REVOLVE

QUARTERLY INSIGHTS INTO A CHANGING WORLD

N°46 | Winter 2022/23



Coral is Queen

See coral biodiversity in a new light. p.35

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Sustainable Mobility for All p.68 Kenya's Textile Industry p.76

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One Planet - One Ocean

Our oceans are the largest heat sink on the planet, absorbing more than 90% of the excess heat caused by greenhouse gas (GHG) emissions.

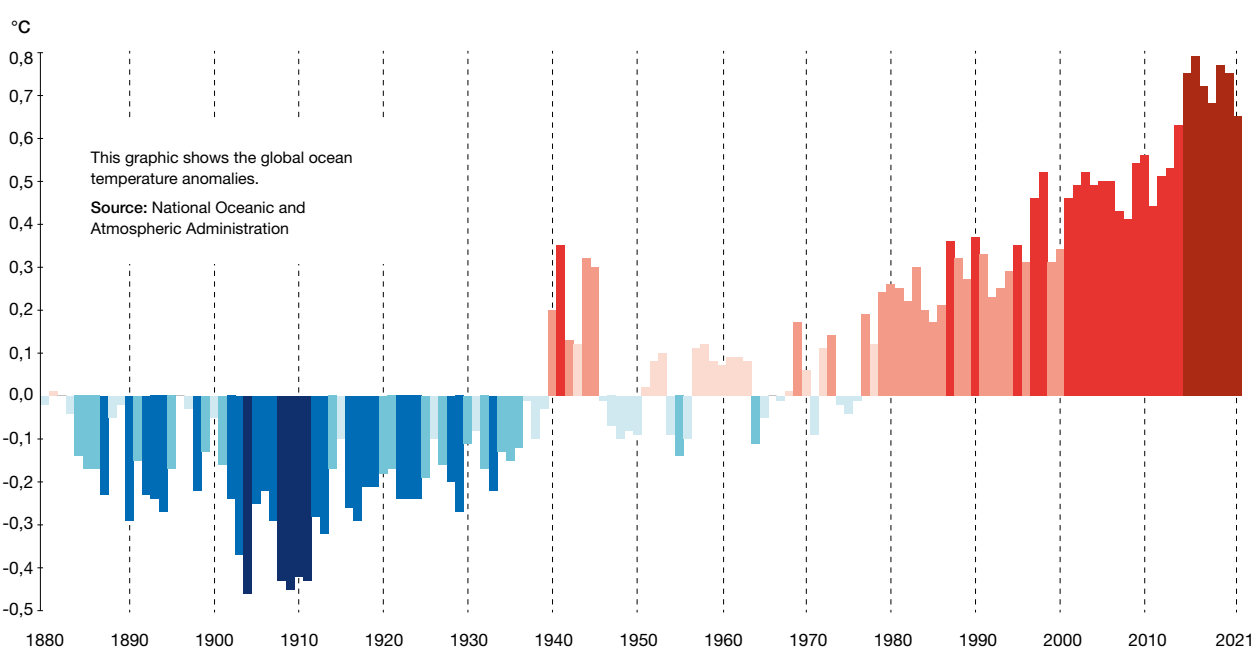
According to the National Oceanic and Atmospheric Administration, in 2021, the global ocean surface temperature was .65 °C higher than the 20th century average. Even if dramatic GHG reductions are made, the ocean will continue warming. This continual rise in temperatures means more meltwater from glaciers contributing to rising sea levels which holds devastating consequences for coastal settlements and ecosystems. Are we going towards a world submerged in water? Not so soon, but the compounded cascade of interrelated changes demands our collective reflection: how can we stop what is coming when everything is changing on such a colossal scale?

In this issue, we present different perspectives that bring to light specific solutions for ocean protection. We begin with a reflection on achievements for conservation in 2022 with our Special Guest Editorial by Peter Thomson, UN Secretary General's Special Envoy for the Ocean, before shedding light on how the European Union's Maritime Spatial Planning (MSP) Directive is providing parameters to its Member States for better management of its seas. We also take you on an aerial tour of corals with the Global Airborne Observatory (GAO) to view the mapping of sub-sea biodiversity. And you will go on an unexpected visit to the remote Italian island of Lampedusa off the cost of Tunisia to learn about how they are providing freshwater to their inhabitants.

In addition, we have circular economy solutions to share from the textile industry in Kenya and sustainable mobility solutions for a more just, equitable, affordable and accessible transition for all. ●

Send us your stories, ideas for features, and other comments at: **editors@revolve.media**

Thanks for revolving with us!



This graphic shows the global ocean temperature anomalies.

Source: National Oceanic and Atmospheric Administration

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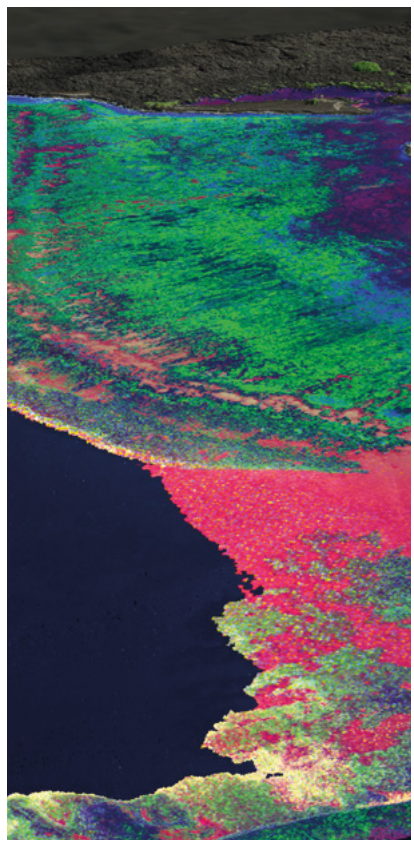
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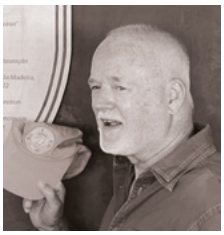
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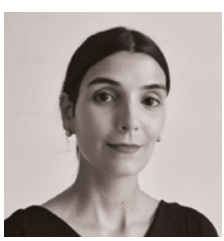
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To date, REVOLVE has planted 261 trees in reforestation projects in Roupage (BE) in 2020, Stoumont (BE) in 2021, and Martouzin (BE) and Zaragoza (ES) in 2022.



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Pillar coral.

Photo: Greg Asner

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No Healthy Planet Without a Healthy Ocean

WRITER: **PETER THOMSON**
UN SECRETARY-GENERAL'S SPECIAL ENVOY FOR THE OCEAN

The UN Secretary General has pronounced a red alert for humanity. He says we have been engaged in a war against Nature and that it is time to make peace. Making peace means living in a world in which human hope and progress exist within parameters of utmost respect for Nature's requirements.

As a loving grandfather, I assert a fundamental truth that we must strive with steadfast hope towards the bright prospects for a better world that lies ahead. That truth is anchored in reason, not the fantasy of superheroes or the politics of denial. It is anchored in the knowledge that humanity has ample reserves of genius capable of discovering the required solutions. And as the way ahead becomes clearer, we should be confident that leaders will emerge in politics and commerce with the courage to reallocate the world's resources in the direction of sustainability, equity, and intergenerational justice.

When it comes to intergenerational justice, the call for suitably qualified young people to take their place at international negotiating tables relevant to their specialties is as logical as it is compelling. Who better than them to be part of the decisions that will shape the conditions through which their generation will live? This is not about advocacy – it's about identifying workable solutions and resourcing their implementation. Thus, since the UN is a Member State organization, we should be actively encouraging countries to include suitably qualified young professionals in their delegations.

From the air we breathe to the food we eat, we are intimately connected with the good health of the Ocean. And the Sustainable Blue Economy, based upon circularity and adaptation to changing planetary conditions, is the basis of our future security. Everything is connected. From chemical and plastic pollution, to overfishing, habitat loss, ocean warming, death of coral and rising sea levels – all have the



Illustration by Dariana Guevara / REVOLVE

same anthropogenic origins, arising from our long record of flagrant disrespect for Nature and everything it provides. And so, yes indeed, it is time to reset the balance and give Nature the respect that is its due, at the very deepest of levels.

In many ways 2022 has been a good year for Sustainable Development Goal 14 (SDG14), our universal agreement to conserve and sustainably use the ocean's resources. In February this year, the UN Environment Assembly agreed in Nairobi to commence negotiations for an internationally binding treaty to control the planet's scourge of plastic pollution. And then in June in Geneva, after two decades of drawn-out WTO talks, agreement was reached to stop harmful fisheries subsidies. Then, following on from the great progress made on ocean action issues at the One Ocean Summit in Brest and the Our Ocean Conference in Palau, in Lisbon in late June at the UN Ocean Conference, we witnessed the launching of a great fleet of commitments in support of SDG14.

We look ahead now to a successful conclusion of the BBNJ negotiations in New York in the months ahead, so that we may have a robust treaty for the governance of the High Seas; to the full delivery of promised funds under the UNFCCC's processes to enable developing countries' adaptation to the challenges of the Climate Crisis; and to CBD COP15 in Montreal for the adoption of the Post-2020 Biodiversity Framework in order to halt the disastrous loss of species currently underway on Planet Earth.

We know there can be no healthy planet without a healthy Ocean, and the Ocean's health is currently measurably in decline. And so, we all have much work to do. The time has come for humankind to exercise those capabilities of genius of which we are capable, for us to agree upon resilient, workable solutions, and for us to jointly undertake the transformations required. ●



Recycling Water to Ensure Food Security in Egypt

WRITER: **MARTA CASTILLO SÁNCHEZ**

Managing costs and safety concerns to combat resource insecurity.



1

Egypt is suffering an increasing water supply-demand gap; expected to keep growing due to population growth and climate change impacts. The hosting country of the twenty-seventh session of the Conference of the Parties (COP27) is also experiencing the impacts of the war in Ukraine due to the disruption in global food supply chains, hampering water and food security in the country and preventing it from reaching the Sustainable Development Goal (SDG) 6 on ensuring safe drinking water and sanitation for all.

The decisions taken at COP27 reflect the global challenge of food insecurity linked to water, and offers a roadmap for climate action in agriculture to tackle this issue.

Wastewater: part of the problem and part of the solution

Egypt is a water-stressed country. The constant population increase, and a shrinking water budget are overstretching available water resources. The annual per capita water share continues to decrease year after year.

"Per capita annual renewable fresh water was 1,593 m^3 in 1970, it dropped to 804 m^3 in 2000, and 584 m^3 in 2020", according to Javier Mateo-Sagasta – senior researcher and project leader at ReWater MENA project, led by the International Water Management Institute (IWMI).

Water is part of every step in the food value chain, from food production to processing and consumption. The reduced amount of freshwater available impacts both the climate and food security, triggering social instability. Egypt's water demand is 114 billion m^3 per year. However, the country only has about 60 billion m^3 per year available, of which more than 90% is supplied by the Nile River, making it less resilient to dramatic climate change and extreme weather.

However, not everything is negative. Egypt has an untapped opportunity with wastewater. More population translates into more wastewater produced creating an opportunity to recycle and reuse it – but also a danger for ecosystems and human health if that growing amount of wastewater is directly discharged untreated. In 2020, the total municipal wastewater generated in Egypt was 7.2 billion m^3, according to data shared by the ReWater Mena project. However, Mateo-Sagasta explains that only 77 out of more than 500 municipal wastewater treatment plants in the country reused their effluents directly for productive purposes. That accounts for less than 5% of the total wastewater generated.



> "We need regulations to encourage direct wastewater reuse, and we need to show the benefits and need for water reuse and recycling to the public."
>
> — Javier Mateo-Sagasta



2

Direct or indirect water reuse?

Water is not always reused following the same process. A basic difference is between direct and indirect water reuse. In the former, wastewater is first discharged into a water body where it undergoes dilution prior to use downstream. While in direct water reuse, wastewater goes through an advanced treatment plant that eliminates pollutants.

There is yet another difference in the regulation of both processes. As the ReWater MENA project sourcebook highlights, indirect water reuse is typically considered safer, so it is normally not regulated or controlled. Nevertheless, indirect reuse can be unintentional, and users downstream do not know the sources or quality of the water they are using with obvious health risks, while direct reuse is often strongly regulated and sometimes prohibited for food crops.

With this in mind, Egypt has reacted to the dwindling per capita water share by reallocating freshwater to priority uses like drinking water, while maximizing the share of drainage water reuse in the agricultural sector (as officials agree with the view that indirect water reuse is safer than direct reuse.)

"The indirect reuse model in Egypt is associated with agricultural practices in the Nile Delta, particularly for farmers at the tail ends of the irrigation network where freshwater quality and quantity are reduced", explains Bezaiet Dessalegn, Livelihood and Gender Specialist at the International Center for Agricultural Research in the Dry Areas (ICARDA).

Almost 60% of generated wastewater is reused indirectly, after discharge and dilution in water bodies, Javier Mateo-Sagasta explained. He added that around 35% of generated wastewater is lost when it is discharged into the environment and evaporates on land, along rivers, or is lost in the sea.

Mateo-Sagasta says “We are wasting here not only water but also resources embedded in the water, including nutrients like phosphorous and organic carbon that if recovered can be used for energy production in the form of biogas and methane to generate electricity for households.”

The indirect reuse of wastewater in the Nile Delta was estimated at 9.31 billion m^3 in 2015, and the target is to increase the amount to 16.26 billion m^3 by 2037. However, the high concentrations of pollutants in the discharged untreated wastewater was being mixed with treated wastewater, forcing the ministry to close many mixing pump stations, hindering the reuse of an estimated 2.37 billion m^3 per year.

Direct reuse is an alternative, but it is more expensive for the administration and the end user. Research shows that the treatment of 1 m^3 of wastewater costs the HCWW around 2.6–3.0 Egyptian pounds (LE). This is around three times more than the current water tariff per m^3 for domestic use. “Legislation is not giving the required incentives for entities to reuse treated wastewater. In many cases, it might be cheaper to use fresh water”, explains Prof. Khaled M. AbuZeid, Senior Regional Water Resources Director Centre for Environment & Development for the Arab Region & Europe (CEDARE).

However, besides the centralised control and management of wastewater by the HCWW, there is an informal wastewater collection and reuse system in the Delta. This illegal system is managed by local actors who organize their activities through socially embedded arrangements, which are not recognized by the institutions. The recognition and legalisation of this informal system could “potentially help to narrow the water demand-supply gap for irrigation in a safe and environmentally friendly



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manner in Egypt", as research held within the ReWater MENA project highlights.

Working towards safe water reuse

The upscaling of water reuse projects – whether direct or indirect – faces barriers related to governance, social acceptance and investment. The technologies to reclaim water and recover the resources embedded in it do exist. "But to recover all these resources, there are many challenges, mostly legal, institutional, or simply lack of awareness," Mateo-Sagasta said, adding that water can be used in cities and reused in agriculture, with benefits for all.

ReWater MENA worked on two pilot sites in Egypt to analyse the barriers and opportunities for direct and indirect reuse. The pilot site for indirect reuse was in the Nile Delta within the Kafr El Sheikh governorate, close to the Sakha wastewater treatment plant. The direct reuse site was in the governorate of Ismailia and near the Serapeum wastewater treatment plant.

Bezaiet Dessalegn explains that each site presented different environmental, and socio-economic challenges and opportunities for reuse. However, she highlights that the main barrier is not user resistance to new ideas – because "they are very much interested" – but more on the marketing side where perceptions influence market prices.

In parallel to the work on the sites, the project has been working on the development of the Egypt 2030 Shared Water Reuse Strategy. The strategy has been built following a participatory process that gathered representatives from the Ministry of Housing, the Ministry of Water Resources and Irrigation, the HCWW, the Ministry of Agriculture, and the Ministry of Environment, as well as research, academia, NGO representatives, entities and farmers associations.

Having a space for discussion between all stakeholders has helped align objectives, explained Prof. Abu Zeid. The creation process of the strategy has been a stepping stone for the multisectoral dialogue in Egypt, now this needs to be sustained and kept in place in the



The increasing frequency of extreme weather events has exposed millions of people to acute food and water insecurity.

future. “The strategy needs a follow-up, an action plan with specific projects”, underlined Prof. Abu Zeid.

Water and food security at COP27

“We need regulations to encourage direct wastewater reuse, and we need to show the benefits and need for water reuse and recycling to the public”, Javier Mateo-Sagasta said, pointing out that public awareness of water reuse is still lacking. A statement that is reflected in the decisions taken at COP27.

This is best reflected in the joint work on the implementation of climate action on agriculture and food security. The adopted decision -/CP.27 builds on the outcomes of the Koronivia joint work on agriculture and acknowledges that “the increasing frequency of extreme weather events has exposed millions of people, especially small-scale farmers, those from low-income households, indigenous peoples, women and youth in developing countries, to acute food and water insecurity”.

The document notes the importance of considering “sustainable land and water management for agriculture in a systemic and integrated manner informed by scientific, local and indigenous knowledge implemented in a participatory and inclusive manner”.

The decision taken at COP27 opens a four-year joint work roadmap with the objectives of promoting a holistic approach and enhancing research and development on issues related to agriculture and food security. For Egypt, this is a chance to ensure food and water security for future generations. ●

1. Woman washing wheat (wafaa). **Photo:** Hamish John Appleby (IWMI)
2. Farmers cultivating lettuce, while another farmer digs a small channel (marrwa) with a donkey. **Photo:** Hamish John Appleby (IWMI)
3. Man adjusting newly introduced modern sprinklers systems on a farm. **Photo:** Hamish John Appleby (IWMI)
4. Farmer pumping ground water for irrigation. **Photo:** Hamish John Appleby (IWMI)



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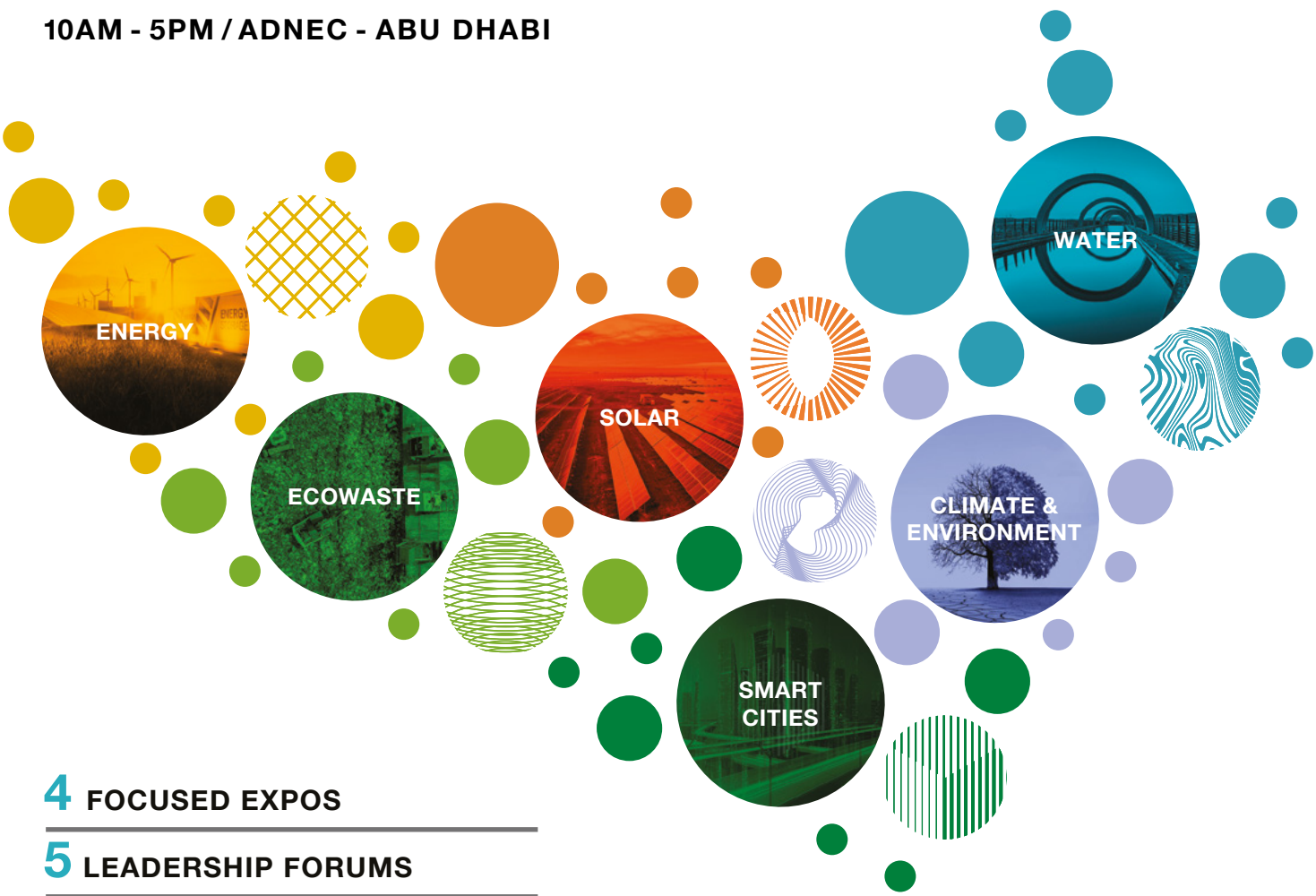
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Securing a Sustainable Future With Our Ocean

WRITER: **HELENA RODRIGUES**

How to find a balance between nature and people across Earth's final frontier.



