The Ciénaga reemerges from its seeds

For decades, the mangroves of the Ciénaga Grande de Santa Marta have been dying. With mangrove nurseries, seed by seed, communities and some institutions are trying to combat the degradation caused by road construction, climate change and water limitation due to monocultures and livestock.

By: Daniel Zamora Quiroga and Jacobo Patiño Giraldo

Illustration: Manuela Guerrero Pineda

This report was made possible thanks to the United for Forests grant from the Foundation for Conservation and Sustainable Development (FCDS) and won the Porvenir Sustainability Journalism Award in the Contribution to the Environment category.

Javier de la Cruz is about two years old and grows lush in an area of crystalline waters in the Ciénaga Grande de Santa Marta. He lives surrounded by eight thousand small cousins who recently moved in. Javier is a mangrove that bears the same name as its caretaker, a fisherman who transplanted it when it was already occupying abundant space in his house, located in Buenavista, a "palafito" village (built on the water), in Magdalena.

When one approaches the "macollas", small shoots of mangroves organized in groups, one notices that all of them have a plate with the name of Javier de la Cruz. It was he, his son and other fishermen and inhabitants of Buenavista who planted them with the purpose of giving life back to the swamp that was once embraced by the countless roots of its trees, which, like woody hands, held a treasure of life between their fingers. However, most of them were lost up until the 1990s, and have only started to recover.

Javier and his companions are not the only guardians of the mangrove. There are others who, like them, live on the islands that border the swamp - or in the stilt houses that peer like mirages over the water - and have created mangrove nurseries: sanctuaries where they take care of thousands of red, black and white mangrove seedlings to later plant them in different affected areas of the swamp.

Pesquisa Javeriana visited two of these nurseries: Buenavista, in the municipality of Sitionuevo, Magdalena; and Criapez, managed by fish farmers from Rosario Island who reformed an area of dead mangrove to cultivate fish. It was a journey of several days that recorded the deterioration of the swamp, the hope offered by projects such as the nurseries and the uncertainty left by the continuous degradation caused by climate change, the capture of water for livestock and agriculture, and the expansion and construction of roads near the swamp.

How do mangrove nurseries work?

Mangroves are coastal tropical ecosystems that have developed the capacity to resist salt water from the sea, with which they are in permanent contact. To grow, they use long and numerous roots that, on the one hand, support the plant, and on the other, form an underwater network that protects hundreds of species of fish, clams, crustaceans, sea cucumbers and starfish, among many others.

"The mangrove is a forest," defines biologist Alexandra Rodríguez, "but it is also a wetland," she notes. Even in 1998 the Ciénaga Grande eco-region was designated as a Ramsar wetland (of international importance). "That conception of it being only a forest has been changing. Before it was conceived purely as a forest resource, although it is really a wetland, and that means that its conservation and restoration have to do with the management of water resources," adds the head of the Marine and Coastal Ecosystems Research and Rehabilitation Line of the Marine and Coastal Research Institute (Invemar).

Almost 75% of the mangrove ecosystems are found on the Pacific coast, the remaining percentage grows in the Caribbean, and of these, 44% are in protected areas, According to the Ministry of Environment and Sustainable Development.
"All of us who were born in the swamp depend on it and the mangrove is what gives us life, oxygen. If the swamp were a body, the mangrove would be the lungs," says Jesús Serrano, co-founding partner of Criapez, the association of artisanal fishermen, as a boat crosses the swamp to dock near a reforested mangrove area on a cloudy August afternoon.

One of the most important aspects of mangroves is the biodiversity they harbor, as the security they provide allows them to be a cradle for marine species, which will later live in other ecosystems such as reefs or seagrasses.

The boat stops on the coast where a small path covered with mangrove roots begins, leading to a grayish area of warm soil, where next to the corpses of some mangroves, hundreds of seedlings grow in furrows, planted by fishermen, men and women, from Criapez.

