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Water vegetation is seen under the water in Everglades wetlands in Everglades National Park, Florida on Sept 30, 2021. — AFP photos



A bird perches on a tree in Everglades National Park.

Global warming kills 14% of world's corals in a decade

**D**ynamite fishing and pollution—but mostly global warming—wiped out 14 percent of the world's coral reefs from 2009 to 2018, leaving graveyards of bleached skeletons where vibrant ecosystems once thrived, according to the largest ever survey of coral health. Hardest hit were corals in South Asia and the Pacific, around the Arabian Peninsula, and off the coast of Australia, more than 300 scientists in the Global Coral Reef Monitoring Network reported.

"Climate change is the biggest threat to the world's reefs," co-author Paul Hardisty, CEO of the Australian Institute of Marine Science, said in a statement. Oceans absorb more than 90 percent of the excess heat from greenhouse gas emissions, shielding land surfaces but generating huge, long-lasting marine heatwaves that are pushing many species of corals past their limits of tolerance. A single so-called bleaching event in 1998 caused by warming waters wiped out eight percent of all corals.

Coral reefs cover only a tiny fraction - 0.2 percent-of the ocean floor, but they are home to at least a quarter of all marine animals and plants. Besides anchoring marine ecosystems, they also provide protein, jobs and protection from storms and shoreline erosion for hundreds of millions of people worldwide. The value of goods and services from coral reefs is about \$2.7 trillion per year, including \$36 billion in tourism, the report said. Loss of coral from 2009 to 2018 varied by region, ranging from five percent in East Asia to 95 percent in the eastern tropical Pacific.

The 'Coral Triangle'

"Since 2009 we have lost more coral worldwide than all the living coral in Australia," noted UNEP executive director Inger Anderson. "We can reverse the losses, but we have to act now." The UN's climate science advisory panel, the IPCC, projects with "high confidence" that global warming of 1.5 degrees Celsius above preindustrial levels will see 70 to 90 percent of all corals disappear. In a 2C world, less than one percent of global corals would survive. Earth's average surface temperature has already increased by 1.1C above that benchmark.

The report, titled "Status of Coral Reefs of the World: 2020", found reasons for cautious optimism. "Some reefs have shown a remarkable ability to bounce back, which offers some hope for the future recovery of degraded reefs," Hardisty said. East and Southeast Asia's "Coral Triangle"-which contains nearly 30 percent of the world's coral reefs-were hit less hard by warming waters over the last decade, and in some cases showed recovery. This resilience could be due to species unique to the region, potentially offering strategies for boosting coral growth elsewhere, the authors said.

Based on nearly two million data points from 12,000 sites spanning 73 countries and 40 years, the report is the sixth such global survey and the first since 2008. To measure change over time, the researchers contrasted areas covered by healthy live hard coral with areas taken over by algae, a sign of coral distress. The report was undertaken with support from UNEP and the International Coral Reef Initiative, a partnership of governments and research organizations focused on preserving corals reefs and related ecosystems. — AFP

# CLIMATE CHANGE THREATENS EVERGLADES, FLORIDA'S GEM

**U**mberto Gimenez loves alligators. He gives them nicknames such as "Smile" and "Momma Gator" and laughs when he thinks of their antics. Gimenez, an airboat captain, has found his paradise in Florida's Everglades National Park, a natural gem in the southeastern US state at risk from climate change. "It's an amazing place and there's only one in the world," he says. The largest wetland in the United States is under threat, and has become a battleground for one of the most sweeping ecological conservation efforts on Earth.

Gimenez hopes the efforts will help preserve the park. But time is running short, and global warming is sabotaging a subtropical wilderness that is home to more than 2,000 species of animals and plants. The primary threat comes from the sea. The Everglades, like all of south Florida, is almost flat, which makes the ecosystem extremely vulnerable to rising sea levels, one of the biggest consequences of temperature increases.

The passage of salt water into the freshwater wetlands can have disastrous effects. The region stores and filters the water that nine million of Florida's population of nearly 21 million depends on. Once salt penetrates subterranean aquifers, they can be ruined. In addition, salt water risks destroying the habitat for much of the rare fauna and flora in the area. Intensifying droughts and reduced rainfall, other consequences of climate change, are also causes for concern.

"As a massive peatland that builds up organic soils over time, this ecosystem has sequestered huge amounts of carbon that are locked in the soils that contribute to the formation of habitats," explains Steve Davis, chief science officer at the Everglades Foundation, a non-governmental organization. A lack of fresh water not only ends carbon sequestration, it also causes the release into the air of what was stored in the soil. A double climate disaster.

Multi-billion-dollar project

Gimenez puts on sunglasses, ties a bandanna around his head, and jumps barefoot into his airboat along with Davis.

The boat starts up and speeds through a carpet of green with the water hidden below the vegetation. It feels like floating on grass. For thousands of years, water accumulated north of the Everglades in the rainy season, shaping the landscape by moving very slowly as it followed the slight slope of the terrain. In the last century, however, the natural flow was diverted to allow for urban and agricultural growth in south Florida.