1

206 million Europeans live on a coastline, likely sharing a sense of wonder and possibility when casting their eyes out onto the world's last frontier. But this wide-eyed view comes tinged with a dark stain: through common colonial narratives of expansion, we have been led to perceive this vast blue expanse as an immense, unidimensional "white canvas" where human activities such as fishing, offshore oil and gas exploitation, shipping, and more can grow without limits, even if the limit has already been reached for many valuable ecosystems. But while the ocean occupies over 70% of our planet, we still only know less than 5% about all its ecosystems. Even with new discoveries made each year, this knowledge gap means we still don't fully comprehend the impacts of human actions on vulnerable species and habitats.

While most coastal livelihoods are tied to the ocean, online searches of human activities in the Atlantic region show idyllic coastal living, not images of the thousands of fishing and sand dredging vessels, kilometers of undersea cables, heavy presence of oil rigs and growing plastic islands.

Although evidence of humanity's continued overexploitation of nature may not be readily visible, it does not mean that these activities are not there and in a very big way: OECD projections show that by 2030 the "blue economy" – our exploitation of marine resources for sustainable economic development – could outperform the growth of the global economy as a whole, both in terms of value-added and employment. In the EU, the gross value-added of the blue economy grew by 10.41% between 2009 and 2019 and today it employs 4.45 million people (2.3% of the EU's total population).

It is vital to remember that our deltas, sea basins and ocean are common goods – no single person or entity owns them. However, national governments do have sovereignty over the first 200 nautical miles off their coastlines (a country's exclusive economic zone, or EEZ), and their public policies significantly impact the development of human activities and the protection of marine biodiversity, both within national boundaries and outside of them on the high seas.

Given the critical status of our ocean in light of the twin climate and biodiversity crises, coupled with its interconnected nature across man-made borders, long-term strategies for sustainability that are supported by robust planning and management tools are more needed than ever before.

The EU's Directive for maritime spatial planning (MSP) acts as the foundation for coherent management of the EU's marine area and provides a formal structure for scientific knowledge to support how Member States develop strategic national plans for regulation, 'zone' various industries at sea and protect the marine environment.

The EU's approach to planning is uniquely valuable because it is the most comprehensive maritime policy being implemented globally, and because it brings all interested people together to decide our blue future.

MSP: a tool for sustainable ocean governance

MSP started as a management approach for nature conservation in Australia's Great Barrier Reef Marine Park 50 years ago. Over an area bigger than the United Kingdom, the Netherlands and Switzerland combined, policy-makers sought to develop legislation that would save the reef from oil drilling and mineral extraction while permitting other activities like fishing and tourism in specified areas. The ripples of this work have reached far beyond the Great Barrier Reef: in the past 25 years, over 74 countries have started trialing or fully practicing MSP as an effective approach to managing human activities and nature protection in their marine areas.

However, not all plans keep maritime activities in balance with people's social and economic interests, or in harmony with conservation of an area's natural and cultural integrity. For example, in the EU, Member States are required by law to apply an ecosystem-based approach to MSP, meaning they must consider the ecological boundaries of marine ecosystems when allocating

The ocean occupies over 70% of our planet, but we still only know less than 5% about all its ecosystems



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1. Humpback whale (Megaptera novaeangliae) fluke with fishing boats in background. Andfjorden close to Andoya, Nordland, Northern Norway. **Photo:** naturepl.com / Espen Bergersen / WWF

2. Women in the fishing industry at Joal-Fadiouth port, Senegal. **Photo:** Helena Rodrigues

3. Couple of Harbour seal (Phoca vitulina) on sand beach, Wadden Sea, Netherlands. **Photo:** Jan van de Kam / WWFBergersen / WWF

space to different human activities; however, WWF research has revealed that the national plans in place don't adequately consider nature's limits to economic development. Further, they have different interpretations of what an ecosystem-based approach requires. The result is an incomplete approach to MSP and a lack of harmony between activities in each European sea basin.

For MSP to support a sustainable blue economy successfully, it needs to be a forward-looking process that considers all economic sectors and ecological factors related to a marine area. Then, space needs to be allocated both geographically and over time, to different activities and people whose livelihoods are tied to our seas. This is particularly important in light of EU commitments to speed up the deployment of offshore renewable energy, which is

essential to deliver a carbon-neutral future and achieve the 1.5°C Paris Agreement target. As the ocean is the Earth's largest carbon sink and with the EU boasting the biggest maritime territory, there is an opportunity for a new wave of positive MSP 'ripples' to be felt around the globe.

MSP in the EU

Promisingly, in the EU, MSP works as a link between industries tied to our seas. It allocates space for different maritime activities while also having a broader say over long-term national and regional visions for a sustainable blue economy. As MSP supports how social, economic and environmental priorities are translated into the physical occupation of space at sea, it is a crucial tool for good ocean governance – a high-level word used to define the integration of policies, actions and affairs contributing to how the ocean is protected and accessed by all of us.

Most importantly, MSP does not replace the policies to effectively manage maritime activities across different sectors, nor does it replace the need for effective and well-managed marine protected areas that serve as refuges to valuable and vulnerable ecosystems. Instead, it helps to create and support the political conditions for developing and evaluating networks of well-managed protected areas in harmony with other at-sea activities. This is important because the accelerating impacts of climate change in our ocean make protecting the "right" places like biodiversity hotspots and wildlife migratory corridors imperative.

Because national maritime plans take a long time to develop, they also stay in place for extended periods of time – usually between six and ten years in the EU. That's why it is so crucial to get them right, and to collect data over the course of a plan's implementation period to generate the knowledge essential for creating more effective and inclusive plans in the future.



4

Inclusivity is a key point of successful MSP. While it is ultimately up to the national authorities what elements are included in the final strategic document, embracing opportunities to improve the planning process via new information and diverse perspectives from marine-affiliated communities and industries can help mitigate the impacts of climate change, support the transition to sustainable seafood consumption and boost cooperative management of protected areas.

Importantly, nothing prevents countries from redesigning their plans as soon as new data or priorities emerge. This flexibility has proven key in Denmark, with the government deciding to kick-start the MSP process all over again following the backlash from civil society over how economic interests triumphed over nature protection. Hopefully, with the present need to speed up renewable energy deployment and address biodiversity collapse in EU seas, more countries will follow Denmark's example and improve their existing plans as soon as possible to reflect geopolitical priorities.

4. Knot (Calidris canutus) flock flying in front of East Hoyle Windfarm, Wirral, UK. **Photo:** naturepl.com / Graham Eaton / WWF

5. Shooting away the trawl on a North Sea trawler. **Photo:** Quentin Bates / WWF

6. Puffin (Fratercula arctica) with fish in beak, Saltee Island, Ireland June 2009. **Photo:** Wild Wonders of Europe / Pal Hermansen / WWF

The state of planning in European waters

Despite the EU having the tools for sustainable ocean planning enshrined in law (which is still very unique from a global perspective), Member State plans are currently insufficient for the EU to deliver on its climate and biodiversity goals. European Commission research also shows that the objectives of the European Green Deal, the EU's policy package to deliver the first climate-neutral continent by 2050, are not integrated with Member States' national maritime plans. This is completely at odds with EU ambitions to be a global leader in climate action.

Climate change isn't the only area where countries are lagging behind in their plans: there has been a struggle across Member States to prioritize how their marine areas are accessed and shared by different sectors, including traditional ones like fisheries, while still leaving space for "future uses" such as tidal and wave energy, expansion of protected areas, and more.

Member State plans are insufficient for the EU to deliver on its climate and biodiversity goals

Fisheries, which is one of the most long-standing and influential maritime industries, and responsible for a big chunk of the EU's blue economy (10% of 2019 gross profits), is just one activity that stands to lose from poor MSP processes. As planners tend to follow an approach that prioritizes "fixed uses" such as wind turbines which are usually anchored to the sea floor and for a long period of time, more "mobile industries" like fishing are overlooked. Without the participation of fishers in MSP, it is nearly impossible to safeguard a sustainable future for the industry. These stakeholders bring with them both a feel for what is happening in our seas via inter-generational learnings and invaluable data about the health of fish populations, as they are legally required to report what they catch.

The *pièce de résistance* for our ocean's health is how to successfully integrate protected areas in MSP. Less than 30% of EU seas are allocated for the protection of marine life, despite all Member States pledging to do so by 2030 under the UN Sustainable Development Goals. Sharks, dolphins, whales and numerous other species in serious decline are



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not sufficiently protected in Europe, and very few efforts are underway to actively restore the habitats essential to their existence and help fight climate change through carbon capture. When nature loses, we do too.

Underlying all challenges is the actual implementation of the MSP law across the EU. As of December 2022, six Member States, five of which are in the Mediterranean region, have yet to implement a national maritime spatial plan. This leaves one of Europe's most iconic sea basins without the tools to develop activities like the deployment of offshore renewable energy in a sustainable and forward-looking way. It is essential for national governments to focus on finalizing these plans as quickly as possible, without side-lining important steps such as comprehensive consultations with all interested stakeholders. For those Member States with a national plan, it is urgent that upcoming policies, such as REPowerEU and the Nature Restoration Law are implemented in line with the MSP process, and that plans are updated to reflect the much needed action on clean energy and conservation.

The further we delay implementation of nature restoration and conservation, the heavier the price tag: the current trajectory of biodiversity destruction will cost the global economy as much as US$2.7 trillion a year by 2030 and the longer we wait to act, the more difficult it will be to solve climate-related problems such as food insecurity, unemployment and loss of nature, to name just a few.

This is no longer exclusively an environmentalist argument: economists are now objecting to the commodification of nature (the idea that nature exists only as an 'object' that can be used as an input in the production chain) and debunking the colonial myth of unlimited marine resources. They're also speaking out on the need to protect our blue commons, the planet's final frontier, from the threats posed by extractive and exploitative policies that deplete our ocean of life and the resources on which we all depend.

Learning to surf the MSP wave

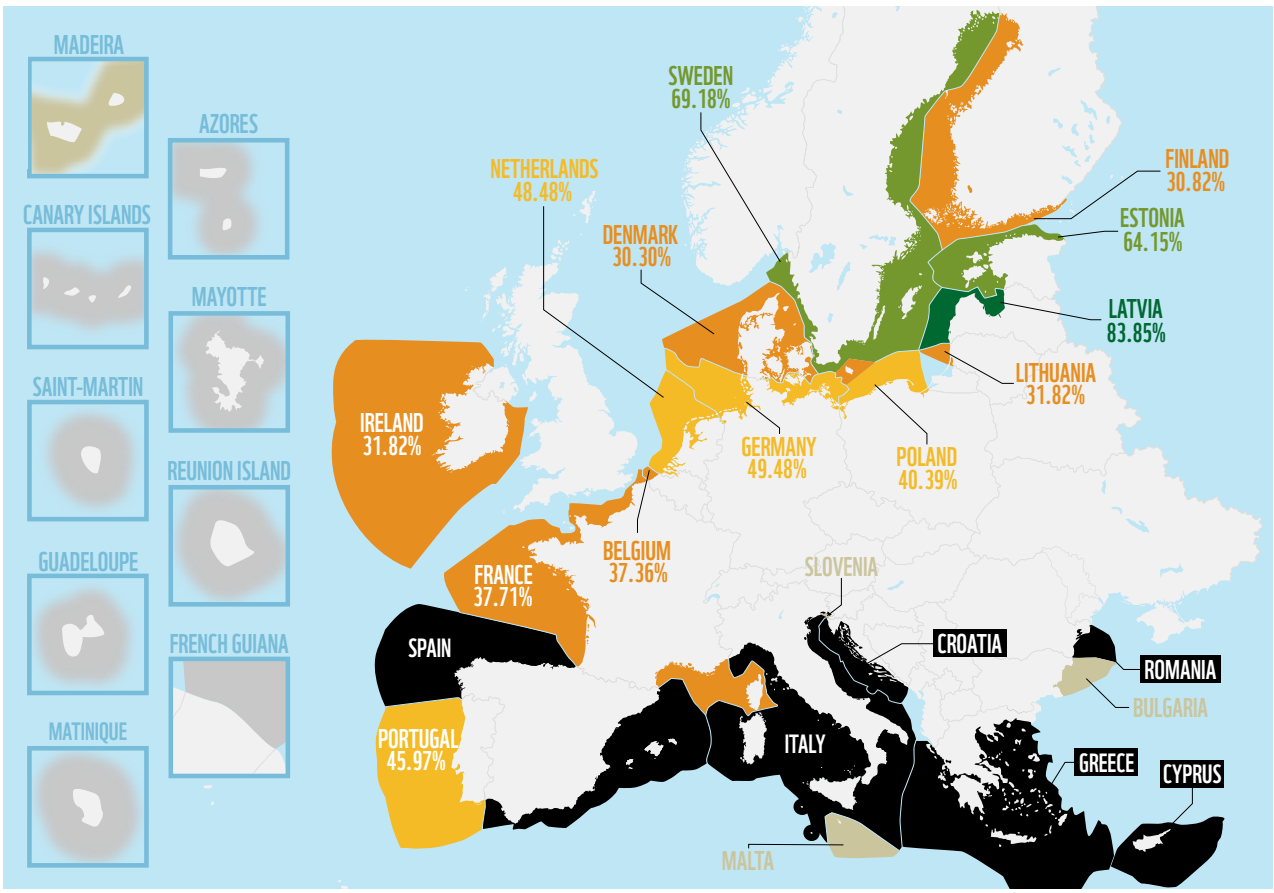
The challenge now is deciding how to move forward. How can we step out of this one-dimensional view on MSP that plots economic activities without consideration for future changes, and that not only excludes nature but vulnerable communities too? In the EU, it is urgent that Member States talk to each other and invest in a dynamic, collaborative approach to planning that involves people and non-EU neighbors throughout the whole process.

Today, MSP is the best solution for addressing the multiple problems our ocean faces. The way the EU's law on this process was developed allows for growth and improvement. What we need now is the political will to keep Paris Agreement promises and achieve European Green Deal ambitions in harmony with EU Biodiversity Strategy goals for nature restoration and protection.

Renewable energy expansion in the world's largest marine area must go hand-in-hand with the recovery of degraded marine ecosystems. We can't have a climate-neutral future without our ocean's natural resources, but we also can't have a healthy ocean unless we curb climate change and its destructive impacts. Fundamentally, ocean action is climate action.

Finally, it is crucial to open the processes of how we plan our blue future to communities often excluded from decision making. Our ocean belongs to all of us and, in turn, its health depends on all of us. It is everyone's responsibility to be part of the MSP process and to have their say for good ocean governance. To ensure that future generations can grow up looking at the sea with the same sense of wonder many of us feel today and that countless numbers of people have felt throughout history, we must deliver a balance between nature and people. ●

THE EU IS FAILING AT ECOSYSTEM-BASED MSP



KEY

SCORE IN %

A national maritime spatial plan is in place and has been assessed by WWF. 100% corresponds to the complete achievement of an ecosystem-based approach to MSP

A national maritime spatial plan is in place but has not yet been assessed by WWF

No national maritime spatial plan in place and the country is under infringement procedures by the European Commission

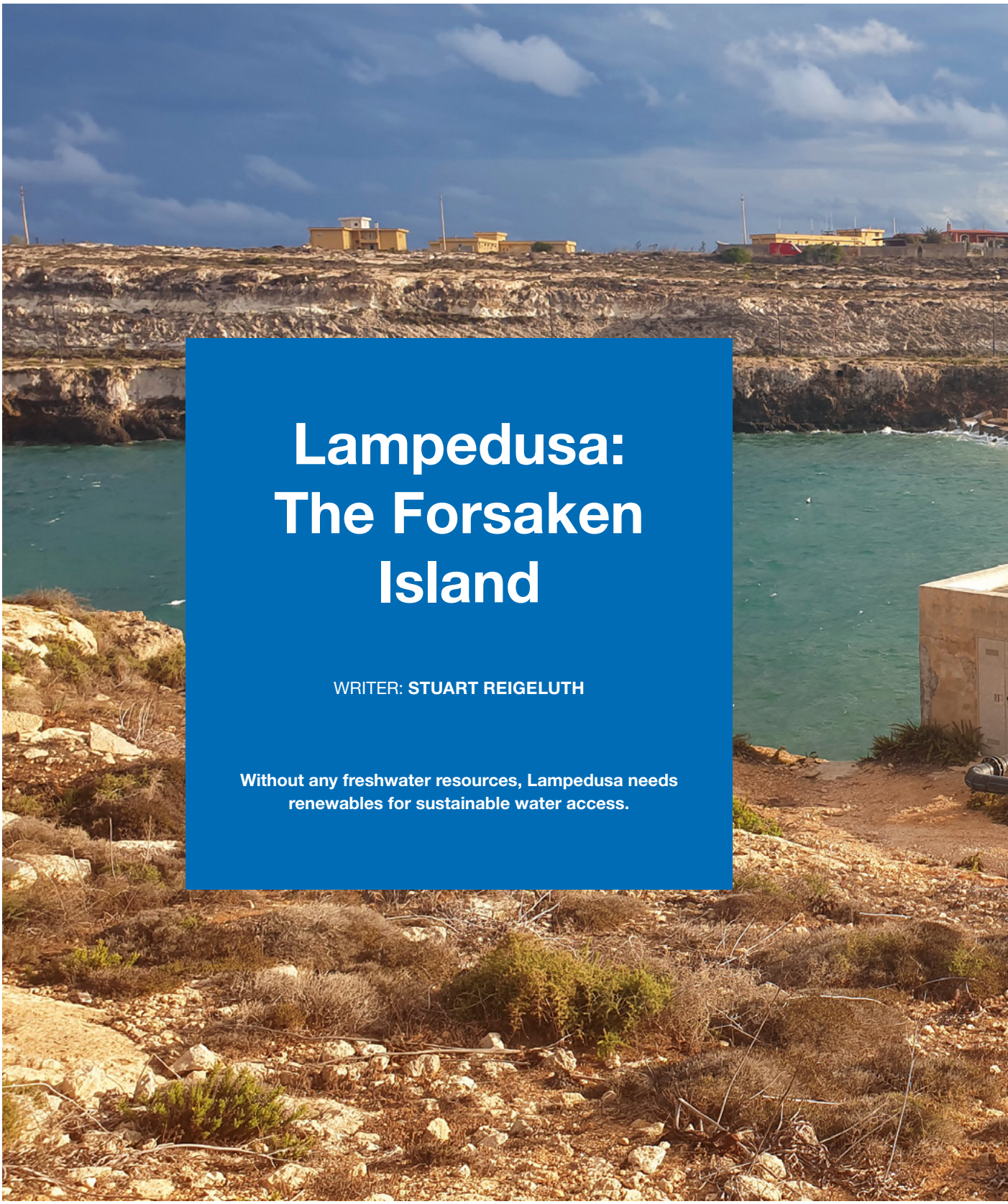
No national maritime spatial plan is in place but there is no infringement procedure underway as the outermost regions have more time to comply with EU laws

To effectively restore and protect our ocean as per the EU Biodiversity Strategy, achieve carbon neutrality by 2050 with the European Green Deal, and put legal and sustainable seafood on our plates in line with the CFP, we need rigorous, ambitious and long-term strategies – and we need them now.

But no Member State is currently on track to meet the minimum 30% MPA and 10% strict-protection targets by 2030. Space for nature protection and restoration is also not well integrated in today's national maritime plans, but these are essential to sustain the EU blue economy and improve coastal resilience to climate change.

Ecosystem-based Maritime Spatial Planning is the right tool to secure harmony between sectors and address the dual biodiversity and climate crises. With the world's largest maritime territory, the EU must lead by example.

WWF's assessments of MSP in the EU:



Lampedusa: The Forsaken Island

WRITER: **STUART REIGELUTH**

Without any freshwater resources, Lampedusa needs renewables for sustainable water access.



1

Lampedusa is Italy's southern-most island, located off the eastern coast of Tunisia on the longitudinal level of Kairouan – one of the four holiest sites in Islam. With a population of about 6,000 inhabitants, Lampedusa is Catholic and they celebrate their local patron saint of the island (La Madonna di Porta Salvo) on 22 September by walking through the narrow streets in the evening. Coinciding by chance with this festival, REVOLVE was in Lampedusa for a field trip for the WATER-MINING project.

WATER-MINING is an EU-funded project that is developing energy-efficient technologies for treating wastewater from urban areas and industrial sites, while promoting the extraction of valuable resources from the residues generated during the processes. The technologies for extracting minerals and providing freshwater from seawater include nanofiltration, eutectic freeze crystallization (EFC) and desalination. The Lampedusa power station and desalination plant is one of the case studies of this project.

A water-stressed island

Unlike Malta that still has some (rapidly depleting) groundwater aquifer reserves, Lampedusa has no freshwater resources. Entirely devoid of water, the population of this flat rectangular 20 Km^2 stone formation protruding from the Mediterranean swells to 30,000-40,000 with the arrival of tourists from Italy and abroad during the summer season; not to mention the unspoken and estimated 25,000-30,000 migrants who are somewhere in camps inland (that we did not see during this trip) that also need fresh water on a daily basis.

Water scarcity and a complete lack of natural access is not a theory but rather the day-to-day reality in Lampedusa. Tankers bring fresh bottled water by cargo ships that are powered by diesel engines and the desalination plant pumps out 3,500 cubic meters per day (also powered by the diesel power station) of potable water that is sent to one of the seven municipal reservoirs, providing drinking water to the inhabitants and visitors. Water stress obviously accrues severely during the summer tourist season.

