Oceans are absorbing the Earth's excess energy. That's bad news for food systems.

As the planet traps more energy than it releases, the pathways for global food production are being upended.

Frida Garza Mar 31, 2026

Every year, the World Meteorological Organization, or WMO, tracks a set of key climate indicators — including the amount of carbon dioxide in the atmosphere and the Earth's temperature — to assess how global warming is progressing. In their latest report, released last Sunday, the authors decided to include a new measure: the Earth's energy imbalance.

"Climate change is often discussed in terms of the change in the global mean surface temperature," John Kennedy, lead author and scientific coordinator of the report, said in an email to Grist. But year-to-year variations in air temperatures, caused by the weather patterns El Niño and La Niña, can "hide the long-term trend" of global warming, said Kennedy.

With the addition of this new key indicator, however, the WMO authors aimed to clarify the fundamental dynamics of global warming, and represent them simply. The Earth's energy imbalance, or EEI, is a pretty straightforward concept: It's the difference between how much energy from the sun the planet takes in and how much energy is radiated back out into space. Put even more simply, the energy imbalance, Kennedy said, is "fundamentally what climate change is."

"As long as that energy imbalance is there, the Earth will keep on warming, ice will continue to melt, and the sea level will continue to rise," he added.

As far as numbers are concerned, what the WMO found should be unsurprising to anyone following the climate crisis. Because of the greenhouse gas effect, the Earth has been steadily holding on to more energy, mostly as heat, since the 1960s. And every year for the last nine years, that rate has set a new record.

What's more, the report shows where on the planet most of that heat is going. Oceans, the WMO reports, absorb 91 percent of the excess energy hanging out in the Earth's climate. Kennedy offered that, as a key indicator of global warming, EEI provides a helpful context to better understand all the other indicators followed by the organization, such as sea level rise and glacier melt.

This rising ocean heat also carries significant consequences for food pathways in a number of ways. Warming oceans mean more coral bleaching, habitat degradation, and reduced fishing yields. Sea level rise also leads to coastal erosion, which can wreck the livelihoods of those who work in fisheries — and spell trouble for the people and other animals who depend on them for food. When glaciers melt, the resulting flooding can also disrupt farming on land.

Jennifer Jacquet, a professor of environmental science and policy at the University of Miami, said she "really appreciated" the WMO's efforts to reframe the climate crisis — and its emphasis on the relationship between oceans and global warming. Oceans are often talked about as carbon sinks — but Jacquet, who was not involved in the WMO report, prefers to refer to them as carbon sponges, as a way of pointing out that these ecosystems have saturation points. Because oceans do sequester so much carbon, she fears that they have been "masking" how much climate change has progressed this century — that is, how much more heat has been absorbed than has been reflected back to space.

Jacquet added that the question of whether and how warming oceans impact food security is complicated. For example, marine heat waves can greatly impact farmed fish, in part because these fish cannot freely move around. In Chile in 2016, a fish farmer noted their Atlantic salmon were dying at a higher rate after an algae bloom, because they couldn't escape it.

Jacquet argues that farmed fish often end up serving higher-income populations, not food-insecure ones. But as oceans warm, wild fish populations are moving closer to the North and South Poles where relatively cooler waters carry more oxygen. This trend does negatively impact the livelihood of fishers near the equator, said Jacquet, and can increase food insecurity.

"The oceans are reaching their limit of what they can do to help offset anthropogenic changes," she said, adding that scientists and science communicators should try "whatever way we can represent that to communicate that reality."

Article link: https://grist.org/food-and-agriculture/oceans-are-absorbing-the-earths-excess-energy-thats-bad-news-for-food-systems/