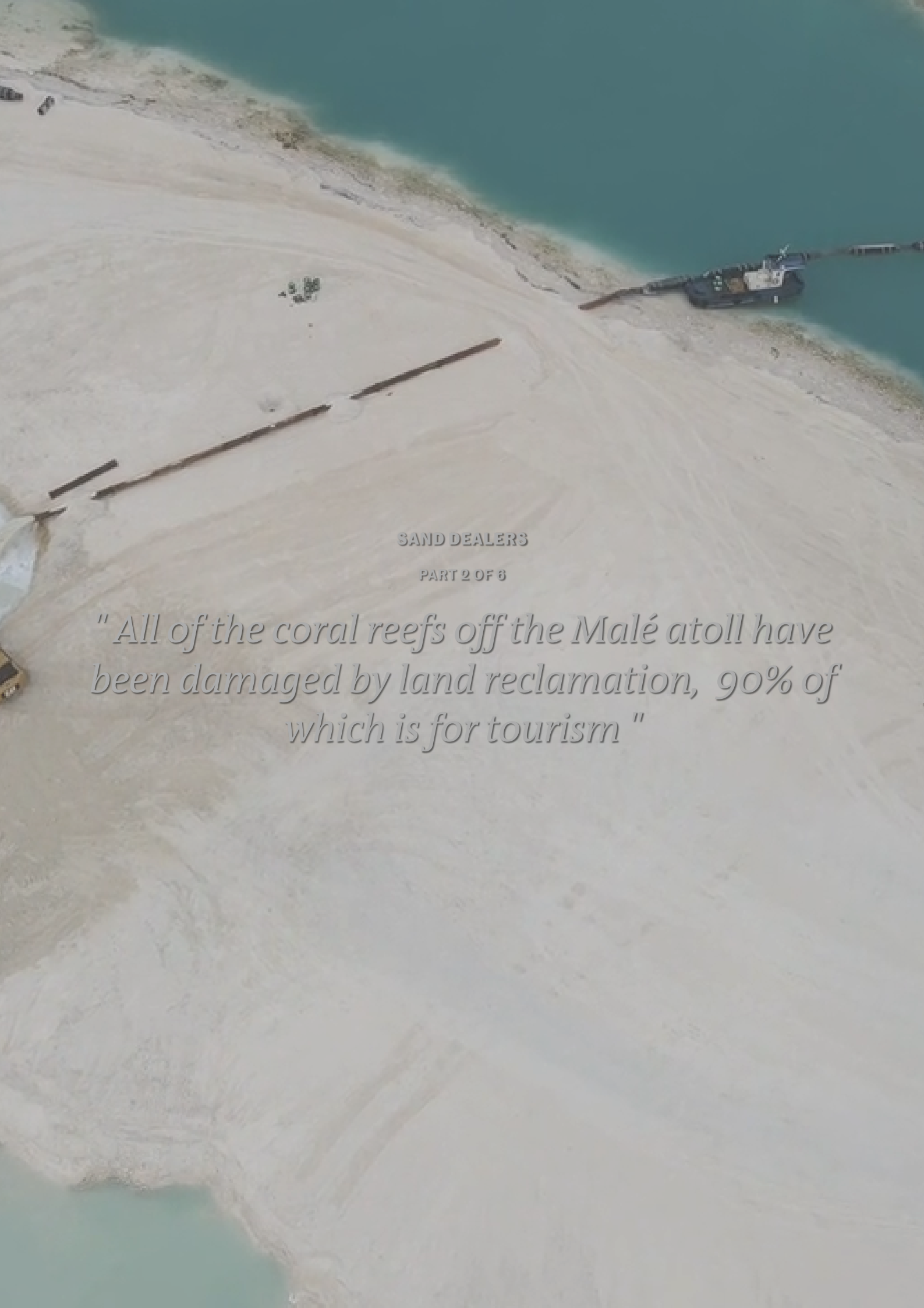

SAND DEALERS

PART 2 OF 6

" All of the coral reefs off the Malé atoll have been damaged by land reclamation, 90% of which is for tourism "

Sand is both a blessing and a curse for the Maldives

By Audrey Garric and Mathias Depardon

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FEATURE | 'Sand dealers' (2/6). The world's lowest-lying nation has continually dredged sand to expand its islands, build new ones and protect them from rising sea levels. But in the name of this development, the archipelago is destroying coral reefs and increasing its vulnerability.