The Lampedusa desalination plant was ahead of its time when in 1992 solar photovoltaic (PV) panels were installed to power the energy-intensive reverse osmosis (RO) process of removing salt from seawater. Back then, the PV-RO combination produced about 1,500 cubic meters of fresh water per day, which has since doubled with greater demand and capacity. However, this has not been without local complications with renovation permits and different municipal administrations.

30 years since their installation, the solar panels have fallen into complete



2



3

disrepair due to petty local politics that have blocked the permit renewal to revamp the PV installations. The private company operating the plant – SELIS – continues to lease the land from the municipality to operate the desalination next to the sea, by the Cala Pisana enclave on the eastern side of Lampedusa, yet they cannot renew the solar panels without municipal approval. While the situation is expected to change with a new municipal administration coming in 2022, the desalination plant remains powered by diesel in the meantime.

According to Angelo Catania, Technical Manager at SELIS for the desalination plant, if the reservoirs of Lampedusa were in proper operation, then it would be possible to have more water than needed during the day with a PV plant (instead of 1,500 m^3/day, we could reach 3,000 m^3 every 12 hours, or more. This would mean a quadrupling of the capacity of clean water produced). As the reservoirs are on higher ground,

Lampedusa Desalination Plant in Numbers:

Electric consumption:
4
KWh/m^3

Total year consumption:
3 million
KWh/year

Max water production per year:
750,000
m^3

the excess water could be stored here and then distributed via the water pipe networks during the night using gravity. In the future, Mr. Catania asserts that this could be possible, if the reservoir systems were to be revamped. By using the natural pull of gravity, instead of having water storage that is powered by batteries, we could have storage powered by water, thus reducing the greenhouse gas emissions from the power station. This would be the most sustainable solution for providing clean water to all the inhabitants (and visitors) of Lampedusa.

Regional water dynamics

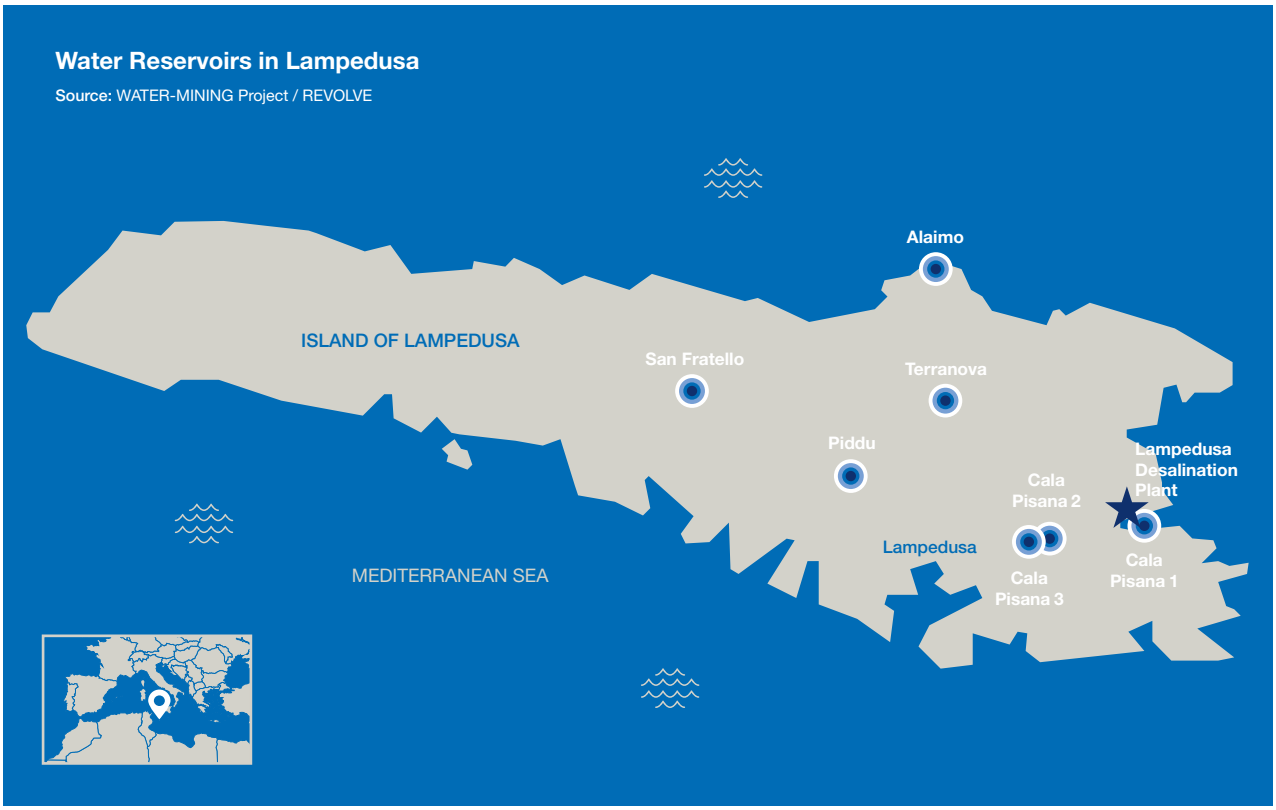
Desalination was introduced to Lampedusa in 1972 at a time when there were three desalination plants in Italy, including Trapani, Gela and Porto Empedocle. The land where these desalination plants were located was owned by the regional government, such was the case for the islands of Linosa, Pantelleria and Lampedusa as well. In particular, in minor islands, not all water came from desalination, as much of it still had to be transported and imported. The provision of water more broadly was under the responsibility of the Ministry of Defense that would pay for tankers to deliver water to the islands. This water was essentially free of charge for the municipalities to sell to the inhabitants.

In addition to these complexities and the tensions between regional-municipal ownership, there are the private companies owning the desalination plants (in terms of equipment only), whose role is to ensure that clean and fresh water is being provided via the pipes from the desalination plants. A sobering fact is that regardless of the source of the clean water, there is a very serious infrastructure problem: there is an estimated 30-50% leakage

1. Pump station brings Mediterranean saltwater from Cala Pisana to the Lampedusa desalination plant. **Photo:** Stuart Reigeluth / REVOLVE
2. WATER-MINING project field visit to Case Study 1 in Lampedusa's desalination plant and evaporation pools. **Photo:** Stuart Reigeluth / REVOLVE
3. Remnants of the 1992 installation of solar photovoltaic (PV) panels that provided renewable energy to the desalination plant. **Photo:** Stuart Reigeluth / REVOLVE
4. Andrea Cipollina from UNIPA presents the evaporation ponds at the test site. **Photo:** Momen Bakry / REVOLVE
5. Cala Pisana enclave swimming hole with Lampedusa desalination plant on the right. **Photo:** Momen Bakry / REVOLVE



4



issue in minor islands, meaning that half the water is being lost via cracks and holes in the old pipes. Therefore, it is important to see the bigger picture to understand that the water-energy ecosystem needs to address and resolve integrated water management before increasing investments in more desalination and reclaimed wastewater. The Salva Mare legislation of May 2022 goes in that direction.

"Lampedusa wants to be a flagship frontrunner of the energy transition," says Angelo Catania. Islands are symbolic of the potential for energy independence in Europe and elsewhere. Getting off fossil fuels is a political game but also a reality in the transition towards integrating and deploying renewables more robustly. Coupled with greater electrification and energy efficiency technologies like heat pumps, renewable energies (solar and wind in particular) can lead the way in providing cleaner water more sustainability for future generations.

In the WATER-MINING test site in Lampedusa, there is already progress in the efficiency of the technologies being tested. In comparison to a previous project, ZERO BRINE, where the EFC unit in Botlek, the Netherlands, produced 10 liters/hour of fresh water, here in Lampedusa the EFC unit has improved the prototype drastically to produce 100 liters/hour. We are talking about the efficiency of producing clean water and using the byproducts of sodium chloride solutions for fertilizers, detergents, the glass industry and even for dyes in the clothing industry.

Making Europe more competitive

These are circular economy actions that are hard to see and understand at first in such small testing sites, but

Lampedusa has no natural access to freshwater.

they have tremendous potential for being replicated in urban wastewater and industrial wastewater treatment plants to deliver fresh water, and to create those virtuous cycles of recovering the valuable resources that so often still go to waste. Improvements are also being made in extracting magnesium from industrial and urban wastewater sludge, making Europe more competitive as the global magnesium market is controlled largely by China.

During our visit, the Adviser to the Mayor of Lampedusa for Health, Family and Technological Innovation, Dr. Aldo Di Piazza, claimed that a more "sustainable future is possible". With greater societal awareness and environmental considerations becoming embedded in such projects as WATER-MINING, he may be right: the potential is there to produce water sustainably with power from renewables and to recuperate the maximum amount of minerals and freshwater, while minimizing the waste being discharged into the sea or into the surrounding landscape, thus contributing to the circular economy in a replicable and scalable way across Europe.

The last Prince of Lampedusa, Guiseppe Tomasi said in his novel *The Leopard* that things need 'to change to remain the same'. Now in Lampedusa, things need to change – quickly – to become more sustainable. ●

The author is grateful to Angelo Catania from SELIS and Andrea Cipollina from the University of Palermo (UNIPA) for their valuable input.



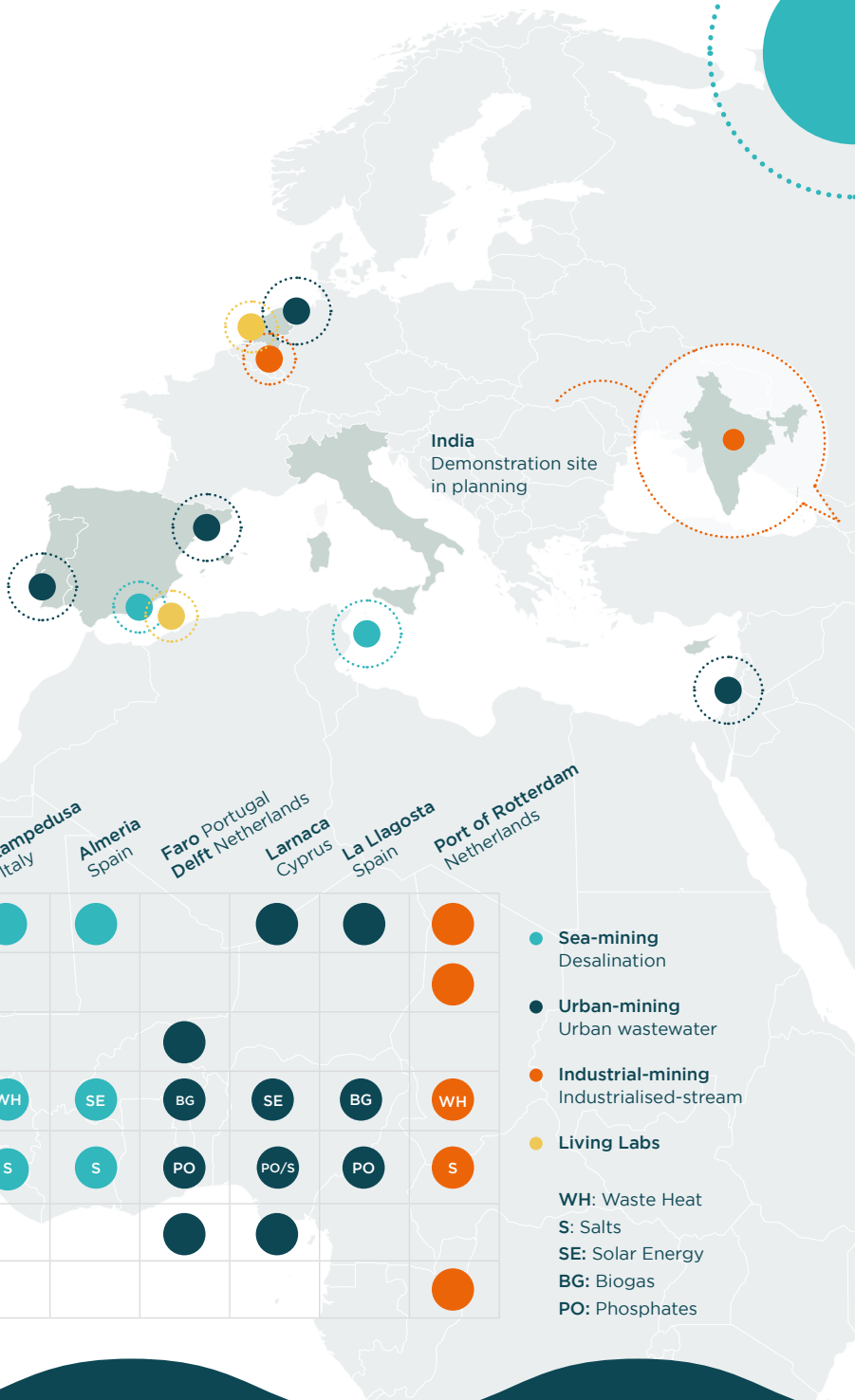
5

water mining
value for society

By 2030, water demand is expected to be two times the sustainable water supply. New sources of water are needed, now.

WATER-MINING is an EU-funded research project that creates water management solutions based on circular economy principles.
The project develops innovative methods to extract usable water from seawater and industrial and urban wastewater, whilst recovering valuable resources from the treatment process and improving the energy efficiency of the processes.

The project includes six demonstration sites in Spain, Portugal, Italy, Cyprus and the Netherlands covering the three water sources: sea, urban and industrial.



Services	**Lampedusa** Italy	**Almeria** Spain	**Faro** Portugal **Delft** Netherlands	**Larnaca** Cyprus	**La Llagosta** Spain	**Port of Rotterdam** Netherlands
Maximize water usage efficiency	●	●		●	●	●
Reduce water consumption						●
Safe water reuse			●			
Energy production and saving	WH	SE	BG	SE	BG	WH
Recovery and supply of critical raw material	S	S	PO	PO/S	PO	S
Supply of alginate-like polymers			●	●		
Chlorine recycling						●

- **Sea-mining** Desalination
- **Urban-mining** Urban wastewater
- **Industrial-mining** Industrialised-stream
- **Living Labs**

WH: Waste Heat
S: Salts
SE: Solar Energy
BG: Biogas
PO: Phosphates

Want to know more?
Visit us at watermining.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 869474.



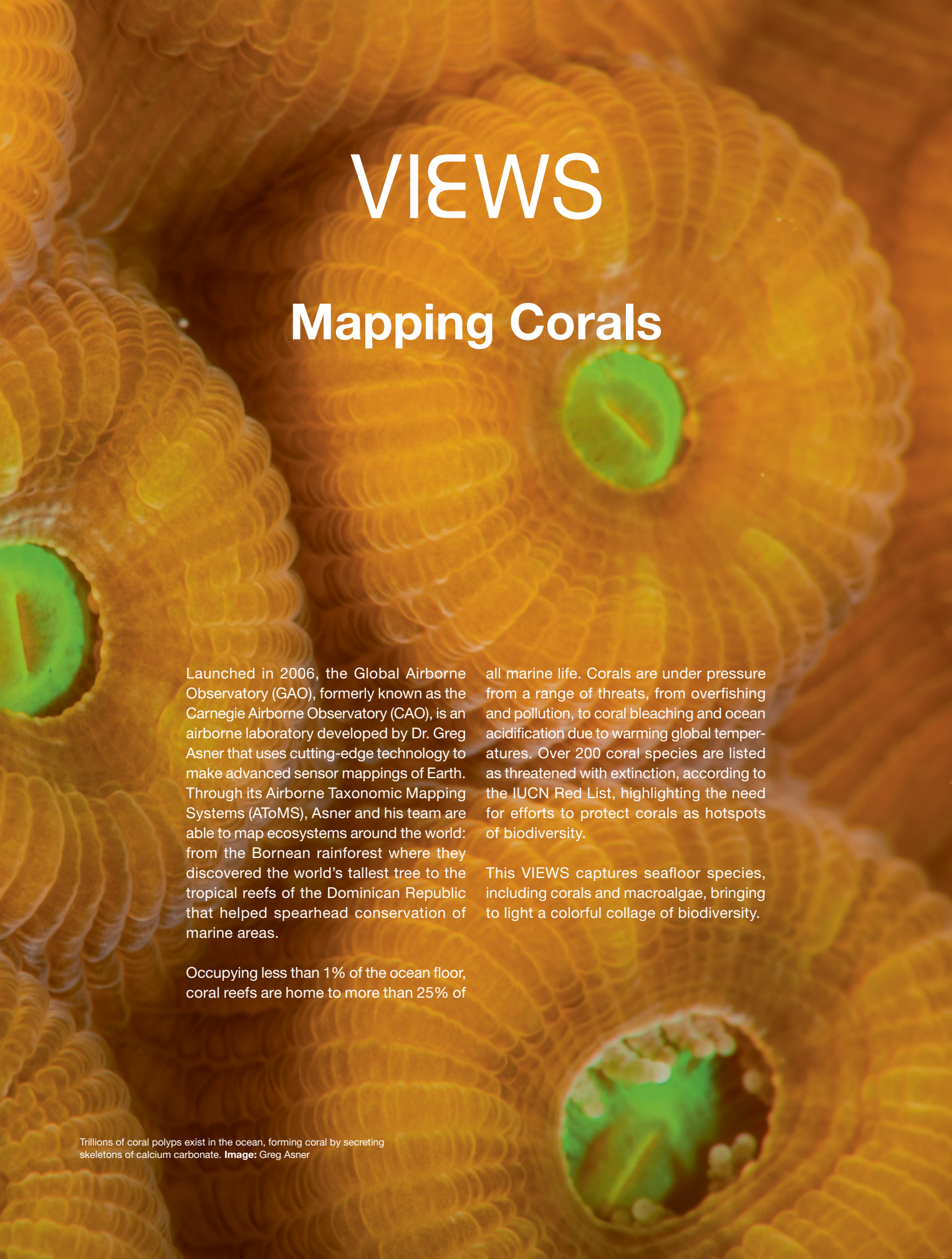
Pathways
FOR SUSTAINABLE FOOD

Pathways for transitions to sustainability in livestock husbandry and food systems

With the aim of reducing environmental impacts while addressing societal demands for safe, nutritious and affordable meat and dairy products, PATHWAYS is about identifying and increasing sustainable practices along the supply and production chains of the European livestock sector.

pathways-project.com

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 101000395.



VIEWS

Mapping Corals

Launched in 2006, the Global Airborne Observatory (GAO), formerly known as the Carnegie Airborne Observatory (CAO), is an airborne laboratory developed by Dr. Greg Asner that uses cutting-edge technology to make advanced sensor mappings of Earth. Through its Airborne Taxonomic Mapping Systems (AToMS), Asner and his team are able to map ecosystems around the world: from the Bornean rainforest where they discovered the world's tallest tree to the tropical reefs of the Dominican Republic that helped spearhead conservation of marine areas.

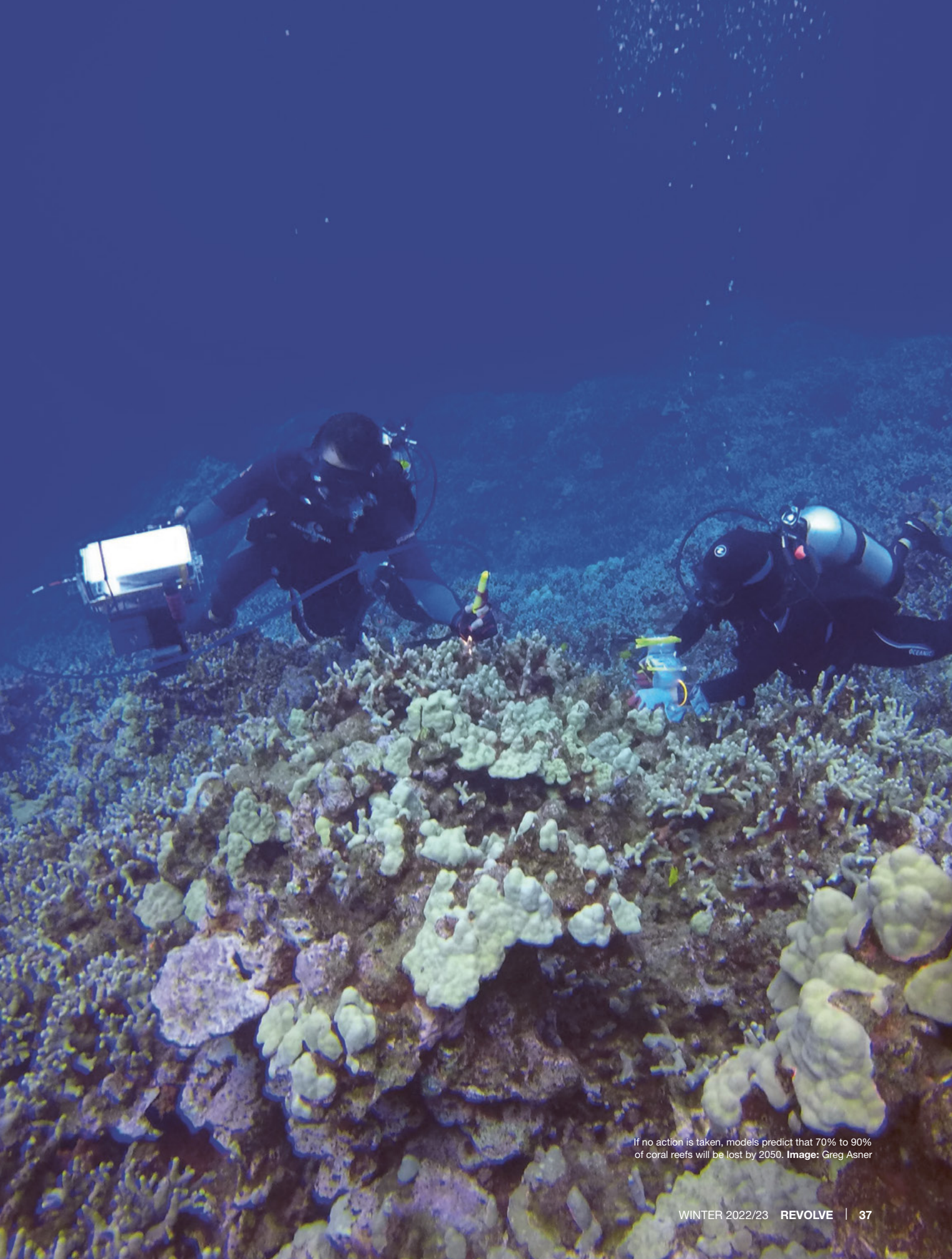
Occupying less than 1% of the ocean floor, coral reefs are home to more than 25% of all marine life. Corals are under pressure from a range of threats, from overfishing and pollution, to coral bleaching and ocean acidification due to warming global temperatures. Over 200 coral species are listed as threatened with extinction, according to the IUCN Red List, highlighting the need for efforts to protect corals as hotspots of biodiversity.