The nurseries operate by taking the seeds of three mangrove species from the remaining relicts in the swamp. These seeds are planted inside bags or bottles using the same mud from the site where they will be planted when they reach a certain size. Planting is done in furrows, in the case of Criapez, or in small groups called macollas, as is done in Buenavista.

These nurseries have the goal of planting 52,000 seedlings; 32,000 (Criapez), 20,000 (Buenavista), and one of them can hold thousands of seedlings at a time. In addition, these are recent projects -2022 and 2021, respectively-, in which Colombia's National Natural Parks and CORPAMAG are involved. Criapez, in particular, receives financing from international organizations such as Malteser International and the German bank KFW.

According to Invemar, between 2020 and 2021, 200 hectares of mangrove were recovered with respect to 2019, in addition, the number of seeds increased 15.5 %.

"The nurseries have always been a viable alternative in the sense that, if I want to develop a restoration project, I need to get to the field with plant material that is strong, robust and adequate enough to maintain the survival of the plantings," explains Doctor in Marine Sciences, Ángela Margarita Moncaleano Niño, also a professor at the Pontificia Universidad Javeriana.

A pronounced mark of the disaster in the swamp

During the 1950s, the construction of the Troncal del Caribe, the road from the municipality of Ciénaga (Magdalena) to Barranquilla (Atlántico), interrupted part of the natural flow of water that fed this ecosystem - a mixture of salt water from the sea and fresh water from the rivers that, if not balanced, causes salinization and prevents the mangroves from growing. The results are visible seventy years later. The water does not flow, it stagnates, and in doing so, it loses oxygen, therefore, the swamp dies.

In some areas, especially those near the highway, "when it is ten o'clock in the morning, I estimate that the water can be 30°C or 40°C," says Jesús Serrano, from Criapez.

Impacts in Ciénaga Grande de Santa Marta

Coastal marine ecosystems such as mangroves capture more carbon, and more efficiently than common forests. This CO2, one of the greenhouse gases, which remains in the water, is known as blue carbon.

But it has not been the only construction with a dramatic impact. "In '76 another road was built parallel to the Magdalena River, and in fact, this one caused more impact on the hydrological integrity of the system. Both limited the flow and there was a time when the internal areas of the swamp were very degraded because there was no water replacement," explains Alexandra Rodríguez, from Invemar.

Javier de la Cruz, who is also the legal representative of the Fishermen's Association of Buenavista, stands in front of hundreds of mangrove seedlings that are almost ready for planting, crosses his arms and says that "the swamp used to have seven rivers - which fed it - on the eastern side. Today there is only one left, the Sevilla River." Although the others have not disappeared, their contribution to the swamp has decreased.

"The contamination also becomes a threat to these ecosystems and to the fauna that inhabits them, which is also consumed by the neighboring populations," -Ángela Moncaleano.

De la Cruz denounces that the water capture comes from monocultures and livestock areas that are located down the Sierra Nevada de Santa Marta, because "they have taken the riverbeds, they have diverted them and the swamp is seeing that negative impact".

For Alexandra Rodríguez, from Invemar, this water limitation is the key problem for the survival of the mangrove - and the entire marsh - because the use of water for palm, banana monocultures and buffalo raising "is not completely regulated, meaning that there is no estimate of the ecological inflow that allows effective control of the volume - of water - for these uses".

Rodríguez points out that this is one of the bottlenecks on which Invemar is working with other institutions: "to generate information because the water system of the swamp is so complex and large that until recently there was no estimate of river flows; and also, progress is being made to have more effective monitoring and control measures".

Both the roads and the diversion of water made it so that between 1956 and 1995, 60% to 70% of the mangroves that existed in the swamp died. "It is very worrying and has been a key reason in many of the environmental management decisions that have been taken, because they involve trying to hydraulically intervene the swamp, with the idea of ensuring that the balance of fresh and salt water is maintained. However, this has not been an easy task," said Sebastián Restrepo-Calle, a researcher at the Faculty of Environmental and Rural Studies in Javeriana University.