All you have to do is dip your head a few centimeters under the surface, while standing waist-deep in the sea, to see them bathed in light: Thousands of corals, yellow, green, blue or purple, with multiple patterns, colorful labyrinths that take your breath away. Around the reef, the colors also compete in beauty, between the turquoise of the sea, the azure of the sky, the white of the beach and the green of the luxuriant vegetation which covers the fine strip of sand plunging into the ocean. The island of Fulhadhoo, in the Maldives, looks like a piece of paradise.

The construction site of the new port on Fulhadhoo Island, Maldives, on February 14, 2022. MATHIAS DEPARDON FOR "LE MONDE"

Marine biologist Aya Naseem observes the growth of corals that have been installed on metal structures to restore the reef around Fulhadhoo Island on February 16, 2022. MATHIAS DEPARDON FOR "LE MONDE"

But that's in appearance only. At the other end of this oasis, located two

hours by boat to the northwest of the capital, Malé, the ocean reveals a dramatically different reality: a coral cemetery. As far as the eye can see, broken and completely white branches litter the ground, covered by a thick layer of sand. "When I saw this disaster, I cried," said marine biologist Aya Naseem, documenting the losses with her camera. "There were at least a hundred species of coral here, some of them very resilient, that had survived multiple global warming-related bleaching events, including the 2016 one," said the co-founder and vice president of the Maldives Coral Institute.

She took off her snorkel and pointed to the culprit: the harbor that adjoins the area. Begun in 2019, its construction destroyed part of the reef, some pieces of which now serve as depressing sculptures on the island. The dredging of hundreds of thousands of cubic meters of sand in the lagoon has also resulted in the displacement of huge amounts of sediment that have settled on the seabed in the vicinity, suffocating the surviving corals. In February 2022, excavators were stacking huge rocks to consolidate the coast. Not far away, large sandbags offered minimal protection against the onslaught of the sea. Elsewhere, local residents, equipped with shovels, tried to replenish the beach that the water was already engulfing.

Sand is a vital resource in the Maldives, but its overconsumption risks leading to the loss of this jewel in the Indian Ocean. It's a vital resource used to maintain the immaculate beaches that are the showcases for the archipelago. It's used in construction, and buildings and hotels are growing everywhere. Above all, it's hugely used to enlarge islands or build new ones in the name of development, a process called "land reclamation." Millions of cubic meters of this material are extracted every year in a bid to support strong demographic growth (15% increase in 10 years) and frantic tourist development (an increase of 120% over the same period). In 2019, more than 500,000 inhabitants and 1.7 million tourists shared this territory of less than 300 square kilometers.

Near the construction site of the new port, on February 14, 2022, inhabitants of the island of Fulhadhoo (Maldives) replenish the beach with a rake. MATHIAS DEPARDON FOR "LE MONDE"

Dead corals are seen in the sand on Felivaru Island (Maldives) in February 2022. MATHIAS DEPARDON FOR "LE MONDE"

The Maldives is an archipelago as vast as it is narrow. Its 1,200 islands are scattered over 800 kilometers from north to south, but most of them don't

scattered over 800 kilometers from north to south, but most of them don't exceed one square kilometer in area. 90% of the territory is water. For now, only 350 islands are occupied, 190 by locals and 160 by resorts, luxury hotels whose bungalows on stilts grace the country's postcards. "We need space to build housing for the inhabitants, hospitals, schools, as well as ports and airports to access the islands when conditions at sea become difficult," said Shauna Aminath, the Minister of the Environment and Climate Change. "You have to balance that with protecting the environment, it's a dilemma."