This VIEWS captures seafloor species, including corals and macroalgae, bringing to light a colorful collage of biodiversity.

Trillions of coral polyps exist in the ocean, forming coral by secreting skeletons of calcium carbonate. **Image:** Greg Asner



Housed on a highly modified Dornier 228-202 aircraft. **Image:** ASU Global Airborne Observatory

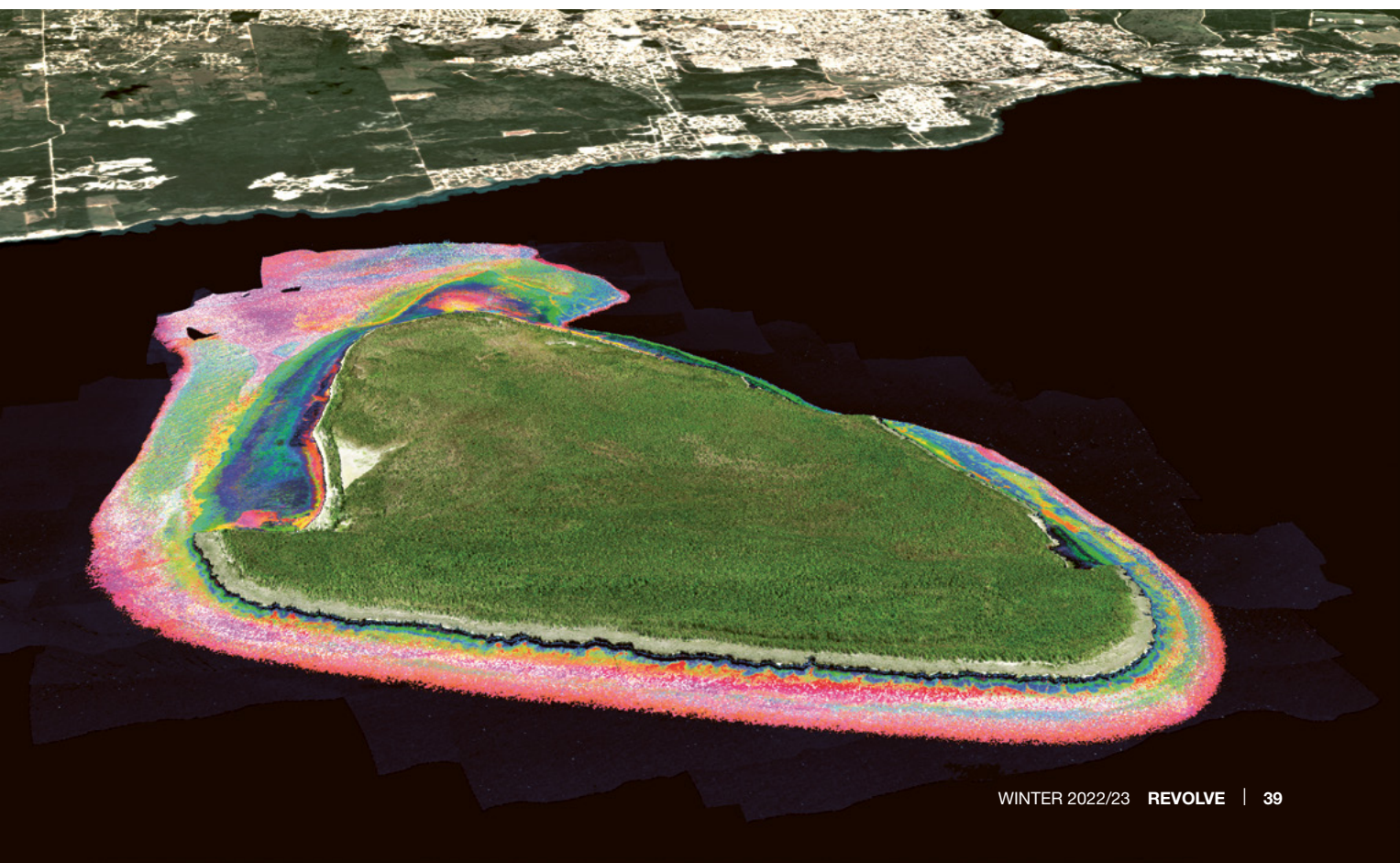


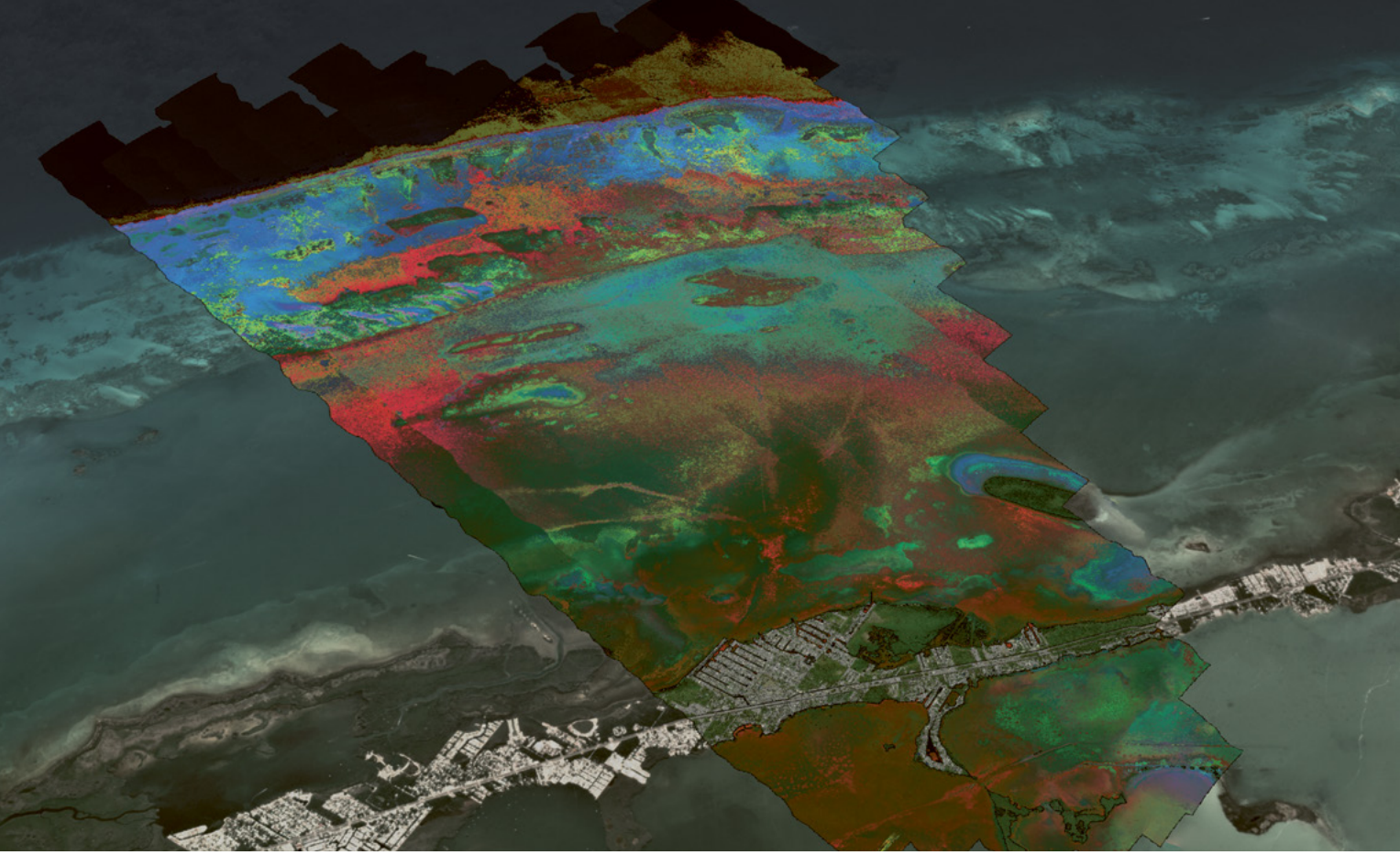
If no action is taken, models predict that 70% to 90% of coral reefs will be lost by 2050. **Image:** Greg Asner



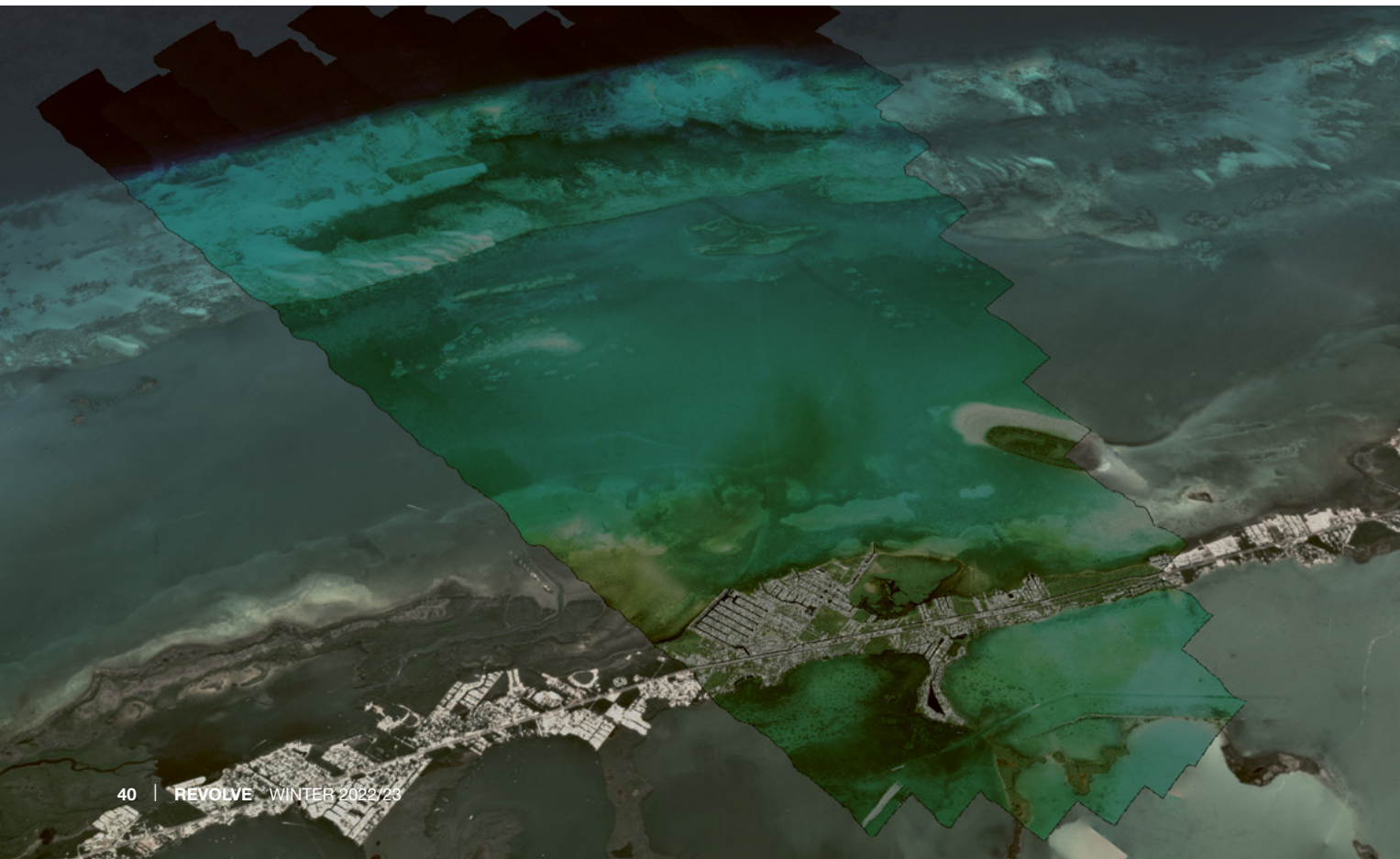
The GAO is regarded as one of the most advanced mapping technology operating in the civil sector. **Image:** ASU Global Airborne Observatory

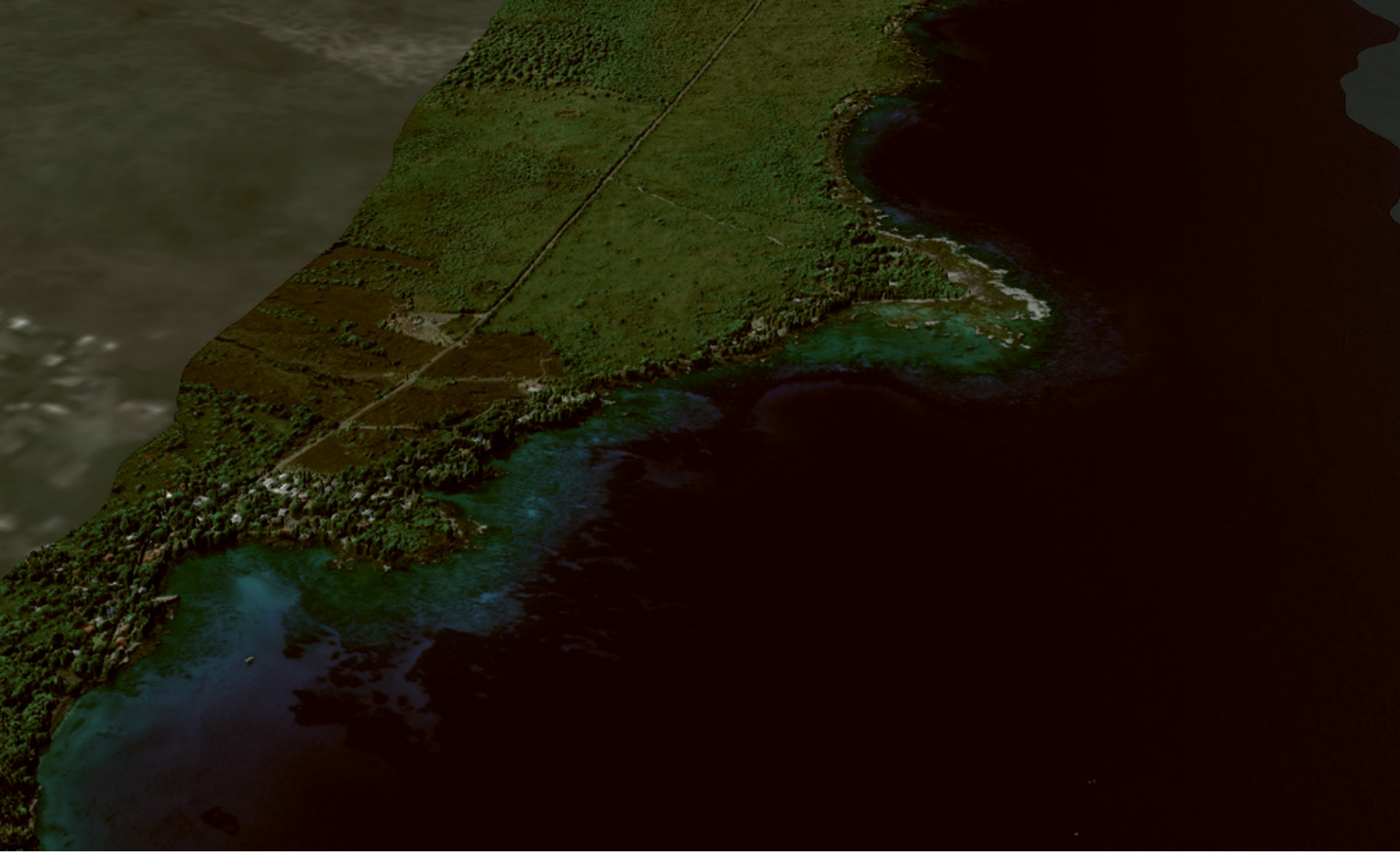
DOMINICAN REPUBLIC – This image above is captured in 'natural color' as you might see it from the window in an airplane. To the left of the island a noticeably sandy area is accompanied by a coral reef that forms a ring around the island. Tragically enough, as shown in the image below, 90% of the Dominican Republic's coral reefs have been destroyed, having detrimental impacts to the entire coastal ecosystem.



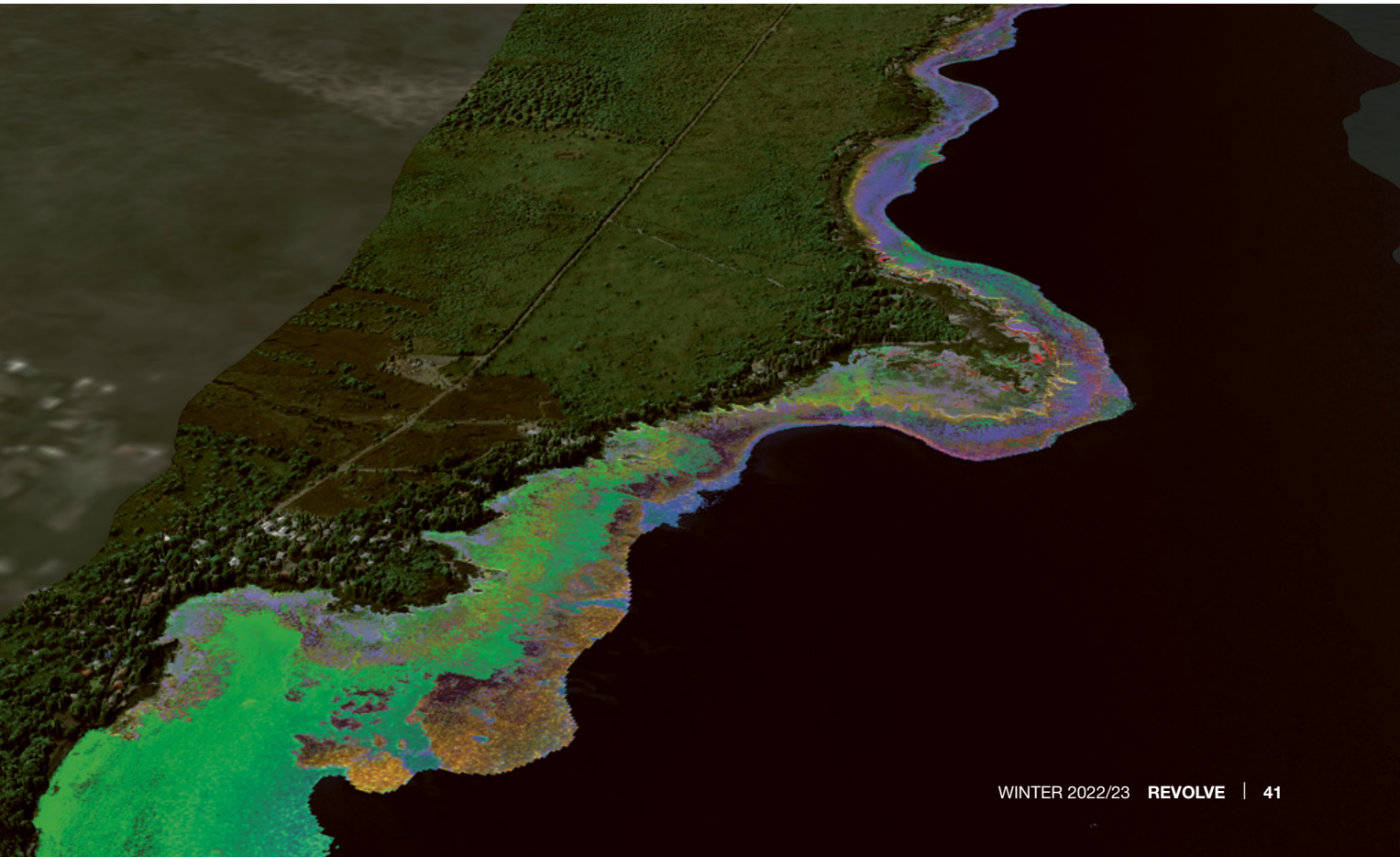


FLORIDA KEYS, USA – The Florida Reef Tract is home to over 6,000 species of plants, fishes, and invertebrates. This mapping reveals a range of habitats on the seafloor: dark green is seagrass ecosystem, blues are different sand-dominated ecosystems (each with different types of algae), and very light green-to-yellow colors are different groups of corals commonly found in Floridian reefs.





