

What the tragic floods in Southern Brazil tell us about health-centered climate-resilient development in Latin American cities

Elis Borde,* Lidyane V. Camelo, and Flávia B. Pilecco

Universidade Federal de Minas Gerais, Faculdade de Medicina, Belo Horizonte, MG, Brazil

Global climate change threatens the integrity of ecosystems and has provoked an increase in the frequency, intensity and reach of extreme weather events worldwide with record-breaking droughts, heat and floods. In a recent publication, van Daalen et al. (2024)¹ provide a cogent analysis of the ongoing and predictable consequences of climate change on human health based on 42 indicators and make a call for addressing inequalities, reinforced by “differences in exposure, sensitivity and adaptive capacity — often reflecting intersecting patterns of (...) inequity”.¹ The authors assert that “climate change is not a distant future scenario”, a statement tragically evidenced by the recent floods in Southern Brazil, which constitute one of the most extensive climate catastrophes in the history of Brazil. Until May 20th, 21 days after the tragedy began, more than 580,000 people were displaced and 76,000 were in shelters,² meaning that, considering only the situation in the state of Rio Grande do Sul, at least 3 out of every 1000 Brazilians were climate refugees. Additionally, 157 deaths have been confirmed, and 88 people were missing. Apart from immediate deaths and injuries, the state will also face indirect health impacts in the short, medium, and long term, including reduced access to health services due to temporary closures, increases in infectious diseases (particularly waterborne), rising levels of poverty and food insecurity, and potential increases in violence (especially against women and children) as well as mental health issues, and substance abuse in the aftermath of the disaster. These events not only underscore the broader conclusions drawn by van Daalen et al.,¹ but also highlight specific vulnerabilities and challenges of climate-related emergencies in [cities of] the Global South.

Regrettably, this disaster cannot be considered unexpected. A major study commissioned by the presidency in 2013, involving more than 30 renowned researchers, already indicated that climate change would lead to heavy rainfall in the southern region of Brazil.³ The study also highlighted the need for actions to mitigate climate change, such as warning systems,

urban drainage mechanisms, and contingency plans. Several other studies came to similar conclusions and forecasted a progressive intensification in the incidence of heavy rainfall, and risks of landslides and flash floods, not only in the South, but also in highly populated regions in the Southeast, and the coastal section of the Northeast.^{4,5} Despite numerous warnings, scientists were ignored, and especially during the Bolsonaro administration, we observed record levels of deforestation, the weakening of environmental laws, and the dismantling of institutions responsible for protecting the environment.⁶ The events in Southern Brazil reinforce those pre-existing inequities due to a legacy of class-based and racialized policies, decision-making and funding practices, fundamentally shaping [climate] vulnerability.⁷ Consequently, the ongoing floods disproportionately affect the most vulnerable populations—predominantly Black, working-class individuals from urban peripheries.

In terms of exposure, the events in Brazil reveal a general lack of adequate infrastructure investment and preservation, reinforced by corruption. This is coupled with the historic racial and class-based urban territorial segregation that has compelled vulnerable populations to settle in high-risk neighbourhoods prone to flooding (for instance, on swamplands) or susceptible to landslides.⁴ In terms of sensitivity, the well-documented health inequities in Brazil,⁸ shaped by social determinants of health and mediated by systemic discrimination, as well as late or insufficient access to health services, result in disproportional disease burden that increases sensitivity and vulnerability, which may be further exacerbated by the temporary interruption of treatment, as health infrastructure is being rebuilt.

The 2023 Lancet Countdown Latin America report⁹ suggests that mitigation policies remain insufficient and highlight the absence of comprehensive national and especially city-level climate adaptation plans and risk assessments. While Brazil and several state capitals have established climate adaptation plans, Porto Alegre (state capital) and other cities in Rio Grande do Sul lack such a plan, which may have contributed to its largely uncoordinated response. It is important to emphasize not only the need for developing these tools to guarantee locally-driven coherent policy framings and targeted collaborative action, but also effectively implementing its recommendations.

