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FOREIGN DESK

A Record Amazon Drought, and Fear of Wider Ills

By **LARRY ROHTER (NYT)** 1859 words

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MANAQUIRI, Brazil - The Amazon River basin, the world's largest rain forest, is grappling with a devastating drought that in some areas is the worst since record keeping began a century ago. It has evaporated whole lagoons and kindled forest fires, killed off fish and crops, stranded boats and the villagers who travel by them, brought disease and wreaked economic havoc.

In mid-October, the governor of Amazonas State, Eduardo Braga, decreed a "state of public calamity," which remains in effect as the drought's impact on the economy, public health and food and fuel supplies deepens. But other Brazilian states have also been severely affected, as have Amazon regions in neighboring countries like Peru, Bolivia and Colombia.

With hundreds of riverside settlements cut off from the outside world, the Brazilian Armed Forces have for three months mounted what officials describe as the biggest relief operation that they and civil defense agencies have carried out together. Nearly 2,000 tons of food and 30 tons of medicine have already been airlifted by plane and helicopter to affected communities just in Amazonas State, the region's largest.

"There have been years before in which we've had a deficit of rainfall, but we've never experienced drops in the water levels of rivers like those we have seen in 2005," said Everaldo Souza, a meteorologist at the Amazon Protection System, a Brazilian government agency in Manaus, the nine-state region's main city. "It has truly been without precedent, and it looks like it is only going to be December or January, if then, that things return to normal."

Scientists say the drought is most likely a result of the same rise in water temperatures in the tropical Atlantic Ocean that unleashed Hurricane Katrina. They also worry that if global warming is involved, as some of them suspect, it may be the beginning of a new era of more severe and frequent droughts in the region that accounts for nearly a quarter of the world's fresh water.

"The Amazon is a kind of canary-in-a-coal-mine situation," said Daniel C. Nepstad, a senior scientist at the Woods Hole Research Center in Massachusetts and the Amazon Institute of Ecological Research in Belém.

"We have no idea of the game we have played into by running this worldwide experiment of pumping so much greenhouse gases into the atmosphere," Mr. Nepstad said. Even more than in other parts of the world, people who live in the world's largest rain forest depend on water for transportation, food, sewage removal -- in short, just about everything, so the drought has touched nearly every aspect of their lives.

"I am very frightened," said Jair Souto, the mayor of a sleepy market town, Manaquiri, that started seeing signs of drought in September. "One thing goes wrong, and the entire system follows."

In Acre State in western Brazil, parched trees turned to tinder, and the number of forest fires recorded tripled to nearly 1,500 at its peak in September compared with a year earlier. The resulting smoke, which may itself have intensified the drought by impeding the formation of storm clouds, was so thick on some days that residents took to wearing masks when they went outdoors.

On the Madeira River, a main trade artery for products including soybeans and diesel oil, navigation had to be suspended when water levels fell to barely one-tenth of their rainy season level. Peasant farmers have watched their crops rot because they cannot ship them to market, and schools have shut down now that students can no longer get to class even in small boats.

"The water level wasn't but two fingers high, and the channel was choked in the grass that sprang up, so you couldn't even paddle a canoe," Rivaldo Castro Serrão, a peasant farmer in a hamlet on the Purus River, São Lázaro, said in late November as an army helicopter was delivering supplies to the 41 families living there. "With the fish all dead and our watermelon and banana crop all rotted, we'd be starving if it weren't for the food packages the government brings."

As water levels dropped, areas where the river normally flowed free instead became stagnant pools, the ideal breeding ground for mosquitoes. As a result, malaria, always a problem in the region, has become more prevalent and has further strained limited health care resources.

A vast majority of communities rely on the river to carry away human waste. With sewage now accumulating near the settlements, the risk of cholera and other diseases is expected to rise with water levels when the rainy season, which is starting in some parts of the basin, finally arrives in earnest. Around larger towns like Manaquiri, peasants who fled the drought looking for aid and still cannot return home have formed floating slums. Horácio de Almeida Ramos, for example, has been marooned in Manaquiri since September, when river levels began falling as much as 20 inches a day. In October, the teeming schools of fish in the lagoon suddenly died off, and by November, the entire lagoon had dried up, leaving boats here stranded and outlying communities isolated.

