

Reviving the seagrass: How a local island is leading Tunisia's sea restoration

By Nada Abdelkader

Many people have never heard of *Posidonia oceanica*. Even fewer know that this underwater plant helps protect coastlines, supports marine life, stores carbon, and carries cultural memory.

On the future marine and coastal protected area in Kerkennah archipelago, Tunisia, researchers and local communities are quite literally restoring the sea. They are bringing back *Posidonia oceanica*, a native marine plant. Over time, pollution, overfishing, and climate change have severely damaged this vital habitat.

But instead of waiting for external solutions, they decided to take action, using not machines or high-tech equipment, but science, local knowledge, and cultural heritage.

This work shows the power of involving communities in both restoration and science. When people feel responsible and connected to the process, restoration becomes more meaningful; and more sustainable.

Community engagement is not just a social benefit—it is also a key indicator of restoration success from a socioeconomic perspective. It adds meaningful value to both environmental and scientific outcomes. This approach reflects the essence of nature-based solutions: using local knowledge, cultural practices, and natural materials to create results that benefit both people and the planet.

The seagrass restoration work in Kerkennah stands as a concrete example of how global goals can be applied at the local level. It directly contributes to SDG 14 (Life Below Water), SDG 13 (Climate Action), and SDG 11 (Sustainable Cities and Communities). By combining science, tradition, and community action, Kerkennah is demonstrating how small island communities can lead the way in sustainable marine restoration.

In the heart of the Mediterranean, off the eastern coast of Tunisia, lies the Kerkennah archipelago, a place where nature and people have lived together for centuries in a delicate balance. Kerkennah is full of life, both above and below the sea. One of its most precious treasures is a marine plant called *Posidonia oceanica*. This seagrass, found only in the Mediterranean, grows in wide underwater meadows. These meadows help the sea breathe by producing oxygen, storing carbon, protecting the land from erosion, and giving fish a place to live and grow. For the people of Kerkennah, *Posidonia* is more than just a marine plant, it supports their way of life. *Posidonia oceanica* is part of everyday life in Kerkennah. In the past, people used dried seagrass to insulate homes, treat illnesses with traditional remedies, ect.. This marine plant has served generations across the Mediterranean and still holds value today.

One of the most beautiful traditions of the island is «Charfiya», a fishing method passed down through generations. Made from green palm leaves, Charfiya is installed in shallow waters where *Posidonia* meadows grow. It gently guides fish into traps using the movement of the tides. The fish stay alive and undamaged until collected. Every autumn, families come together to rebuild these structures, keeping both the marine ecosystem and their cultural identity alive. Recognized by UNESCO as intangible cultural heritage, Charfiya is more than just a fishing technique, it is a symbol of harmony between humans and the sea.

But now, this peaceful balance is in danger.

The palm trees once used to build Charfiya are disappearing. Climate change, rising sea levels, plastic pollution, salty soils are damaging the island's land and sea. In many areas, plastic has replaced natural palm fibers, making fishing less sustainable and more harmful to marine life. Fish and octopus are becoming harder to find. Illegal trawling, a destructive fishing technique used in shallow waters, is tearing up *Posidonia* meadows. In the Gulf of Gabes, around 80% of these meadows have already been lost, causing millions of euros in damage. As fish stocks decline, families lose income, young people leave, and communities begin to break apart.

Faced with these challenges, a group of Tunisian scientists from the local NGO called "Tunisian Association of Taxonomy", ATUTAX, decided to take action. They launched a pilot project to protect what matters most, nature, culture, and community, working hand in hand

with local fishers, young people, women artisans, NGOs, farmers, and private companies. During one community meeting, a young farmer stood up and said, “I never went to school. I don’t know what climate change means. But I know this: if you want to protect the Charfiya, if you want to protect the sea, you must protect the palm trees. No palm, no tradition. No tradition, no future.” That moment captured the heart of this project, everything is connected: the sea and the land, the past and the future.

The first step was to restore the damaged *Posidonia oceanica* meadows. Scientists chose restoration sites based on field research, but also by listening to the local fishers who have observed changes in the sea over time. They collected valuable knowledge through surveys and interviews, then came the question of how to restore the meadows!

That’s when they had a beautiful idea: to use tradition to save nature. Inspired by Charfiya and another traditional method called Drina, they designed eco-friendly restoration tools using palm leaves. These models were crafted with the help of local women, bringing income and opportunity while reviving ancestral skills.

