Flooding in Brazil's Rio Grande do Sul highlights the need for policies that anticipate the risks of climate change.

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Brazil undermines flood resilience

In September, heavy rains caused substantial flooding in Brazil's state of Rio Grande do Sul (*1*). In the past 2 years, similar events have occurred in the states of São Paulo (*2*), Rio de Janeiro (*3*), Minas Gerais, Espírito Santo, Tocantins, Bahia, Piauí, Pará, and Maranhão (*4*, *5*). Heavy rains and flooding events are expected to increase as global warming continues (*6*, *7*). Therefore, President Luiz Inácio Lula da Silva's administration must update the country's laws to account for the effects of climate change.

In 2021, during the previous administration, Brazil's President Jair Bolsonaro signed Bill 2510/2019 into Law 14,285/2021 (*8*). The legislation removed the federal restrictions (enumerated in Law 12,651/2012) that were in place to protect from development strips of land ranging from 30 to 500 m in width along watercourses in urban areas (*9*). Before the changes, for example, a 30-m strip was protected on each side of a stream under 10 m in width (*9*). The new guidelines permit local governments to allow houses or other infrastructure in areas near watercourses (*8*). As a result, many municipalities have already declared that buildings can be built closer to the banks of rivers and streams; some have established distances as small as 5 m (*10*). Riverbanks are the areas most vulnerable to extreme weather events [e.g., (*3*)]. Many existing houses and other structures are already very close to watercourses, posing risks to humans in the case of floods.

Instead of increasing the risks caused by extreme events, Brazil should be working to increase the land's resilience to flooding. Riparian vegetation—which will also be extirpated under the new law—protects watercourses (*11*), regulates flow, and helps limit damage from extreme climatic events. In addition to passing a new law to revoke Law 14,285/2021 (*12*), Brazil urgently needs policies to restore occupied and paved areas along streams and rivers (*12*). Brazil's laws should strengthen environmental protection and reaffirm the country's commitments to international environmental treaties.

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Hope for funding biodiversity efforts

The climate crisis and the biodiversity crisis are intertwined (*1*, *2*). Climate change can accelerate biodiversity loss, and the associated ecosystem degradation undermines ecosystem resilience and reduces climate change mitigation by reducing carbon sequestration (*2*). However, because decision-makers and the public devote more attention to climate change (*2*), there is a large disparity between resources allocated to climate change mitigation and those allocated to biodiversity conservation and restoration (*3*, *4*). The European Union (EU) spent about €201 billion (USD211 billion) between 2014 and 2020 on climate change mitigation (*4*) and plans

to invest another €118 billion (USD124 billion) between 2021 and 2027 (*5*), an average of almost €23 billion (USD24 billion) per year. This sum far exceeds the amount spent on biodiversity by the entire international community, estimated to be between USD4 billion and USD10 billion per year (*4*, *6*). By funding biodiversity efforts as well as climate change solutions, international coalitions can deliver a more effective response to both challenges.

The international community has recently taken steps toward better funding biodiversity efforts. At the Global Environment Facility's Seventh Assembly in Vancouver, Canada, in 2023, 186 countries agreed to create the Global Biodiversity Framework Fund to increase investment in restoration and renewal of nature (*7*), and two countries—Canada and the United Kingdom—committed to initial contributions of CAD200 million (USD161 million) and £10 million (USD12 million), respectively (*7*). The fund promises to mobilize resources from public, private, and philanthropic sources, with a focus on biodiversity and ecosystem sustainability (*7*).

This biodiversity fund will allow investment in crucial protection of natural ecosystems, which will also serve as a cost-effective way to mitigate climate change. For example, Brazil's "conservation units" (protected areas) have all been created to preserve biodiversity, yet they provide important climate benefits by maintaining carbon stocks and recycling water (*8*). Although the immediate goal is to protect existing carbon stocks in intact ecosystems, global land vegetation can sequester an extra 13.7 gigatons of carbon per year if additional management practices are adopted (*9*). Wild animals and their ecosystem roles are key components of natural climate solutions that can potentially sequester 6.5 gigatons of carbon per year (*10*).

Biodiversity (*4*) and ecosystem function (*2*) must be included in responses to climate change, including the discussions about resource allocation during 2023 United Nations Climate Change Conference, or Conference of the Parties (COP) Climate 28, which begins on November 30, as well as at COP Biodiversity 16 and COP Climate 29, both scheduled for 2024. Focusing on these issues equally is imperative to ensure a balanced distribution of economic resources, reflecting their comparable importance and impact on humanity.

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The Asiatic cheetah's road to extinction

The expansion of road networks in Iran has substantially affected the critically endangered Asiatic cheetah (*1*–*4*). Since 2004, at least 23 Asiatic cheetahs have been killed in vehicle collisions (*4*). The worldwide Asiatic cheetah population is now estimated to be fewer than 20 adults, all of whom live in Iran (*5*). The country must take immediate action to protect the species from extinction.

Ten cheetahs, one of which was pregnant, have been killed on Semnan-Mashhad Road alone (*6*), which is located at the periphery of the Touran Biosphere Reserve, supposedly the last remaining sanctuary for Asiatic cheetahs (*2*). In 2018, Iran established a 3-km fenced area near the reserve to prevent cheetahs from accessing the road (*6*). After the fence was built, cheetah road accidents ceased until 2022 (*6*). However, because the fence only covered part of the reserve's border and no monitoring was implemented, it is unclear whether the temporary halt in road-kills resulted from the intervention. Iran has proposed several additional collision mitigation measures, including extending the fence from 3 km to 36 km on both sides of the road, retrofitting culverts under the road as wildlife corridors, installing roadway lighting, and deploying speed control cameras (*7*).

Insufficient funding, exacerbated by the devaluation of the Iranian rial (*8*, *9*), poses a substantial obstacle to minimizing the number of Asiatic cheetahs killed on roads. Nongovernmental organizations have launched donation campaigns but struggle to raise the USD2 million that the fence extension proposal estimates will be required (*10*). The Ministry of Roads and Urban Development of Iran has pledged cooperation with the Iran Department of Environment (DOE) to fund about 15 km of fencing (*7*). The Conservation of Asiatic Cheetah Project was established to reverse the decline of the Asiatic cheetah (*11*), but suspended operations after difficulties collaborating with Iranian government officials. Reinstating it could improve conservation efforts. Moving forward, Iran should track the success of its interventions to identify the most effective conservation strategies. However, the most immediate need is stronger commitments from DOE and nongovernmental organizations to implement and evaluate the effectiveness of every possible intervention that could save this species from global extinction.

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COMPETING INTERESTS

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