



# STATEMENT ON THE 2023 AMAZON DROUGHT AND ITS UNFORESEEN CONSEQUENCES

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The 2023 drought has been characterized by greatly reduced rainfall and four heatwaves, which occurred during the pre-rainy season, reducing river levels. These alterations caused increased mortality of fish and aquatic mammals, scarcity of potable water and food for river-dwelling communities, halted river transportation, increased risk of waterborne disease, and strong defoliation of vegetation along river margins due to surface fires. Middle- and long-term impacts include forest degradation near deforested areas; increased tree mortality and decreased growth, reducing forest carbon sinks, and negative impacts on community-based socio-bioeconomies. Extreme drought in the Amazon is also expected to reduce atmospheric moisture transport to the southern part of South America, worsening the water and energy crisis both inside and beyond the Amazon region.

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## Historical patterns and uniqueness of the 2023 drought:

Recent decades are the warmest of the observational period, with severe droughts occurring in the Amazon in 2005, 2010, 2015/2016, a smaller one in 2020, and this very strong in 2023-2024. The current drought is the most extreme ever seen in the historical record, and somewhat unique since it started during the pre-rainy season, while in previous events, drought occurred during the peak of the rainy season (austral summer). This drought combines widespread reduction of rainfall over most of the western-central Amazon Basin – 100 to 300 mm below average in the Bolivian Amazon and in the Brazilian states of Amazonas, Acre, Roraima, and Rondônia – with a warmer austral winter due to El Niño, and four heat waves with air temperatures 2-5°C warmer than usual in the austral winter and spring. As a result, several large rivers experienced the most extreme reductions in water levels since 1902. None of the previous droughts were affected by all those characteristics together.

## What can happen in 2024 and in the long term:

The El Niño 2023 is expected to continue its evolution during the first part of 2024, and, together with a warmer Tropical North Atlantic, it is very likely that the Amazon's rainy season will be weaker than normal, and river levels will be lower than normal. This drought illustrates the possible effects of warming on the Amazon and may represent a 'new-normal' if no action is taken to stop climate change.

## Consequences and impacts:

The consequences and impacts of the drought are already large and will continue in the medium term. They have affected aquatic and terrestrial systems (Table 1), and human populations in both rural and urban areas. Among the most striking effects are high fish and aquatic mammal mortality in the Solimões-Amazonas River, images of leafless trees along riverbanks, and surface fires in dry forests. The total lack of access to safe drinking water, disruptions to crop production, and fish

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mortality have forced large numbers of people to leave riverine villages, and reports have shown many camping in canoes many kilometers from home in search of water.

The drought has had in some cases unexpected consequences. For example, Quito and other cities in Ecuador have been experiencing energy shortages for as long as 4 hours per day since late October<sup>3</sup>, because of reduced energy production from Amazonian dams. A similar situation occurred in Rondônia due to the historic drought of the Madeira River. This example highlights once more how dependent we are upon the Amazon, and the interconnectivity of forests, water, and people.

There are synergies between the effects of droughts and deforestation; when these occur together, there is increased risk of fire spreading into the forest. For example, in the Brazilian Amazon, fires increased 52.3% during the 2023 drought (September and October) relative to August<sup>4</sup>. Fires not only destroy forests; they increase thermal stress to plants and animals, emit carbon to the atmosphere, and produce huge masses of smoke that cover cities. In the Brazilian Amazon, an estimated 150,000 people experienced fire-related health problems<sup>5</sup>.



Igarapé dos Reis in Iranduba, Amazonas once again had a large fish mortality due to lack of oxygen during the dry period of the rivers. Photo: Alberto César Araújo/Amazônia Real.

**The synergy of drought, deforestation, and degradation reduces the Amazon’s capacity to recycle water and act as a carbon sink.** The most important consequences of the drought are summarized in Table 1:

**Table 1. Consequences of Drought**

<b>In aquatic systems</b>	Reduced water supply and increased water temperatures (~40°C)
	Decreased water quality affecting human health
	Halted transportation, isolating human communities
	Mass mortality of fish and aquatic mammals
	Disruption in the way of living of river-dwelling populations
	Decreased energy production by dams
<b>In terrestrial systems</b>	Water deficit and thermal stress on terrestrial vegetation
	Biodiversity loss due to thermal stress
	Increased vulnerability of seasonally flooded and seasonally dry forests, with expected increased tree mortality
	Increased risk of fire-spreading into forests
	Decreased air quality affecting human health
Decreased carbon sink, increased carbon emission	

<sup>3</sup> <https://www.vozdeamerica.com/a/ecuador-comienza-a-racionar-energia-electrica-con-cortes/7330356.html>

<sup>4</sup> <https://efe.com/medio-ambiente/2023-10-01/incendios-forestales-en-amazonia-de-brasil-suben-con-la-actual-sequia/>

<sup>5</sup> <https://www.nature.com/articles/s43247-023-00704-w>

## WHAT TO DO NOW?

The drought has shown the vulnerability of the Amazon ecosystem and its people to climate change. Thus, to reduce risk and prevent similar situations in the future, zero deforestation and ecosystem conservation in the Amazon has to be achieved as soon as possible. At the same time, Amazonian countries need to define and implement robust conservation policies that allow for adequate conservation of protected areas and Indigenous territories, and promote the restoration of deforested and degraded forests. Such policies should also include a clear strategy on how to reduce wildfires. Such a strategy needs to include education campaigns and monitoring systems for prompt fire detection and suppression, among others. Finally, it is crucial that the Paris Agreement target of limiting temperature increase to 1.5°C is met, so that the negative effects of climate change on the Amazon do not worsen.

To reduce the negative impacts of drought on Amazonian populations, governments need to define and implement emergency plans, in collaboration with local communities, to cover the basic needs of people (e.g., access to water, energy, transport, and livelihoods). The health system needs greater capacity to treat respiratory disease caused by poor air quality. Inclusive regional strategies will strengthen the Amazon's ability to withstand and recover from environmental challenges.

The severe drought in the Amazon is a humanitarian and ecological crisis with global implications. To make the recommended actions effective, national and international governments must lead the transition to sustainability and climate resilience<sup>6</sup>. Finally, funding channels are needed, locally and globally; therefore, politicians must be urged to take concrete and effective actions, translating their declared commitments into tangible steps to protect the Amazon and promote sustainability in the region.

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<sup>6</sup><http://otca.org/en/wp-content/uploads/2023/10/Declaration-of-Belem.pdf>



Dry view of Porto Balneário da Prainha in Tarumã-Açu, in Manaus. Photo: Juliana Pesqueira/Amazônia Real.

The SPA will be developing an extensive Policy Brief on Amazon Drought in 2024, ensuring a rigorous examination of the subject matter.

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