Once the Amazon rainforest passes the point of no return it could be gone in decades

By **Ivana Kottasová**, CNN

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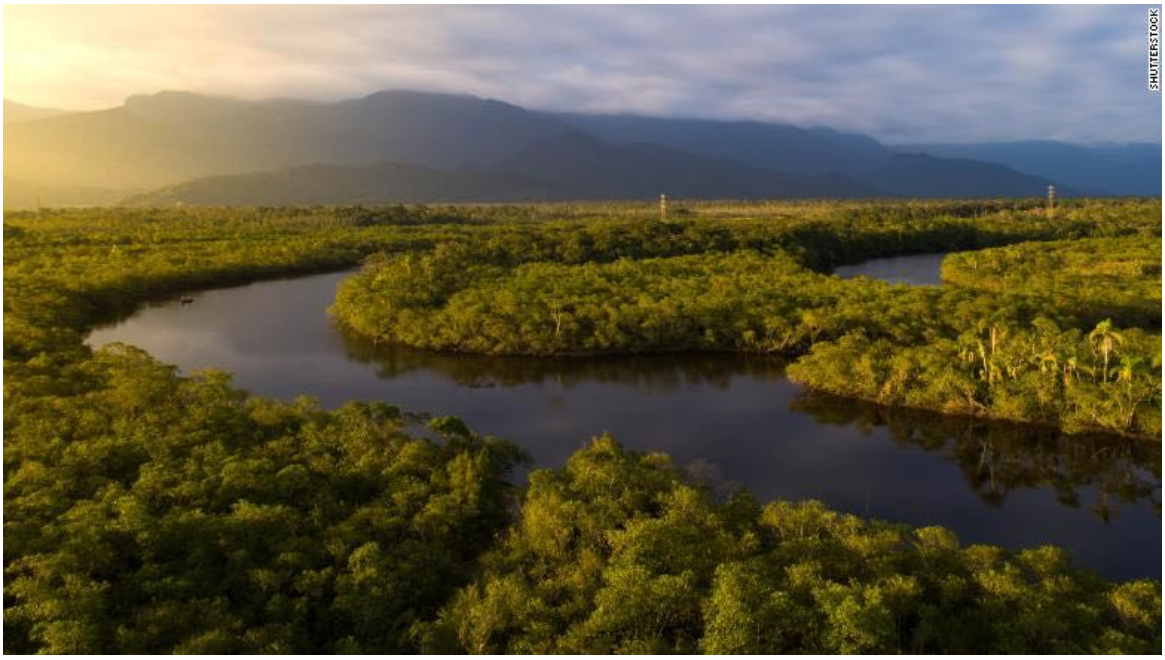
(CNN) The Amazon rainforest could turn into a grassy savannah within 49 years of reaching an ecological tipping point, scientists have warned.

A team of researchers found that once they start collapsing, the world's largest ecosystems, such as the Amazon, are likely to be gone much faster than previously thought.
They said the findings should serve as yet another wake-up call for policymakers to halt the cycle of destruction of the natural world.

A study published Tuesday in the peer-reviewed journal Nature Communications states that the speed of collapse is surprisingly disproportionate for large ecosystems.
"A forest that is 100 times bigger than another one does take longer to collapse, but it will take much less than 100 times the time ... what this means is that the biggest ecosystems that we have in the world are likely to collapse much quicker than we think, in a matter of decades," said John Dearing, professor of physical geography, who was part of the research team along with scientists from Bangor University in Wales and London's School of Oriental and African Studies.
While humans are causing these ecosystems to collapse through rapid deforestation, overfishing and other activities, they will also be the ones to pay the price once these habitats are gone.



Some scientists say the Amazon rainforest is already facing its tipping point.

Dearing told CNN that when ecosystems collapse from their natural state, the resources they offer in terms of food or agriculture become severely diminished.
Fishing communities, farmers and others relying on natural resources have experienced the devastating impact of such events over and over again. When the Atlantic northwest cod fishery collapsed in 1992, the Canadian government imposed a fishing moratorium on Newfoundland and Labrador communities that had relied on fishing for 500 years. As a result, around 30,000 people lost their jobs. The government tried to help, providing financial aid, early retirement options and retraining programs, but the population of the province dropped by 10% in the following 10 years and its unemployment rate still remains higher than the rest of the country.
More recently, the United Nations has warned that as fertile land turns into desert in sub-Saharan Africa, deadly clashes between

farmers and herders are becoming more common. The African Union-United Nations Hybrid Operation in Darfur has warned that there was an increase in tensions over resources between the two communities during the last rainy season in Darfur, with a number of people being killed.

Finding the tipping point

The problem is that scientists have not yet figured out how to predict when a tipping point -- the threshold that, once exceeded, leads to a change in ecosystems -- is coming, or even recognize with certainty that it has been reached. "Most tipping points have been viewed with hindsight, we have looked back and said 'oh, it looks like the tipping point was x years ago,'" Dearing said.
Some scientists argue that the Amazon forest, a crucial part of the global carbon cycle, is at the tipping point right now.
Thomas Lovejoy, a professor at George Mason University in Virginia, and Carlos Nobre, a senior researcher at Brazil's University of São Paulo, have been warning for several years in their research, separate from the Nature Communication study, that the rainforest is "teetering on the edge of functional destruction" because of the impact of aggressive deforestation on droughts.

