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Learning from 536 AD: climate collapse, pandemics, and the urgency of collective action in the 21st century

Aprendendo com o ano 536 d.C.: colapso climático, pandemias e a urgência da ação coletiva no século XXI

Heslley Machado Silva[1,2]

[1] *Universidade do Estado de Minas Gerais (UEMG), Minas Gerais, Brazil*

[2] *Centro Universitário de Formiga (UNIFORMG), Minas Gerais, Brazil*

ABSTRACT

This article revisits the year 536 AD, often described as one of the darkest periods in human history due to a climatic collapse and the Justinian Plague, drawing a parallel with contemporary challenges shaped by climate change, pandemics, and scientific disinformation. Through a narrative review and theoretical reflection, it highlights how extreme events (such as floods, droughts, and wildfires) are intensifying, undermining ecosystems and disproportionately affecting vulnerable populations. The COVID-19 pandemic revealed structural weaknesses in health systems and the impact of denialism (information avoidance). Unlike ancient societies, today's humanity possesses scientific knowledge, technological resources, and strategies capable of mitigating these crises; yet political inertia and cultural resistance continue to hinder coordinated action. The historical experience of 536 serves as a warning: scientific knowledge alone is insufficient unless it is ethically, collectively, and responsibly mobilized. The article concludes that only through urgent, science-based collective action can humanity avoid repeating cycles of collapse.

Keywords: Climate Change; Pandemics; Information Avoidance; History as Topic; Community Action; Public Policy.

RESUMO

Este artigo revisita o ano 536 d.C., frequentemente descrito como um dos períodos mais sombrios da história humana em razão de um colapso climático e da Peste Justiniana, traçando um paralelo com os desafios contemporâneos moldados pelas mudanças climáticas, pandemias e desinformação científica. Por meio de uma revisão narrativa e reflexão teórica, o estudo destaca como eventos extremos (como enchentes, secas e incêndios florestais) vêm se intensificando, comprometendo ecossistemas e afetando de forma desproporcional as populações vulneráveis. A pandemia de COVID-19 revelou fragilidades estruturais nos sistemas de saúde e o impacto do negacionismo (evitação da informação). Diferentemente das sociedades antigas, a humanidade atual dispõe de conhecimento científico, recursos tecnológicos e estratégias capazes de mitigar essas crises; contudo, a inércia política e a resistência cultural continuam a dificultar uma ação coordenada. A experiência histórica de 536 serve como alerta: o conhecimento científico, por si só, é insuficiente se não for mobilizado de forma ética, coletiva e responsável. O artigo conclui que apenas por meio de uma ação coletiva urgente e baseada na ciência a humanidade poderá evitar a repetição de ciclos de colapso.

Palavras-chave: Mudança Climática; Pandemias; Evitação de Informação; História como Assunto; Ação Comunitária; Política Pública.

INTRODUCTION

Throughout history, certain events have served as milestones revealing human vulnerability in the face of natural and biological forces. The year 536 CE (*Common Era*) is often cited as one of the darkest periods ever endured by humanity. Historical accounts and scientific evidence point to a succession of global catastrophes, including an inexplicable haze that shrouded the skies, obstructing sunlight and causing a dramatic drop in global temperatures[1]. Recent studies suggest that this phenomenon resulted from a massive volcanic eruption, possibly in Iceland, that released vast quantities of sulfur particles into the atmosphere, reflecting solar radiation and triggering a "volcanic winter"[2]. This climatic disruption led to successive crop failures, widespread famine, social collapse, and even

Correspondence / Correspondência:
Heslley Machado Silva
Flor de Liz Street, 117, Jardim das Flores. CEP: 32410-124 – Ibirité, Minas Gerais, Brazil.
Tel: +55 37-99982-5189
E-mail: heslley@uniformg.edu.br

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reports of cannibalism. At the same time, the Justinian Plague—one of the earliest bubonic plague pandemics, swept across Europe, dramatically increasing mortality rates and deepening human suffering[3].

