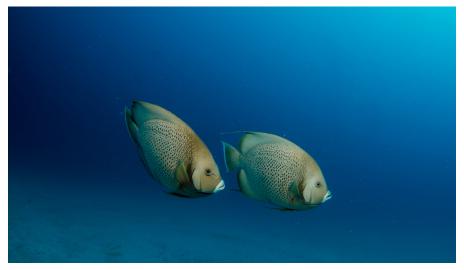
The major threats on the Corozal Bay Wildlife Sanctuary come from a bad water quality due to pesticide runoff, inherent in industrial agriculture practiced inland, and from untreated water that pollutes the rivers. The unplanned and unmitigated tourism development also has an impact on the sanctuary, mainly towards the west, in the villages of Consejo and Corozal. The owners of private lands increasingly demand coastal areas and cut down trees and mangroves, causing contamination

and damaging the biodiversity and the ability of ecosystems to function properly. Sarteneja, Corozal, Chunox, Consejo, and Copper Bank are the five communities that put direct pressure on the protected area. Residents agree that the main social issues in their villages are the lack of schools, equipped clinics, and roads in good condition.

Giselle Tepaz, a 24-year old health promoter, thinks that it is unfortunate to have only one nurse per clinic and few medications. "We are in a far corner of the country, and that is a risk to our lives. People with severe diseases or accident victims cannot get timely medical attention." Although somewhat mitigated, a feeling of mistrust still prevails towards government authorities. Residents indicate that the color of the political party determines the extent of how resources arrive to cover their needs. There is favoritism or disdain depending on the political allegiance and who is in office in local and national authority positions.

Abisai Canul, a fisherman, says that he and his fellow fishermen saw for many years that politicians visited villages only to ask for their support, their votes, or pose in photographs in exchange of promises that were never fulfilled. People were disappointed and stopped trusting all institutions, including nongovernmental and even civil society organizations dedicated to protecting the environment. "Fishermen lack formal education and have a hard time understanding the concepts and benefits of conservation. They believe they will be banned from going to the sea," Canul says.

"Most fishermen never completed elementary school, and fishing is their only option to make a living," explained Abisai Verde, the education project coordinator of SACD. In order to protect marine resources from the excessive catch generated by demand, he decided to bring knowledge about their natural environment to the fishermen. He approached the leaders of every community and persuaded schools to let him give presentations on corals, fish, sharks, rays, manatees, mangroves, and stromatolites, and on the importance of protecting and conserving them. He challenged apathy, the



lack of motivation, and the mistrust of people. He gradually gained new allies. Children and youths were his irreplaceable support, as they convinced their parents of the need to protect their habitat.

Abisai Verde raised awareness on the consequences of climate change. "I make them realize about rains and hurricanes being heavier now, about the rising sea levels, the severe droughts, and the plagues that arise from increased temperatures. I tell them that mangroves and reefs are resources that mitigate this impact and make the environment and communities more resilient."

As a result from these talks, fishermen understood why the fish took longer to arrive to the bay and why rains came later. "I understood why having natural resources is a privilege and why it is important to protect them. Conservation workshops have helped us a lot, and we all have been involved. When SACD organizes meetings, they provide us with transportation, food, and drink. We don't have to spend a dime. We attend to learn about the north winds and the effects of climate change, as well as new ways to adapt to different conditions that affect the abundance of our fishing resources," Canul adds.

"They do a good job because together we are protecting the source of our livelihoods. We used to think that they would take everything from us, but we joined them and saw how they are helping us," declared fisherman Marcelino Cruz.

Abisai Verde approaches young people through an invitation to learn about environmental education for three months and to share their knowledge with their community. It is an effective way of broadening the positive impact of the project. Ineiri Muñoz, a 21-year old girl, who studied high-school specialized in biology and human resources, was elected in 2018 to follow the training. "Abisai trained me to give presentations in schools and villages. We designed games to explain elementary children about the importance of fish, manatees, and stromatolites. We showcased SACD's actions and give them prizes when they answered correctly. We promoted not to litter and to keep the beaches clean. Children become quickly aware and show good practices to other family members. I learned how to communicate with people and to lose the fear of public speaking. Although I wasn't expecting it, they gave me a uniform and a monthly stipend of eight hundred Belizean dollars. They even gave me my very own computer," the teacher says proudly, who now teaches 17- and 18-year old students in the School of Sarteneja.

Abisai claims that educating has been a tough job. "Earlier, we didn't have vehicles, so we rented one and would only go to the villages once a month. Resources were quite limited, hindering our projects. With the learning material, the training, and the car we bought with donations from MAR Fund, we have made progress, and we will be able to raise awareness and change the population's mindset."

### SURVEILLANCE AT SEA

In 2011, Belize approved a national program called Managed Access (*Acceso Controlado*, in Spanish), which issues licenses to 2,525 fishermen registered in the Fisheries Department, to have access to specific areas (to which they respond through community surveillance). In return they must comply with regulations and systematically record their catch for a data base on the abundance and condition of fisheries resources. The goal is to reduce illegal practices and overexploitation, counteract resource depletion, increase fisheries profitability, and contribute to the economic growth and development of communities.

Ruby Arrivillaga and Reynel Blanco are SACD's rangers who patrol twice a day in the Corozal Bay Wildlife Sanctuary. During their patrols, they watch the bay, educate the community, and ensure that models of use are respected, such as Managed Access. When fishermen go out to sea, rangers ask them respectfully for their license, verify the fishing gear they use, and the product they are taking out. They are vigilant so that closed seasons are observed, that small fish are not taken, and that permits, bonefish or tarpons are not captured, which are exclusively for sport fishing. Rangers use a tool called SMART, in which they register the name of the boat owner, type of vessel, license number, location, and infractions (if any). From boat to boat, from fisherman to fisherman, they talk about the need to protect marine resources, which are their livelihood and the source of income for future generations.

"When I started conducting patrols four years ago, 90% of fishermen's practices were illegal. Their papers were not in order, they didn't carry their licenses, or they were taking small size product. They didn't know much about conservation. It was tough raising awareness on why they should protect the sea," Ruby recalls. Infractions were reduced by 30%. Current violations occur because they don't have the boat's papers, yet in the past two years, rangers haven't seen illegal nets nor fishing during close seasons, or taking fish that are not big enough.

Ruby says that at the beginning, government coastguards —who have gun permits—joined SACD rangers. They worked together for years until the coastguards left the bay because they had no money to pay for their stay. "Coastguards provided us with protection because you see many things at sea, not just fishing," Ruby adds. Reynel explains, "There is a lot of smuggling of products like beer, canned goods, produce, household supplies. They are brought from Mexico to be sold here, in Belize." For Ruby and Reynel, work becomes dangerous when smugglers think that they will be arrested, unaware that their job is to promote good fishing practices. Fortunately, they have never witnessed any violent acts, and have engaged in a good relationship with the fishermen because of their constant conversations.

What Reynel enjoys most is to teach about conservation, and Ruby, to protect marine wildlife. They are proud to belong to SACD, and they underline that the strengths of the institution derive



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from the community itself, from its genuine strive for conservation, from the transparency of their actions, and from Joel Verde's leadership, their boss.

Claudia Matzdorf, also an ally of the organization, sums it up well, "SACD is the small giant that was born from the community and has achieved the promised change in the region. Joel Verde is an example to us: he is an optimist, unbreakable, patient, assertive, and strategic, and he treats everyone with respect and fairness." While she speaks these words, the sun is coming down in Sarteneja. The blue and violet sky spreads out like an infinite scarf, a canvas where stars appear flickering, one by one, precisely where they belong in systems and constellations.



Lorenzo J. de Rosenzweig

## BREATH FOR THE SEA

What seas what shores what grey rocks and what islands What water lapping the bow And scent of pine and the woodthrush singing through the fog What images return

T.S. Eliot

To invoke the sea, people from the city, cup our hands to echo the seashell over our ears, we taste its breath in our tongue, the salty aroma, we hear the lashing of salt against the sand. But those who live in Sarteneja, north of Belize, are fortunate to see the waves, touch the water, and set sail to dwell in the sea. [Paraphrasing the poem *Agua primordial*, by Gustavo (ñiguez].

Besides their marine location, the Sarteneja village holds ancestral traditions, as its fishermen use the trap technique since pre-Columbian times, which consists of sticking poles in the shallow beach for prey to swim towards the heart-shaped net and get trapped in it. The trap is a sustainable method because it gives the chance to sort the product and

return smaller animals to the ocean so they can reproduce and avoid becoming scarce.

Sarteneja is a village that depends entirely on marine resources. The environmental imbalance caused by climate change, overfishing, water contamination, and changes in the use of soil may have fatal consequences because they damage the reef, and it would be left without fish, food, or any other form of livelihood. To prevent this tragedy, the Sarteneja Alliance for Conservation and Development (SACD), a non-governmental organization that has been working in the area for a decade, devised other alternative livelihoods for the residents so that they are not as dependent and reduce the pressure on marine resources. SACD experts have put forward





different projects such as pig farming, sustainable agriculture, training of tour guides, and teaching of specialists on environmental monitoring. At the same time, they have supported an education that raises awareness of the value of natural resources for their people.

Claudia Matzdorf coordinates one of the projects that offer economic alternatives. She is a young Guatemalan-German girl, who, since 2018, has been working on the tourism model for families of local fishermen to be able to generate income. The project involves taking tourists to experience a fishing day with the beach trap method. The project, called Sarteneja Beach Trap Pesca Tours Association, also takes into account fishermen's wives, who cook with fresh products collected from the sea by travelers. Tour guides (who may be other fishermen's relatives) are also involved providing information during the trips.

"The tourist may participate in beach trap fishing used in Mayan times. He or she may visit the house of the local host and may eat traditionally cooked fish. The trip would include watching birds, dolphins, and manatees," says the biologist, who has lived in Germany, Iceland, Indonesia, Belize, and Costa Rica, and has always pushed for better resource management. The goal is to communicate about the culture and local traditions, improve the resident's income, teach the village sustainable fishing practices, and facilitate the observation of close seasons. So far, the project has included 15 fishermen

from Canul, Cruz, and Blanco families; six women who will set up a diner and will receive supplies and training on food handling, and seven more people who will be the tour guides.

Abisai Canul, a 38-year old resident of Sarteneja, is one of the fishermen who has used the beach trap method all his life, and he is one of the project's leaders, of which he explains, "It is a great and unique project in Belize. We will show tourists how we do our job. They will see how the striped mojarras, mojarras, barracudas, blue crabs, snappers, yellowtails, and snooks follow the trail on the ocean shore until they get trapped in a heart-shaped space. We will invite them to get in the water to choose a fish, clean it, and cook it to their taste."

For Amael Cruz, a 24-year old neighbor of Sarteneja, learning to be a tour guide was an excellent opportunity because he had been forced to drop out of school when his father became very ill. "Through the training, I learned about the places and biodiversity found in Corozal Bay Wildlife Sanctuary," says in the living room of his house while his family listened to him. Amael, a very generous and cheerful person, recalls that at the beginning, he would feel very nervous when talking to tourists, but he overcame his fears. He thinks he is now ready to guide tours into seeing different fishing methods and to promote conservation in his region. This job will help him to provide for his family and to maintain his pursuit of becoming a doctor.

The tourism model will equally benefit those who have homestay accommodations in Sarteneja, as well as 54 members of the Tour Guide Association, who will get support from SACD to reinstate the water taxi and attract more visitors by extending the sea routes up to the city of Chetumal, in Mexico.

Joel Verde, the SACD director, admits that tourism is the only economic alternative for villages settled in northern Belize; however, if poorly planned, it can destroy nature. For that reason, he believes in sustainable tourism that engages the private sector in good practices. For this purpose, SACD will create its own tour operator, which will manage and oversee the sustainability of the practices at sea. SACD will

sell its services to visitors in order to achieve financial stability to fund long-term projects, and will promote research by inviting students to visit the sanctuary specializing in commercial fisheries, water quality, manatees, birds, sharks, rays, mangroves, seagrass, or stromatolites.

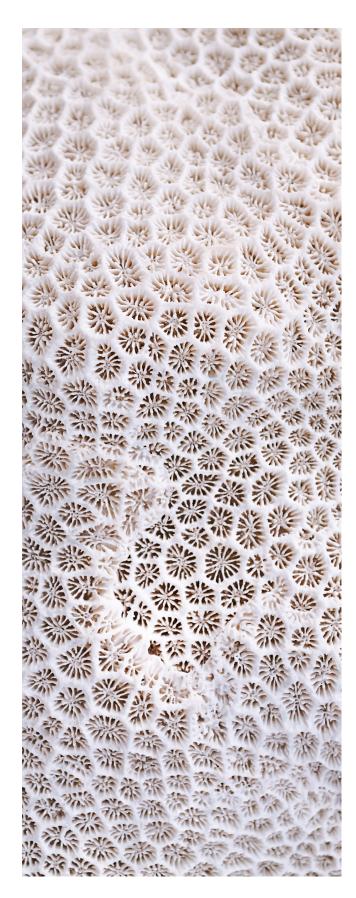
In Chunox, SACD is training Bartolo Tun's family members, who are fishers/farmers, on how to set up a plant nursery, reduce their dependence on fishing, avoid the use of pesticides, use water effectively, and produce high-quality fruits and vegetables, thus, giving them a higher market value. "What I like most is to be able to generate options in an area where there are few job opportunities. We have done it thanks to the support from the Mesoamerican Reef Fund (MAR Fund). They have played a significant role in this corner of the planet," Claudia Matzdorf states.