So Mr. Ramos lives, with his wife and their seven children, ranging in age from 2 to 15, in the canoe that brought them here and is now beached beside the pier. "We're stuck here until the lagoon fills up again, living off charity and whatever make-work I can find," he said resignedly. "We had to abandon all our crops, so I don't know what it's going to be like when we eventually go back."

Even as the drought begins to subside, scientists are still debating what caused it. The explanation accepted most widely pins primary responsibility on higher water temperatures in tropical regions of the Atlantic Ocean, the same phenomenon being blamed for the increase in the number of hurricanes forming in the Northern Hemisphere this year.

"A warmer Atlantic not only helps give more energy to hurricanes, it also aids in evaporating air," said Luiz Gylvan Meira, a climate specialist at the Institute for Advanced Studies at the University of São Paulo. "But when that air rises over the oceans in one region, it eventually has to come down somewhere else, thousands of miles away. In this case, it came down in the western Amazon, blocking the formation of clouds that would bring rain to the headwaters of the rivers that feed the Amazon."

Whether the increases in deforestation registered in the Amazon in recent years have also played a role is less clear. The Brazilian government, often criticized for not doing enough to stop the depredations of loggers and ranchers, argues there is no direct connection, attributing the drought to larger external forces beyond the country's control.

"There are a lot of peculiar things happening on a large scale, like the tsunami, hurricanes and now this drought without precedent," **Ciro Gomes**, the minister of national integration, said in October, during a tour of the affected region. "We should all be concerned and launch an alert to the world that irresponsible management of natural resources needs to cease, the sooner the better."

In fact, some of the areas hardest hit by the drought are those that have done the most to limit or control deforestation. Here in Amazonas, which is larger than France, Germany, Britain and Italy combined, officials say that 98 percent of their forest remains intact but that they are suffering more than neighboring states where deforestation has been rampant.

But river-dwellers old enough to remember the era before deforestation began on a large scale say that the cutting down of trees along rivers and lakes has aided in the accumulation of silt. As a result, they say, navigation channels that remained open even in the most severe of previous dry seasons are now blocked and choked.

Research also suggests that the forest itself, and consequently the entire ecosystem, has been made more vulnerable by the drought. When deprived of an adequate ration of rainfall, trees instead drain water from the soil and curb the growth of their trunks, which are vital to their role in pulling immense quantities of carbon dioxide out of the air.

"Because droughts remain registered in the soil for up to four years, the situation is still very critical and precarious, and will remain so," **Mr. Nepstad** said. Where there are "forests already teetering on the edge," he added, the prospect of "massive tree mortality and greater susceptibility to fire" must be considered.

While scientists largely agree that higher temperatures in the Atlantic are responsible for the severity of this year's drought, they are still searching for an explanation for that phenomenon. It could be just a one-time disturbance, or it could be more permanent, perhaps brought on by greenhouse gas emissions.

"Yes, a global warming effect would explain increases in ocean temperatures, but no one is saying that yet, because it is still very early, and we don't yet have enough data," said Carlos Nobre, director of Brazil's National Institute of Space Research, which monitors climatic patterns in the Amazon. "Droughts like this one are very rare, but one consequence of a warmer planet would be that they occur with more frequency, which is something we are going to have to be watching for."

Local governments in the Amazon do not have the luxury of awaiting the results of that research, and they fear that the drought this year may not be an aberration. So they have already begun taking as many steps as their limited budgets will permit to prepare for a recurrence.

In a region where water has always been abundant and taken for granted, programs are under way to build wells and cisterns. Warehouses to stock food, medicine and fuel are being built, in anticipation that communities may again be left isolated in the near future.

"We have become the victims of a phenomenon we did not provoke," said Mr. Braga, the governor of Amazonas. "What is happening is not our fault. We didn't heat up the atmosphere or chop down our trees. But we are paying the price with the suffering of our people."

Photos: Men in Manaquiri, Brazil, towed a boat that was stuck in the dry crater that remained of a lake. The drought also has killed fish and crops. (Photo by André Vieira/Polaris, for The New York Times)(pg. 1); São Lázaro residents, above, received food from the government after the lake where they once fished dried up in the worst drought in the Amazon region. The drought has left hundreds of settlements isolated.; Diana Lima dos Santos of São Sebastião do Miraaúá went home after washing clothes in the Solimões River, which shriveled in the drought. (Photographs by André Vieira/Polaris, for The New York Times)(pg. 6)

Map of Brazil highlighting Amazonas: In Amazonas, the governor declared a "state of public calamity." (pg. 6)

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