*Corresponding author.

E-mail address: eborde@ufmg.br (E. Borde).

© 2024 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



The Lancet Regional Health - Americas 2024;35: 100817

Published Online xxx <https://doi.org/10.1016/j.lana.2024.100817>

Health-centered responses⁹ have been promoted to build transformative responses that overcome immediatism, top-down and isolated measures. Nonetheless, the case of Southern Brazil echoes the arguments made by van Daalen et al.,¹ emphasising that such responses should be guided by a focus on vulnerability and thinking about the Brazilian context, we would add an intersectionality lens.¹⁰ This perspective is crucial for devising targeted strategies, identifying gaps, and redirecting the development of climate mitigation strategies, ultimately transforming them into opportunities for significant social change.

Contributors

Elis Borde conceptualised and wrote (original draft) the manuscript; Lidyane V. Camelo conceptualised and wrote (original draft) the manuscript; Flávia B. Pilecco conceptualised and wrote (original draft) the manuscript.

Declaration of interests

None.

References

- 1 Daalen KR van, Tonne C, Semenza JC, et al. The 2024 Europe report of the Lancet Countdown on health and climate change: unprecedented warming demands unprecedented action. *Lancet Public Health*. 2024. [https://doi.org/10.1016/S2468-2667\(24\)00055-0](https://doi.org/10.1016/S2468-2667(24)00055-0).
- 2 Casa Militar - Defesa Civil-RS. *Defesa Civil atualiza balanço das enchentes no RS- 20/5, 12h*. Defesa Civil do Rio Grande do Sul; 2024. <https://defesacivil.rs.gov.br/defesa-civil-atualiza-balanco-das-enchentes-no-rs-20-5-12h>. Accessed May 20, 2024.
- 3 Prazeres L. Inundações no Rio Grande do Sul: o programa federal de 2015 que previu enchentes e foi engavetado. *BBC News Brasil*; 2024. <https://www.bbc.com/portuguese/articles/c90zxeqj342o>. Accessed May 19, 2024.
- 4 Debortoli NS, Camarinha PIM, Marengo JA, Rodrigues RR. An index of Brazil's vulnerability to expected increases in natural flash flooding and landslide disasters in the context of climate change. *Nat Hazards*. 2017;86:557–582.
- 5 Marengo JA, Camarinha PI, Alves LM, Diniz F, Betts RA. Extreme rainfall and hydro-geo-meteorological disaster risk in 1.5, 2.0, and 4.0°C global warming scenarios: an analysis for Brazil. *Front Clim*. 2021;3. <https://doi.org/10.3389/fclim.2021.610433>.
- 6 Meyerfeld B. *Brazil: deforestation in the Amazon can be traced to Jair Bolsonaro's policies*. *Le Monde.fr*; 2022. https://www.lemonde.fr/en/environment/article/2022/10/30/in-brazil-the-deforestation-of-the-amazon-is-a-result-of-jair-bolsonaro-spolicy_6002264_114.html. Accessed May 19, 2024.
- 7 Smith GS, Anjum E, Francis C, Deanes L, Acey C. Climate change, environmental disasters, and health inequities: the underlying role of structural inequalities. *Curr Envir Health Rep*. 2022;9:80–89.
- 8 Landmann-Szwarcwald C, Macinko J. A panorama of health inequalities in Brazil. *Int J Equity Health*. 2016;15(174). s12939-016-0462–1.
- 9 Hartinger SM, Palmeiro-Silva YK, Llerena-Cayo C, et al. The 2023 Latin America report of the Lancet Countdown on health and climate change: the imperative for health-centred climate-resilient development. *Lancet Reg Health Am*. 2024;33:100746. <https://doi.org/10.1016/j.lana.2024.100746>.
- 10 Hankivsky O, Grace D, Hunting G, et al. An intersectionality-based policy analysis framework: critical reflections on a methodology for advancing equity. *Int J Equity Health*. 2014;13:119.