### SPECIALISTS IN THE LOCAL CULTURE

Chunox is 30 kilometers from Sarteneja and 60 kilometers from Copper Bank, which are communities that do not exceed one thousand inhabitants. Some of the residents who live there are experts in the Maya culture, local traditions, the geography of Belize, and conservation. They are young people who were trained as SACD tour guides to have job alternatives.

To meet up with them, we get on the only truck the SACD has, acquired thanks to donations made by MAR Fund. We drive through dense landscapes. Our route is a dusty road full of potholes, a road that becomes impassable during the rainy season. Residents say that in 2014 a storm hit so hard that left them uncommunicated. For two months, they found it impossible to move to other places. Trucks delivering groceries were stranded. People who needed to see a doctor chose to go by boat and emergency trips were made by sea, although more costly. Many young students stopped going to school because they couldn't get out of their villages, until a neighbor kindly towed the student's bus daily with his tractor.

As we drive, I remember the words said by Deiden Gorosica, a young accounting expert working in



SACD, who assures that the lack of proper roads hinders economic growth and education in Belize. "It is essential to invest in the future of our country, especially in our children, their education and nutrition. The lack of roads interrupts the movement of people, supplies, and food."

We arrive at Copper Bank, and we meet with Anahí Teck, a 22-year old tour guide, who welcomes us in her living room. She, as most of her community peers, also thinks that the lack of roads hinders tourism development. "If I had the chance, I would fix the roads so that other people may learn about our culture and nature in our villages." Teck is grateful to SACD for protecting the environment and helping people by providing training. "In order to become tour guides, they taught us about the Maya culture, the nature around us, the conservation of the sea, and first aid." She said that she and her colleagues in Copper Bank –a village where copper was exploited– are getting organized to promote their own natural protected area. "We need to protect the reef because it is a haven for different species, and tourists from all over the world come to visit. We need to raise awareness that garbage changes the natural landscape and drives visitors away, thus reducing jobs and undermining the country's economy."

Meanwhile, in Chunox, 22-year old Adianie Tun is sitting across her father's home. She rocks her baby in her arms. She said that she used to live 368 kilometers from there, in Punta Gorda, with her husband and her other son, but she left to be able to get free training on tourism. Her father, a fisherman, heard that SACD was training young people on something her daughter liked the most: tourism. He told Adianie about it, who signed up for the workshops. "I attended the whole week, from eight in the morning to three in the afternoon. I learned a lot about my country. It was a huge challenge because I was pregnant and had to take care of my son. But when you love something, you give it all of your time, and I was able to finish with the support from my parents."

What she liked the most was to visit the Museum of Maya Culture in Chetumal (Mexico), the civilization that inspired the museum, and the story of Xibalbá,



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the pre-Hispanic underworld. "The instructor, Rodolfo Burgos, was spectacular. His passion for Belize motivated me to continue studying. He would suggest a setting so that we could improvise and talk about something, it could be flowers, plants or food. I did an internship in Blue Creek. The first time, I was very nervous, but later on, I was delighted to talk with tourists." She explains that Chunox has many Maya ruins and plenty of legends. One of them tells about a beautiful woman who appears before drunken men and, when they follow her to the woods, she transforms into a green snake and kills them. But what happened to her neighbor Feliciano is true, Adianie says. "One day, a gnome took him to the mountain and gave him a present, the privilege to control any wild animal or plant. Feliciano can walk among fierce animals or be on top of a corozal, a plant surrounded by thorns, and he is fine."

In the mountains of Chunox other real, yet quite concerning stories coexist. "There are people who buy lands with wells; they fill them up with material, but before that, they take out the Maya relics. We cannot do anything because they are private lands." Adianie believes that Belizean people should value their culture and their environment. "I thank the people who provided the funds so that I was able to open my eyes and cherish what my country has to offer," she concluded while the midday sun keeps the fresh air from blowing.

### LOOKING CLOSE AT NATURE

Leomir Santoya is one of the key men in the organization of SACD. Fishing brought him closer to the sea, and the marine biodiversity inspired him to study Biology. He began volunteering in SACD, then he became a ranger, and now he is the monitoring and research coordinator. He is in charge of eight community researchers; that is, young people that approach SACD by a call for applications and then are chosen to monitor water quality, larvae, fish, manatees, crocodiles, birds, seagrass, mangroves, and plankton. They gain experience, education, and the possibility to find a better-paid job in the future. "We require them to at least have completed high school. To be active, participatory, and dedicated.

We teach them to follow the criteria, protocols, and methodologies. The age of men and women participating in the program ranges from 18 to 33."

José Viamail is a 23-year old community researcher. Monitoring birds is his favorite activity, "We were trained to collect information. We set out at five in the morning. We sail to Cayo Falso, and from the boat, we can watch the birds that fly out from the island. From the color and spots of their feathers, we are able to identify the species and distinguish males from females. I am very proud to share my knowledge with children in schools. We talk about conservation and the kinds of animals found in the bay area." Beatry Verde, who was born in 1998, agrees with him. She believes that the most satisfying part of her job is to talk about biodiversity to over three hundred children.

For Liliani Tamai, the most enjoyable experience she had as a researcher was measuring and learning about crocodiles. "You have to grab their snout, cover their eyes, and determine their size with a measuring tape. It is exciting." SACD gave her uniforms, food, and 50 dollars every day for monitoring, like the rest of her colleagues.

Gisellie Tepaz has been a community researcher for three years. She, who is 24 years old, was awarded a scholarship to go to Cuba but lost it due to a family issue. Her favorite activity is the monitoring of larvae. "Traps are deployed the day before and then we collect the samples trapped in the sieve and place them in a container, we store them and send them for analysis. We take photographs and try to identify the type of fish to which they belong." Data is sent to El Colegio de la Frontera Sur (Ecosur), a research center located in Chetumal, Mexico, 100 kilometers from Sarteneja.

Gisellie, who hasn't lost her pursuit of becoming a gynecologist, praises the work by SACD regarding environmental education. She declares that people are much more informed and aware of the value that the environment has for her community, which is evident from the current respect they show for the species. The biologist Santoy agrees, as he states

that the population of freshwater scale fish hasn't changed thanks to the observance of close seasons, and bull shark depredation has dropped, a species that was used in making tasty turnovers.

Experts believe that monitoring is fundamental in making better decisions and push through public policies for conservation. Scientific data helps to understand environmental changes that have been occurring for a long time and to propose solutions and joint actions in Belize and in other nations.

"It is not effective to work and protect a single natural area. It is essential to carry out an interconnected work because ecosystems are related," says the SACD leader, Joel Verde. "As community researchers, we are more than friends; we are a great family," Liliani Tamai says. A great family who is in charge of the conservation of the Caribbean coast of Belize and has made good use of its tools and knowledge to preserve the vibrant life in this world.

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## TO STAY AFLOAT

"If you don't have one foot on the ground you will never be able to stand on it"

### **Odysséas Elýtis**

There is a tiny island in the Caribbean Sea of Belize, called Tobacco Caye, trying to stay afloat. It is located 20 kilometers from the city of Dangriga, on the mainland. Each year, the archipelago loses territory due to the rising sea level. Villagers who live a few steps from the waves watch in dismay as their land shrinks. They blame climate change and the reckless people who continue to pollute.

Mark Bradly has lived there since he was a kid. In the offices of his own hotel, he says, "The caye has been transformed a lot since I was a child. There used to be a beach; it no longer exists. I don't know for sure the reasons we lost ground, but it could have been natural erosion, excess waste, or increased tourist activity. I have no doubt that has to do with climate change."

Margaret Vernon has also spent basically her entire life on the island. From the dining room of her house, she says, "I was born on October 2, 1958. I'm 60 years old. I'm the seventh of 13 siblings. When I was a child, I saw a lot of fish and played on a great beach that doesn't exist anymore. In the last years, the caye has been reduced by at least two acres (8,094 square meters). I am sure that it has been as a result of climate change, which produces the most vicious hurricanes."

The name of the island is associated with tobacco because, during the 17th century, it was a commercial port where European pirates and natives traded this plant. There's another hypothesis that suggests that the island got its name because, seen from the sky, it seems to have the shape of a tobacco cigarette. Whatever the theory, the truth is that today, 35 people, three dogs, and one cat coexist on the island of 4.6 acres (18,616 square meters). Because of its size, it is possible to get across the island in less than ten minutes.



Among the palm trees, the houses and lodging sites, built mainly of wood and equipped with septic tanks, stand out. There is a freshwater well, several tanks for harvesting rainwater, an electricity generator, and a convenience store. There is also a Marine Station, with an internet connection, where foreign students (especially English) do coral cleaning and biological research. The archipelago is characterized by having a wall built with shells by the residents from the island to prevent the sea from advancing towards their homes, and the boats that go around the reef do not damage it. And there is a pier, below which magnificent manta rays swim under the crystal-clear water, while the blue Caribbean Sea stretches on the horizon.

For many years, the inhabitants of Tobacco Caye engaged in fishing, but when the island became more attractive for tourism, some locals sold their properties or turned them into hotels. Tobacco Caye belongs to the South Water Caye Marine Reserve, Belize's second-largest marine protected area, covering 117,878 acres (477 square kilometers) and harbors part of the Mesoamerican Reef System, the 1000-kilometer coral barrier that stretches across Mexico, Belize, Guatemala, and Honduras.

### STAYING ON THE MAP

Margaret Vernon, a resident and the leader of Tobacco Caye, has been involved in environmental conservation projects. In her opinion, waste management on the island is a serious problem.

Villagers throw organic waste into the sea as food for fish, burn some of the inorganic waste, they compress plastic bottles, and pay a person to take this waste by boat to the city of Dangriga. When the weather is bad and the waves are high, the bags containing the plastic bottles are overthrown in the ocean and float. "I am really angry about this situation; there are people who don't care."

Margaret thinks that islanders should find financial support, either from private institutions or the government, to have the resources to sort and move the waste to another place. "On many occasions, we do not have the money to pay a boat to take the waste to the mainland. Also, we shouldn't continue polluting with fires. And, for example, what should we do with cans? It's something that cannot be incinerated. We're on the side of the reef. We need to protect it. We are a public island, not a private one, like those around us. We don't have enough capital to maintain it properly. Every year, I organize a festival to encourage the catching of lionfish (a species harmful to the reef) and to keep fishermen active, but I need help in handling the waste because it has an impact on the environment. Climate change is eroding our island. I would love my grandchildren to be able to know this paradise; I wouldn't want it to disappear, like what happened with Bird Island."

Bird Island, five kilometers by sea from Tobacco Caye, is a place where there were hundreds of trees sheltering birds. Because of climate change, the strongest hurricanes, cutting mangrove to clear the land, and sand dredging by some hotel developers in the adjoining cayes, the island was left in ruins. Only photographs and some stoic logs that support the sea surge remain from what once was. "It was practically eroded because hotel developers on private islands took over the land to build their facilities," Margaret says. Mark stopped touring in Bird Island three years ago, because the appeal was lost: "There's nothing to see because the birds have left and the manatees are no longer seen."

Residents of Tobacco Caye not only need to be aware of the environmental problems, but they also need to be wary of the organized crime smuggling illegal goods at sea. That is why they requested funding

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to install solar panels to improve the lighting across the island, reducing the high costs generated by the power transformer, and also preventing crime.

Around Tobacco Caye, there are natural canals through which boats carry illegal products, mainly at night. Boats hit the reef close to the surface when speeding in the dark. So, residents have managed to place seashells around the island as a form of protection. "It would be much easier for the Security and the Fisheries Department to see what's going on in the water with a better lighting system. We are located in one of the main points of entry of drug trafficking," the locals claim.

### A BATTLE WITHOUT WEAPONS

Tyrell Reyes is responsible for managing and directing the group of rangers that patrol the South Water Caye Marine Reserve (protected since 1996), which covers the beaches of at least twenty micro cayes, Tobacco Caye among them. Tyrell is a biologist and an official of the Fisheries Department. He protects the reserve along with Kenrick Diego and David Linarez, both rangers, and with Ronaldo Romero, a marine biologist. Before dawn, they set out to sea from their base, located in the island Twin Cayes, 6.5 kilometers from Tobacco Caye. "Our job is to patrol and be out at sea almost all day. We speak to the fishermen to advise and remind them of the permitted activities within the reserve as well as the restrictions," Tyrell explains, a young fellow born in Belmopan, the country's capital.