A "picnic" island for tourists and Maldivians was built in the lagoon of Maafushi (Maldives) in February 2022. It is protected from erosion by rocks and some palm trees have been planted. MATHIAS DEPARDON FOR "LE MONDE"

In a country on the front lines of climate disruption, "land reclamation" is also presented as a matter of survival. With 80% of its territory not exceeding one meter in altitude, the lowest nation in the world is at the mercy of rising sea levels. Episodes of flooding and erosion, which are already frequent, are bound to increase. "When we reclaim land, we build higher islands, which provide more protection," said Ms. Aminath.

So everywhere, people are trying to squeeze precious square meters out of the sea. In 10 years, 65% of inhabited islands have been expanded by

humans, as revealed in a 2019 study published in *Scientific Reports*, a peer-reviewed journal. Dozens have been created artificially. "We're now like Dubai. No other country has conquered so much space on the sea," said Azim Musthag, a marine ecologist at Land and Marine Environment Resource Group. "We're reclaiming at a speed and scale never seen before, while sand takes tens of thousands of years to form."

The expansion of Felivaru Island (Maldives), in February 2022. It should help gain 25 hectares on the sea to create new infrastructures, notably the port. MATHIAS DEPARDON FOR "LE MONDE"

The sand is pumped from the bottom of the ocean and then transported to land through large pipes on Felivaru Island (Maldives) in February 2022. MATHIAS DEPARDON FOR "LE MONDE"

The sand pumped from the bottom of the ocean is continuously spit out on Felivaru Island (Maldives) to fill it in, in February 2022. MATHIAS DEPARDON FOR "LE MONDE"

On all of the islands, coastal expansion is coupled with heavy engineering for added protection. They are installing rocks, seawalls and tetrapods, breakwaters made of four feet of cement. "The Maldives is the small independent island state where we see the most cumulative impacts of climate change and an extremely rapid increase in man-made impacts. We're heading for disaster," said Virginie Duvat, professor of geography at La Rochelle University and one of the authors of the study in *Scientific Reports*.

The excessive development of the coastline has increased the vulnerability of the archipelago. Fixing the coasts using heavy structures has disrupted the functioning of the islands, which "can no longer receive sediments and therefore adjust naturally to the rise in sea level," said Ms. Duvat, who is also the author of the latest Intergovernmental Panel on Climate Change (IPCC) report on adaptation to climate change.

By destroying corals, already heavily impacted by ocean warming, the construction work is attacking the islands' sand production plant.

Above all, by destroying the corals, already heavily impacted by ocean warming, the construction work is attacking "the islands' sand production plant," she said. These coral reefs, the seventh largest in the world, are at the origin of the formation of the Maldives and continue to feed them with sediment. Serving as a habitat for fish, they also protect the coasts by damping the swell and absorbing the energy of storms.

To get out of this vicious circle, the archipelago must invest in new structures, always higher and more expensive. But this poses the question of the future habitability of these islands altered by human action. In the long term, the Maldives risk being destroyed by the same sand of which they are made.

Geotextile bags filled with sand protect Fulhadhoo Island (Maldives) from erosion, February 16, 2022. MATHIAS DEPARDON FOR "LE MONDE"

Tetrapods protect the coast of Malé, the capital of the Maldives, on February 6, 2022. MATHIAS DEPARDON FOR "LE MONDE"

"The Maldives has been damaged as never before. I'm scared we might lose our home," said Hassan Ahmed, the founder of the NGO Save the Beach. On Fulhadhoo island, he collaborates with Ms. Naseem in a reef restoration program. At the bottom of the lagoon, they have attached coral fragments to metal structures to help them grow. The process works, but is "not yet a large-scale solution," said the biologist. The operations, long and expensive, failed to restore the diversity of the reefs. "The main thing is to protect and preserve the existing ones. And to drastically reduce global emissions of greenhouse gases," she said.