Other actions that have degraded the marsh and its mangroves have been the dredging for the Canal del Dique, the adaptation of Cartagena's docks and the expansion of urban centers such as Coveñas and Tolú.

Are the nurseries enough to save the mangroves of the swamp?

On the way to Playón Ariza, one of the reforestation zones in Buenavista, the speed of the boat makes the wind bend two mangroves that Javier de la Cruz selected for replanting, so he holds them, almost in a hug, to protect them.

"We," he says, referring to the twelve people who currently work in the Buenavista nursery and those who have participated in the project that began in 2021, "have tried to rectify the damage that we have also contributed to cause to the swamp by our stay here, because human beings, wherever we go, always cause an impact by way of our actions".

After about twenty minutes of walking and crossing the furrows of a mangrove area where roots peeked from one side to the other, forcing those of us in the boat to remain lying down, the area where de la Cruz and his team plant the seedlings opened up imposingly. Hundreds of seedlings float, birds of different species flap about, and raccoons sniff around, hunting the crabs that hide among the saplings, occasionally damaging them.

Because of the Ciénaga Grande's hydrological imbalance, there are doubts about the effectiveness of mangrove reforestation alone. "I would think the system would be able to recover if the habitat is suitable. If the factors affecting the mangrove remain, all that money from reforestation is lost. So what needs to be done? you must eliminate those factors, and the one that affects the swamp the most is hypersalinity," said Alberto Acosta, biologist and researcher at the Science Faculty in Universidad Javeriana.

Alexandra Rodríguez, from Invemar, agrees. For her, actions should focus on hydrology, proper design and maintenance of streams inside the mangrove swamp so that the wetland recovers its natural dynamics and thus the temperature improves, salinity decreases and, only then can reforestation begin. "In fact, many reforestation efforts failed because they did not take into account these preliminary aspects. It doesn't mean that they are negative or useless, but first you have to overcome certain biophysical barriers to be able to use this type of technique that seeks to accelerate a process that would have to occur naturally."

But this does not mean that reforestation is unsuccessful, "I think they are important strategies to bring the community closer to the ecosystem, because they can offer an economic alternative at a certain point. Restoration is on the rise and these initiatives can be associated with ecotourism", adds Rodríguez.

For Osmiro Jiménez, legal representative of Asoguitur -Association of Tourist Guides of Ciénaga-, which has nine certified guides, including him, the tourist who has visited this ecosystem during the last few years is aware that he must take care of it, and says that there have been approaches with the guardians of the nurseries to offer tourist packages where they can be invited to visit the stilt villages and plant mangroves to contribute to the reforestation.

Decades of good intentions and a ghost that returns.

"I remember that in the 1990s the mangrove project in Colombia had among its objectives to change the fishermen's practice of cutting the roots to fish for oysters and give them other economic alternatives. That was the nurseries, such as the one in Pasacaballos, near Cartagena. It is the result of a community that set up the nursery and sought recognition by Cardique - Corporación Autónoma Regional del Canal del Dique - so that it could directly buy the plant material from the community's nursery," notes researcher Ángela Moncaleano.

Mangroves have historically been used as charcoal, firewood, ecotourism, among others. In the 90's, for example, resolutions such as that of the Ministry of the environment (1995) limited its use. Other measures, such as the most recent, last July - law No. 2243 to protect the mangrove, promote its conservation and restoration -, the conservation of this ecosystem has been the focus of public policy, however, there is still small-scale deforestation for the use of communities, and concessions are made for the expansion of roads and the construction of infrastructure.