South Water Caye Marine Reserve stands out due to its economic contribution to Belize, because it provides lobsters, conch, and finfish, which are essential to commercial fishermen from Sarteneja, Dangriga, and Hopkins, and for the basic nutrition of Tobacco Caye inhabitants. The reserve is divided into three zones: for preservation, for conservation, and for general use. In the preservation zone, fishing and diving are not permitted. In the conservation zone, commercial and extractive fisheries are not allowed, only recreational activities like diving, snorkeling, and sport fishing are allowed, yet motorboats are forbidden (except for emergencies). In the general-use zone, only fishing without nets is admitted.

Tyrell's goal is to change the mindset of fisherfolk. The idea is that they place their trust in officers of the Fisheries Department to see them as allies and not as enemies to protect the ocean together. Little by little, they have begun trusting them, and it has been mostly through environmental education. "At sea, from boat to boat, we tell them that the reserve works like a bank. With more money, or more fish reproducing, there will be more availability."

Many fishermen have already understood and have learned to respect the sea. However, others continue to fish illegally; that is, they catch products during a close season or catch undersized species that have not yet reached their reproductive stage. These practices affect the continuity of species. "We see them, for example, taking conch with a shell under seven inches. Fishermen are not the only one to blame, but also the consumers who buy the product."

Tyrell highlights that giving them a second chance has worked well as they rectify their mistakes. And when they repeat the offense, rangers open the process to fine them or confiscate the product. The system still has room for improvement, because after a great deal of paperwork to confiscate the product and sanction the offenders, the economic value of the fine, sometimes is not proportional to the amount of product they have taken illegally, and the offenders are happy to pay.

For Ronaldo Romero, a 24-year old marine biologist, it is essential that the private sector, which owns real estate within the reserve, becomes more engaged in taking care of the sea. "Almost all the islands of the reserve are privately owned. Their owners should be more involved in its conservation because the islands provide for them. The government needs to put more pressure on the tourism sector, which is making a lot of money." Teresa Rath agrees. She owns land in the reserve. "Those of us who make a living from tourism need to keep the place clean, but in order to achieve that, a lot of organization and investment is required. Our properties located in the natural areas run fully on renewable energy."

The biologist Ronaldo would like his Belizean countrymen to have the opportunity to visit the



South Water Caye Marine Reserve to see it, value it, and take better care of it. "Most of Belizeans are not able to come and enjoy it because they need many dollars to travel and stay in the cayes."

Tyrell, Rolando, Kendrick, and David also risk watching over a space where drug trafficking is conducted. Tyrell says, "Sometimes we patrol at night, but it is very limited. We don't have the equipment, and it is very dangerous. Not only fishermen are committing illegal fishing, but there is also smuggling of other types of goods involving more countries and more armed people. I don't want my people to be exposed to that kind of danger. When I get information in advance on fishermen coming from other parts to buy lobster or conch during a close season, we coordinate with the police and coastguards to make a joint operation, but we are only responsible for confiscating the illegal products."

### TWIN CAYES IS ALSO ERODING

Twin Cayes, the base island for the rangers, runs the same fate as Tobacco Caye: it is eroding. "Sea level is rising and washes down the island. The water has already reached the entrance of three buildings of the Fisheries Department," explains Celso Cawich, a marine biologist who works in the reserve, on an international volunteering program.

Not only that. In 2007, a fire completely destroyed the surveillance headquarters and the electric equipment. Now, rangers live in an uncomfortable and rustic infrastructure. And yet they still have to manage the marine reserve, promote environmental education in fishermen and local and international visitors, monitor and analyze biological data, and protect commercial species and coral life.

The Mesoamerican Reef Fund (MAR Fund) is a non-profit organization that promotes and funds conservation projects in Mexico, Belize, Guatemala, and Honduras. MAR Fund is collaborating with the Belize Fisheries Department in preparing assessments that help design a mechanism to control the erosion in Twin Cayes and a containment wall on the beach to stop losing ground. In addition, MAR Fund will invest in feasibility studies required to support the building

and equipping of the station where rangers can be housed, so they can rest and carry out their activities better.

The new infrastructure and the recovery of the island have the goal of getting visitors to spend the day at the base of the reserve and attend lectures on environmental education. "We haven't yet begun with the construction," Adriel Castañeda comments. He is the coordinator of Marine Reserves of the Fisheries Department. "We are in the stage of designing the new base and planning the retaining wall, which has included assessments of soil erosion and water patterns in order to create a natural ecosystem."

Castañeda, a biologist with a master's degree in natural resource management, says that Belize has nine marine reserves that depend on the Fisheries Department. Consequently, 22.5% of the



country's sea is protected, and 3% is devoted to fish replenishment zones.

He admits that there is still a lot of environmental education to be done because residents keep littering the beaches and throwing away their waste into the sea. He thinks that the leading program of the Fisheries Department called Managed Access needs to be improved, as it has led to conflict and division among fishermen fighting over their fishing grounds. It is a program that offers licenses to traditional fishermen to enter specific fishing areas in exchange for them to comply with the regulations and to describe the types of catch they are taking.

Some users claim that the program has been quite positive because it has curbed overfishing of species. Although fishermen's positions might be opposed, most of them agree on the lack of resources to care for the sea and the need for better public policies in natural areas, and that both illegal fishing and climate change are great threats to the sea.

Sandra Grant, who is responsible for the Belize Marine Conservation and Climate Adaptation Project of the Belize Fisheries Department, states that the erosion on the islands like Tobacco Caye or Twin Cayes cannot be entirely attributed to climate change. "We don't have enough assessments to validate this statement. We have seen gradual changes and erosion could have been caused by a natural effect or a change in currents," the expert in marine biology and aquaculture describes.

The project that Grant is developing includes educating and preparing communities to address the problem they are experiencing and offer new livelihood alternatives to fishermen in tourism, aquaculture, or rural development, with the goal to steer them away from depending only on marine products. The international scientific community has already issued a warning that climate change will put pressure on the world's food supplies in the coming decades because fish populations are declining.

Scott Jones, an American scientist who has been working for ten years in the Carrie Bow Caye Marine Station, also located in the South Water Caye Marine Reserve, confirms this theory and underlines that

snapper and grouper populations have shown a sharp decline in the area. "We use to see many groupers every day, whereas now we only see one on every trip. These species are under threat due to the warming of the sea (climate change) and illegal fishing. Uncontrolled real estate development is another threat. More surveillance and greater support to rangers is urgent. We give presentations to the schools of Dangriga, and they are very concerned about what is happening. Although the planet's coral reef covers a tiny part of the ocean -as it only represents 1% of the global surface-, twothirds of marine species are associated with this coral system. That is, the reef provides an invaluable benefit to human beings, and our future as a species will depend on how we take care of it."

As for biologist Celso Cawich, he says that one of the effects he has seen caused by climate change is that turtles are not digging more than ten centimeters in

the sand to lay their eggs. "The heat is turning the sand harder, and that is why turtles are leaving their eggs on the surface. Under these conditions, almost 50% of the eggs are not even hatching. Developed nations should assume their responsibility for climate change because countries like ours can only hope to adapt," Cawich claims.

Belizeans know that their shrinking land means a loss of space to live, hang out, chat, walk, eat, or read. What is the use of environmental rights, human rights, or democracy if there is no space to enforce them? Like Mohamed Nasheed, former president of Maldives, said, "Politicians must hurry because while they are fighting for a territory to rule, the land is disappearing under their feet."



## **EDUCATION, A RELIEF**

### TO THE AFFLICTIONS OF THE SEA

The circular afternoon is already a bay: in its still sway the world swings.

#### Octavio Paz

"I communicate better with the ocean. I know about the suffering of the sea. Also, I know about its magic and power. The sea is the essence of life. I wish we could be kinder to it," shares Paola Colman, a fisherwoman of Belize who was born in a small fishing town called Dangriga. Her mother, a Guatemalan, taught her to speak Spanish, and her father, a Belizean fisherman, introduced her to the art of the ocean.

She gets excited when she talks about swimming as a child. At 26, she plunges into the deep ocean water without diving gear to catch lobsters. She submerges only with the oxygen held in her lungs. Smiling, thin, short, and with a Caribbean suntan, she says that she studied high school with a focus in Economics and

that with her popularity, the strength of her words, and her charismatic presence, she has represented the fishermen of her community.

"Everyone here knows me," Paola claims. She is convinced that this was a determine factor for the Belize Fisheries Department to choose her in 2016, along with other 19 young members of the communities of Dangriga and Hopkins, to be part in a training program and become tour guides, divers, and community researches, in order to protect the South Water Caye Marine Reserve. I have learned so much since I enrolled in the program. For example, I used to know the name of some fishes and corals, but now I am able to quickly tell their scientific name. I also learned diving rescue techniques."



She and her 19 friends specialized in subjects such as Belize's history, Maya culture, reef, land and marine systems, diving techniques, and biological data collection. "It helped us to open our minds and have fun," the fisherwoman explains.

The international organization that provided the financial resources for the training on responsible and sustainable development of marine wealth was the Mesoamerican Reef Fund (MAR Fund), an institution involved in caring for the protected areas, among other activities. Paola is grateful to MAR Fund because it allowed her to learn and raise awareness on the population about the consequences of their actions. "We should think that littering or deploying gillnets inappropriately may break the coral or mangroves, causing changes in the ecosystem and negative consequences to the planet. Sometimes, tourists climb on the reefs to take photographs, but they are oblivious to the damage they are causing. We tell them not to touch anything to avoid harming the ecosystem," Paola comments.

For her, elementary schools should strengthen and keep a constant environmental education to preserve marine resources. "Many fishermen don't know which the permitted fishing areas are, and they lack the information of the authorized sizes of the species they are allowed to catch from the sea. People used to take better care of the ecosystem, and now it seems they only care about money."

Paola is proud of cleaning beaches, of collaborating with the Red Cross and the Church, and of working in a pre-Kinder school where she teaches children to respect their country, the seas and beaches. "I feel connected to the nature God gave us. I love my surroundings, and I hope we still have enough time to be humble and carry out positive actions for the planet," Paola thinks.

Also, Tony Ysaguirre, born in Dangriga 25 years ago, was appointed to be a tour guide and community researcher and to train in diving techniques. His high school studies were focused on Science and Economy. He considers that if a person does not understand the importance of the ecosystem, it is hard to care for it. Under this conviction, he gives



Adriana Navarro

talks on the care for marine resources to local fishermen and children who are and will be potential stakeholders in conservation. "I am grateful to the organizations that supported us with training courses because it promoted our creativity and provided us with useful tools to preserve natural areas. In learning how to collect biological data, we are able to offer better solutions to the problems that nature faces. I would like my country's government to make a greater investment in scientific research in marine reserves to ensure their protection and our economy since we depend on the sea."

Tour guides like Paola and Tony are key stakeholders in the conservation of protected areas such as South Water Caye.

#### PAPER, PENCIL AND THE SEA

Alexander Moore is a marine biologist and an expert in environmental education and communication. He was hired from 2016 to 2018 by MAR Fund and by the Fisheries Department to raise awareness on the protection of natural resources in coastal towns near South Water Caye Marine Reserve.

Alexander's base was in the town of Dangriga, and he would go to different places to provide environmental education in every school. He reached 21 learning centers, and over 1,600 children attended his classes.

As is usual in the beginning, it was difficult for Alexander to go into the communities that mistrust or discredit government programs. But Alexander is strong and clever, so he was successful. He first supported rangers of the Fisheries Department on the surveillance of the area. Then, he started reaching communities through education. Later, he bonded with fishermen while building a collection center together, where the fish is cleaned.

The teacher comments on the rejection he had to face from communities who believed that the Fisheries Department only wanted to confiscate their products or fine them. "It was tough to work with Dangriga fishermen. As the officer in charge, they have no respect for you, they give you a hard time. But I set out to the sea, and further out, boat to boat, I would explain to them the importance of conserving fishing resources. In order to get closer, I would give them useful presents, such as pens, cups, or water. They had many questions about the laws and closed seasons. On land, I joined the fishermen to build the collection center, a small house with a roof, and two tiled tables to clean out the fish. The communication between fishermen and officers of the Fisheries Department improved. They realized that we were trying to teach and help them, not arrest them, although I admit that changing a mindset overnight is impossible, especially with the current generation."