Environmental protection remains a challenge in the Maldives. In a country

where unemployment is high and where infrastructure and services are lacking, access to development is paramount. The climate crisis is not one of the main concerns of the population. "We have 300 inhabitants who have been asking for a port for 20 years to welcome more boats and develop tourism," said Ali Azuhar, the president of the municipality of Fulhadhoo. With the previous wooden jetty, only dinghies – small sailing and motor boats – could dock, but not speed boats, more powerful and larger boats that can sail to Malé. "The harbor was the most important thing," said Abdul Muhusin Abdul Raheed, a 37-year-old resident, "even though we weren't aware it would cause the corals to die, until after it was built."

Jobs and services

"Each island wants the same level of infrastructure and services as its neighbor, which no government is able to provide. Land reclamation is being carried out at an excessively high rate, but it's also necessary to provide services in regional centers to decentralize the country," said anthropologist Thoiba Saeedh.

A worker on a construction site on the island of Hulhumalé (Maldives), February 11, 2022. The artificial island, which rises 2 meters above sea level, is designed to accommodate 230,000 inhabitants. MATHIAS DEPARDON FOR "LE MONDE"

Maldivians currently migrate not to escape from lands that are in danger of being swallowed up, but to seek work and access to health and education services. They're leaving their small islands, where people talk endlessly in traditional hammocks under the shade of coconut trees, to join the hustle and bustle of the capital. Nearly 150,000 people, a third of the country's

population, are now crowded into Malé, a small piece of land (3 square kilometers) that has become one of the most densely populated places in the world.

When the capital is observed from the sea, you discover a city that's overflowing on all sides, crushed by a tangle of buildings of about 15 floors. In the narrow streets, where you suffocate under the heat and the pollution, the cars drive dangerously close to motorbikes, sometimes forcing the pedestrians to level the walls. "It's not a good place to raise children. There are hardly any trees or parks. I don't let them play outside, it's dangerous," said Zuhura Ismail, a 40-year-old mother of three.

To relieve the overcrowded capital, the government undertook in 1997 to build a huge artificial island, Hulhumalé, in the neighboring lagoon, linked to Malé since 2018 by a one-kilometer bridge. Millions of cubic meters of sand were dredged from the ocean floor to raise 428 hectares from the water, separated into a phase 1 and a phase 2, still under construction. This territory, which is home to 50,000 inhabitants and aims to eventually reach

230,000 when it is finished, is intended to be the country's first intelligent and ecological city. Waste is recycled, rainwater is collected and solar panels will be installed.

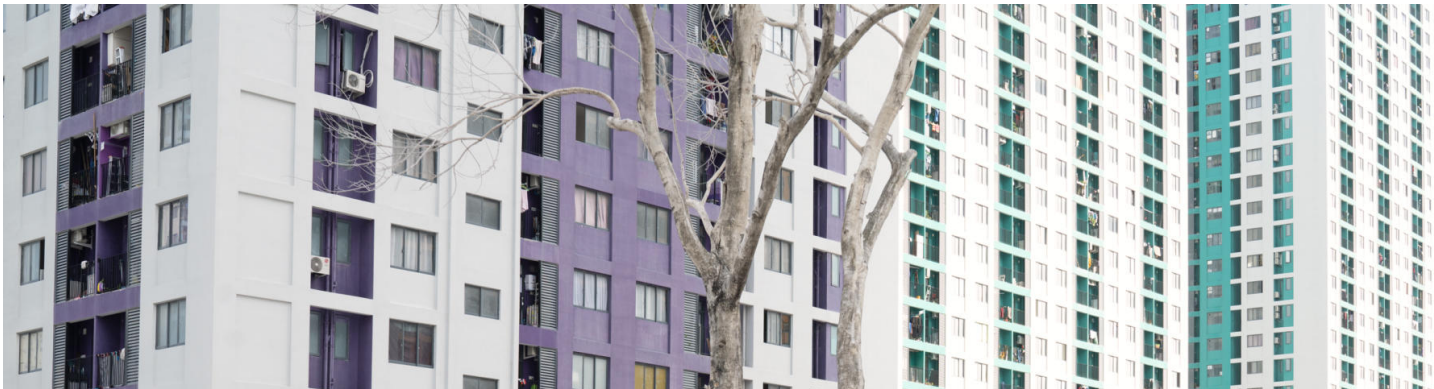
Piles of sand on the outskirts of Hulhumalé (Maldives), February 16, 2022. MATHIAS DEPARDON POUR « LE MONDE »