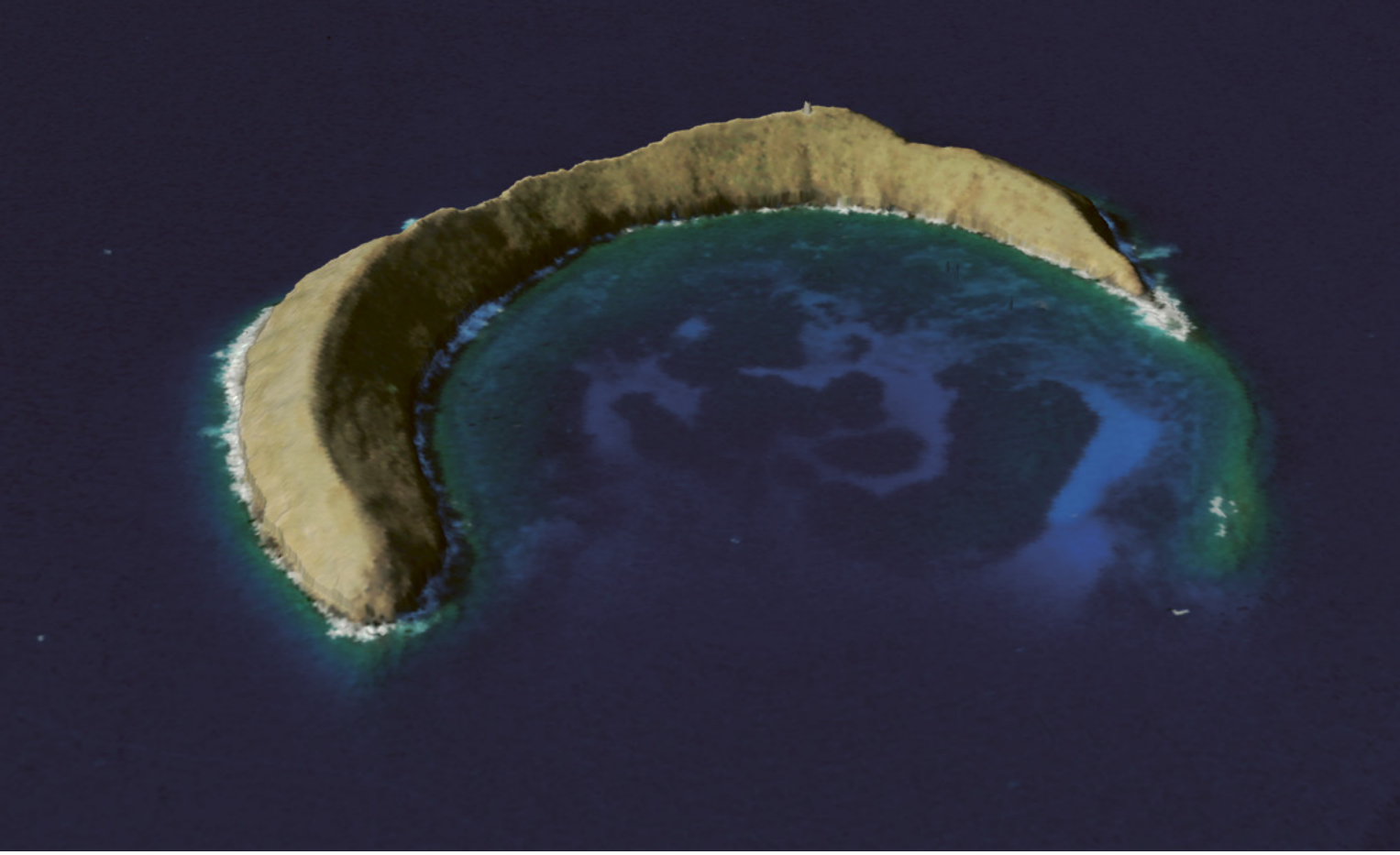
KEALAKEKUA, HAWAIʻI, US – Located on the Kona coast of Hawaiʻi, the diversity is captured in natural colors. Mapping the biodiversity and functioning coral reefs is critical to understanding how best to conserve and manage them.



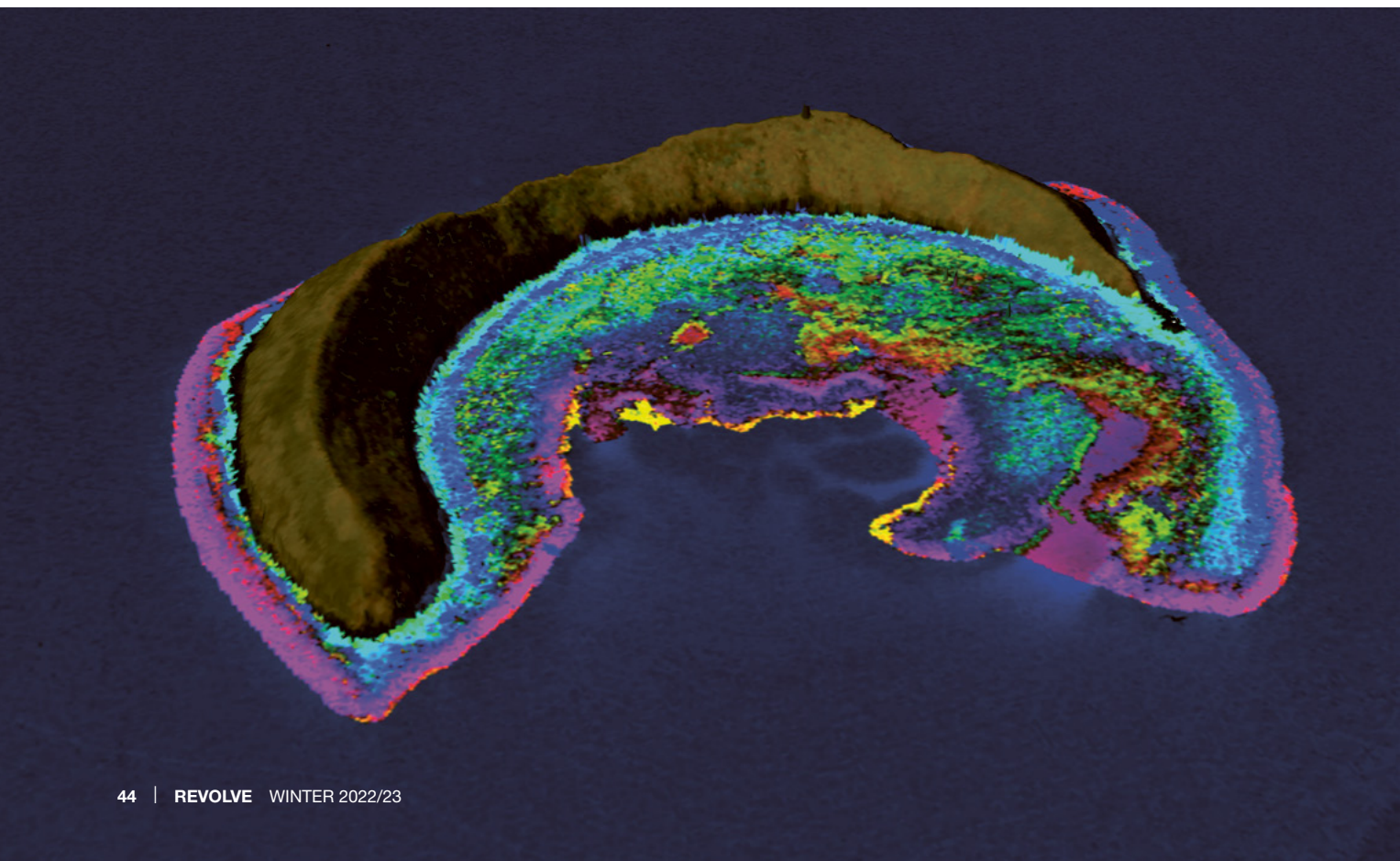


Asner Lab's Coral Haven Project deploys a team of highly trained ecologists using deep diving techniques to explore, survey, measure, and document the efficacy of artificial reefs with a focus on shipwrecks that can support future coral biodiversity. **Image:** Greg Asner



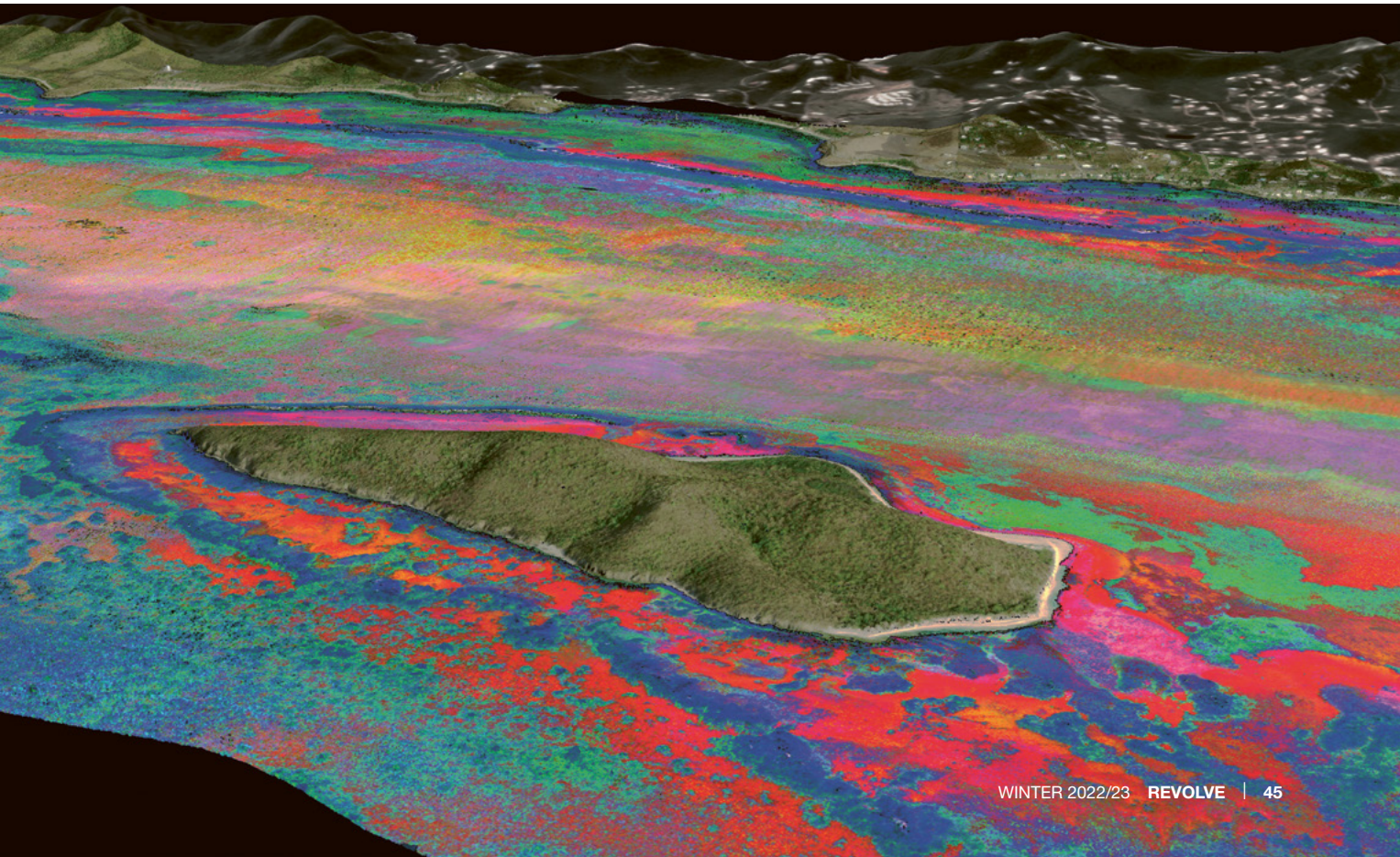


MOLOKINI, HAWAIʻI, US – This tiny island is the top of an extinct volcano and one of only three volcanic calderas worldwide. Corals of all types inhabit the interior and exterior around the bit of volcanic cone that still protrudes from the ocean.



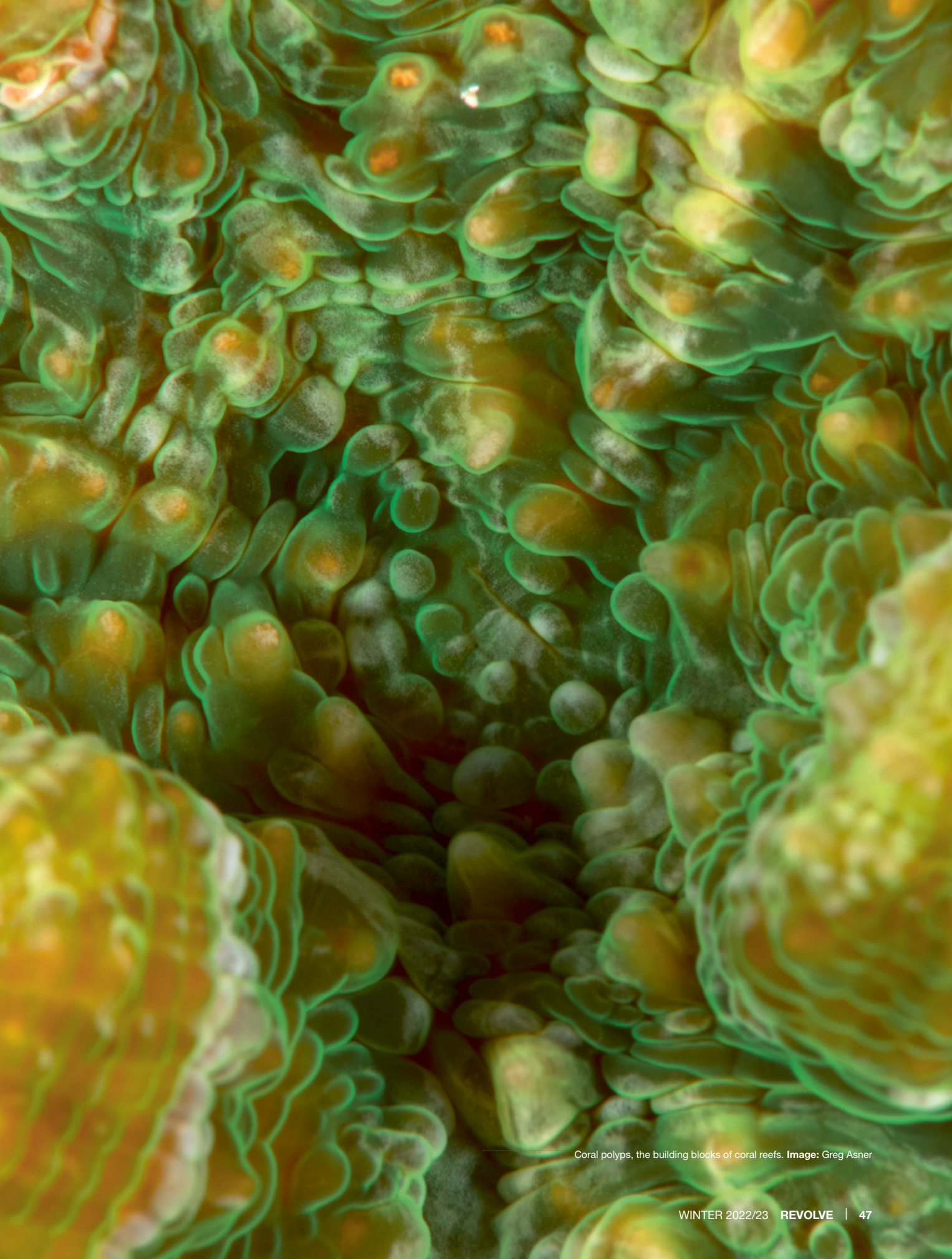


VIRGIN ISLANDS – This is Buck Island off the northern coast of St. Croix Island. Buck Island is shaped like an arrowhead, with the point of the land and reef shaped by continuous currents and waves coming from the east (left side of image). Like a boat moving through water, Buck Island's reefs have arranged themselves into this arrowhead shape.

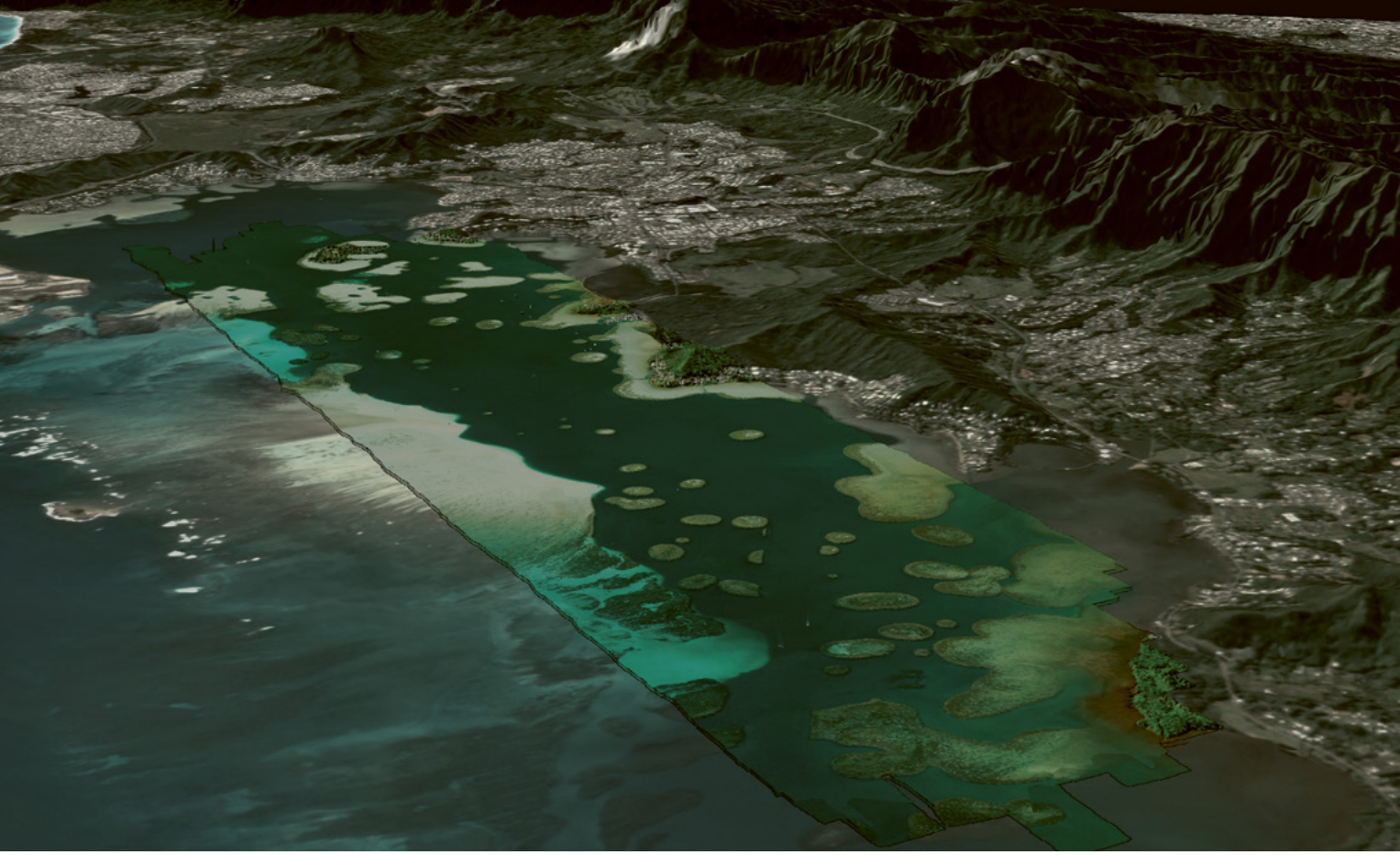




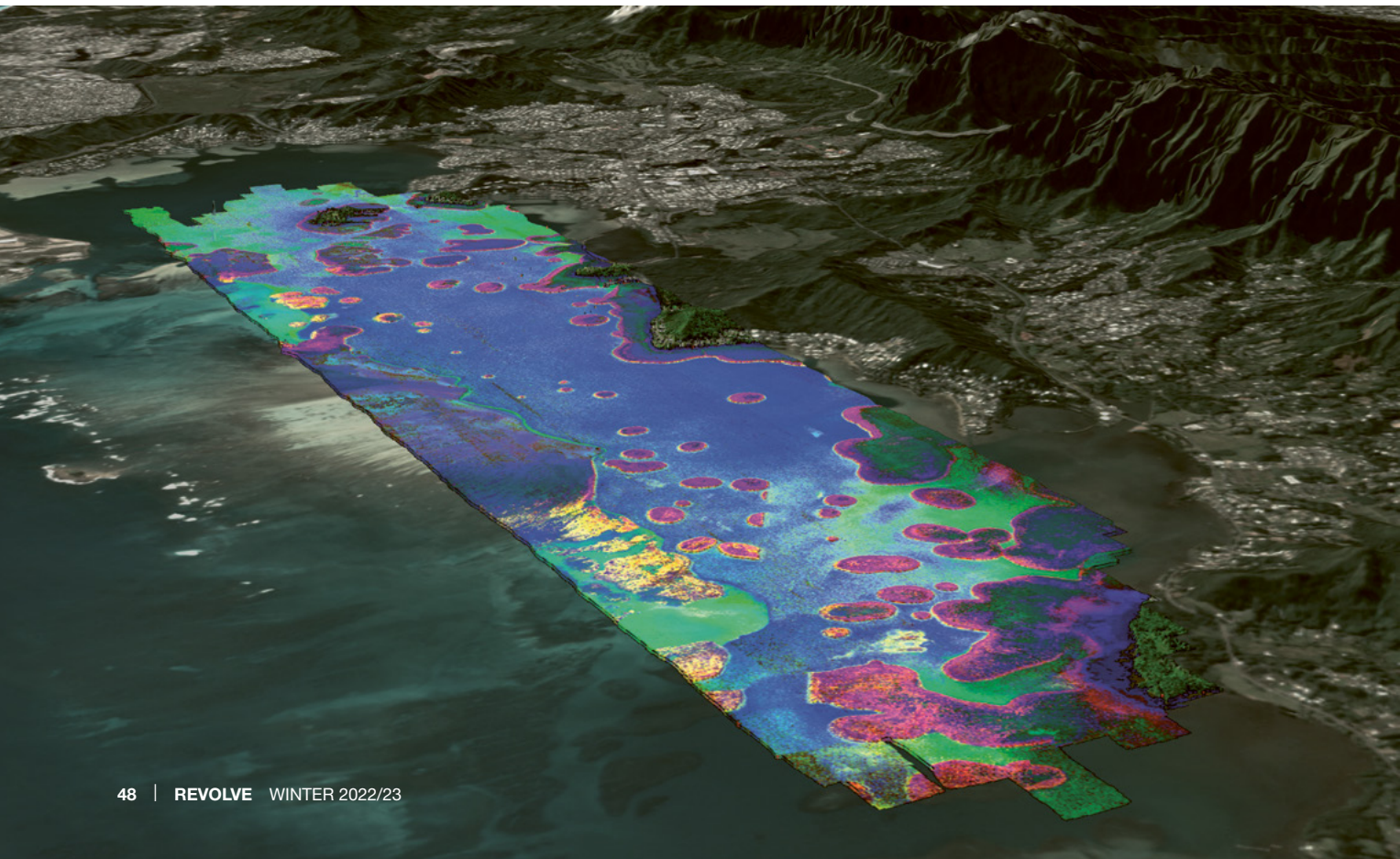
DOMINICAN REPUBLIC - A coral reef restoration project. The Dominican Republic has lost 90% of its coral reefs. **Image:** Greg Asner