"Adults have deep-rooted customs, so I focused on educating children and teenagers. I visited 21

schools, that is, those located in towns near the South Water Caye Marine Reserve, in the district of Stann Creek and places around it like Dangriga, Big Creek, Riversdale, Hopkins, Placencia, and Mullins River." Children and teenagers, five to fifteen years old, paid attention to Alexander's talks on marine reserve management, coral reefs, mangroves and seagrass, the benefits of conserving fishing resources, the connection between land and sea through rivers, how pollution affects the life of ecosystems, and the processes to reuse and recycle materials.

"Scientists who were staying at the marine stations of Tobacco Caye, Carrie Bow Caye, and South Water Caye offered talks to students on turtles and the pollution of the sea. The children were impressed because they showed enthusiasm and learned a lot. From the bottom of my heart, I believe that education is the only way to achieve environmental conservation because it gives us tools to think about a sustainable future. There are many students passionate about natural resources, but there is no one to spark their enthusiasm. And, if no one does it, they will continue with poor environmental practices. It is necessary to introduce environmental education from elementary to college and provide employment alternatives in order to avoid the overexploitation of marine resources. The South Water Caye Marine Reserve is part of our culture. It provides us with food, employment for conservation, and tourism. It holds 30% of the country's biodiversity," the expert explains.

Alexander experienced a gratifying feeling when he built a garden with recycled tires. "Children changed their perspective and their relationship with the environment. We cut the tires in the shape of flowers and put together a nursery. They were driven to be different and take care of their planet," concludes the young man from Punta Gorda, a Belizean town also located on the shoreline.

#### ALLY OF THE SEA

Alexander Moore met the enthusiastic Lisa Mulcachy in Dangriga. She is a young woman from Texas who has lived in Belize for many years now and teaches environmental education. The two teachers decided to work together in all of the elementary and high schools around the South Water Caye Marine Reserve.

The story of Lisa Mulchachy and the Belizean sea is peculiar. She arrived in 2012 as a volunteer after reading a published invitation from the Fisheries Department looking for teachers specialized in marine systems. Lisa fell in love with the ocean, so she decided to stay and conserve it through education.

"I taught as a volunteer for two months and a half, but when I returned to the United States, I started missing Belize," Lisa says. She then asked for a job at the marine station of Tobacco Caye located in the South Water Caye Marine Reserve, but they said there was no funding for her program. However, Lisa didn't give up. She sought and found resources, and that is how she has been teaching all this time.

Today, Lisa lives in Tobacco Caye, a tiny island 20 kilometers from Dangriga that is losing territory to climate change. She regularly travels to the mainland to teach in different towns. In the last years, she coordinated with Alexander Moore to talk to all the classrooms in the region about the environment.

"We talk about the reserve and how to care for it. We taught the kids to plant mangrove trees and made them reflect on the impact produced by water. We took them to visit the cayes. For most of them, it was the first time out of their community. Their faces gleamed with surprise to see such natural beauty, and that helped for them to share their knowledge with their parents. The actual problem is that most of the students only complete elementary school. Their employment expectations are low because their training is limited. Their only opportunity to learn about natural resources relies on the education we can provide them. If you ask me what is the best option for the Caribbean countries, I would say to improve the education level," Lisa describes.

She underscores that the threats that impact the South Water Caye Marine Reserve rise during the Christmas holidays and when children go back to

school because there is an increase of illegal fishing due to the overexploitation of sea products to cover household financial needs. She confirms that the consequences of climate change represent severe problems to the Caribbean Sea, as they bring coral death or bleaching. "Fortunately, we have a resilient system. Yet, if one of your family members becomes sick, you take care of him or her. That is what we have to do with the ocean. Preventing overfishing and littering is essential."

"Raising awareness in children and adults of their actions and their impact on the sea is a priority, given that everything is connected. I was born to love the ocean and protect it, and I will keep doing it because I have an unbreakable bond with nature since I was a little girl," she says, while her eyes sparkle as if refreshed by the sea breeze.

## A BIGGER BUDGET FOR EDUCATION AND SURVEILLANCE

In Belize City, Inés García works at the government's Fisheries Department, which is located 119 kilometers from Dangriga and 139 kilometers from the South Water Caye Marine Reserve. She is in charge of communication and education in protected marine areas. From her modest office filled with papers, this 33-year old woman explains how the education projects have been implemented to talk to fishermen about the consequences of climate change. "We asked them what they know about the subject, and a conversation sets off about the causes and changes that have been detected in the ocean. They say that certain species have migrated and now it is more difficult to find fish."

Inés adds that they participated in radio programs explaining the adaptation to climate variability. Also, they have visited communities to show them the digital application *Clima Pesca* (Weather Fishing app) installed in their mobile phones, which informs fishermen on the impact of climate and adaptation alternatives to ensure food security. In fairs, festivals, and universities, dialogues are conducted on the use and importance of protected areas, as well as their biological and economic value to Belize. "Our goal is to raise awareness in the population

on the sustainable use of resources. We show that seemingly insignificant actions can have implications on natural resources."

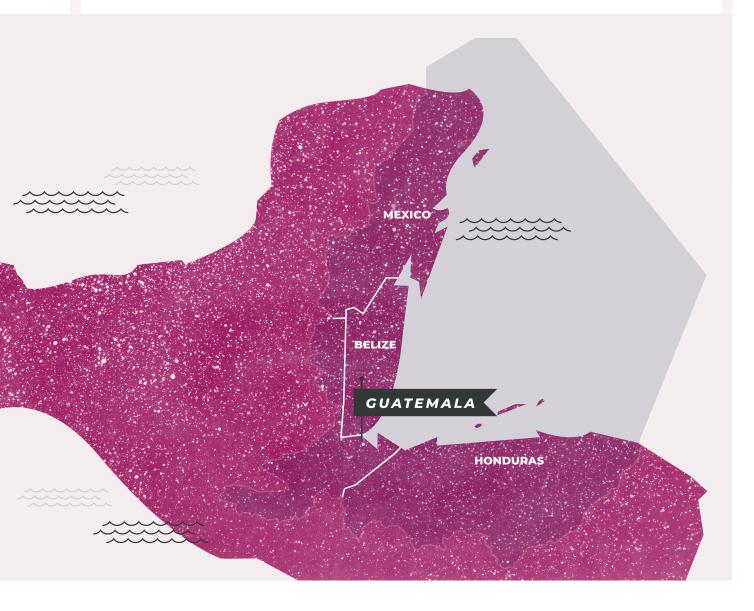
In order to obtain biological data of the reef, conch, lobster, and fish spawning in natural areas, the Fisheries Department has partnered with the biologist Celso Cawich, who coordinates an international volunteering program that recruits young foreigners, 18 to 30 years old, who wish to acquire diving experience and learn how to collect biological data. "The organization Projects Abroad advertises, and we train them on diving skills and data collection for the Fisheries Department," Celso, the teacher and biologist, indicates.

For Inés, it is critical for Belizeans to understand the meaning of these biological data in their daily lives, to learn how to take care of the reef and the species that live in natural reserves, to take ownership, to identify with the species to contribute with their environment's surveillance, and to civil society taking ownership of the natural areas. She would like a balanced public budget for the Tourism Department and the Fisheries Department, because they get fewer resources than other agencies and are in charge of the management of natural areas. "The country's economy relies on tourism and tourism relies on the conservation and good management of natural areas. We could hire more personnel to take care of the hundreds of protected hectares if we could have more funding." Private organizations like MAR Fund have been a strong support to carry out their work, Inés says. Her friend, a 23-year old Adriani Nicholson, who procures tools and resources for the staff, agrees with her.

Adriel Castañeda, the coordinator of Marine Reserves of the Fisheries Department, works in the adjacent office from Inés and Adriani. He underlines that, thanks to MAR Fund's support, the management plan of the South Water Caye Marine Reserve has been updated, and that they were able to draft a communication plan. Moreover, they connected with the communities near the reserves after the job carried out by Alexander Moore. Now, they are planning to partner with Lisa Mulcachy to continue with the education program.

In Belize, those who are at sea, in towns, or in government agencies agree that the economy and conservation are mutually reinforced to create a sustainable world. They know that sustainability will be achieved through awareness and respect to nature, because, as Nelson Mandela said, "Education is the most powerful weapon which you can use to change the world."





## THE LAND THAT FORGOT

## TO HATE

Village winds carry me, village winds blow me away, they scatter my heart and they throw my throat.

#### Miguel Hernández

"This is our land! We will not leave! They lied to us!" yelled a group of people in Maya Q'eqchi,' while years' worth of anger was clenched in their fists. It was a morning of 2005. The residents were planning to ambush the experts of the Foundation for Eco-development and Conservation (Fundaeco, for its initials in Spanish), who were explaining face to face how they had promoted the environmental protection of 35,202 hectares in Congress, through the declaration of the Rio Sarstun Multiple-Use Area (AUMRS, for its initials in Spanish).

Representatives of 21 communities who, for 60 years had made their home in these forests, jungles, and mangroves, were finding out for the first time during a heated meeting that, as a result of the new law in force they would have to use and manage natural resources with greater care. Besides, there was a particular provision that prevented them from the easy legalization of their lands. The news came as a shock to community members, as they had been requesting the title of their properties for over 40 years, and now, they were only a few months away from getting the certified ownership documentation for five communities.

Fundaeco experts were trying to calm things down. They explained that there had been other cases of community members in other natural protected areas with legal ownership titles of their lands, so they thought it was possible to countervail the articles of the law that prevented Q'eqchi' members from owning their land. But residents were still very upset because days before the approval of the

AUMRS, with the support of Claretian priests, they conducted an investigation and concluded that it would be impossible to change the law.

The pressure was building up with every word. Words of rejection and resentment were lashed out. The atmosphere became tense and violent. Julio Montenegro, an agronomist who helped communities for 24 years to obtain legal certainty regarding territory; his colleague Emilio Pitán, lawyer, community leader and the current coordinator of the protected area, and the Claretian priests defused the lynching, yet not the spread of mistrust between locals and Fundaeco members.

Finally, time diffused the anger. Both groups suggested actions to protect the AUMRS, a beautiful shared landscape, located northeast of Guatemala, which connects the border between this country and Belize.

#### THE SHORTCUT

Lili Elías recalls promising herself to resume communication between Fundaeco and the locals. She sat under a tree for hours, watching the work carried out by each member of the community. She, an engineer in Agronomy, with over fifteen years of experience in fieldwork, began assisting them in their tasks, earning their trust. "I started helping them sorting shrimp. They weren't so happy at the beginning, but little by little, they started trusting me, until one day they gave me squids as a gift for my dinner."

Like Lili, every Fundaeco member bridged the gap that had drifted them apart. Marco, Silja, Guillermo, Junior, Ana, Gloria, Ricardo, César, Celia, and Yessenia widened their communication scope by collaborating in fishing, field, environmental education, and sexual education projects.

Julio Montenegro and Emilio Pitán, both community leaders, were key stakeholders in this partnership. They collaborated with *Pastoral de la Tierra* for years, which is a Claretian association that fights for human dignity, community development, gender equality, sustainable management of natural resources, legalization of land ownership, and evangelization. Pastoral de la Tierra founded two indigenous farmers' organizations, one to work in Sierra de Santa Cruz, and the other – *Asociación Amantes de la Tierra* (AAT)– to cover Rio Sarstun.

Marco Vinicio Cerezo Blandón, who created Fundaeco in 1990, recalls, "At the beginning (2005), when we pushed the natural protected area forward, we were very concerned about saving endangered species in Rio Sarstun one of the last wild rivers in Guatemala. But we realized that we couldn't forget about communities, especially women who were dying during childbirth, or to cancer and even AIDS, after being infected by their husbands."

In 2007, the consortium Fundaeco-AAT was formed to jointly manage the AUMRS, in which six thousand people live neglected and affected by discrimination, and who also lack access to health programs, education, and technical assistance. In this regard, 19 out of 21 communities in the area showed interest in the consortium to work in co-management with local fishermen and community members, under a participatory approach and with an emphasis on community development.

Both Julio Montenegro and Emilio Pitán, who relentlessly criticized Fundaeco, became coordinators of the consortium. Julio was the first; then, Emilio took over in 2014.

In 2008, the consortium developed the AUMRS Management Plan, in which communities and 48 institutions participated in the integration of conservation strategies and the review of regulations

and zoning, putting ill feelings behind and betting on social and environmental projects.

Since the beginning, the Fundaeco-AAT consortium has been facing limited funding, weak legal certainty of land ownership, changes in land use due to cattle farming, poaching, and illegal fisheries. Drug trafficking, poverty, lack of health and education in communities, and laws that protect political and economic interests rather than collective interests have also been challenges to the consortium.

#### **DEFENDING AGAINST THE OUTRAGEOUS**

As unbelievable as it may seem, since the establishment of the AUMRS in 2005, mining and oil projects were approved to exploit resources within the natural protected area, with the goal to share a portion of their profits with the community, even if that posed a threat to the area's ecosystems. In 2019, the AUMRS Management Plan will be updated. This document will ratify the need to forbid mining and oil concessions due to their potential negative impact on the environment. It will be in the hands of the National Council of Protected Areas (Conap, for its initials in Spanish) to accept or not these recommendations.