The rainforest generates around half of its own rain by recycling moisture through trees and other vegetation. "The rainforest is central to the regional, and possibly even the global water cycle, it holds so much water, it has its own kind of micro climate, it affects the pressure systems and weather systems through the North Atlantic particularly," Dearing said.
But when trees are cut down, the soil becomes dry and the amount of water in the system declines. Lovejoy and Nobre say the point of no return at which the Amazon rainforest starts drying out and turning into a savannah is "at hand."
They said that the severe droughts of 2005, 2010 and 2015-16 "could well represent the first flickers of this ecological tipping point."

The Jamaican coral reef has been decimated in just 15 years.

Dearing said that when that happens, huge amount of carbon, which is now stored in the rainforest, will be released. As trees burn in wildfires or rot following deforestation, the carbon they sequestered is put back into the atmosphere.
"We will see a lot of species go extinct," he said. "Some of those won't be essential to our survival, but if it means that we lose genetic resources, we lose the possibility of new pharmaceuticals, then we're losing a lot of that potential wealth that those forests give us."

Climate change makes collapses more likely

Climate change is making the destruction of ecosystems even worse. Environments all around the world are getting warmer at a rate they cannot cope with. "When you add in additional stresses like pollution, deforestation, overgrazing, overfishing, the fact that you've got this stress in the background just magnifies the chance that the systems could actually collapse quite quickly," Dearing said.

The rapid spread of bush fires in Australia last year showed the devastating impact of climate change on already vulnerable environments.

Dearing's team developed the model for predicting the speed of ecosystem collapses by looking at similar shifts that happened in the past. They analyzed 42 ecosystems across five continents that have experienced dramatic changes. The lessons are grim. The Jamaican coral reefs were decimated in just 15 years and became an algae-dominated ecosystem, while the agricultural lands in Niger's Maradi region turned into a desert in just 20 years.

There have been natural changes in ecosystems in the past, such as when vegetation changed dramatically in the northern hemisphere during and after ice ages. "During the ice ages, the bands of vegetation moved up and down as the environment becomes warmer or colder," Dearing said.

However, these past changes happened over thousands and tens of thousands of years. "What we are talking about now is decades," Dearing added.

And when more abrupt natural shifts happen -- for example, as a result of a sudden drought or a major volcanic eruption -- environments tend to bounce back relatively quickly, recovering into their former state.

Dearing said that the human-induced changes appear to be more permanent. "What we're seeing is ecosystems that are not really bouncing back, they are staying in this kind of stable but degraded state."

The Amazon is a key buffer against climate change. A new study warns wildfires could decimate it

By **Drew Kann**, CNN

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A photo from Brazil in August 2019 shows one of the many fires that scorched the Amazon last year.

(CNN) In 2019, record fires in the Amazon sparked international outrage and capped a decade that saw the rainforest lose an area the size of 8.4 million soccer fields to deforestation.

But authors of a new study warn that as the climate becomes hotter and drier, future fires could be far more damaging.

They project that the amount of forest burned could double by 2050 and consume 16 percent of the rainforest -- an area nearly the size of the entire state of Michigan, according to Paulo Brando, a professor at the University of California-Irvine and a lead author of the study.

When the rainforest is healthy, its trees and plants pull billions of tons of heat-trapping carbon dioxide from the atmosphere each year, and it is one of the planet's best defenses against climate change.
But fires could imperil its ability to fight climate change, the study found, to the point that the forest actually could begin contributing more planet-warming gases to the air than it absorbs by 2050 -- or sooner.

The findings were published Friday in the journal Science Advances, and add to the growing evidence showing that human activity risks irreversibly changing the rainforest -- and in turn, the planet.

It is also a stark warning that without action to protect the forest from wildfires, one of the world's best buffers against further climate change is in danger of crumbling.
It's hard to overstate how important the rainforest is to the global climate, and how much of an impact its destruction could have.
Through photosynthesis, the plants and trees of the Amazon absorb billions of tons of carbon dioxide from the air each year, which helps limit how much of the heat-trapping gas is in the atmosphere.
And its vast tree canopy serves as an "air conditioner" for the planet, scientists say, influencing global temperature and rainfall patterns.
"If we were to release all of the carbon [in the Amazon] at once, that would be the equivalent of sending about 10 years of human carbon emissions into the atmosphere, so it's a huge carbon sink," Brando said. "And if you leave forests alone, they can actually accumulate carbon over time, and that's extremely important."

An aerial view of a forest fire of the Amazon taken with a drone is seen from an indigenous territory in the state of Mato Grosso, Brazil, in August 2019.

If the fires of last year showed anything, it's that protecting this enormous forest will be challenging.
As bad as last year was for the Amazon, Brando warns that as the forest dries and warms, things could get much worse if policies to fight deforestation are not implemented.
"Last year, people saw that as a disaster." he said. "But if we had a drought then, things could have been much worse."

The study found that due to changes that have already been set in motion by human emissions of greenhouse gases, wildfires are likely to increase in the Amazon no matter what.
But there is some hope.
Deforestation for logging, mining and clearing land for crops and livestock fragments the forest, the authors say, making it more susceptible to catching fire on its edges.

But preventing new deforestation, the report found, could cut carbon emissions from future fires in half and prevent the blazes from spreading into protected areas.
"[The report] is a warning that we should not be surprised if we get a major firestorm pretty soon," Brando said. "But we have the tools to reduce that likelihood by reducing deforestation."