In doing so, it altered the ecosystem of

and pumps. They also designed artificial marshes to filter the water and rid it of nutrients that damage the wetland. At the same time, sections of road that blocked water flow to the park were raised. "Everglades restoration is the model for other ecosystem restoration efforts whether it's wetlands like the Pantanal (in South America) or estuaries like the Chesapeake Bay," Davis says. "We have the same kind of issues here," he adds. "It's about ensuring the

been fully completed. The delays are mainly due to a lack of federal funding. According to the Everglades Foundation, between \$4 billion and \$5 billion have been spent so far on the restoration project, with Florida contributing 70 percent and Washington just 30 percent.

The urgency caused by climate change could, however, give a boost to the conservation plan. President Joe Biden included \$350 million for the Everglades in his fiscal 2022 budget,



An airboat is seen hovering over Everglades wetland.

the 1.5-million-acre (607,000-hectare) wetlands, weakening it in the face of climate change. In 2000, Congress approved a project, funded equally by Florida and the federal government, to protect the area, which was declared a biosphere reserve by UNESCO in 1976. Its initial cost was \$7.8 billion. The goal was "to store water, to clean it and to flow that water in the most natural way back to the national park," according to Davis.

To achieve this, scientists devised a complex system of canals, dikes, dams,

proper quantity of clean water moving through the ecosystem."

Delays

The effects of rehabilitation are already noticeable. Davis gets off the boat, dips his hands into the clear water and scoops up a dark glob from the bottom. It is periphyton, a mixture of algae, bacteria and microbes, the presence of which indicates healthy water quality. Despite making some progress, only one of the 68 major projects in the original 2000 plan has

\$100 million more than in 2021. In April, Florida Governor Ron DeSantis signed an agreement with the US Army Corps of Engineers for the construction of a reservoir west of Palm Beach which will cost \$3.4 billion. The size of the island of Manhattan, it "will store a lot of water that will go south, rehydrate these wetlands, recharge the aquifer and push back against sea level rise," Davis says. — AFP



An alligator basks on grass near a canal in Everglades National Park.



Tourist airboat captain Umberto Lazaro Gimenez walks in wetlands near an alligator.

## Science seeks ancient plants to save foods

**F**rom a bowl of rice to a cup of coffee, experts say the foods we take for granted could become much scarcer unless we can make them resistant to climate change. For more than 10,000 years humans have been using selective breeding to adapt fruits and vegetables to specific growing conditions that today are changing at an alarming rate. And the same breeding that has made crops profitable has also made them vulnerable to rising temperatures, drought, heavy rains,

new blights or plagues of insects. "When you select 'for the best' traits (like higher yields), you lose certain types of genes," Benjamin Kilian, project lead for the Crop Wild Relatives Project at Crop Trust, told AFP. "We lost genetic diversity during domestication history... therefore the potential of the elite crops to further adapt to the future - to climate change and other challenges - is limited." The answer, scientists say, may be to reintroduce that genetic diversity by going back to domesticated crops' wild ancestors.

Disappearing farmlands

According to a study published in May, global warming risks shifting nearly a third of agricultural production outside its ideal climate for cultivation. The International Potato Center predicts a 32-percent drop in harvests of potatoes and sweet potatoes by 2060 due to climate change, while some estimates say coffee growers will

lose half of adapted lands before 2050. Rice, the world's most important staple food crop, contributes massively to global warming by releasing methane as it is cultivated. It is also threatened by rising seas that could put too much salt into the water that floods rice paddies. Older forms of these crops might have had resistance to salt water or high temperatures coded into their genes - and to get them back, experts are looking for their ancestors in the wild.

"We're going to need to use as much biodiversity as we can... because it reduces risks, it provides options," says agriculture expert Marleni Ramirez of Biodiversity International. One potential resource is gene banks, like the Kew Millennium Seed Bank which has nearly 40,000 species of wild plants. "But not all wild relatives are in the gene banks," says Kilian. Instead, he says it's up to expert botanists to take undertake a time-con-

suming search throughout the wild, whose success can sometimes rely on luck.

Race against time

Between 2013 and 2018 the Global Crop Diversity Trust gathered more than 4,600 samples from 371 wild cousins of 28 priority crops including wheat, rice, sweet potatoes, bananas and apples. Botanist Aaron Davis works at the Kew Royal Botanic Gardens that partners with Crop Trust. With his colleagues, he discovered a wild species of coffee in Sierra Leone that is more resistant to climate change than the widely harvested arabica.

And he says they found it just in time. "If we had gone to Sierra Leone in 10 years, it would probably have been extinct," says Davis. "Of 124 coffee species, 60 percent are threatened with extinction, including the ones we might use for breeding new resilient coffees." In a survey of four Central American coun-

tries, one in four plants analyzed was threatened with extinction, including 70 wild species connected to major cultivated crops like corn and squash.

And the race isn't over once they've been harvested. Wild plants may not be adapted to large-scale agriculture and creating new varieties can take years or even decades - perhaps too long to provide an answer to an impending food crisis. Instead, experts say, we may have to find a way to live without certain staples. According to the UN's Food and Agriculture Organization, while the planet is home to some 50,000 edible plants, just three of them - rice, maize and wheat - provide 60 percent of the world's food energy intake. Their disappearance could leave billions wondering what to eat and millions of farmers looking for a new way to survive. — AFP