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AMAZON  
Initiative

## The Amazon and climate

The Amazon biome – spread over an area around one and a half times the size of the European Union – is an essential provider of ecological and economic services. Not just to the 30 million people who live there, but also to the rest of the world. The forests are a key stabilizer of the global climate, helping maintain temperatures by pumping large amounts of water vapour into the atmosphere and by storing an enormous quantity of carbon in their biomass. Further, the Amazon forests are both drivers of and dependent on the regional hydrological cycle that helps regulate global climate. But all these functions are now threatened by deforestation.

### Keeping carbon on the ground

The vast majority of Amazon forests are mature ecosystems that currently store an estimated 90 billion tonnes of carbon. But deforestation, in part exacerbated by the building and improvement of roads, is changing this.

Over the past 30 years, the Amazon has lost more than 520,000 km<sup>2</sup> of forest. This continued since 1990 at an annual rate of up to 27,000 km<sup>2</sup> (an area nearly the size of Belgium). Where forest once stood, cattle pastures and crop fields are now appearing; their grass and soy only absorbing a fraction of the CO<sub>2</sub> taken up by healthy growing forests.

There is another important issue to consider. What forests take from the air, they can also give back. When forests burn, the carbon stored in the trees and soil is released back into the atmosphere as CO<sub>2</sub>. It is estimated that deforestation, including the burning of natural vegetation, is responsible for up to 20% of all global CO<sub>2</sub> emissions

### Amazon biome

#### Extent

6.7 million km<sup>2</sup>

#### Tropical forest

>40% of the world's tropical forests

#### Stored carbon

>90 billion tonnes

#### CO<sub>2</sub> equiv. of stored carbon

>330 billion tonnes

#### Freshwater

Nearly 20% of the world's available freshwater

*The current rates of Amazonian deforestation imply an estimated carbon release of around 200 million tonnes a year.*



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Nigel DICKINSON, Zig KOCH,  
Michel ROGGO.

## The hydrological engine

With almost 20% of the world's surface freshwater that reaches the oceans flowing through the Amazon basin, its hydrological cycle plays a major role in maintaining the regional and global climate. During the day the forests absorb CO<sub>2</sub>, use water passing through the soil, and release oxygen and water vapour into the atmosphere. This plant transpiration, plus the direct evaporation of water from forest and water body surfaces, is known as evapotranspiration.

The evapotranspiration-precipitation cycle helps maintain the temperature and humidity that are essential in making the Amazon biome what it is, and also contributing to global climatic conditions. Conversely, global climate influences how much water the forest pumps into the atmosphere. If precipitation decreases, then the forest may become drier and more prone to fires, thus releasing more CO<sub>2</sub> into the atmosphere. These phenomena occur in a feedback mechanism that could destabilize global and regional climate, increase deforestation, and thus increase greenhouse gas emissions, destabilizing the global and regional climate even more.

In other words, the Amazon's forests depend on a climate that they themselves help perpetuate. But if the climate and forests were no longer able to sustain each other, another more vicious cycle could kick in: as the local climate changes, more trees die, and as more trees die, the climate changes.

The impacts will not only be felt locally. Severe disruptions to water and energy flows in the Amazon are likely to reduce the rainfall in Brazil's southeast, the country's economic engine. The probable results include reductions in crop yields and electricity supply – less rain means lower river flows; lower river flows lead to less energy being generated by hydroelectric power plants, impacting all forms of

economic activity.

Scientific studies suggest that by the year 2050, temperatures in the Amazon could increase by 2-3°C. Such increases, linked to concomitant decreases in rainfall during already dry months, could result in longer and, more, severe droughts, along with substantial changes in seasonality. This could bring irreparable changes for people and natural ecosystems alike; indeed some scientists even suggest that were a further significant part of the forests to fall, nearly the entire Amazon forest could die, vastly accelerating global climate change.

## What WWF is doing

Through its Amazon Initiative, WWF is increasing its efforts to safeguard the Amazon. It is not only a natural wonder of great socio-economic and biodiversity importance, but it is vital to the global climate and the world's hydrological processes. By working with local and international partners to address the drivers behind deforestation, WWF aims to preserve at least 80% of the Amazon vegetation cover and therefore contribute to keeping the biome as a dynamic carbon storage system and water recycling driver. The alternative is to turn the Amazon into a devastating net greenhouse gas emitter.

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