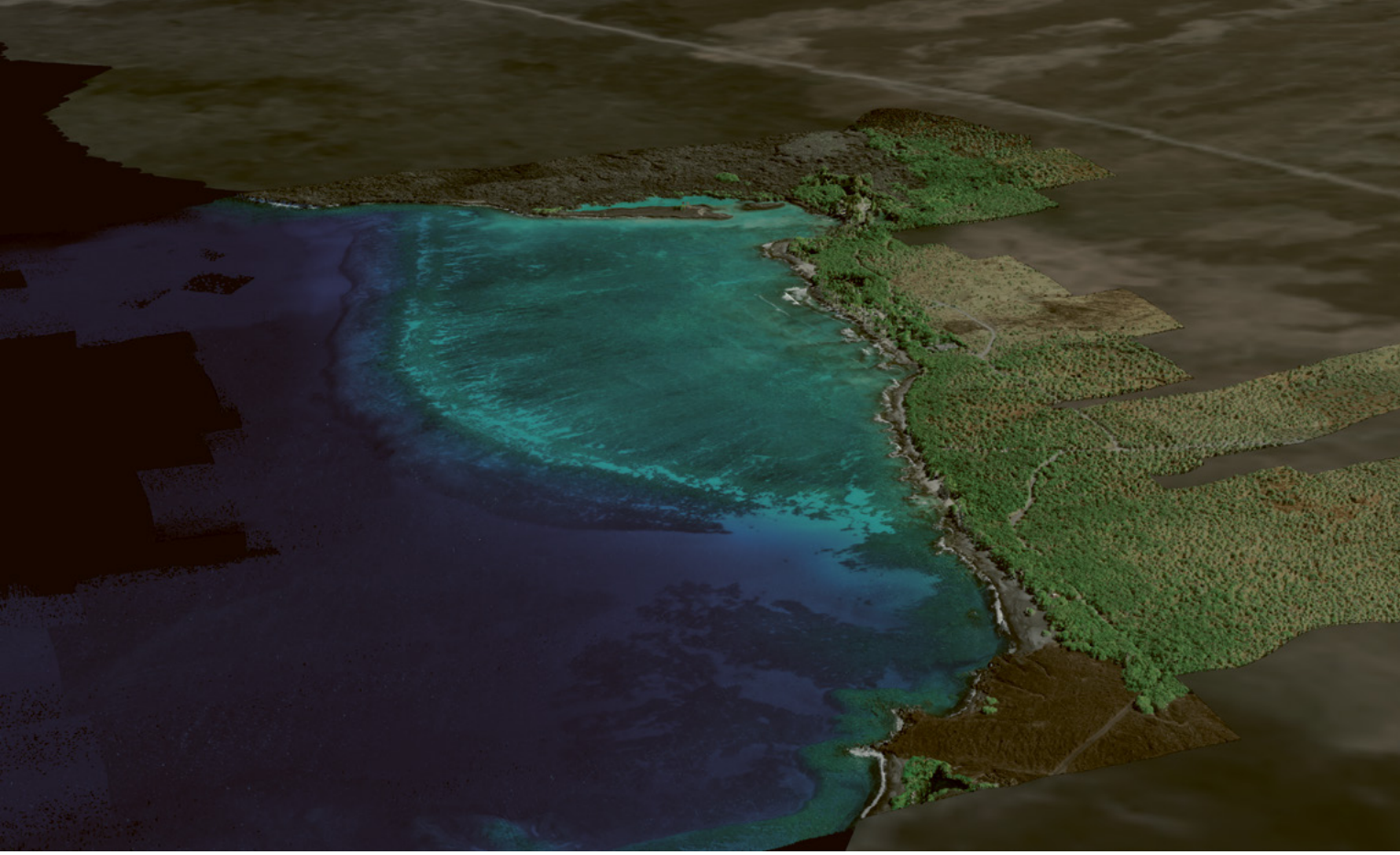


Coral polyps, the building blocks of coral reefs. **Image:** Greg Asner

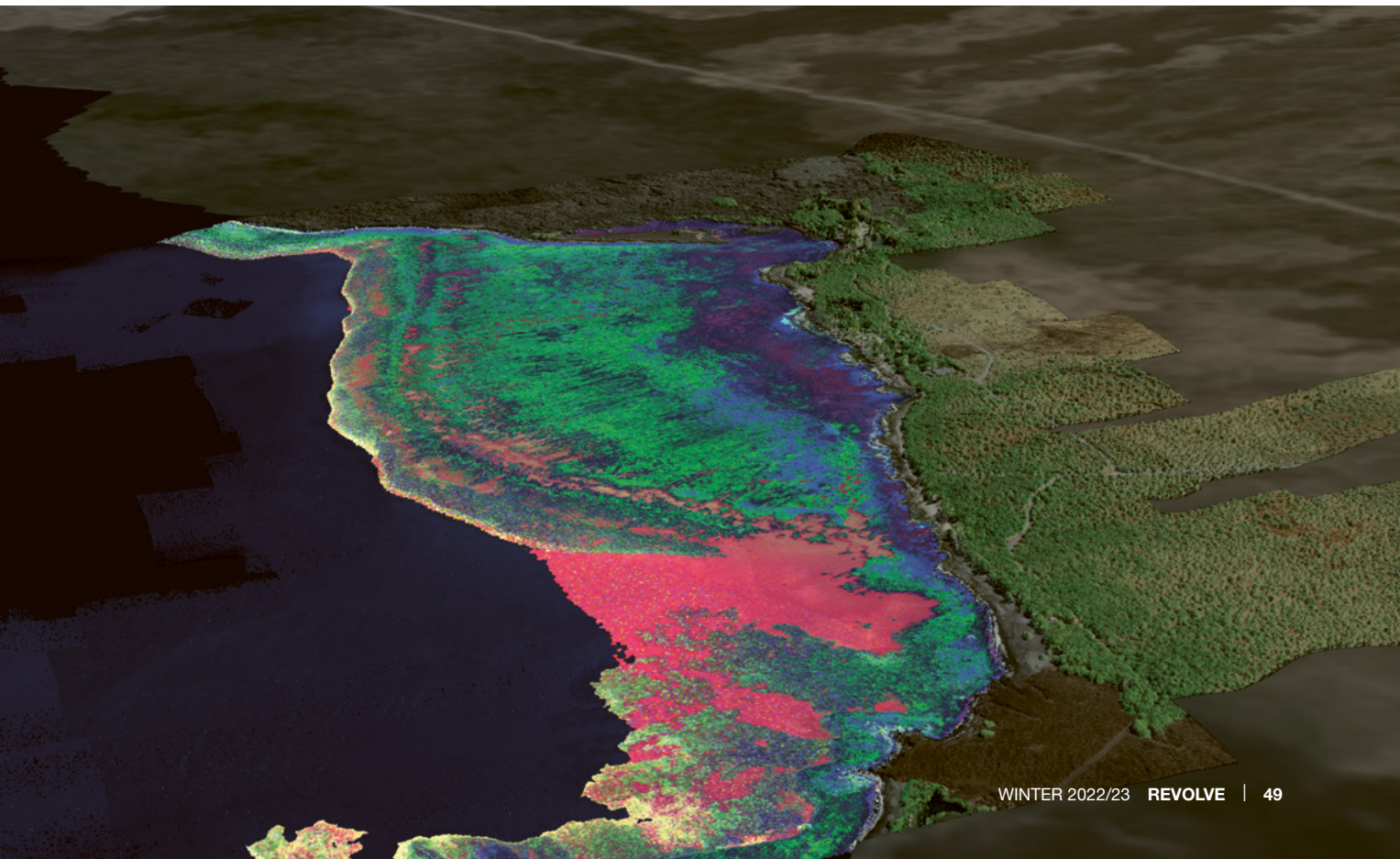


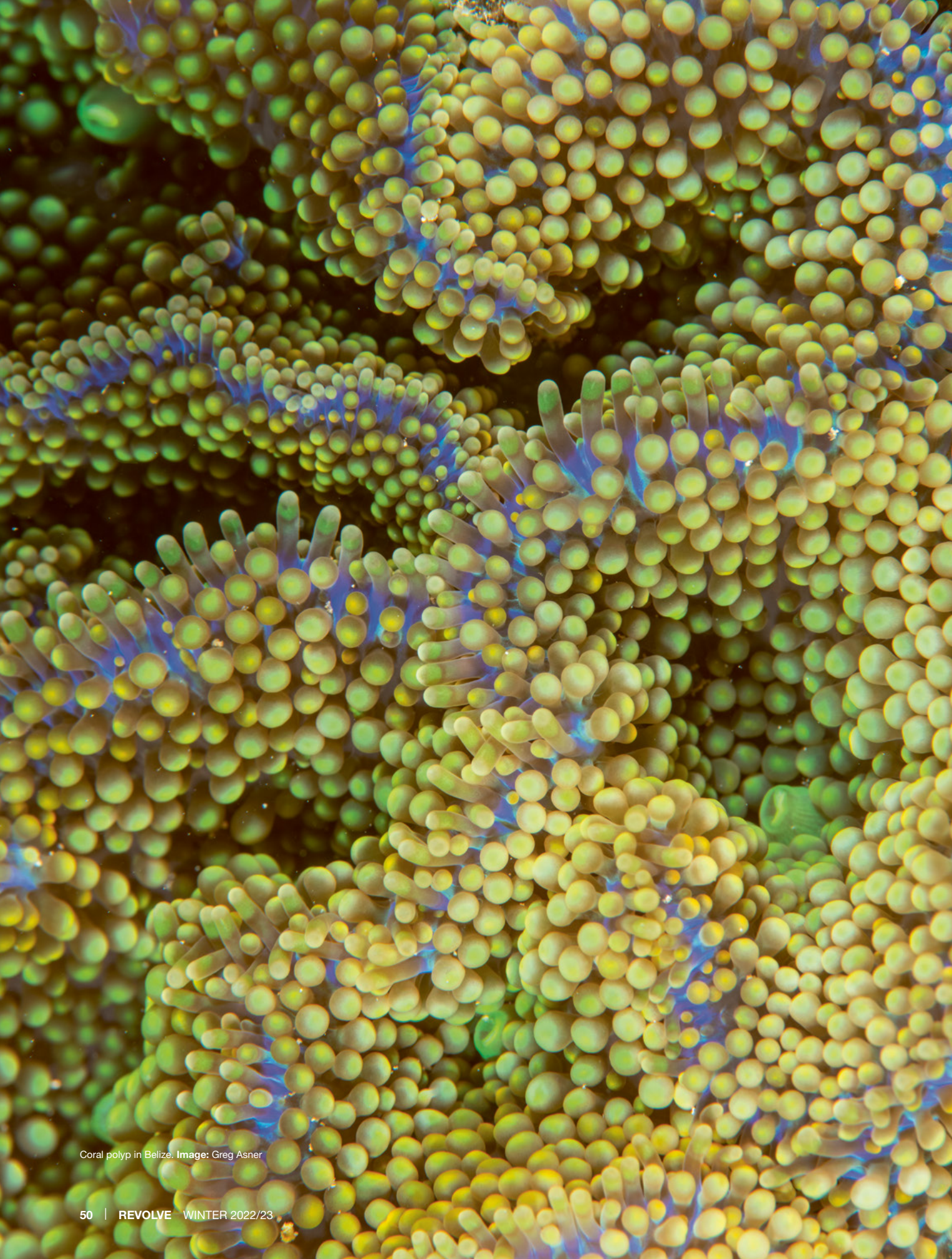
O‘AHU, HAWAI‘I, US – Coral reefs surround O‘ahu, although active live coral growth is limited to the leeward sides of the island or in sheltered areas on the windward coasts. Here you see Kaneohe Bay, a calm lagoon-like place where large circular coral reefs have formed over millennia. These coral reefs are mostly two species, so each one has the same color in the GAO AToMS data – the hot pink color.





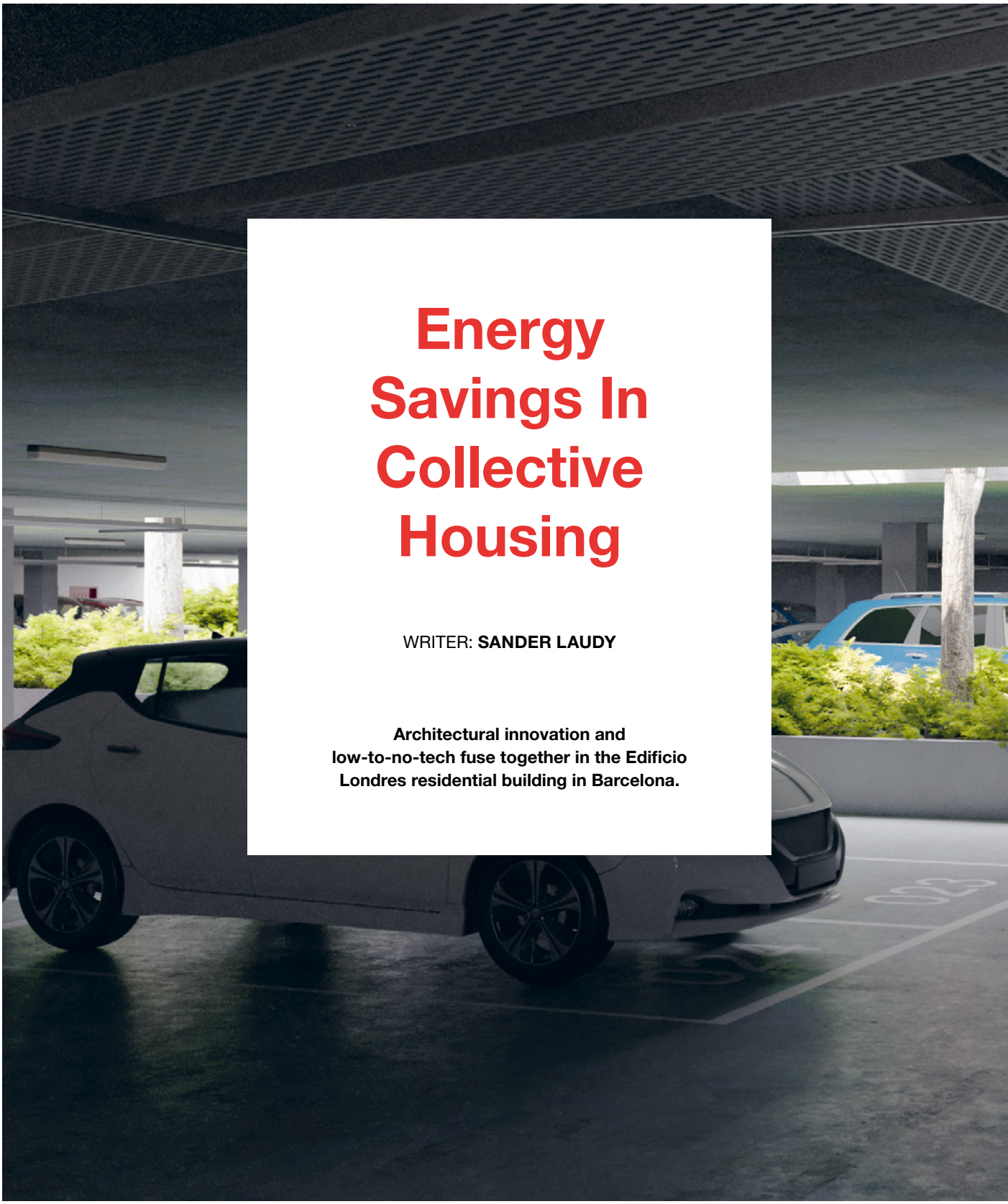
KIHOLO, HAWAIʻI, US – Located off the Island of Hawaiʻi, in 2011 the fishponds of Kiholo Bay were donated to the Nature Conservancy. Restoration efforts have benefited the 3-5 million gallons of submarine groundwater that flow from these ponds into the coastal waters each day, boosting the productivity of surrounding coral reefs and reef fisheries. In this biodiversity map, red is sand and purple is dead coral resulting from a recent marine heatwave, but rest of the colors are different groups of Hawaiian corals that are alive and well.





Coral polyp in Belize. **Image:** Greg Asner


AMWAJ
أمـــواج
Communicating the shift towards water resilience
The Mediterranean's 'water-poor' population is projected to increase by 50% within 15 years, reaching 250 million people by 2033.
At AMWAJ, we are committed to developing water content and communication tools for high-impact activities in order to empower the next generation of leaders in the Mediterranean, and safeguard our water-future.
Join us in our commitment to protect and restore water-related ecosystems and promote sustainable water management.
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Energy Savings In Collective Housing

WRITER: **SANDER LAUDY**

Architectural innovation and low-to-no-tech fuse together in the Edificio Londres residential building in Barcelona.

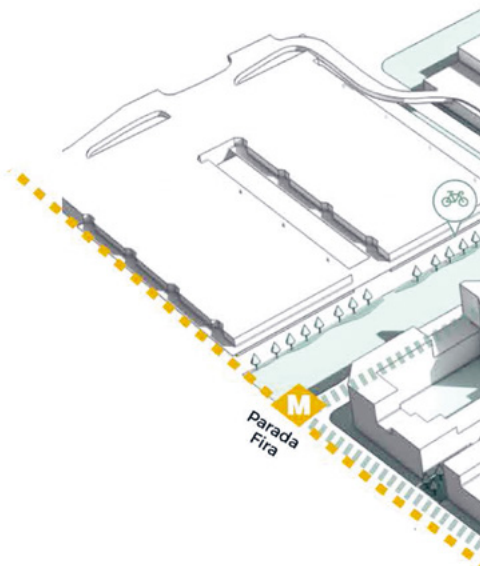


1

When we transpose the three R's of the circular economy 'Reduce, Re-use, Recycle' to energy in buildings, the specific application of these generic terms becomes 'Reduction of energy demand, Efficient installations, Renewable energies.' Some call these three steps here in Barcelona as the "Trias Energetica" and when drawing their buildings architects should integrate this method from the beginning. First, we should design in such a way that the building minimizes energy demands, while creating a comfortable interior climate (it is climatization that causes the bulk of energy consumption in buildings), which means applying good insulation and smart solar protection.

Secondly, we should use heat pumps and systems like floor radiation in order to achieve comfortable interior temperatures more efficiently. Finally: the energy needed for these installations should come from renewable sources on site, such as photovoltaic (PV) panels and geothermal boreholes. The construction sector may be an archaic one but, like everywhere, things are shifting rapidly and realizing net-zero buildings through this approach is becoming an imperative.