In dialogue with this historical backdrop, this article proposes an integrated reading of the "Earth-system shocks" that characterize both the year 536 CE and the Anthropocene: (i) the paleoclimatic reconstruction of an abrupt, multidecadal cooling in the 6th century, now consolidated by high-resolution proxies such as wood-anatomical records and ice cores, refining the notion of the Late Antique Little Ice Age[4]; (ii) contemporary parallels under anthropogenic global warming and the transgression of planetary boundaries, with observable impacts on the frequency and intensity of extreme events, biosphere integrity, and water and food security[5-7]; (iii) the amplification of health risks through zoonotic spillover in contexts of land-use change and biodiversity loss, demanding responses grounded in the One Health framework[8,9]; and (iv) the structuring role of disinformation and the "infodemic" in eroding public trust and undermining evidence-based policies[10-12].

By assembling these four analytical axes, the text argues that historical analogy is not a mere rhetorical device but a heuristic framework for guiding risk governance, science communication, and international cooperation.

This article aims to present a comparative analysis between the catastrophic events of 536 CE and the multiple global challenges of the 21st century, emphasizing structural similarities, fundamental differences, and the ethical and political implications of this historical analogy. Drawing on recent literature, it argues that despite remarkable advances in science and technology, humanity remains vulnerable to the combined effects of climate change, pandemics, and disinformation.

Methodologically, the analysis is organized into three stages that structure the remainder of the manuscript: first, it systematizes the state of the art on the 536 CE episode and its physical–climatic mechanisms, deriving lessons about social vulnerability under rapid forcings; second, it develops parallels with the 21st century in light of scientific consensuses (IPCC) and integrative frameworks (Planetary Boundaries and One Health), discussing implications for climate justice, food security, and health surveillance; third, it examines how degraded informational ecosystems, marked by high volumes of rumors and algorithmic incentives to novelty, erode the social contract of science and explores which institutional and communicative interventions (infodemic management, media literacy, platform transparency) are most promising.

The central argument, developed in the following sections, is that only the ethical and coordinated mobilization of knowledge, from climate monitoring to pathogen-surveillance networks and evidence-based communication, can break cycles of collapse and reduce systemic risk at the global scale.

CONTEMPORARY CRISES AND HISTORICAL PARALLELS

The 21st century is marked by a new wave of global crises that, in several respects, echo the patterns of suffering and instability witnessed in the 6th century[13]. The climate crisis, intensified by anthropogenic activity, has increased the frequency and severity of extreme weather events, including floods, droughts, and large-scale wildfires[14]. In 2024, Brazil experienced simultaneous and contrasting climatic extremes: devastating floods in the South and historic droughts in the Midwest, affecting even the Amazon, one of the world's wettest biomes. That same year, Europe faced a similar dichotomy, with catastrophic flooding in the central region and destructive fires in Portugal, reinforcing scientific projections of a warming planet and its repercussions on the environment, the economy, and particularly on vulnerable populations.

The experience of the ozone hole demonstrates that scientific consensus and international governance can reverse environmental damage on a planetary scale[15]. The Montreal Protocol, anchored in decades of assessment by independent panels, eliminated roughly 99% of ozone-depleting substances, placed recovery on track, and generated significant climate co-benefits. Projections indicate a return to 1980 levels around 2040 globally, 2045 in the Arctic, and 2066 in Antarctica, while the Kigali Amendment could avert an additional 0.3–0.5 °C of warming by 2100[16-20]. In contrast with the online distortions that today delegitimize science, the ozone case shows that evidence-guided policies, rather than disinformation, can mitigate systemic risks and strengthen institutional capacities transferable to the contemporary climate crisis[15,21].