Mangroves protect the coasts from erosion and tropical storms. Without these forests to cushion the tide, up to a hundred meters of coastline could be lost each year.
In the book Repensando La Ciénaga: nuevas miradas y estrategias para la sostenibilidad en la Ciénaga Grande de Santa Marta, edited by the doctor in Biological Sciences, José González; and Sandra Vilardy, recently appointed as vice-minister of Environment, several researchers made a kind of biography of the swamp where they documented its history, the numerous attempts to save and restore the mangroves of the swamp, its state and degradation.

There, they mention the ecological plan of the CGSM, led by Inderena in 1981, also the Management Plan for the Ciénaga Subregion (1994-1998), in which Prociénaga and CORPAMAG intervened, the role of Invemar in monitoring these ecosystems since 1999, the link with National Parks as an ally of the other institutions, and the Management Plan for RAMSAR Wetlands and the Biosphere Reserve of the CGSM (2002), by Minambiente and Corpamag.

The Ciénaga has many eyes on it. In June 2021, the then president of Colombia, Iván Duque, announced that a GEF project -Global Environment Facility by its initials- would be carried out, involving an investment of $18 million dollars to continue the recovery of the swamp. This plan seeks to recover 110 kilometers of canals and includes mangrove reforestation initiatives.

Invemar is in charge of the execution of this project, but to date, the resources have not yet arrived - nine million from the Global Environment Facility and another nine million from the national government.

But at the same time that initiatives such as the GEF are announced, plans are advancing to expand the road that crosses the swamp and connects with Barranquilla, also contemplating the construction of more roads and buildings that revive the ghosts that deeply wounded the health of the swamp in the past.

"In fact, that was a tough fight that took place a few years ago when the expansion of the highway was proposed," Alexandra Rodriguez, from Invemar admits. "we told project developers: we will not repeat the same mistake of many years ago, when a work of this type caused deterioration. That's when they finally listened to us - Invemar and other institutions - and the vision of the road being widened in this way was stopped".

The head of rehabilitation of marine and coastal ecosystems at Invemar says that this is why they are working on the designs of three viaducts - constructions that rise, in this case, over the marsh - because "we believe that appropriate designs, at least in critical points, can limit the impact, and in turn, improve the conditions that could have been taken into account in the past but were not".

Lessons from the mangrove guardians

Javier de la Cruz talks to his plants as he waters and weeds them. "They feel that someone is looking out for them, they feel that someone is interested in them and that they cannot cease to exist," he says, smiling.

Although he is aware that his effort, and that of all the other mangrove guardians, it's only a stalk of the lush work that has to be done to recover the mangroves of the swamp. He says he feels "an indescribable satisfaction, because knowing that one is contributing to nature gives motivation to move forward in such a project."

Despite the fact that planting mangroves does not make them millionaires -sometimes it pays 40,000 pesos (8$) per planting day- Jesús Serrano, from Criapez, among fallen trunks and planted furrows, emphasizes an important truth about restoration: "The saying goes: a paid musician plays a bad sound. It is the difference between doing something out of love and doing something out of interest. If you feel it in your heart and you truly care, you are doing good, not only for yourself but for an entire eco-region".

It is impossible not to be captivated by the beauty of the Ciénaga Grande. The misty early morning horizon that merges water with sky, the perfect launching of a fishing net, the swift silhouette of the frigate birds, the accelerated scurrying of the crabs over mangrove roots that give way to Javier's canoe and Jesús' boots as they fill the gray cemeteries of the lost mangrove with thousands of newly germinated saplings.

The beauty, complexity and value of mangroves demonstrate that the work must be integral. Reforestation, water balance and control of the causes are essential to rehabilitate this invaluable ecosystem so that, in a few years, there will not only be twenty thousand mangrove seedlings named Javier de la Cruz, but hundreds of thousands more, hopefully with the names of all those who navigate and restore the swamp every day in the hope of saving it.

* This report was made possible thanks to the United for Forests initiative, led by the Foundation for Conservation and Sustainable Development (FCDS) and the Norwegian Embassy, with the support of the embassies of the United Kingdom and the European Union, as well as the Andes Amazon Fund and Rewild.