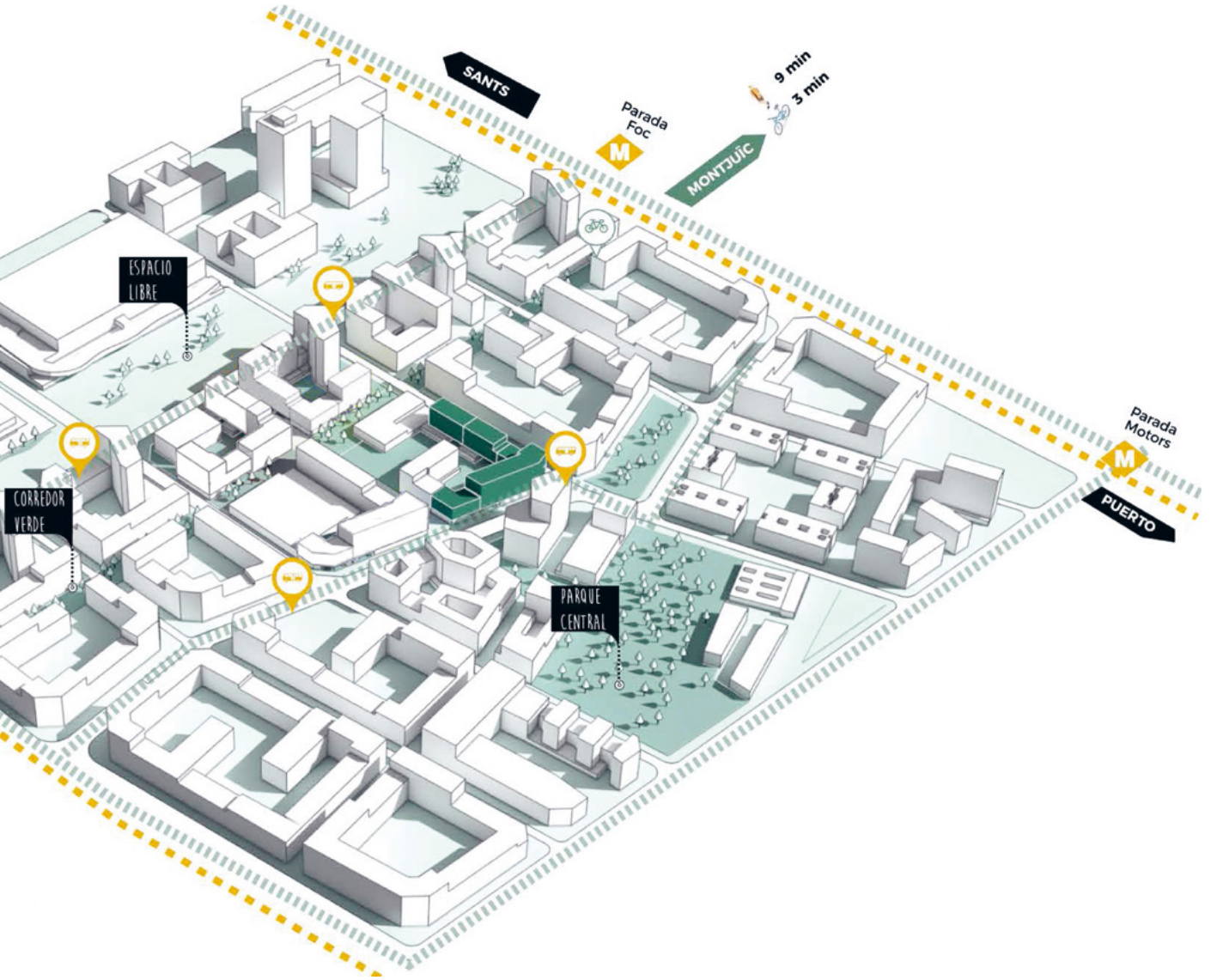
The Edificio Londres residential building in the Marina neighbourhood of Barcelona – a development by the developer AQ Acentor – is an example where a variety of energy saving concepts was applied. The results are old-fashioned passive bio-climatic technologies (or better yet we should call them 'bioclimatic strategies', as in the end they avoid technology rather than apply technology) mixed with modern PV panels and energy storage systems like lithium batteries. This overlap runs the risk of becoming an energetic Frankenstein, and it could seem somewhat pretentious to turn an urban housing complex with 210 dwellings of which 30% is social housing into a living machine with Tesla-like-installations. However, reviewing all the different energy aspects that were incorporated, they do add up to a coherent combination of design decisions that – thanks to the transversal approach – simply makes sense from the perspective of the user.



The most sustainable kWh is the one that you do not need.

Sector 3 of la Marina del Prat Vermell

In 2019, the Barcelona-based studio B01 arquitectes was invited to participate in a design tender organized by AQ Acentor, the Spanish development partner of the German investment fund Aquila Capital. The majority of the assets that Aquila manages are related to energy infrastructure, so when B01, together with On-a architecture and with the energy engineers of Wattia-Innova and the structural consultants of Otherstructures, came up with a

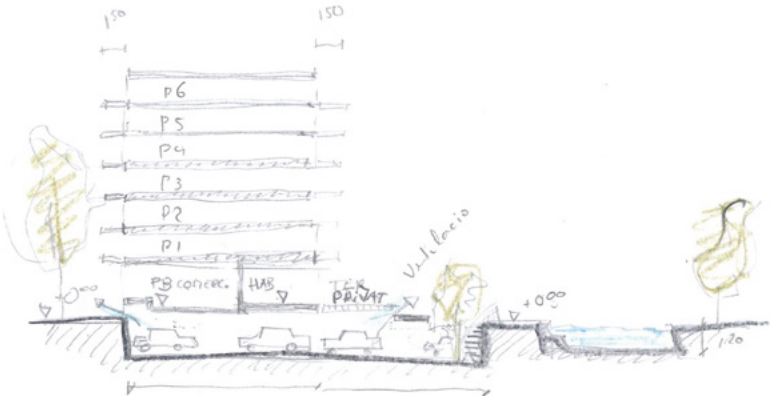


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proposal that included both low-cost passive-energy saving solutions and innovative energy storage technologies, the team won the assignment for the biggest of the four residential blocks that AQ Acentor was to build in the Marina del Prat Vermell neighbourhood: Block C, with 210 dwellings and 22,000 m^2 gross floor area, later baptized with the name Edificio Londres.

In 2019, the developer had just acquired the whole of Sector 3, terrains that add up to the size of ten soccer fields, located in a former industrial area on the south side of Barcelona. The Marina del Prat Vermell is probably one of the last large-scale urban developments that Barcelona will be able to direct within its municipal boundaries and the city is very keen on enhancing the creation of affordable and sustainable housing there. Forming part of the Sants-Montjuic district, the Marina del Prat Vermell will have 12,000 new dwellings for 28,000 new inhabitants, leaving behind the industrial and logistical ambience that previously reigned there. The urban plan was drafted at the beginning of the 2000s but the real estate crisis of 2008 delayed its realization.

The Barcelona Urban Ecology Agency, which includes the urbanistic services of the city, have been updating the design of this urban transformation in order to make the Marina del Part Vermell as sustainable as possible and the design of Edificio Londres fits completely within their ambitions. The private developer and the left-wing public administration are working hand-in-hand in Sector 3 and the completion of the construction, by contractor VIAS and directed



3

1. Between the cars there are openings with gardens underneath. **Photo:** B01 Arquitectes

2. The Marina Del Prat Vermell neighbourhood – Edificio Londres is the green building in the middle. **Photo:** Aq Acentor

3. The -1 level of the parking has natural ventilation and daylight entrances through the roof. **Photo:** B01 Arquitectes

4. Sixth floor with cross ventilated apartments. On the left side the corridor typology is clearly recognizable. The apartments indicated with blue airflows enjoy cross ventilation. **Photo:** B01 Arquitectes

in collaboration with Betarq studio, is foreseen at the beginning of 2024.

A variety of design solutions

A – Bio-climatic and passive strategies

The most sustainable kWh is the one that you do not need: there are no associated greenhouse gas emissions and people do not have to renounce anything in exchange. The architects of Edificio Londres therefore set out to reduce the primary energy demands of the building, concentrating on the summer season, as winters in Barcelona are relatively mild.

In the beginning of the design process, the 210 dwellings had to be fitted within the volumetric envelope described by the zoning plan and the main challenge was to give the maximum of them so-called 'cross-ventilation'. This concept of bio-climatic architecture implies that the dwelling has its windows positioned on opposite or perpendicular facades, so that when they are opened simultaneously, this creates a natural flow of fresh air through the apartment. This makes it possible to cool the house during hot summer nights while during the daytime the movement of air through the rooms gives the sensation of lower temperatures. It is the effect of a ventilator that does not really cool down the air, but de facto creates a cooler sensation on a person's skin.

Energy savings have become a part of the visual appearance of the building.

The dimensions that the zoning plan defined for the depth of the building obliged the designers to apply a 'corridor typology'. This is a common scheme in urban real-estate development where the building is organized so that the staircases give access to a corridor, leading to apartments on both sides. It is without any doubt a very efficient scheme, as there is little communal space needed for many dwellings and thus much floor area left for the dwellings itself. In Barcelona, where the need for housing is big, this is highly appreciated.

However, on the downside, the windows of such apartments all end up being on the same facade, so there will be no cross-ventilation effect. In this project, the architects looked for

ways to maximize the number of apartments that could have this bio-climatic energy-saving system anyhow, creating exceptions on corners, in areas where the number of floors changed and where bigger dwellings were located. In the end, about 28% of the total number of apartments became the exception and these will surely need less cooling in summer.

Natural ventilation is also applied at the first level of the parking, where no mechanical installations are needed, as fresh air and natural daylight enter through openings in the roof. Underneath them are small gardens, located in between the cars, while strict compliance with fire regulations was needed to make this possible.

Protection against excessive solar radiation was also elaborated to always place shade-casting cantilevers above large glass surfaces. Then, there was an analysis made of the total amount of solar energy that every part of the facades receives each season, taking into account the orientation and shadows of surrounding buildings as well as the location of trees in the sidewalks. The parts of the facade that accumulate more sun exposure are colored white, the ones with average exposure grey and the ones with little exposure dark grey, as dark colors absorb more energy, converting it into warmth. Energy savings have become a part of the visual appearance of the building.

B – Energy efficiency

Edificio Londres will be connected to the district heating and cooling network of ECO-energies, which provides warm and cold water to the whole Marina del Prat Vermell area. This type of network, which works on a neighborhood level, has a much bigger efficiency than conventional systems that provide climatization for individual buildings. In addition to energy efficiency, all the heat and cold comes from sustainable energy sources, such as biomass that is collected in the nearby Collserola National Park as well as recycled cold energy from the liquid natural gas (LNG) central at the port of Barcelona.

LNG terminals release enormous amounts of cold energy into the seawater when they evaporate the liquified natural gas arriving in ships at -165ºC. This cold that permeates the surrounding seawater is considered an inherent part of the energy transfer system and thus far has been silently accepted along with the environmental consequences of affecting sea life and marine biodiversity in the Mediterranean Sea.

The Energy-Return-on-Energy-Invested (ERoEI) of LNG is what it is, and in the case of the LNG terminal in the Port of Barcelona the quantity of cold energy flowing into the Mediterranean rises to a staggering amount of 30MW. In 2010, local engineers at the



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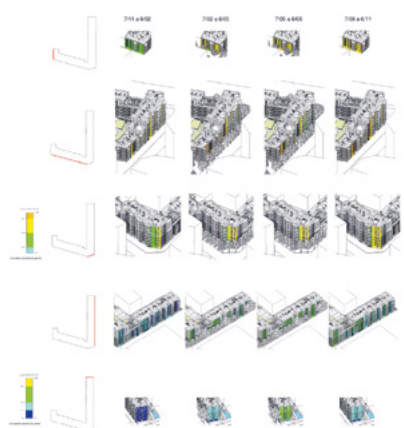


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Barcelona Metropolitan Urban Planning Department, had conceived a network where, instead of seawater, liquids could be cooled, which would then provide refrigeration to surrounding industries, offices and residential buildings. The VEOLIA subsidiary ECO-energies will start the construction of this installation that will make this cold-recycling possible and from there onward the network will pump cooled water to the whole Zona-Franca and Marina area at the south of Barcelona, reducing enormously the greenhouse gas emissions of the energy needed for climatization and refrigeration. This kind of efficiency can only be created on a large scale and depends on local public administrations, taking innovative and brave initiatives. It is obvious that this cold-recycling concept should be replicated in other LNG-plants around the world.

Energy efficiency in buildings in Barcelona

Barcelona is determined to reduce greenhouse gas emissions caused by buildings. For residential buildings, this means protection from the winter cold through better insulation, while for other functions, like offices, the main problem lies in ever-higher temperatures in summer, usually compensated by energy-intensive air-conditioning units. Increased energy requirements and regulations make new real estate developments more efficient. But as the city consists of an already dense urban fabric, filling almost every square meter within the municipal boundaries, the biggest challenge lies in enhancing the sustainable renovation of existing buildings. Tearing down all old buildings and replacing them by new energy-efficient ones will only increase emissions, as has been shown clearly by Life Cycle Analysis of existing constructions. Extending the useful life of buildings is a much better strategy towards decarbonization but requires a drastic transformation for the whole real-estate and construction sector.



6

5. The colors of the façade are lighter where there is less shadow, where solar radiation should be reflected. **Photo:** B01 Arquitectes

6. Analysis of the accumulated solar radiation and heat exposure on the façades in different seasons. **Photo:** B01 Arquitectes

7. Birds-eye view of Edificio Londres. **Photo:** B01 Arquitectes



7

C – Renewables and storage

It is a no-brainer to fill roofs in Spain with PV panels and in Edificio Londres there will be almost 70 kWp (kilowatt 'peak' power) installed. The question then arises of how to manage the generated energy in such a way that it really makes sense for the residents of collective residential buildings. A typical household needs energy in the morning and in the late afternoon and evening, because during the day people are at work or at school. And when do PV installations generate the big majority of their energy? At mid-day, when nobody is at home. All the solar energy that is not consumed directly flows into the general network, from where it is re-distributed with less efficiency than if it would have been consumed on site.

Despite the energy lost, this is also bothersome from an economic point of view, as the residents will be ceding their energy at a price of about 40% of what they pay for the same energy later in the evening. The PV installation ends up favoring the big energy companies that resell these kilo watt hours (kWh) outside the building. Renewable energy generated in collective housing should benefit the residents, and this is even more so when we talk about social housing, as energy poverty is a serious problem, also in Spain. Therefore, the architects of the project integrated 45 kWh batteries for energy storage and thanks to this feature the residents can consume the energy generated on their roof when they really need it, for example while cooking dinner at night with the lights on.

Holistic approach

Preliminary energy calculations indicate an estimated energy demand in the building of 10 kWh/m^2 per year, while less than 26 kWh is required to comply with level A energy efficiency certification. The majority of the savings are caused by the connection to the ECO-energies network, which is primarily the merit of the city council, VEOLIA and the developer. At the same time some results will be hard to monitor and quantify, such as the effects of the colors of the facade, while the cross-ventilation will be absolutely important in the daily life of the people living in the building, if it is used well (you should have smart people, even though you already have a smart building).

The most important feature of the project is that architects and engineers were allowed and encouraged to think out of the box, thanks to the confidence given by the developer. Controlling energy demands is very complex as energy consumption is being determined by decisions made during the entire architectural process. In this project, the design team dedicated efforts, from the tender phase until the actual construction, to apply unconventional solutions. They established an overall, holistic energy concept, which was then elaborated in a coherent design, combining innovative and low-tech features. It is an approach that might as well prove to be the most realistic way to drastically reduce greenhouse gas emissions in architecture.



Smart Farming for Food Security

WRITERS: **DANIELLE KUTKA & DANIEL DE LA PUENTE**

Digitalization can support a more sustainable, food-secure Europe.



1

The impacts on global food supply chains due to Russia's invasion of Ukraine have exacerbated an already unstable European agri-food sector that has suffered a series of industry losses and disruptions due to climate disasters and the COVID-19 pandemic.

In 2022, production costs for the European agri-food sector have soared, with high energy costs threatening the continuity of food, feed, and agri-food commodities causing companies to halt production, lay off staff or go out of business altogether. Due to gas shortages, European fertilizer plants have shut down while sanctions between the EU and Russia have led to fertilizer prices tripling from a year ago. In the context of these turbulent times, farmers are being forced to make difficult decisions with the long-term impacts on food security yet to be known. With inflation affecting the entire production chain, one certainty is that consumers will pay the price.

Seeking smarter solutions

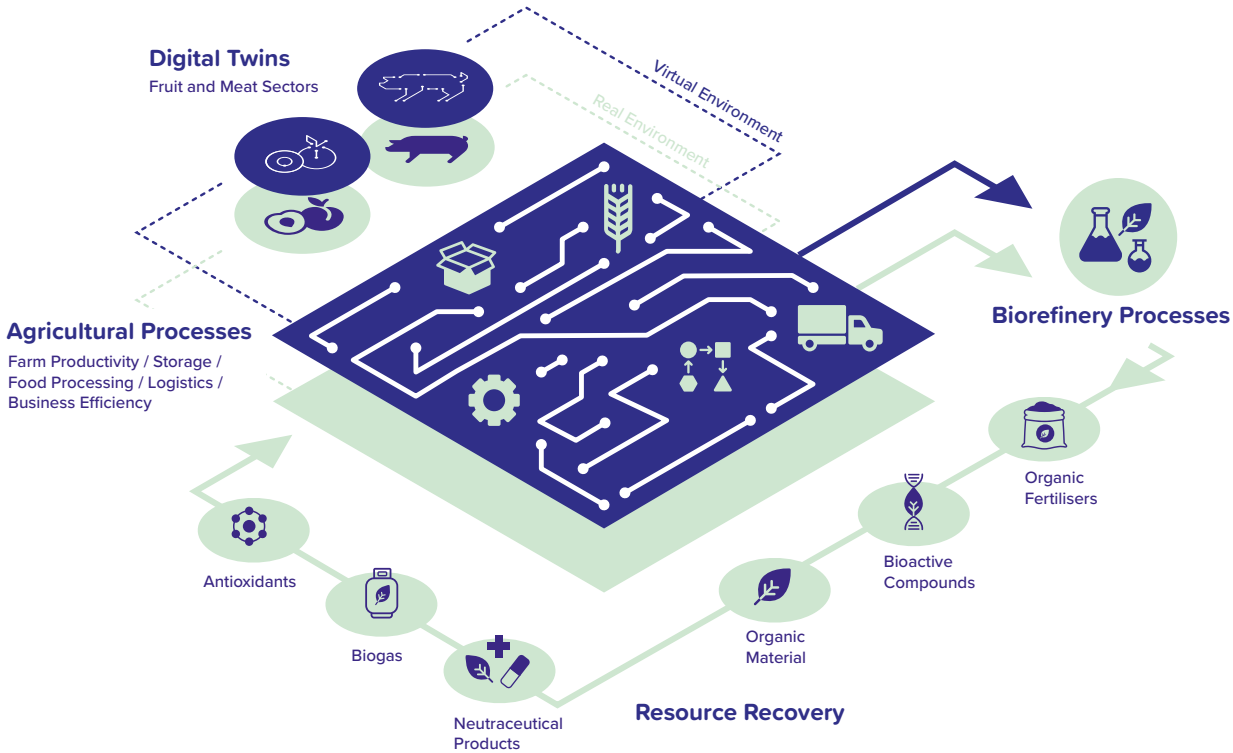
The farming landscape has changed drastically over the past 30 years and in light of the rapid advancements in digital technologies that are enabling more efficient and sustainable production and consumption of food, smart farming solutions are needed to reshape Europe's fragile supply chains into more resilient, sustainable food systems.

Supply chain issues have pushed global food prices up by 56% when compared to the end of 2019. The intelligent agriculture market is projected to grow from €1.4 billion in 2021 to €2.5 billion in 2026, however, in the context of today's geopolitical situation, the actual growth could be higher as farmers seek smart solutions to overcome the multitude of crises being faced. One example is the benefit that precision farming offers due to fertilizer shortages by deploying sensors to detect individual plant nutrient needs, cutting down on overall fertilizer use. Yet this is just the tip of the iceberg.

The growing influx of digital solutions for agriculture will continue to take a leading role, but what may be most compelling is the potential that the combination of technologies can have on building resilient supply chains and food systems. It may seem unrealistic to predict the shocks to food security that supply chain disruptions such as drought or war can have, yet a novel combination of cutting-edge technologies for two agri-food case studies is making this a reality.



2



Through the BBTWINS project, a group of innovative SMEs, research institutes, and bioeconomy clusters are working to develop a novel digital platform combining blockchain, artificial intelligence, machine learning, and big data to simulate entire value chains from crop to final product. The project is producing digital twins for two use cases – Portesa, an integrated pork producer in Spain that grows its own feed for their pig and meat processing facilities, and Dimitra, a fruit cooperative in Greece.

Using machine learning components to replace parts of the logistics optimization system, the project is working to reduce the needed raw materials (food, supplies, feedstock) and cut transportation costs of agri-food production. It is also validating new products from the valorization of waste streams for bio-processing that can be reused in agri-food applications, including biofertilizers, which could serve as alternatives to synthetic fertilizers. Additional bio-based products include nutraceuticals and protein concentrates for feed, that in addition to providing new revenue streams for farmers and food producers, could also be fed back into their production cycle, leading to more resilient supply chains.