A canal crosses the artificial island of Hulhumalé (Maldives), also called "City of Hope," on February 11, 2022. MATHIAS DEPARDON FOR "LE MONDE"

This massive project has resulted in the destruction of most of the coral reef and natural ecosystems. "But the positive impact outweighs the downside for Maldivians, as they now have access to a healthy life and more space," said Shahid Ahmed Waheed, chief urban planner for the Housing Development Corporation (HDC), the state-owned enterprise overseeing the island's development. "When the project is completed in 2035, every resident will have access to all services on foot," he said. Already, in phase 1, the buildings are surrounded by vegetation, stores and playgrounds. They run along a long beach, where people can lounge under palm trees.

Grinding the soil

Land reclamation has become a way of life in the Maldives. Every year, the state-owned Maldives Transport and Contracting Company (MTCC) conducts four or five land reclamation operations in the archipelago. It has dredged 3.2 million cubic meters of sand in 2021. The company, which employs 300 people, carries out most of the work within the country, except for the large-scale operations managed by foreign operators, such as Dutch Boskalis or Van Oord. "Our goal is to do even more backfilling. I am firmly convinced that what we are doing is helping the future of our children," said Nahiz Ahmed, an engineer at MTCC, as he walked on thick sand mixed with pieces of dead coral.



Residents of the new residential towers in Hulhumalé, Maldives, set up food stalls on February 7, 2022, despite the piles of trash and lack of street amenities. MATHIAS DEPARDON FOR "LE MONDE"

The construction site he came to inspect isn't intended to respond to the housing crisis but to promote industrial development. On Felivaru island, two and a half hours south of Malé by boat, machines are at work to gain six hectares of land on the sea, a "small operation." The aim is to create a

fishing complex for the state-owned Maldives Industrial Fisheries Company (Mifco), which exports tuna to Europe, China and Singapore. At the edge of the turquoise lagoon, a special type of boat is parked: a dredger. With a dull noise and a smell of oil, it spins a head with rotating blades to crush the soil, at a depth of 14 meters. The sand is sucked up by huge pumps and then transported to the island through large pipes, where it's continuously spat out. Machines are working non-stop to recover the sand and transport it to the new shoreline, which is progressing meter by meter.

Workers load a motorcycle with several bags of sand after a dredging operation off the coast of Guraidhoo (Maldives), February 9, 2022. MATHIAS DEPARDON POUR « LE MONDE »

On all the islands, Maldivians also dive into the lagoons to collect the precious resource by hand. At the end of the day, in Guraidhoo, half an hour south of Malé, a man called Suvey loaded bags of sand into a pickup truck. "We fill between 200 and 300 bags a day, which we collect about 100 to 200 meters from the shore," he said. This activity supplies residents who want to build their homes. The cost is 10 dollars a bag, and five for half a bag. But the sand isn't strong enough to be used in construction. In the high-rise buildings that are springing up all around Malé, where Bangladeshi workers are busy working, the sand comes from India.

