Stopping wildfires before they start

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Wildfire season is back in the world's largest rainforest, the Amazon. Last month, the Brazilian part of the forest saw the highest number of fires in 15 years.

The good news is, scientists can predict where these blazes are likely to erupt so firefighting crews can react quickly. Today, I'm going to tell you how those forecasts work, and about one biologist's mission to protect the Amazon and other important ecosystems.

That scientist, Liana Anderson, has been studying forest fires for over a decade. She works in Brazil's disaster warning center, Cemaden, where she leads a group of 17 researchers working to predict fires across South America.

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The work has a double benefit: When you avert a big fire, you don't just save people and property. You save a crucial tool in the fight against climate change. That's because trees absorb planet-warming carbon dioxide and lock it away in their trunks, roots and branches. When they burn, that carbon is released back into the atmosphere.

To head off fires, Anderson and her team — which includes scientists from Venezuela, Bolivia and Colombia — start with data on recently deforested areas. It's a highly effective indicator of wildfire activity.

The reason is simple. After trees are cut in a section of forest, often by ranchers who want pasture for livestock, fire is used to clear the felled timber. And those fires can burn out of control.

"About half of the areas that are deforested in a given year, burn that same year," Anderson said. "The rest are time bombs that will burn in one or two years."

With that in mind, she and her team factor in three other variables: Above-average temperatures, below-average rainfall, and the time of year. The further into fire season, the drier the forest, and the higher the probability a spark will turn into a blazing wildfire.

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The predictions are effective, but not perfect. Even when conditions don't favor fire, Anderson noted, big areas can still burn. In 2019, for example, when fires in the Amazon shocked the world, the forest was not especially dry.

"If people want to, they will set the forest on fire," she said, referring to ranchers, smaller farmers and land-grabbers. Understanding the human component "is the part of our methodology we are trying to improve."

The team's most recent calculations estimate that almost 115 million acres are highly vulnerable to fires in protected areas in the Amazon rainforest over the next three months. That's an area bigger than Germany.

As climate change contributes to heat waves and droughts that lead to more frequent and intense wildfires, scientists like Anderson will become increasingly important for officials seeking to avert forest destruction.

One of those officials, Waldemir Moreira Jr., a colonel in the firefighting service of Mato Grosso do Sul, a state in west-central Brazil, said his office used data from Anderson's team to decide where to place larger teams in advance. The state includes a large section of the Pantanal, the world's biggest wetland. Two years ago, wildfires burned a fifth of its area.

The data, he said, "can help me get more resources for prevention," including the prescribed fires that crews set deliberately to get rid of fuel that can feed big blazes.

I asked Anderson if she ever gets frustrated that leaders in Brazil aren't doing more to protect the Amazon. Deforestation rates continue to grow and wildfires still rage. Meanwhile, law enforcement agencies, assigned to protect the forest, struggle with low funding and threats of violence from environmental criminals.

Her answer was to describe herself as “over-optimistic.” It’s a quality I didn’t expect in someone whose work is both incredibly important and incredibly daunting. But maybe it’s a necessary one.