Emilio Pitán, the young lawyer from Q'eqchi' origin who coordinates the Fundaeco-AAT consortium, explains that preventing the illegal wood trafficking by loggers around the Rio Sarstun area has been another strong challenge for the conservation of the natural area.

In order to stop illegal logging, the AUMRS was divided into critical zones, where 13 community rangers patrol, accompanied by members of the Nature Protection Division (Diprona, for its initials in Spanish), the Infantry, and the National Civil Police, to stop offenders. Eleven rangers work with resources from Fundaeco, and the other two, with support from Conap.

Government authorities, which have the legal capacity to confiscate and stop offenders, seldom enter the protected areas because they do not have vehicles or fuel to do it. Communities and civil organizations such as Fundaeco have taken

on the responsibility to preserve nature, as they receive support from the German Cooperation and international organizations like the Mesoamerican Reef Fund (MAR Fund). These organizations have been investing for decades to provide them with infrastructure and technical, scientific, and education capacities, contributing to the conservation of the Mesoamerican Reef that stretches throughout the coasts of Mexico, Belize, Guatemala, and Honduras.

#### **VOICES FROM THE JUNGLE**

Valentín Suchite admits that, before being a Fundaeco ranger, he wasn't aware of the importance of preserving nature. This farmer gave up fishing and farming to devote himself—six years ago— to taking care of the jungle and the sea. Together with his colleagues, Macario, Lucas, and Abel, he sets out in his canoe and walks for hours under the sun, guarding the mangrove, the forest, and the biodiversity.



"We used to see a lot of mangrove felling. People would take the branches and throw them into the sea so that fish would gather up and be caught easily. However, as a result of providing environmental education and talks to communities, this practice has decreased. They are now aware that mangroves are critical in cleaning the water and mitigating hurricane impact. There was also poaching of jaguars, tepezcuintle, deer, and wild pigs. Skins were sold, and their meat was used as food. Precious woods started disappearing from the felling of *Chicozapote* and Santa María trees. Fortunately, chainsaws are no longer heard in the forest," Suchite says. "The dialogue has been tough. In 2014, some loggers shot at us. They sent me a message, "If Valentín comes here, we will shoot him." We were afraid. We had to ask Diprona to help us calm these people down."

Walking through the protected area, it is evident that people survive in poverty and lacks electricity and water. They live in jungle landscapes hard to access. There is also a lack of schools, health providers, and clinics, and there are no job opportunities. High fecundity rate causes demographic growth, demanding more natural resources. Some businessmen hire community members to clear the forest and plant oil palm, particularly in Manabique, a territory adjacent to the Sarstoon River. Drug traffickers are also a threat to Manabique and the Sarstoon River, because they build roads to access their farms, which has an impact on forests, and launder money through cattle farming.

#### STRONG GUARDIANS

"In order to mitigate human-driven pressure on natural protected areas, we promote economic projects aligned with the principles of environmental and social sustainability," indicates Fundaeco leader, Marco Vinicio Cerezo Blandón. One of these projects is implementing agroforestry systems, which reduces the impact of logging and deforestation, and ensure the provision of food to families that depend on the environment. The concept consists of planting fruit, medicinal, and forest species in plots for self-consumption.

Ricardo Xol Rax, an agronomist and forest technician of the Fundaeco-AAT consortium, explains that, through the support of MAR Fund, people were trained on farming techniques and the reduced use of agrochemicals. They were also provided with seeds, fertilizers, and the necessary farming tools. Communities planted mahogany, *Santa María*, bay laurel, and *San Juan*, exuberant trees that, besides making the landscape more beautiful, work as a living fence, protecting their orange, lemon, tangerine, mango, and avocado orchards and pineapple crops.

The project, which was launched in 2016, has repaired the degraded soil from single-crop farming. Because when communities grow corn, rice, and beans, the ground becomes less fertile, and then they use more agrochemicals or clear forests for new crop areas with better qualities and continue on planting. "With agroforestry systems, we were able to control logging and use of toxic chemicals. We restored the land and diversified food production for the population," Xol Rax adds.

The cacao crop, another agroforestry system sponsored by MAR Fund, has been fundamental to the economy of dozens of families who are expecting to harvest the ancient ingredient in two-years' time. The goal is to sell it to the company Choco, located downtown Puerto Barrios (half an hour by boat from the communities), who promised to buy it at a fair price: 2.5 dollars per kilogram.

Emilio Pitán has also taken on the task of seeking other economic alternatives for communities and has found them through the government forestry incentives, such as the Forestry Incentive Program for Owners of Plots Suitable for Forestry or Agroforestry Use (Pinpep) and Probosque.

Pinpep is aimed at community members, and Probosque, for landowners. In both cases, they are committed to taking care of their hectares. In exchange, they receive 1,867 dollars for each hectare. Emilio Pitán enrolled 90 projects in a year, which represented 168,030 dollars for the communities to improve their living standards, conserve their woodlands, and increase carbon stocks. The staff of the National Forestry Institute inspect the beneficiaries' hectares; if they find them deforested,

families must return the money, so it is no surprise that they have become strong custodians of their lands.

But Emilio and the other seven technicians of Maya origin see beyond the economic incentives and want to change people's mindset. They want to preserve their surroundings regardless of financial motivation. With that in mind, they invited several leaders of the Rio Sarstun in 2018 to visit a town in Totonicapán. The locals explained how they have organized for more than 500 years to care for their coniferous forests and shared with them how proud they feel to have quality water, air, and soil.

César Enrique Pop Choc, technical assistant of the Fundaeco-AAT consortium and a sustainable tourism expert, is convinced that culture and education can promote change. He sails for an hour and walks another hour just to get to the last towns in the deep forests, where he teaches people how to reforest and encourages them to preserve their traditions respectful to the environment. He tells that the Maya elders still thank Mother Earth for the resources she provides. However, some youths have lost that grateful attitude.

"When we plant, we thank the land, the water, and the air. We ask for the purification of the territory, the seas, and the lakes, which are life's essence. We seek forgiveness for the damage we cause. We burn copal incense and light up candles to perform a ceremony for our Mother, nature. Our culture depends on natural resources; it is closely linked to them," César Enrique reflects. "It is an invisible bond, like a secret happiness that we experience when we have the chance to conserve the sacred geography of our great Q'eqchi' people."

## OF THE RIO SARSTUN

I read in the palm of my hand, Homeland, your sweet geography. Uplift the line of my life with a stroke equal to your volcanoes and then go down as a line from heart to my fingers

Miguel Ángel Asturias

After the tiny aircraft landed, I was welcomed with the warm air of the Caribbean beaches, at the military airport of Puerto Barrios, north of Guatemala, on the border of Belize. We landed in the jungle, where back in the 1930s, vines and lush trees were the setting for the film *The New Adventures of Tarzan*, starring Herman Brix who played the character of a burly man searching for the mysterious sculpture of the Green Goddess, while fighting a group of bad guys who wanted to seize the same idol.

My mission –unlike Tarzan's– was far less heroic and consisted of unraveling the processes that communities, scientists, politicians, and civil organizations have followed since 2005 to preserve the Rio Sarstun Multiple-Use Area (AUMRS), a 35,202-hectare natural space.

From Puerto Barrios, I sail towards Livingston, a coastal village where one of the Fundaeco offices is located. Fundaeco is a private, non-profit, ecological organization that was founded in 1990 to establish, manage, protect, and conserve natural protected areas. Some of its members will be guiding me through the visits and to understand the area.

Livingston is a multicultural place, different from other places in the country. Through its streets, Maya Q'eqchi' women who wear their traditional colorful skirts walk among the noisy tuk-tuks. And, Garifuna folk can also be seen with their exuberant bodies and their heads adorned with long braids and dreadlocks. Guatemalan mestizos, and people from Indian origin who are distinguished by their bright dark eyes, also reside in the area. A harmonic combination of languages floats in the air: Spanish, Mayan Q'eqchi', Italian, French, and Garifuna blended with English from the influence of foreigners that have stayed there or from those just passing through, learning about the culture or enjoying the local food.

The village is located in the AUMRS buffer zone, and is the point of departure to set out for the protected area by boat, where 21 communities reside, 19 of which are attended by Fundaeco. The population is comprised of Maya Q'eqchi' people (78%) and mestizos (22%).

The AUMRS is a chain of ecosystems. Mountains and tropical forests can be seen above the sea level. Over the horizon, there are flooded forests, mangroves, and lagoons, and seagrass and reefs are found below the water surface. If the forest is affected, the watershed is damaged because ecosystems are interconnected, undermining the air, water and soil quality, the beautiful landscape, and the social well-being.

Guillermo Gálvez Argueta, the sub-coordinator of Fundaeco, explains that the AUMRS is a land

protected area linked to the coastal marine environment. It covers 600 hectares of mangrove that are considered determining for the productivity and life cycle of species, such as snook, yellowtail, bonito, tarpon, Spanish mackerel, and shrimp. "The Guatemalan Caribbean is the only protected area with dwarf mangroves. There are also reef patches between the first and sixth kilometer, out from the coastline. It is a space where manatees —endangered marine mammals— grow and feed," Guillermo concludes.

#### LIFE OF THE FISHERMEN

We left Livingston on a December morning and set out to visit the fishing towns. My guides are Darwin Ponce, a 21-year old, who navigates the boat, and Celia Gamboa, a social worker and environmental educator. The landscape is filled with palm and mangrove trees displayed across the breeze as they pass quickly before our eyes.

We dock, and I get out of the boat, making a contortionist's move to avoid losing my glamour. We arrive to dry land in San Juan and walk among huge trees, branches, and fallen leaves covering the slippery mud. We head towards a wooden hut where a group of fishermen is expecting us. I can hear the waves splashing.



Isaac Troches says that, as a boy, he learned how to handle fishing nets, as is common among those who are born and raised in the coast. His grandparents taught his parents, and his parents taught their children. The craft of fishing runs in families. "Fishing trawlers have proliferated in the past 20 years. Since this is a small fishing area, there are no more fish. Shrimp trawlers drag a net that sweeps all biodiversity from the ocean floor: seagrass, larvae, fish, invertebrates, and even juvenile sharks."

His neighbors from Barra Cocolí town experienced the same situation. The town is 25 minutes away through the river. Eight families who depend on the sea live in this town. "We used to fish with three or four gillnets, providing enough to cover for fuel and feed a family. Now, we use five or six gillnets, but it doesn't even provide for fuel," Fernando López claims.

Not far from there, in the town of Barra Sarstún, half an hour by boat, live the fishermen Ricardo Castro, Pablo Castro, and Félix Vega. "Back then, we could easily pull out fish practically just by putting our hands in the water," Félix shares.

Product depletion led communities to organize themselves and legalize or formalize a fishing committee in each town, in order to protect fishing resources, promote alternative economic projects, build capacities, and receive funding. Each town experienced different processes and times for establishing their committees. They agree that internal conflicts and big egos are the major threats of productive work, respectful to the environment.

#### A DISPUTE OVER THE SEA

The German Cooperation provided funds to the Mesoamerican Reef Fund (MAR Fund), which, in turn, would finance Fundaeco activities for the establishment of fish replenishment zones in the Guatemalan Caribbean.

After training on environmental education with Fundaeco, fishing committees and community councils of urban and rural development –the authorities of the internal life of each town– signed a document committing to care for the sea, watch

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their coasts up to three kilometers out, observe close seasons, avoid fishing in river mouths, and respect fish replenishment zones.

Silja Morgana Ramírez, head of Fundaeco's marine program, says that the commitment of fishermen allowed for progress in the achievement of the AUMRS conservation goals. The environmental education efforts promoted by Fundaeco strengthened the awareness of communities that are proud of their territory, while alternative and subsistence projects produce a better quality of life.

But the journey has not been easy because, although the villages of Buena Vista, Barra Sarstún, San Juan, Barra Cocolí, and Livingston (the urban aspect) had signed the agreements for conservation and surveillance in their areas, the government has not acknowledged these community agreements. "There is no protocol in Guatemala to establish fish replenishment zones because it doesn't exist within the Fishing Law nor the Law of Protected Areas," explains Guillermo Gálvez Argueta, Fundaeco expert on aquaculture. "The Fisheries and Aquaculture Regulation Directorate (Dipesca, for its initials in Spanish) argues that the decision should come from the National Council of Protected Areas (Conap), and Conap says that Dipesca is responsible for it. We delivered the documents to both entities, yet there has been no progress at all since 2013."

The lack of government certainty has generated an environmental and social problem, because boats that fish in front of the towns come in conflict with the locals that patrol on their skiffs. "These fools come into our areas and make a mess. We need them to respect the community law. We gave notice to the Navy, but they seldom come," Margarita, Luis, Fernando, Noé, and José agree. They all are fishermen of Barra Cocolí.