The team then went to sea, aboard fishermen’s boats, joined by volunteers, students, and eco-guards of the future MCPA, all trained in a workshop on *Posidonia* restoration. The site, located in the future marine and coastal protected area of Kerkennah, was selected with care. There, they began restoration activities by collecting naturally detached *Posidonia* fragments, placing them into the palm-based models, measuring scientific parameters, and gently they dive and fixing them to the seafloor. This first restoration effort covered an area of 300 square meters.

Now, the team is in the post-restoration phase, observing how the *Posidonia* grows and whether the method needs adjustments. Fishers and local co-managers are helping monitor and protect the site. They are no longer just beneficiaries, they are full partners in this work.

Later, one of the scientists became part of a broader effort, supported by the Knowledge and Scientific Network (KSN). With KSN’s backing, the project began to evolve, finding a new direction that weaves and interlinkage together all its goals: protecting nature, improving people’s lives, and ensuring the sea remains a source of food and livelihood for generations to come.

The municipality, a local authority, stepped in, not as a guest, but as a key partner. Alongside scientists, fishers, and community members, they began shaping local rules. This collaboration will bring the project closer to real policies and decisions that touch everyday life.

This alliance between science and local leadership is no longer just about studies or reports. It's about building something real, something lasting, something the community can understand, support, and take pride in.

This project is also helping raise awareness. It teaches fishers and the wider community how some fishing gear and practices damage marine habitats, and it shows how protecting biodiversity brings benefits, not only for nature, but also for jobs, food, and future generations. Imagine if this pilot project could grow to reach larger areas and involve more people : the impact would be incredible, not just for Kerkennah but for Tunisia and all of North Africa.

Restoring *Posidonia* means restoring the sea, and when the sea is healthy, the community becomes stronger. This pilot project is not only about restoration, it is also shaping a new policy path for ecological recovery in Tunisia and the region. Along the way, the team has learned that listening to local knowledge is just as important as science, that using simple language makes complex issues real and relatable, and that when people feel ownership, they stay committed, even after the scientists have gone.

What's happening in Kerkennah is an example of what we call a nature-based solution. It means using the power of nature, and working with it, not against it, to solve problems like climate change, biodiversity loss, and economic decline. By restoring *Posidonia oceanica* with tools inspired by local traditions, this project protects the marine environment while also creating jobs, strengthening cultural identity, and supporting sustainable fishing. It shows that ecological restoration is not a luxury, it is an investment in local economies, in food security, and in the resilience of coastal communities.

When nature is respected, it gives back. The sea becomes healthier, fish stocks return, and families can stay instead of leaving. These solutions are not only good for the planet , they are good for people. They bring a vision of the future where conservation and economy go hand in hand, where ancient knowledge meets science, and where small islands like Kerkennah become models for coastal sustainability across the Mediterranean and beyond.

Suggested reading:

Henderson, J. (2019). Oceans without History? Marine Cultural Heritage and the Sustainable Development Agenda. *Sustainability*, 11(18), 5080. <https://doi.org/10.3390/su11185080>

Available at: <https://www.mdpi.com/2071-1050/11/18/5080>

Acknowledgments:

The authors wish to sincerely acknowledge the contributions of Dr. Rym Zakhama Sraieb, Assistant Professor at the Department of Fundamental Sciences, High Institute of Biotechnology of Sidi Thabet, and researcher at the Laboratory of Diversity, Conservation, and Monitoring of Biological Systems, Faculty of Science of Tunis, for her invaluable input in writing and brainstorming this article.

The authors also extend their gratitude to the Tunisian Association of Taxonomy (ATUTAX) for making this work possible through the PPKER, PALMKER, and CoBioKer projects in the Kerkennah Archipelago. From technical support to logistics and financial investment, this research greatly benefited from these projects, as well as the dedication of all ATUTAX office members and volunteers.

Special thanks go to Ms. Salma Zribi for her significant contribution to the fieldwork, workshops, and scientific activities, and to Mr. Akrem Dridi for his involvement in fieldwork and activities with the local community. The authors are also deeply grateful to the local NGO Kraten Association for Sustainable Development of Culture and Leisure (AKDDCL) and its members for their collaboration as co-managers of a future Marine and Coastal Protected Area (MCPA) in the northern islands of Kerkennah.

The authors wish to warmly thank the people of Kerkennah—fishermen, artisan women, schools, farmers, local NGOs, private sector partners, and all others who facilitated this work. Without their support, none of this would have been possible.

Finally, the authors acknowledge the KSN project for ensuring the continuity of this work and for managing the project data.