TECHNOLOGY SNAPSHOT

Digital Hams and Peaches

Using mathematical equations, CTIC CITA is creating virtual replicas of physical and chemical transformation of raw material to final product. Each processing step, from the salting, drying and curing of the meat, to the ripening of peaches before transport will be simulated.

Addressing consumer interests

In the wake of the pandemic, 52% of global consumers found that sustainability became more important to them. Deloitte's survey on consumer attitudes has for a third year in a row, shown increasing trends that they are making more sustainable and environmentally conscious decisions. While inflation and supply chain disruptions impact

their purchasing power, the conscious consumer wants to know where their food comes from to address sustainability and product quality concerns.

Based on blockchain, the BBTWINS digital platform uses an integrated traceability system that allows producers to track and trace all material flows within their production chain. This also can inform consumers about the origin of the products they see on the shelf, while cutting costs for food producers that allow smoother flows to processing plants and faster delivery times. Using blockchain to ensure this traceability is pivotal for companies with integrated production like Portesa, that see the value and advantages to having such transparent production chains.

Another consumer interest related to sustainability is the issue of food waste. More efficient and sustainable food production must address this issue, as the EU is committed to the UN Sustainable Development Goals (SDGs) that calls for the halving of per capita global food waste at retail and consumer level by 2030, as well as the reduction of food losses along the food supply chain.



3

Despite being the world's largest exporter of food and drink products, a 2022 report found what has been dubbed the EU food waste "scandal": the EU wastes more food than it imports. In 2020, nearly 57 million tonnes of food waste were generated in the EU worth an estimated €130 billion, which was nearly double previous amounts due to better data of food waste on farms. While households are responsible for over half of all food waste, improving efficiency at the production side through digitalization and the solutions offered by BBTWINS can ensure the quality of the products while improvements in logistics results meaning that less food would go bad in transit, reducing the greenhouse gas (GHG) emissions associated with food consumption also at the consumer level.

Skills for strong economies

A resilient food system should draw from the inextricable links between the agri-food industry and the bioeconomy, and the skills needed to ensure the uptake of smarter, more circular food production. A report released in October 2022 by the Bio-based Industries Consortium (BIC), shows the EU bioeconomy is stronger than ever, with a turnover of €2.4 trillion – the food and beverage sector

TECHNOLOGY SNAPSHOT

Blockchain

Beyond cryptocurrencies – blockchain is a distributed database that stores a permanent and tamper-proof ledger of data. This distributed database is not controlled by a single entity, but the opposite – it is characterized by its decentralization, consensus-based mechanisms, smart contracts, and immutable records designed with security from its inception. Blockchain provides serializability, immutability and cryptographic verifiability without a single point of trust, unlike a standard database system. These properties have triggered blockchain adoption in a wide variety of industries beyond viral cryptocurrencies.

1. Trucks on plant field. Germany. **Photo:** 'no one cares' / Unsplash
2. Peaches in hand. **Photo:** Bakhrom Tursunov / Unsplash
3. Pile of trash bins in Germany. **Photo:** Jasmin Sessler / Unsplash
4. Vegetables stall in market. **Photo:** PhotoMIX Company / Pexels



4

accounting for half this total. However, with this value projected to reach €3 trillion by 2050 and three-quarters of the bioeconomy workforce employed by the agri-food sector, skillsets need to keep pace with the digital and green waves that will continue to shape the future of the EU and its climate neutral ambitions. To ensure these transitions are taken up at local level, a new era of skills must be realized that fosters and leverages local talent if the EU's green transition is to deliver an estimated 884,000 more jobs by 2030.

In October 2022, the European Commission announced 2023 as the European Year of Skills; while dissolving the skills gap is crucial to boosting innovation and competitiveness for the European economy, digital skills are urgently needed. An estimated 70% of businesses consider a lack of digitally skilled staff as an obstacle to investment, with nearly half of the EU population having little to no level of digital skills. In rural areas especially, where 30% of the EU population resides, digital skills lag 14 percentage points behind EU urbanites at 48% vs 62% respectively.

Farming during these turbulent times is an opportunity to transform our food systems in a way that prioritizes the advantages offered by digital solutions. How we combine technological advances with existing agri-food value chains will determine the competitiveness of the European food ecosystem while also addressing consumer needs and interests. The intimate link between agri-food and the bioeconomy should be supported in this transition and should not be an afterthought, but rather at the core, with all stakeholders, especially the EU institutions, being diligent to ensure policies also support adequate skills development for a resilient and just European agri-food sector for all. ●

This project has received funding from the Bio-based Industries Joint Undertaking (JU) under grant agreement No 101023334. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.

BBTWINS

Essentials of Crop Rotation

WRITER: **EVA PETTERSSON**

Part IV

Author of *Sustainable Gardening Made Easy*, Eva Pettersson, invites us to become stewards of more sustainable lives, sharing excerpts from her book on how permaculture is the best tool for doing so. Join us this winter in preparing for next year's planting season.

Personal Note

Winter is here, and many gardeners talk about the end of the growing season. But from my point of view, winter is the start of the growing season. How come? For me, everything starts with planning for the following year. To think through what worked well and what didn't; if there was anything missing last season and, best of all, to start planning and even buy the seed for next season.

One thing that I really want to recommend is to grow with crop sequences. In the past, this was a standard practice, as it was unthinkable to deplete the soil and expose the crops to diseases and insect attacks. One could still cultivate with nature. Since the 1950s, this knowledge has slowly but surely disappeared due to the use of artificial fertilizers and chemicals. Fortunately, it has started to swing back in favor again, dusting off the old knowledge.

Of course, you do not have to blindly follow these suggestions. As always, the best is to adapt your cultivation to what you want to eat yourself.

Book Excerpt

Crop sequence

There are several forms of crop sequences – or crop rotation, as it is also called. One way is that plants are planted sequentially in the same cultivation area within the season. For example, one can first grow lettuce, then dill, which also peaks quickly, and finally winter lettuce, which will finish growing late in the season. Another form of crop rotation is the one that runs over a number of years and where the plants change their place of planting from year to year according to the set rules.

It is not as difficult as one might think at first glance. By dividing the crops into four parts, which are then cultivated according to the 4-year crop rotation, you are already up and running. To keep track of what you grow and how it is progressing, it is excellent to keep notes.

The basis of crop rotation is that plants with similar nutritional needs are cultivated together in each bed while at the same time ensuring that the plants thrive on growing together.

Depending on how many different plants you want to grow, how large the available area is, and how good the soil is when you start your cultivation, you can choose between different amounts of years in your crop rotation cycle.

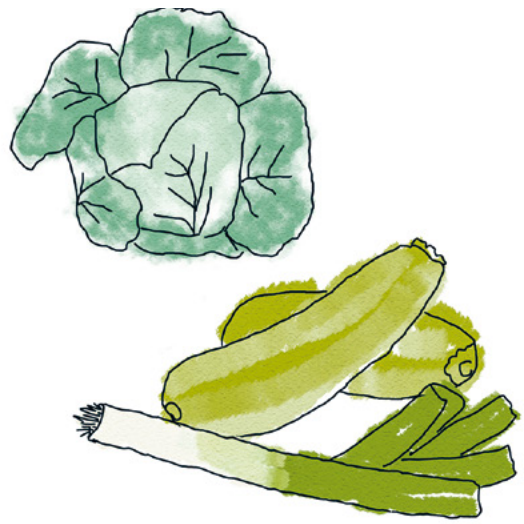
The benefits of crop rotation

- Reduced soil fatigue
- Healthier soils
- Reduced number of diseases
- Fewer pest infestations
- Optimal nutritional conditions
- Different amounts of years in a crop rotation

4-year crop rotation

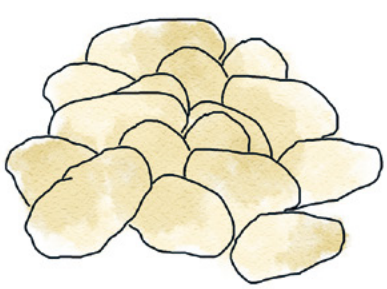


YEAR / BED 1
Plants that provide nutrition
Beans, Peas, Green crop plants such as clover, vetches, and lacy phacelia



YEAR / BED 2
Nutritionally demanding plants
Brassica, Turnips, Celery, Tomatoes, Cucumber, Squash, Melon, Maize, Leek, Garlic

YEAR / BED 4
Small nutritional requirements
Potatoes



YEAR / BED 3
Moderate requirements for nutrition
Carrots, Parsnip, Beets, Radishes, Spinach, Chard, Onions, Lettuce, Dill, Parsley





The Sustainable Mobility Transition Must Be Just

WRITER: **BELÉN GUTIÉRREZ CARMONA**

Clean, sustainable mobility can be achieved with more affordability and accessibility for all.



1

Transport decarbonization urgently needs to be addressed on a global scale. In 2020, the transport sector (including international aviation) accounted for 23.2% of the greenhouse gas (GHG) emissions in the EU.

The European Green Deal includes a target to reduce transport-related GHG emissions by 90% by 2050. In order to achieve it, the EU Sustainable and Smart Mobility Strategy proposes a boost to zero-emission vehicles, vessels, and airplanes, as well as addressing the related infrastructure; adding milestones such as 3 million public charging points to be installed by 2030.

To deliver these big ambitions, it is essential to encourage cross-sector collaboration. Road, rail, maritime, and air transport face common issues while solutions can be found sooner by working together and engaging with their users.

The policy framework needs to attract private investment to both the research and implementation phases. As put by Patrick Child, Deputy Director-General at the European Commission Directorate-General for Environment (DG ENV) and Cities Mission Manager, "making Europe the first climate-neutral continent by 2050 requires not only implementation of technology, but winning hearts and minds of citizens."

This debate cannot only revolve around technological innovations or economic implications. When we look at the bigger picture, it is about making people's lives easier by offering them efficient and sustainable mobility options that get them seamless transportation. Decarbonization will lead to promoting biodiversity in cities, decreasing air pollution, and contributing to health and well-being; all of which are benefits that should be considered from the start.

Decreasing road transport emissions

Aviation and maritime transport face huge challenges of transforming the fuel ecosystem, scaling up technologies in the market, and still meeting demands.

But the biggest issue for transport system decarbonization remains on the road. It makes up the lion's share of the overall transport system emissions: in 2020, road transport emitted 77% of all EU transport GHGs, according to the European Environment Agency.

Cars will not disappear and the approach of shifting to cleaner energies such as electricity or hydrogen is not enough anymore, there is no time left. "When we consider the full life cycle, there is no such thing as zero-emissions cars," argued Pedro Nuno Santos, Portuguese



1. Arc de Triomphe Monument at the Center of the Roundabout. Paris, France. **Photo:** Mikhail Nilov / Pexels

2. Tram in Ancient City Center. Lisbon, Portugal. **Photo:** J. / Pexels

> "Making Europe the first climate neutral continent by 2050 requires not only implementation of technology, but winning hearts and minds of citizens."
>
> — Patrick Child, Deputy Director-General at DG Environment, European Commission

Minister for Infrastructure and Housing, during the Transport and Research Arena (TRA) Conference 2022. There needs to be a shift from linear to circular value chains and collective mobility will be key, both for people and freight transport.

"We are committed to a modal shift as the most powerful tool to decarbonization," concluded the minister. For that, the industry demands both firm political will to close the gap between fossil fuels and alternative fuels, and financial mechanisms.

This requires a major societal and cultural change in users' behavior, as Francisco Jose Cardoso dos Reis, Chairman of UIC Europe Region and International Affairs Director and Senior Advisor to the Board of Directors at Infraestruturas de Portugal, explained: "We must teach people what are the alternatives to use. We must ask new generations to teach their parents and their grandparents. The mindset of the baby boom generation is to have two cars in the garage and perhaps another one for the weekend. This has to change."

Nevertheless, the reality is that most transport is expected to continue to be by road in the coming decades and therefore decarbonization efforts should also be focused here. Demand for transport continues to grow and the EU Green Deal is, in the end, a growth strategy. This sector is essential for the EU economy, contributing around 5% to EU GDP and employing more than 10 million people. The growth must be coupled with bigger efforts and incentives to shift from the existing paradigm to multimodality.



2



3

Alongside decarbonization, affordability and accessibility are two key targets of present and future mobility. The transition to smart and sustainable transport will only work if it is fair and inclusive in all places. This process should start by increasing awareness of different user needs and by engaging them in the decision-making process.

Mobility precariousness mostly affects distinct groups of the population. These comprise women, people living in deprived areas lacking urban links, people with disabilities, migrants and ethnic minorities, youth, children, and people with low incomes and who may be unemployed, according to the European Commission (EC) Directorate-General for Mobility and Transport's study on the social dimension of the future EU transport system regarding users and passengers (August 2022.)



> "A transport system that is not designed for or with women will not achieve its decarbonizing transport targets."
>
> Source: International Transport Forum.

These groups face a wide range of barriers or exclusion factors, from digitalization to a lack of coordination and resources. The risk that decarbonization and modernization of the transport system itself will exacerbate these factors is high.

Among the solutions and good practices already identified, involving different stakeholder communities in mobility strategies can be highlighted. The EC study also recommends free



4

public transport, deployment of autonomous technologies, rural on-demand transport or services tailored to young people, disabled people, and women.

Rural youth's mobility options

The few policies oriented to rural areas tend to focus on the concentration of aging and low-income populations. Rural youth is often disregarded, and the diversity and sustainability of urban mobility are rarely offered to this population group. Rural mobility is seen as a challenge when it could be a solution to foster the communities' growth and the connection of economic opportunities.

"We need to give children and young people a diversity of opportunities, it's important for their lives and their development," explained Jessica Berg, Research Director, Mobility, Actors and Planning Processes at the Swedish National Road and Transport Institute (VTI) during the Transport and Research Arena (TRA) Conference 2022. This is important in terms of transport and mobility, and it includes health and well-being, urban design, safety, and, of course, sustainability.

To address user and citizen needs, we first need to understand them. The final user must be involved first in the research and innovation stages, and then in the regulation process, as we look at the differences between cities and rural areas, instead of neglecting the latter. Co-creation needs to become common practice.

The gender aspect

Gender strongly determines transport choice. Women make more frequent and shorter trips than men, they use more sustainable means of transport and their dependence on public transport

is higher. Men tend to travel during peak hours, they have a higher rate of motorization and cycling, and are bigger users of new vehicle technologies.

If we look at the bigger picture, the gender perspective and women's trip patterns need to be studied and considered from the strategy development and urban mobility planning stages. Key aspects for women, such as safety and security, but also simple routines like combining caring activities and domestic chores with work, must be contemplated as part of the solution.

"If we keep asking the same questions and getting the same answers, we won't get closer to inclusive mobility," argues Rita Jacinto, Programme Manager at the Division for Pedestrian Mobility in the City of Lisbon – "Women are disproportionately negatively affected by our current mobility systems. We need to ask different questions; we need to ask what people need in order to move to inclusive, affordable, and sustainable mobility."

The International Transport Forum (ITF) report Gender Equality and the Role of Women in Decarbonizing Transport (September 2022) concludes that "a transport system that is not designed for or with women will not achieve its decarbonizing transport targets." In short: a sustainable mobility transition that does not fully address affordability and accessibility for all users will never succeed.

3. Trainline by the Tagus river in Lisbon, Portugal. **Photo:** TRA

4. Road in the Countryside. Poland. **Photo:** Vincent Delsuc / Pexels

5. Young woman driving in countryside road. **Photo:** Kei Scampa / Pexels



5

Vitalise Europe's Urban Bioeconomy

The **HOOP project** supports **8 lighthouse cities and regions** in developing large-scale urban circular bioeconomy initiatives that will focus on making bio-based products from urban biowaste and wastewater.

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Consortium Partners

The HOOP project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°101000836.



Kenya's Potential for Sustainable Textiles

WRITERS: **NADIA ASHRAF & JESKE VAN SETERS**

How African green growth leader Kenya can respond to the changing EU textiles market.



1

Since the majority of textiles in the EU are imported, businesses in producing countries will need to comply with the evolving requirements of the EU market. Kenya, a leader of green growth in Africa with a burgeoning textiles sector is searching for how best to respond to the changing EU market and position itself as a frontrunner in the field of circular textiles.

A wasteful industry

The textile sector is one of the most polluting and wasteful industries globally, with significant environmental impacts associated with different stages of the value chain. Starting with fiber production, fossil fuels (petrochemicals) are used to produce synthetic fibers, while natural fibers use a lot of chemicals, land, and water. Manufacturing textiles also consumes fossil fuels for heat and electricity generation, while the use of hazardous chemicals in production processes contributes to environmental degradation.

The damage continues even while we use textile products. Washing textiles, for instance, releases microplastics, a key contributor to water pollution. Finally, when we discard textile products, low recycling rates lead to huge amounts of textile waste ending up in landfills.

The changing EU textiles market

With the new EU Sustainable and Circular Textiles Strategy, Europe has an ambitious plan to make the textile ecosystem more sustainable. The introduction of eco-design requirements will ensure that all products placed on the EU market – including imports – are more durable, reusable, and reparable, and include a certain degree of recycled content. At the same time, a Digital Product Passport – with information about the production and composition of



2

a product, almost like a list of ingredients – will help consumers make greener choices.

New EU rules on waste shipment aim to ensure that exported textile waste does not contribute to harmful dumping in third countries. Export of textile waste will only be allowed to those non-OECD countries that can manage it sustainably. The textile industry is also infamous for worker rights abuses, especially in producing countries. The proposal for a Corporate Sustainability Due Diligence Directive introduces a due diligence obligation for big EU companies to prevent adverse impacts on human rights and the environment across their global value chains.



3



These and other circular economy policy measures will impact all those involved in global textiles value chains servicing consumers in the EU, which can both be a challenge and an opportunity for them to speed up their efforts towards more circular textiles.

Kenya leading green growth

While the majority of textiles sold in the EU come from Asia, there is growing interest in sourcing from African countries. In Kenya, a thriving textiles industry is emerging, and exports to the EU are a small but growing share of Kenyan textile exports.

Kenya has taken several steps toward building a greener economy. The country is a leader in Africa's renewable energy generation, with 89.6% of its total electricity generation coming from renewable sources. Businesses and the government are looking increasingly at circular economy principles and practices. The government has developed a green economy strategy and implementation plan to consolidate and scale its green growth initiatives.

Manufacturing textiles more efficiently

Kenya's transition towards circular textiles will be driven by a number of factors in different stages of the value chain. Looking at manufacturing processes, the high cost of electricity is an important reason for textile producers to consider energy-saving and renewable energy solutions. While much of Kenya's energy mix is green, there is potential to promote the use of off-grid renewable power, particularly solar energy.

To save on costs and promote the green agenda, a number of companies are already moving in this direction. This includes textile mills, such as Thika Cloth Mills, and garment producers, such as Shona EPZ. As Kenya's textile sector grows, there is also an opportunity to invest in more efficient, energy-saving technologies – especially in textile mills, which are technologically intensive.

At the same time, businesses are discouraged by the high level of investments required to develop appropriate 'circular' skills and systems. For instance, while companies are interested in more efficient water management systems, they are not always convinced of the potential returns of these investments. The Kenyan government is supporting businesses in this regard. The compliance assistance program, for instance, helps companies identify environmental risks in their operations and build their capacity to respond to the risks, focusing on low-hanging fruits: low-cost, high returns.



4

Investing in circular product design

Beyond manufacturing processes, the changing global market presents an opportunity for Kenya to invest in circular product design. This means producing more recycled textiles, for instance. At present, the majority of fibers, as well as fabrics used in textile manufacturing, are imported from outside Kenya, so there is little scope for producing recycled fabrics. Moving forward, Kenya would need to invest in the early stages of the textile value chain to create opportunities for local high-value circular economic activities, which make the industry more competitive globally.

Kenya would also need to support investments in the textile collection, sorting, and recycling infrastructure. Fibre-to-fibre recycling, for instance, is rarely happening across the world, with only one such model involving Kenya, focusing on virgin white cotton

1. Garment factory in Athi River, Kenya. **Photo:** ECDPM
2. Garment factory in Nakuru, Kenya. **Photo:** ECDPM
3. Garment factory in Nakuru, Kenya. **Photo:** ECDPM
4. Textile mill in Thika, Kenya. **Photo:** ECDPM
5. Textile mill in Thika, Kenya. **Photo:** ECDPM

from post-production waste. There is scope to support investments in fiber recycling and, more broadly, create favorable conditions for the recycling sector. The latter includes better textile waste collection infrastructure and more streamlined communication and coordination between brands, manufacturers, waste collectors, and recyclers. Textiles with recycled materials can only be produced if recycling technologies are available and collected textiles waste is of good quality and abundant.

Kenya is an African leader in renewable energy generation with ~90% of its total electricity coming from renewables.

Source: Kenya National Bureau of Statistics

Now is the right time

The EU Strategy for Sustainable and Circular Textiles is creating a market for circular textiles. This is an opportunity for a country like Kenya to develop and green its textile manufacturing processes by leveraging its existing strides towards renewable energy transition. 'Made in Kenya' textiles may be on the rise if the opportunity is seized, showcasing to other African countries and beyond to go circular.



5

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