"We ask them to refrain from fishing during close seasons. They say we are selfish, but we are only preventing damage," Jacobo, Jacinto, Isaac, Norberto, and Francisco agree, who are residents of San Juan. "Here, at Barra Sarstún, is forbidden to fish with gillnets and trawls, and cut mangrove trees. We fish with hooks to catch the food for our families. It is unbelievable that there are people who don't respect



the sea and disregard the benefits of the spillover effect," Félix adds, joined by Ricardo and Pablo.

Fish replenishment zones are expected to increase individual sizes and the abundance of commercial species in five or more years, boosting the amount of catches and its consequent profitability beyond these zones. This is what is known as the spillover effect.

Fishermen in the AUMRS think that conservation has improved their quality of life and has strengthened the social fabric of communities. "Ecosystems are like the human body: each part has a role. If we neglect it, it affects our health. See how well I am saying it! I learned that during the training," Ricardo from Barra Sarstún says with a smile.

#### **EXPOSE THE BEAUTY**

My eyes are flooded with delight. Dense vegetation surrounds us. Birds fly close to the coast and embellish the skies covered with white sheep. The locals in Barra Sarstún, San Juan, and Barra Cocolí describe the ecological projects submitted to MAR Fund with the support of Fundaeco. With tourism initiatives, they have obtained knowledge and explored new productive alternatives to extract fewer products from the sea and the land, without affecting their income.

Ricardo Castro, Pablo Castro, and Félix Vega travel by boat, the only transportation in these communities, to reach a half-finished wooden house facing the sea and the mangrove forest. This hut will soon be a fish market and a tourism booth; that is, a hybrid between a visitors' center and a collection and trading center for local products and tourism services. In the future, a restaurant will be built on one side of the hut.

They are part of the Fishermen Committee of Barra Sarstún, and say that their first economic project consisted in placing cages in the sea to breed *mojarras* in a natural setting. "We had a good profit from sales and used that money to build the committee's office and the fish market. MAR Fund provided us with funds to furnish and turn it into a restaurant.

The community diner was ready two and a half years ago. It created jobs in the area, yet 16 days after its conclusion, a tragedy struck in August 2017. Everything was burned down in 45 minutes. A gas leak in the kitchen was the source of the misfortune. The 30 members of the committee suffered depression, anger, and sadness, but they didn't give up. Three days later, they resumed their work. "These are lessons learned. MAR Fund keeps supporting us. We have received training and recently bought extinguishers. We have developed plans for our new project that will include a restaurant, as well as tours to visit our town and sell our fish," the project's partners assure.

In another setting, at Barra Cocolí, the community plans to offer a beach where tourists can enjoy sunny days, snorkeling, sport fishing, and taking promenades through the trails to observe the birds and plants of the area. "The idea is to build bungalows for lodging and a booth to sell food and provide tourist information. The project has been running for two years. The environmental impact assessment was approved. We are now waiting for the construction license to start purchasing materials," Fernando López explains.

The problem in this community is all the plastic that comes from the rivers and the sea. Community members clean the trails daily, but they can't keep up with all the pollution that comes from nearby villages. Therefore, they have asked municipalities, towns, and cities, particularly in Guatemala, to be aware of waste management.

In the town of San Juan, fishermen are opening a collection center to offer their products at fair prices, because, for years, intermediaries have taken half of the profit. The support from MAR Fund has enabled them to learn business management, processing of fishing products, and kitchen management, as well as becoming tour guides. "The whole idea of undertaking a business helped us to think about the future and make better decisions. It was interesting to see how we could become tour guides. They taught us how to control our personality, have a good attitude, be nice and respectful, and foster good values," the villagers admit.

Fundaeco also coordinates the project *Ecoveleros* (in Spanish) or Ecosailboats, which teach the sons of fishermen on how to handle fiberglass, carpentry, mechanics, electricity, and tourism. "These kids attend class with Justo Rodríguez, a former fisherman and current environmentalist, to learn an alternative trade," Celia Gamboa says.

"They learn to use these tools to apply this knowledge into their communities. We have groups that include almost 30 people, half of them are women, and half of them are men. The average age is 17. The goal is to repair together an old sailboat bought by Fundaeco, and then use it to transport tourists," explains Justo Rodríguez, better known as Junior.

Now I know why Darwin, who drives back to Livingston, knows about navigation, mechanics, and electricity. He acquired most of this knowledge through the project *Ecoveleros*.

#### SOCIAL AND ENVIRONMENTAL DEVELOPMENT

"The damaged environment cannot be restored if gender inequality persists, because division of roles has fostered women exploitation. Women must reclaim their rights –without reinforcing gender stereotypes– and participate in the design and jump-start of development models in line with the

biological, social, and cultural values of the region. Equality must be the core component of social transformation. But equality cannot be based on the stereotype of woman-mother or woman-nature," the ecofeminist Alicia Puleo adds. She proposes the slogan "Liberty, Equality, Sustainability," which involves women being able to decide over their sexual and reproductive rights.

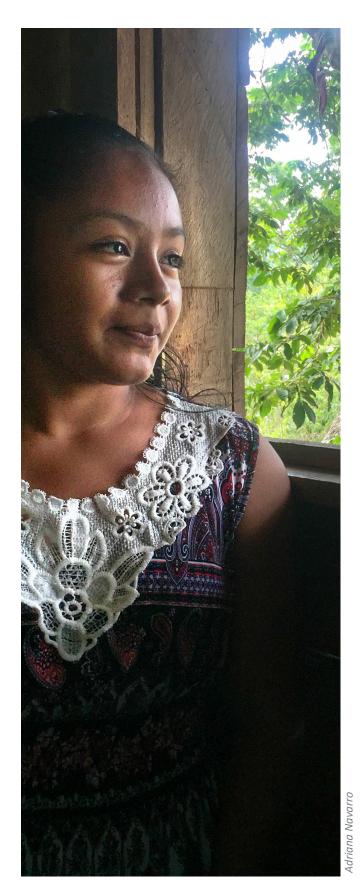
María Cabnal Pérez, a Q'eqchi' midwife from the town of Barra Sarstún, says that men in their community have not yet committed to respecting women. "We cannot feel at peace if there is violence. Intimidation stifles you and makes you fearful; that is why we help them to know their rights."

Cabnal, an expert in the healing properties of plants, says that her town not only lacks equality, but also basic services such as water, electricity, a permanent nurse and staff bringing sick people down the mountain and transporting them by boat to urban clinics. She describes an ordinary reality that villages located in the protected area have to endure, people survive poverty, and job and education opportunities are scarce. It is a place where women are those who suffer the most from unfair treatment.

Mirza Shol Cucul, a Q'eqchi' woman, interpreter, conservationist, and expert in ecotourism, thinks that discrimination against women persists, but not as terrible as 15 years ago, when women didn't know how to read and write. "Men no longer hold the total power of decision given the education provided to women in communities."

Today, children, youths, women, and teachers have more access to education processes in terms of health, self-esteem, and sexuality. Gloria Galindo from Fundaeco talks about the job they do, "We inform families that child marriage is a crime. We tell girls and teenagers that pursuing higher education or starting productive projects is a possibility, and so that marrying or finding a husband is not their only option. We encourage them to take advantage of the scholarships offered by Fundaeco.

Zenaida Rocío Castro, Xiomara Lizet Chiquín, and Olga Marina have taken this advice and have requested support. They obtained 800 quetzales (100 dollars)



every three months to buy school supplies. "I work at a food store, but the scholarship has helped me to buy what I need in school and keep studying computer science," Olga says.

The three testimonials, paused and melodious, with the rhythmic flow of the Mayan and Spanish languages, can be heard inside the Women's Health Center, a modest wooden hut built among the trees, on one side of the corn mill. It is the central office that provides information on family planning, and has medication bottles obtained in medical missions. There, María assists pregnant women and says that she used to deliver 20 babies per year; but now, only five babies are delivered into the community in that same period.

Ana Elena Yatz, an environmental educator, manages the health clinics in the communities, schedules medical missions, and organizes training events for midwives. "Without health, we cannot take care of the environment."

Several women explain that at least fifteen of them gather at Maria Cabnal Pérez's house to discuss their right to leave the house to attend meetings, study, and work. "Men used to yell at us, now we are able to stand up for ourselves." They are part of the Women's Association of Barra Sarstún, formed in 2006, in which they collaborate by baking bread and food they sell to tourists. "We divide the money come December and we buy things for our children," Juana Chiquín Melgar says.

Far from the AUMRS, in the city headquarters, Marco Vinicio, the Fundaeco's leader, says that family planning and women's education are critical factors for social development and conservation because they will make better decisions for themselves, their families, and their communities. He claims that declaring protected areas has enabled Guatemala to defend the last ecosystems. He underlines that the laws have passed thanks to the communities, the same way that the commitment of visionary, sensible, and mindful people has transformed the social reality and the sustainable development of the country.



Fundación Albatros

"Mankind is trapped in the inertia of having lived in a pristine and bountiful planet, with a lavish nature. But the cumulative effect of a hundred years of destruction pushes us to change cultural practices, bet on scientific research, and engage public and private sectors in the challenge regarding the environmental crisis we are going through," Marco Vinicio says.

For many years, Fundaeco has faced threats, harassment, and murder for defending its territory. Also, the organization went through a terrible loss in March 2019, because Obdulio Javier Villagrán, known as *Yuyo*, was murdered in the town of Carboneras, in the municipality of Livingston, department of Izabal. The environmentalist worked as an assistant in biological investigations of Fundaeco. He was in charge of a shelter in the Cerro San Gil Protective Springs Reserve, and had received threats for his constant reports against logging in protected areas.

As I head to the airport to return home, I go through the statistics that place Guatemala and Honduras as countries that represent the greatest danger at a global scale to defend the territory, from the lack of competent entities that stand up against the interest of big companies and governments. Despite the bad news and the strong winds that shook the small aircraft in which I flew back to the city, the memory of the people I met and the places visited gave me hope for the future.



## THE PERPETUITY OF PARADISE BEGINS IN THE CLASSROOM

When it rains, I will cross the central square, I'll sit on a bench with a book and suddenly listen a bell tower of words arise from some poem.

**Denise Vargas.** 

"A few days ago, I was traveling on a boat with a woman and her son. She had a rusted umbrella that the wind broke when she opened it. She was about to throw it into the ocean when her son shouted, 'Don't litter, mom! It's rusted, it will pollute the water and make the fish sick," the teacher Erika María Galea says.

She was happy to hear the boy correcting his mother and preventing more waste from ending up in the ocean because that is an unmistakable result of environmental education. Teacher Galea, head of the Richard H. Rose Basic School —a school in Los Cayitos on the island of Utila, Honduras— stresses that her community changed its habits after the Bay Islands Conservation Association (BICA) built a culture of caring for the environment.

"BICA visits us once a week. They offer talks on ecosystems, reefs, turtles, and whale sharks. They motivate students with prizes and incentives, such as taking them out snorkeling to get them to know the reef. Students learn in the classroom, but they learn more when it has a practical approach. Furthermore, BICA offers workshops for teachers and takes the community out to clean the beaches and release turtles."

Erika María Galea recalls another success story derived from environmental education: The case of Roland Cooper, a member of the community, owner of a *pulpería* (grocery store) who finished high school and participated with BICA. She recalls, "Cooper said to me, 'I learned to love Honduras, to know where I come from, to recycle, collect plastic, clean the beaches, put garbage where it belongs... Because I used to throw garbage out the window."

Cooper —as other members of the community—thought that he had the British nationality by living in Utila because during the 17th century, the British conquered the island. However, after receiving an education, he changed the way he thinks, and this reflects on how he takes care of his land. "In the past, the community seemed to rest over a mattress of garbage. Now it looks cleaner, there is a healthier environment, and it is all because BICA has educated students, parents, and fishermen."

#### SURIEL, THE HEROINE OF UTILA

Suriel Dueñas, loves photography. She is a young woman in charge of bringing environmental education to the communities of Utila. She was born in La Ceiba, studied ecotourism, and

her spirit of adventure made her travel to Utila for her internships. She started working in the Iguana Research and Breeding Station of the Bay Islands Foundation. Later, she worked at BICA as an administrative assistant and soon became responsible for environmental education. She has been promoting new ways to coexist with nature and to be more respectful to it.

Suriel plans the annual schedule to visit schools, meets with the Education Directors Council, takes note of suggestions and organizes her agenda to address them. On the other hand, she coordinates with several non-governmental organizations and businesses to recruit volunteers and collaborate in activities and workshops.