'A ghetto'

Just as money doesn't buy happiness, sand is far from solving all the island's problems. In Hulhumalé, the demand for land and apartments has caused prices to skyrocket. The second phase of the island is in danger of becoming congested, with 140,000 people expected to arrive in the near future. Many of them will be clustered in 25-story towers, an oddity in a country where residents traditionally live in single-story homes. "It's not easy to meet our target of 2.5 square meters per capita," said Shahid Ahmed Waheed of HDC. "And the number of vehicles, which is growing very fast, will soon be a big problem."

Mariyam Mohamed, gender and development consultant, in Hulhumalé, Maldives, February 16, 2022. MATHIAS DEPARDON FOR "LE MONDE"

"We're turning Hulhumalé into a ghetto," said Mariyam Mohamed, a consultant on gender and development, pointing out a dozen cranes working all day in phase 2 to erect soulless buildings outside her window. The newcomers, on the other hand, said they're happy, even if they have moved into unfinished apartments.

There are no shops or even sidewalks yet, and garbage dumps clutter the bottom of his building, but Jaudha Abdulsattar doesn't care. "It's comfortable here, cheaper, and you can see the ocean from the window. In Malé, 10 of us lived in a cramped 34-square-meter house and I couldn't even lift my arm from my bed," said this mother of three, who just moved into a small three-room apartment on the 19th floor.

In two or three years, HDC is already planning to reclaim land on the other side of Malé, to further expand the agglomeration, around Gulhi Falhu and Thilafushi, the "garbage island" of the Maldives, a gigantic open-air landfill that receives the majority of the country's waste. A huge bridge will also be built to connect those islands.

A string of 5-star hotels

In this "greater Malé," a large portion of the land reclamation process is due to tourism. "The entirety of the reefs of the Malé atoll [composed of 52 islands] has been damaged, 90% by tourism," said Azim Musthag, showing a satellite map. A quick look on Google Earth confirmed this. Over the past decades, dozens of small artificial islands have appeared in the ocean, while others have seen their surface area double, triple or even more. Called "Paradise Island" or "Summer Island," they're all the property of resorts that occupy them entirely – mostly owned or managed by foreign companies. You can only go there and enjoy the "unique moments of luxury" that they promise if you have paid for a room, often at a thousand dollars a night.

Over the last few decades, dozens of small artificial islands have appeared in the ocean, while others have seen their surface area double, triple or even more

This is the basis of the Maldivian economy: Tourists travel directly from the plane to the boat to reach this string of 5-star hotels, where they spend their entire stay. They were 1.3 million in 2021, mostly Indians (who have replaced the Chinese since Covid-19), British, Germans, Italians and French. Tourism began in the early 1970s and has continued to grow, and today, it represents 40% of the GDP, with 90% of indirect earnings. "This sector benefits Maldivians, as it employs 60,000 people and the population's income has risen to more than 10,000 dollars per capita annually," said Nashiya Saeed, a tourism consultant. "But the redistribution of income doesn't go enough to the local islands," she said.

Since a 2008 law, which allows Maldivians and tourists to mix on the same islands, guesthouses are flourishing, this time often owned by Maldivians and aimed at the middle classes. On the tourist island of Maafushi, half an hour south of Malé, ground-level houses are gradually giving way to huge towers, and 25 hectares have just been reclaimed from the sea to further develop housing and guesthouses. "We want to build more hotels and make them taller because everyone wants to enjoy the seaview," said Abdulla Nasheed, chairman of the Kaani Group, which owns four hotels in Maafushi. He denied any "environmental impact." "We collect all the plastic bottles to turn them into shoes and we pay a 'green tax'", which goes into a fund for adaptation to climate change, to finance heavy engineering work.

