Why the countries most responsible in the past are now facing the greatest climate threats: rethinking climate justice

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Introduction: Wildfires are becoming one of the most visible symbols of a changing climate. However, their geographical distribution raises important questions: why are some of the largest burned areas now recorded in high-latitude countries such as Canada and the United States, while countries of the Global South are often considered the most vulnerable to climate change? How can we explain this apparent paradox, and what does it reveal about the need to rethink climate justice in a world where the impacts of global warming are becoming increasingly complex and uneven?

In 2026 (as of early August), the differences between countries are already striking. **Canada** is among the countries most affected by wildfires, with **more than 1.4 million hectares burned by late July 2026**, according to the Government of Canada, while data from the National Interagency Fire Center (NIFC) indicate several million acres burned in 2026 **in the United States**, representing **several hundred thousand to more than one million hectares depending on the period considered**. By comparison, **the European Union had recorded around 254,000 hectares burned by late July 2026** (according to the Joint Research Centre (JRC) of the European Commission, through the European Forest Fire Information System (EFFIS)), with **Spain** being one of the most affected countries, with **more than 150,000 hectares burned**. **France** had exceeded 90,000 hectares burned (and **around 116,000 hectares** after the major Gironde wildfires). **Portugal, Italy, and Greece** also experienced significant wildfire activity, with **each country recording several tens of thousands of hectares burned**. **In North Africa, the burned areas remained much smaller**: **Morocco** recorded **around 1,850 hectares burned by late July 2026**, according to the National Agency for Water and Forests, while **Algeria and Tunisia recorded several thousand hectares or fewer**, depending on the regions and events considered. These figures show that, **even when compared with Mediterranean Europe and North Africa, North America is experiencing a much larger scale of wildfire activity.**

At first glance, this situation may seem paradoxical. We often hear that **Southern countries, particularly those in the Mediterranean basin and North Africa, will be among the regions most severely affected by climate change**, experiencing more frequent droughts, more intense heatwaves, and an increased risk of wildfires. Yet it is **Canada** and, to a lesser extent, the **United States**, that are recording by far the largest burned areas. In reality, this is not a contradiction. Southern countries are indeed highly vulnerable to the impacts of climate change on populations, agriculture, and water resources, but **high-latitude regions, especially the Arctic, are warming much faster than the global average** [1]. This phenomenon, known as **Arctic amplification**, means that some regions of northern Canada are warming two to four times faster than the planet as a whole. This accelerated warming dries out vegetation, lengthens the wildfire season, increases the number of lightning strikes, and makes the vast boreal forests far more flammable.

Why does the North Pole warm faster than the rest of the planet? The main reason is the loss of snow and ice. Snow and ice act like a giant natural mirror: they reflect a large portion of the Sun's energy back into space. In contrast, dark surfaces such as the ocean, land, and forests absorb much more heat. As warming causes sea ice to melt, the white reflective surface is replaced by dark ocean water. This darker water absorbs more solar energy, warms up even further, and accelerates the melting of the remaining ice. It becomes a vicious cycle: **the more ice melts, the more heat the Earth absorbs, and the more temperatures rise**. Other mechanisms also contribute, including increased water vapor (a powerful greenhouse gas), changes in cloud cover, and the thawing of

permafrost, which releases carbon dioxide and methane. As a result, Arctic regions are warming much faster than tropical regions, which explains why Canada's forests are now experiencing wildfire seasons of unprecedented magnitude, even though Southern countries remain among the most vulnerable to the human and economic consequences of climate change [1].