Early on, teachers from some schools were indifferent and even said that it was a waste of time, but today, they consider the program to be essential and request more and more capacity building for themselves and their students. There is only one sector, the heads of private schools that has not been as responsive to the subject and continues to resist providing environmental education in their schools. However, Suriel visits all the schools in Utila. Six of them are located downtown and one in Los Cayitos. She visits preschools and high schools as well.

She talks to students about the reef, life in the ocean and ways to save it, as well as the monitoring of sea turtles, the harmful presence of lionfish, and endemic species. She divides her program into land and marine systems and shows them how humans can keep the ecosystems healthy.

Suriel has partnered with Mayra Lucila Hernández, head of the Public Basic Education Center —the most noted school in Utila— with 480 children. Lucila explains that she and Suriel take the students on field trips to the natural protected areas, the mangroves, and the reef to encourage them to appreciate and value natural resources by being in contact with them.

"Visiting these areas has helped raise awareness, stop bad habits, and reconsider the lack of family values," the teacher says. The thing is that some parents throw garbage on the streets or take their children to hunt iguanas. "These bad examples have become a regular habit. Changing this way of thinking is difficult, but it is possible through environmental education," she adds.

Meanwhile, in order to address these bad habits, Suriel shares her knowledge as much as she can. She participates in *Educa Todos* or Educate Everyone, a



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project that educates adults who work during the day and go to class after their working hours. Despite these activities taking place after office hours, she continues doing her job at night. "It is an opportunity for me to do what I love. Environmental education reveals our bad practices and shows ways to live sustainably. Environmental education does not exist in Honduras neither in primary or secondary schools, even if it is essential and necessary, especially because we have the Bay Islands National Marine Park with its biodiversity corridor and the Mesoamerican Reef System."

BICA, which is present in the three islands — Utila, Roatan, and Guanaja— has tried to include environmental education in the school's program. "We haven't achieved this yet. We are represented locally, but we lack support in other regions of the country to include the subject into the national board. Institutions should work together, but we have a long way to go. The tourism industry should be engaging more in conservation, and authorities should enforce the law, not just focusing on the financial aspect," Suriel says, who also has a strong love for reading.

To compensate for the lack of environmental education in Honduras, BICA Utila inaugurated the *Aula Azul* or Blue Classroom, a center where students and teachers can visit can attend workshops and conduct research, study, read, or present environmental projects. It is located inside BICA's offices, and it is easily identified because the walls are decorated with pictures of turtles, fish, corals, anemones, and octopuses that live in the clear waters. Suriel's sisters, Geisy and Heidy, who are permanent volunteers in the organization, made the paintings. Animal figures made with recycled materials by students hang from the ceiling.

The Blue Classroom was opened in 2019 and is a continuation of the *Aula Verde* or Green Classroom, designed by Cindy Flores, a conservationist from BICA Roatan. Both projects received support from the Mesoamerican Reef Fund (MAR Fund), an international organization that donated resources

for the construction, chairs, tables, computer equipment, learning material, air conditioning, and incentives for developing educational programs. MAR Fund also covered food and transportation costs so students could go on trips.

#### **ISLAND LEADERS**

Utila is a lucky place. It is a magnificent coastal territory with endless hues of blue, bright fish, and seagulls adorning the skies. According to several accounts, Utila is also immortal in the literature. Historians and experts like Shelby Mac Nab say that Daniel Defoe was inspired by this archipelago when he wrote his famous novel *Robinson Crusoe*, whose main character is an English castaway who spent 28 years in a tropical island.

But Utila is not only literarily charming, since there are youths on the island that know its environmental value and have seriously committed to its conservation. Abigail Martínez Hernández is one of them. She participates in the project *Líderes del Arrecife* or Reef Leaders, promoted by BICA since 2016. The project is part of the Environmental Education Program to involve community youths in activities that are essential for conservation.

"I've been a leader for a year, and the experience changed my life completely. Today I am aware of the importance of the environment, I used to throw garbage out on the streets. I cannot continue polluting because I know how this harms the ecosystem. I cannot continue using plastics because I have learned about the lives of fish, mangroves, and turtles. My friends have noticed this change, and I ask them not to use straws. Even my grandmother, María Troches, changed her habits and uses canvas bags. My father used to collect turtle eggs to sell, he even loved eating turtles. But one day, some friends invited him to go out to hunt them, but he refused. He told me about their plans, and I called BICA, so they went out to patrol the beaches and prevented a tragedy," said this 17-year old girl who makes flowers out of recycled plastic bottles to decorate her school. "Being a leader has helped me set goals for myself

Suriel Dueñas claims that wanting to earn a position as a leader has become widespread. The youths have committed their daily lives to carry out actions that are friendly to the environment. They are trained in marine and land subjects, identify fish and coral, and know about land animals. They have taken entrepreneurial leadership workshops. "Some of the kids didn't know how to swim, and they learned with us," Suriel describes.

The leaders care for the nursery that grows in BICA. Suriel tells us how at first, the nursery was part of the Night Education Center under the responsibility of high school kids, but when they graduated, they forgot about the nursery. So, it was decided to transfer the nursery to the Visitors' Center of the organization. "We didn't want to waste MAR Fund's investment because we built the center with it. We leveled the land, did the woodwork, started composting, developed the sprouting process, and designed the space for the plants and the vegetable beds."

Jonny Javier Santiago, an 18-year old young man, who is always willing to help in the nursery, recalls, "When I was in ninth grade, I chose to do my internships in BICA. I applied to become a leader and stayed." He admits that they are an example to the community. "We do not litter on the street; we go in the water and take the garbage out; we monitor turtles and report illegal fishing. We have learned to recycle and to say no to plastics. We are proud of what we do for the island. We were incredibly surprised when they gave us the diving course."

Suriel Dueñas says that the diving courses were planned to improve the training of youths in Utila because, once they finish high school, many of them cannot continue studying, either because of lack of money or because their parents will not let them. Besides, it is difficult for them to leave the island and explore other options. Diving is an opportunity to include them in research and monitoring activities.



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MAR Fund financed 18 open water diving courses. Pamela Ortega, a member of the BICA board, got discounts from the Professional Association of Diving Instructors (PADI) for six advanced immersion courses so that the young men and women would become capable of cleaning the reef. "MAR Fund has been pivotal because they provided support for the diving courses and the implementation of education programs, as well as with my consultancy that involved organizing and coordinating the project Reef Leaders."

Maber Eduardo Gutiérrez Hernández, a 19-year old, better known as *el Primo*, is also part of the leadership program. He is one of the most influential young men on the island. Maber has invited dozens of people from the community to clean beaches, to take part in the care of turtles, to attend talks on the protection of mangroves and reefs, and to join him to watch the ocean's luminescence. Also, he helps organize the Lionfish Derby, a competition to catch this fish, which is harmful to the reef, and where delicious dishes are prepared with its meat. "We gut the lionfish, weigh it, and use its meat to prepare food."

Currently, he works in BICA and is in charge of collecting, cleaning, and cutting the glass bottles that restaurants and hotels provide to turn them into ashtrays and drinking glasses that are sold in the eco-store. "Twice a week, I go around the island on the ATV (financed by MAR Fund) to collect the glass. I gather up to three hundred bottles. The glass-cutting machine is in the patio of the organization. María Arteaga, the director, taught me how to use it. I use protective glasses, gloves, and earplugs for my safety," comments Maber, who is assisted by volunteers.

Soon, tourists will be assisting him, because BICA plans to open two tourist routes, including the recycling area. One route is a bicycle tour where the young leaders will gather a group of visitors and take them to know about BICA's activities. The tour includes breakfast and a bicycle ride around the island. The ride ends in Coral View, where they can snorkel to admire the reef. The other itinerary will include sharing BICA's activities and participating in

the glass bottle recycling process. Both tours have a cost as an income for the guides. "This idea is still a proposal, but we will soon implement it," Suriel says.

BICA has 14 reef leaders, aged between 14 and 28. We interviewed Abigail, Jonny, and Maber, who agree that they would love to have a plastic-free island and a community that has the knowledge and awareness of caring for the ecosystems.

Pamela Ortega, the leader of BICA, says, "leaders grow because people respect and follow them and because they speak and work to benefit the people. Their followers are essential because they share the same vision and create movements. If we all are on the same page, we'll be unstoppable."

#### THE STORY OF A MARINE GUARD

Luis Eduardo Lorens Chinillo, the coordinator of BICA's marine patrol, is sitting in the Blue Classroom. Born 24 years ago on September 29th, he is a very strong young man with a broad smile. After finishing high school, he did an internship for a year at the Iguana Research and Breeding Station of the Bay Islands Foundation. He later joined BICA to protect the sea turtles, an endangered species as a result of hunters selling and eating their meat and eggs.



Luis Eduardo continues, "We locate them with GPS, record the date, the beach, type of species, nest number, and the number of eggs. On average, we count between 170 and 200 eggs per female. We have observed that nearly fifteen eggs are lost because of low temperatures." While turtles are nesting, Eduardo and the volunteers measure and tag their right flipper to record their growth and see if the turtles are returning to nest at the same beach.

After sixty days, the hatchlings, incubated by the heat of the sun, hatch and head out to the sea guided by the sound of the waves. "In their way to the sea, the little turtles are vulnerable to natural predators because their soft shell makes them easy prey for morays, the sea snakes." The sex of the hatchling will depend on the temperature of the nest during the incubation period: the warmer it is, the more females will hatch.

Volunteers —leaders, people from the community, people from diving centers, or other non-governmental organizations— usually stay up from eight at night to four in the morning. During this period, they assist the turtles in their nesting process by erasing the tracks they leave when they come out of the water to avoid hunters from finding the nests, or volunteers accompany the hatchlings along the beach until they reach the ocean.

Schedules evaporate in Utila. The commitment of taking care of the environment goes far beyond the classroom, the households, the institutions, the working hours. It goes as far as the awareness grows, allowing ecosystems to flourish with every step, to preserve the color of the reef with each dive, and to enjoy the luminescence of the sea with every wave.

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# GUARDIANS OF THE ISLAND

I have not come into the world to cry. It is not with tears that the high dimension of man is obtained.

#### Clementina Suárez

"The first waves that hit the boat were so big that I panicked. I thought about going back but decided that it would be much riskier. For a few seconds, I took a couple of deep breaths, looked around, and realized that everyone was watching me. If I showed fear, the situation would end up worse. I said to them, 'Look, guys, this is going to be tough, but we're going to get there. Stay calm. Please sit down and hold on tight. Don't worry," Captain Josué Adalberto Puerto says.

The shoreline disappeared, and the green ocean and blue sky spread in the horizon. Ashen and shaken, Edoardo, Jorge, Maber, and Hazel listened to the captain as they sensed a catastrophe. The uneasy crew swayed in the uncontrolled boat that soared through the crests. The wind was relentless, and the huge waves were strong. The fierce currents crashed against each other and soaked the boat.

Josué tried to control the boat, resisting the intense surge. The boat lingered in the air for a moment and came back down, slamming onto the raging sea. It took them two hours to finally reach dry land, when it usually takes 20 minutes for fishermen to cross this stretch. Pondering and drenched, they remained silent and tenaciously gripped the boat's rails. They

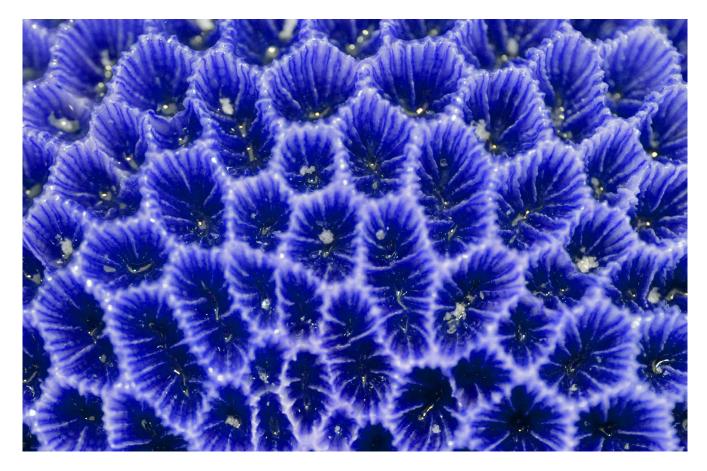
had just finished monitoring the Bay Islands Marine National Park in Honduras, and as they returned to the dock on the island of Utila, they met enormous waves during excruciating hours.

Josué, a park ranger from the Bay Islands Conservation Association (BICA), is grateful that he and his partners came back safe and sound from a vicious ocean and still able to continue working in conservation.

#### THE STORY OF PUERTO

Josué Adalberto Puerto is from Roatan, one of the islands of Honduras. Born under the sign of Aquarius on February 12, 1986, he studied to become a computer technician in La Ceiba. Later, his family moved to Utila, looking for better job opportunities. That is why Josué arrived at the island when he was 21 and started working with his father on building with gypsum board, carpentry, and plumbing.