Residents of Hulhumalé (Maldives) meet on a Friday evening in February 2022 on the sand piles of a construction site. MATHIAS DEPARDON FOR "LE MONDE"

The artificial beach in front of the King Salman mosque, in Malé, capital and most populated city of the Maldives. Residents swim on the artificial beach protected by a dam, February 16, 2022. MATHIAS DEPARDON FOR "LE MONDE"

"The big hotels make a lot of money at the expense of the environment and the Maldivians," said Mohamed Shiraaz, while swimming with his family on one of the beaches of the neighboring Guraidhoo island, which has also recently been expanded. The man who worked for 12 years in a luxury hotel denounced an "industry that's gradually destroying the natural beauty of the country and our future." As a result of the resorts, many of which claim

to be eco-responsible, sandbanks used by the local residents as picnic areas have been privatized, palm trees are uprooted to green the artificial islands and waste is piled up in open dumps due to lack of management.

'Corruption background'

If the environment is sacrificed at the expense of the economy, it's also because of a "lack of transparency of procedures, against a background of corruption," said Shaziya Ali of the NGO Transparency Maldives. A scandal arose under the previous government when about 60 islands and lagoons were ceded for tourism development to businessmen close to the government, without legal tenders, in exchange for bribes. "We now have proper parameters, but the sale of lagoons to resorts continues within a system where a culture of secrecy prevails," said Ms. Ali. In May, for example, the government awarded a vast land reclamation project in Addu Atoll to the company Van Oord, in the south of the country, in the heart of a reserve protected by UNESCO for its "extraordinary biodiversity," even

though the Environmental Protection Agency (EPA) hadn't yet ruled on the project.

The EPA, which depends on the Ministry of the Environment, is "not independent" and has no resources (with just 33 employees), said an environmental expert who chose to stay anonymous. "The government puts pressure on it to approve projects very quickly, sometimes in a few days." "We don't influence the EPA's process, which has full authority," said Minister Shauna Aminath. And yet, the very few negative EPA verdicts are always overridden.

The agency relies on environmental impact studies that are themselves sometimes "botched" by "consultants who think they have to meet the government's expectations," said the expert. A majority of the studies are also carried out by MTCC, the state-owned company that is carrying out the land reclamation work, and is therefore both judge and jury in this case. "Our teams undertake the impact studies in a very strict manner, taking the time that's needed," said Hassan Hazif Shakir of MTCC. However, he admitted that he prepares the worksites before the official end of the studies. "It has never happened that the EPA has refused to allow us to perform the work, but it does ask for adjustments." If "mitigation measures" for environmental impacts are officially mandatory, they "are the responsibility of the project developer and no one has the means to control whether they are actually implemented," said Mr. Musthag.

The Ministry of Planning of the Maldives has awarded the MTCC company the job of reclaiming a new island for tourists and people opposite Maafushi on February 9, 2022. MATHIAS DEPARDON FOR "LE MONDE"

A tourist on Fulidhoo island (Maldives), February 8, 2022. MATHIAS DEPARDON FOR "LE MONDE"

This is especially true since land reclamation has become a strong argument in election promises. "We must put an end to land reclamation and government protection, but it has become something that politicians have to promise at every election," said former President Mohamed Nasheed (2008-2012), now head of Parliament. "If people are expecting all this, it's because governments have made development synonymous with concrete," said Mohamed Saif Fathih, a member of the Malé City Council and Mr. Nasheed's nephew. This push for development is increasing the dependence of the Maldives on its foreign creditors: China for the previous government, and now India.

government, and now India.

What can be done today to get out of this vicious cycle? Some have suggested the creation of floating houses, like the "Maldives Floating City" project of the government and the Dutch company Dutch Docklands, whose construction should begin in January 2023 to accommodate 20,000 inhabitants.

But in the immediate future, in Malé or in the other islands, it is hard to imagine living on the water. "The real solution is to develop employment, education and health in the local islands to limit the construction of massive infrastructure," said Ms. Ali, of the NGO Transparency Maldives. To adapt to climate change, Hassan Ahmed, from Save the Beach, called on his country to stop destroying natural barriers, to develop agricultural resilience – at a time when 90% of the archipelago's food is imported – and

to discontinue the use of fossil fuels. All of this is needed so that the Maldives can become a true paradise again.

SAND DEALERS

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