Another important phenomenon is **the expansion of the Hadley cell**, one of the three major atmospheric circulation cells on Earth (the other two being the Ferrel and Polar cells). To understand this mechanism, imagine that the atmosphere is organized like a giant conveyor belt. At the Equator, the Sun heats the air very strongly. This warm air rises into the atmosphere and then moves northward and southward. As it cools, it sinks back toward the surface around **30° latitude**, where the world's major deserts, such as the Sahara, are located. This descending air is very dry, which is why the regions beneath this part of the Hadley cell receive very little rainfall.
As the climate warms, **the Hadley cell is gradually expanding toward the poles** [2]. In other words, the zone where this dry air descends is no longer confined to the subtropics; it is slowly shifting farther north in the Northern Hemisphere and farther south in the Southern Hemisphere. One way to visualize this is to imagine that the Sahara is slowly extending its climatic influence northward—not because the desert itself is physically moving, but because **the atmospheric conditions that promote dryness are spreading into regions that were previously wetter**.
In practical terms, this means that regions such as southern Europe, as well as parts of North America, are experiencing longer periods of stable weather, with more persistent high-pressure systems, less rainfall, and greater evaporation. Soils become drier, trees lose moisture, and forests become much more flammable. This expansion of the Hadley cell, combined with the fact that **the Arctic is warming two to four times faster than the rest of the planet (Arctic amplification)**, helps explain why Canada's vast forests are now experiencing wildfire seasons of unprecedented magnitude. In other words, **climate change does not simply increase temperatures; it also alters atmospheric circulation, gradually shifting dry climate zones into regions that were once cooler and wetter.**

Climate justice must today be **rethought in light of a more complex reality**. Historically, it has been built around the idea that industrialized countries of the Global North, which contributed the most to greenhouse gas emissions since the Industrial Revolution, bear a particular responsibility, while countries of the Global South, which contributed much less to global warming, often suffer the most severe consequences. This distinction remains largely valid, especially for many vulnerable countries facing droughts, water shortages, or agricultural losses. However, recent climate developments show that impacts do not always follow this simple division between responsible countries and affected countries. Some countries that have strongly contributed to historical emissions, such as **Canada** and the **United States**, are also among the territories that are now heavily affected by certain consequences of climate change, particularly the dramatic increase in wildfires. Canada, for example, is experiencing accelerated warming in its northern regions due to Arctic amplification, which is profoundly transforming its ecosystems and increasing the risk of extreme wildfires. This does not mean that the issue of historical responsibility disappears, but rather that climate justice must incorporate a new dimension: a country can be both **responsible for climate change and a victim of some of its consequences**. Climate justice should therefore no longer only oppose a responsible Global North to a vulnerable Global South, but must simultaneously consider the history of emissions, the current exposure to risks, and the ability of each territory to cope with climate disruptions.

Conclusion: The comparison of wildfire impacts across continents reveals that climate change does not follow a simple North–South divide. While many countries in the Global South remain among the most vulnerable due to limited resources, water stress, and exposure to extreme heat, high-latitude regions such as Canada are experiencing rapid transformations driven by Arctic amplification and changing atmospheric circulation. The expansion of the Hadley cell, the drying of ecosystems, and the

accelerated warming of northern regions are reshaping the geography of climate risks. These changes show that a country can simultaneously be a major historical contributor to greenhouse gas emissions and a victim of certain climate impacts. Therefore, climate justice must evolve beyond a simple distinction between responsible countries and affected countries, by considering the combined dimensions of historical responsibility, current vulnerability, and the unequal capacity of societies to adapt to a rapidly changing climate.

References:

[1] Bouramdane, A-A. (2023). Assessment of CMIP6 Multi-Model Projections Worldwide: Which Regions Are Getting Warmer and Are Going through a Drought in Africa and Morocco? What Changes from CMIP5 to CMIP6? *Sustainability*, *15*(1), 690. https://doi.org/10.3390/su15010690

[2] Bouramdane, A-A. (2026). Why does it rain in some places, form deserts in others, and why are heatwaves becoming stronger? *Energy Central*. *https://www.energycentral.com/energy-biz/post/why-does-it-rain-in-some-places-form-deserts-in-others-and-why-are-gPPTaRKMWFD5bdE*