Soon, Josué adapted to life in Utila. It is a place surrounded by water, similar to his native Roatan and filled with the smell of the breeze, in the middle of a hot jungle. The island, with an area of 42 square kilometers, emerged from a volcano eruption.



Utila was inhabited by Paya and Pech natives, conquered by the Spanish and the English, and continuously besieged by French and Dutch pirates. Up until the end of 1859, after 200 years, England returned it to Honduras, along with Roatan and Guanaja, three islands that are part of the Bay Islands Complex. Today, it is a multicultural land, home of nearly 4,500 people of English, African, Ladino, and mestizo origin, and a growing floating community of ocean researchers.

Below the surface lies a part of the Mesoamerican Reef or the 1,000-kilometer barrier reef that stretches across the coasts of Mexico, Belize, Guatemala, and Honduras. It is the second-largest barrier reef in the world after the Australian reef. The underwater forests make Utila one of the most beautiful spots on the planet for diving. Its white sand harmoniously contrasts with the forested landscape.

Utila's economy depends on diving tourism –an industry that is mainly run by foreigners– and small-scale fishing, which employs at least three hundred people living on the other side of the island in a place called Los Cayitos.

Josué's story in conservation and care of ecosystems began when his biologist friend, Edoardo Enrique Antúnez, a planning technician at BICA, explained the importance of protecting natural resources. Edoardo, an expert on bats, recalls, "Josué used to take me out on monitoring trips. He drove the boat and we spent many hours out at sea talking about the protection of nature." At the time, BICA was looking for someone to patrol the sea. "We opened the position in 2017 and waited eight months for a response. No one wanted to be a patroller because of the dangers of the sea and the challenge of confronting community people known to them from all their lives. It was until November of this year that a local was interested in the position, but it didn't work out due to his lack of experience."

Edoardo asked Josué to patrol the ocean while they found someone else. "He accepted and was a godsend. He is very charismatic and approached the people with a lot of respect; he explained conservation activities with a smile." BICA experts persuaded Josué to accept the job. Currently, he conducts daily patrols in the Bay Islands National Marine Park, an area of land and water protected by law. Two armed naval officers accompany him, and he says that it was tough to get along with them at first because they reluctantly cooperated as they received no extra pay, but they eventually became a good team.

#### PATROLLING THE MARINE PARK

One of Josué's responsibilities is to watch the activities of fishermen of Los Cayitos, at the southeastern end of Utila. The fiserhmen are allowed to use hook and line to avoid overexploitation of resources. The sea around Los Cayitos is strategic for the economy of Honduras because it has a reef that shelters marine species that are essential for the nutrition and the economic and tourism development of the country. The reef is part of the Bay Islands National Marine Park and covers 260 square kilometers of water and coastline that have been protected for more than two decades.

Josué takes care of the park and must guard two fish replenishment zones: White Water, extending over 3.91 square kilometers, and Old Banks, covering two square kilometers, where fishing is banned since 2018 at the request of the Los Cayitos fishermen. They asked BICA, the Municipality of Utila, and the Center for Marine Studies to establish these areas in order to benefit from the spillover effect. This effect is produced when sheltered fish grow in size and population density increases. In time, this makes the species exceed the boundaries of the protected area and repopulate the sea, therefore benefitting fishermen with more catches.

Except for spearing lionfish, which is an invasive, harmful, and ruthless species for the reef, no fishing gear is allowed in the fish replenishment zones. The fins of this fish have poisonous glands, leaving other species without food. Additionally, they wipe out other species because they are voracious predators

of the fingerlings that swim around the coral. To address this problem, BICA Utila organizes two annual competitions since 2011, called the Lionfish Derby, with the goal to catch this fish. Diving centers, as well as restaurants, promote the competition. In order to participate, teams of four are required to be certified on lionfish fishing, and they must have their own spears. Competitors gather as many specimens as they can during a day and take them to the restaurants where dishes are prepared. There is a prize for fishing teams based on categories, as well as one for the restaurant that prepares the tastiest dish. This way, BICA controls the harmful species and certifies those interested in fishing it.

Josué also helps Edoardo in promoting the competition, but he's mainly responsible for navigating the high seas and explaining fishermen the importance of conservation. With time, he has learned that older people are more respectful of animals because they don't catch small-sized species to avoid interfering with the reproduction process. In contrast, some young fishermen, who are oblivious of the value of marine resources, catch small sizes to obtain easy money.

"I know most of the people from the community.
I know who has bad habits. Once, one of them
threatened me while making a gesture as if shooting
me. I know he is upset because I am watching his





every move. People don't understand that if they protect these species and only showed them during diving activities, they would earn more money. When I pass by Los Cayitos, I am aware that the fishermen know that I won't be back to patrol certain areas in a while, so they go out and fish snails, shrimp, lobster, or parrotfish. They kill them without knowing the damage they are causing to the reef. Sometimes we find them fishing with spears, gillnets, and other types of nets; or discover that they have small sizes in their boats. In these cases, we confiscate their fishing gear and throw the illegal product back into the sea," Josué says.

The first thing that Josué does when this happens is to make them aware of their mistakes. If they repeat the offense, he takes them to the municipality to be fined. It is difficult to punish offenders because of the prevailing impunity, like it happens in other Latin American countries.

Due to joint efforts, the community has been absorbing the fact that natural resources have extraordinary economic value and provide health and food. Therefore, the population frequently requests BICA to watch offenders, those who hunt turtles, plunder their nests, cut the mangroves, steal sand or stones for construction or building bridges, among other actions.

#### TAKING CARE OF THE ISLANDS

BICA was established in 1990 as a private organization that was concerned with the deterioration of the environment of the Bay Islands: Utila, Roatan, and Guanaja. In Utila, the organization has managed to work with the community and spearheads the promotion of environmental regulations, education, surveillance, beach cleaning, turtle protection, fostering leaders for conservation, and reporting irregularities.

María Arteaga, a biologist who directed BICA for five years, recognizes that defending the island has been a complicated process. In the beginning, she was the only member of the organization on the island. Jenny Luque and Pamela Ortega helped her unconditionally. They stretched, and continue stretching, the few resources available for protecting the environment. María started to surround herself with allies, such as the Mesoamerican Reef Fund (MAR Fund), an international organization that focuses on caring for the Mesoamerican Reef. MAR Fund offered financial resources and training to empower BICA Utila, help it increase the staff, implement education and communication programs, and patrol the ocean. Thanks to MAR Fund, BICA was able to purchase vehicles, acquire equipment to issue licenses, and sell Hawaiian slings (spears used to hunt lionfish). They also improved their eco-store (which provides income to continue implementing projects), and renovated their volunteer house (second floor of the BICA office), where they focus on conserving marine species and the Bay Islands Marine National Park.

BICA Utila, the government of Honduras, and other 13 organizations are in charge of co-managing the Bay Islands Marine National Park. In collaboration with MAR Fund, BICA Utila has particularly worked on the conservation of 813 hectares of ocean, known as the Turtle Harbour-Rock Harbour Special Marine Protection Zone and its surrounding land, as well as the Turtle Harbour Wildlife Refuge, both located within the marine national park.

"MAR Fund has been like our fairy godmother because it provided funds for the implementation

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of several activities. Thanks to them, we have had access to training, and we work with an administration system beneficial to our organization that will help us achieve financial independence," María Arteaga says.

Since she was a little girl, María has had the conviction of protecting marine life. One of her concerns is the poor waste management in Utila. There are two open dumps where garbage is burned, one in Los Cayitos and the other downtown. The smoke coming out of these dumps is causing people to suffer respiratory diseases more frequently. Contamination is not limited to the air; it also affects the ground, the water, and the plants due to filtrations and currents.

The municipality bought a PET (polyethylene terephthalate) grinder and compactor to dispose of plastic. They built a street on the island with this recycled material. However, not all inhabitants have engaged in sorting waste, even though polymers seriously damage species and their habitat.

"The problem lies in lack of education and failing to enforce the law," María analyzes. She offers another example, "According to the municipal law, houses and hotels in Utila are required to have a septic tank. Businesses located along the shore require at least three chambers per tank. The problem is that sometimes public officials don't supervise that these are working properly."

María Arteaga says that there are at least ten diving centers continuously operating on the island, attracting hundreds of students throughout the year. The population puts a lot of pressure on natural resources. Given this situation, it is imperative to urgently approve a plan for public use regulating the number of visitors in the ocean and for the municipality to take more responsibility for marine resources. Sadly, Utila's Municipal Environmental Unit has been operating for only a few months. It has only one person in charge, and doesn't have an allocated budget to run it.

Cindy Flores, the technical coordinator of the Forest Conservation Institute of the Bay Islands, thinks it is necessary to reinforce the capacity of the marine police force and appoint a public prosecutor for the environment in Utila. The nearest prosecutor's office is located in Roatan, 50 kilometers away by boat. "The lack of political will and distance are delaying or putting off many legal processes regarding conservation and care of the environment."

Flores, responsible for coordinating the projects of 14 co-managers of the Bay Islands National Marine Park and for following up on complaints, says that impunity is one of the causes of environmental deterioration. Law enforcement processes discontinued due to corruption, apathy, negligence, and collusion of officials or industries that seek to profit regardless of the population's health. In contrast, BICA Utila has been a cornerstone of the protection of nature in the country. She says, "We have learned a lot from them because they carry out educational and patrolling activities that have produced multiple satisfactory results."

#### GO BLUE

Pamela Ortega, a key community conservation leader in Honduras, has been altruistically and selflessly supporting BICA for years. When you walk around Utila and ask who is in charge of caring for the island, practically everyone thinks of her.



iana Navarro

Pamela is an environmental engineer and member of the board of BICA and Coral Reef Alliance representative. She says that civil organizations play a significant role in nature conservation for the country because they mitigate negative effects, raise awareness, generate data, implement preventive actions, and respond to adverse environmental situations. Therefore, they should receive more long-term financial support because they implement projects that are independent of political timelines. "We must shake off bureaucracy and learn to work on a common agenda between organizations and different sectors to respond to the needs of the place and the population. We must create a strongly empowered community so that projects aren't cut off when a politician doesn't back them up."

Having this vision, Pamela met with Daniela Mejía to promote the Go Blue project, which encourages private initiatives to adopt ecological measures. If businesses comply, National Geographic advertises them in their travel guide. MAR Fund reinforced the communication campaign for Go Blue in the Island.

Daniela Mejía pointed out that the project was launched in November 2017, and offered training on environmental conservation for tourism businesses. "We evaluate according to the capacity that businesses have to change. We train all collaborators and offer suggestions for them to adopt ecological

measures. For example, we ask them to disconnect electrical devices and turn off the lights and the air conditioning when no one is in a room."

Twenty businesses from Utila were interested in the project. One of them is Utila Dive Center, of which Manny Lagos is the manager. He says that Go Blue members assessed everything, from cleaning supplies to the fuel for their boats. "Now, we use environment- friendly supplies and we ask clients to use resources responsibly." They offer personal chemical-free hygiene products and sun lotions to avoid harming the reef. Additionally, for each diving course offered, they donate two dollars to the construction of a reef nursery. To date, they have raised 4,000 dollars that were used in planting five tree-like structures.

In another setting, Jennifer Izaguirre, the administrator of the Neptunes hotel and restaurant, explains that they invested in a water heating solar system and treat wastewater to use for irrigation as part of the Go Blue project. "The hardest part is to get clients and employees to stop using plastic. Some tourists got upset when we offered them metal straws because more people had touched them. Guests also rejected paper or corn straws; they said that these straws tasted funny. We advised them not to use them at all." They also ask their guests to reuse towels, wash with biodegradable detergents, and use cardboard made from aluminum and compost, or borrow dishes to carry food. Additionally, they only offer fish with short reproductive cycles and fillet them just before preparing them for a meal.

On the other hand, Elizabeth López, owner of The Venue —a hostel that offers multiple activities in Utila— emphasizes that they use kayaks for their outings, to avoid polluting the water with fuel, and that they don't use any plastic in their business. "We do not use plastic. We only charge for the refill of water bottles so our clients will not buy new containers every time. We advise our visitors not to use insect repellents or sun lotions, and our guides explain how to take care of the environment and the reef. We cannot become rich at the expense of nature. We must give back what it has given us and respect it."

Go Blue is hanging by a thread due to financial problems, Daniela Mejía says. These entrepreneurs agree that the health of natural resources has depended greatly on this type of projects and the work by BICA Utila. They would like to see more commitment from the authorities, more recycling centers, and that plastic waste going into the island should be regulated.

Despite the corruption, impunity, lack of interest, threats, ignorance, few resources, and strong storms, there are people like María, Jenny, Suriel, Edoardo, Pamela, Josué, and Luis Eduardo, members of BICA, who possess an admirable social commitment, live to raise awareness in people, and take care of the land and the sea.

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