In public health, history likewise records successes when evidence-based measures were adopted in a timely and coordinated manner. Modern quarantine, institutionalized in Ragusa in 1377, emerged as a rational response to plague[22]. Ecclesiastical and civic responses evolved during the Black Death in the 14th century, and in Rome, during the Great Plague of 1656, the administration under Pope Alexander VII, coordinated by Girolamo Gastaldi, implemented sanitary cordons and extensive public regulations[23-26]. In the 20th century, non-pharmaceutical interventions, isolation, suspension of mass gatherings, and mask use reduced mortality during the 1918 influenza pandemic[27,28], and recent studies show that masks attenuate the emission of respiratory viruses[29]. On the pharmacological side, the eradication of smallpox and the over 99% reduction in polio cases since 1988 illustrate the power of vaccines, although polio still warrants international attention[30-33]. The resurgence of measles in 2024–2025 in the World Health Organization (WHO) European Region, driven by insufficient vaccination coverage, demonstrates the risk of backsliding[34,35]. These precedents reinforce that a new convergence of climatic shocks and pathogen emergence, as in 536 CE, will be averted only if effective environmental governance, health surveillance, and science communication capable of containing the infodemic are integrated[28,29,36].

Concurrently, the COVID-19 pandemic exposed the fragility of modern societies when confronted with emerging biological threats[37]. Despite the rapid identification of SARS-CoV-2 and the unprecedented development of vaccines, the pandemic was exacerbated by widespread scientific denialism, resistance to preventive measures, and the promotion of ineffective or dangerous treatments, all of which contributed to millions of preventable deaths[38,39]. Moreover, the likely zoonotic origin of the virus serves as a warning about the risks of continued human encroachment into natural habitats and increased interaction with wildlife, conditions that facilitate the emergence of novel pathogens[40,41].

SCIENTIFIC KNOWLEDGE AND COLLECTIVE RESPONSIBILITY

Despite these troubling parallels, fundamental differences distinguish the 6th century from the present. In 536 CE, humanity was subject to natural phenomena it could neither comprehend nor control. The volcanic eruption that triggered the climatic crisis was entirely beyond human agency, and the lack of microbiological understanding rendered any effective response to the Justinian Plague impossible. Today, however, we possess a wealth of scientific knowledge, technological resources, monitoring systems, and mitigation strategies capable of preventing, alleviating, or even reversing many of the crises we face. The consequences of climate change are scientifically predictable, and numerous viable solutions, such as reducing greenhouse gas emissions, restoring ecosystems, and developing early-warning systems, are within our reach[42].

Considering what is already known and what occurred in 536 CE, confronting the twin threat requires simultaneous progress on mitigation, adaptation, and health preparedness. On the climate front, this entails accelerating decarbonization, safeguarding critical ecosystems, and embedding early-warning systems for heat waves and floods within local health action plans[5,43,44]. On the health front, it calls for building climate-resilient, low-carbon health systems, with systematic risk assessment, infrastructure designed for extremes, and integrated environmental–epidemiological surveillance[45-47]. A One Health approach is pivotal: land-use change and global warming increase cross-species contacts and the probability of spillover, a dynamic evidenced both by global projections of viral sharing under warming[41,48] and by studies linking deforestation and forest fragmentation to Ebola outbreaks in Africa[49,50]. Prevention therefore demands aligning climate, biodiversity, and public-health policies to reduce the likelihood of a new cascade, in which climate disruption leads to food insecurity and social instability, which in turn foster the emergence and spread of disease, akin to that of the 6th century.

Nevertheless, political inaction, collective apathy, and resistance to scientific consensus have emerged as significant barriers to effective intervention. Denial of global warming and rejection of public health measures during the pandemic reflect a dangerous cultural trend of disengagement from empirical reality[51]. The history of 536 CE offers a powerful warning: even when humanity possesses the knowledge and resources to act, failure to do so in a timely and coordinated manner can yield catastrophic consequences.

This agenda can only be sustained by networks of scientific production and collaboration capable of turning data into decisions: maintaining and expanding open genomic surveillance (for example, through the Global Initiative on Sharing All Influenza Data (GISAID)), leveraging the legacy of the Global Influenza Surveillance and Response System (GISRS) of the WHO as an early-warning platform for respiratory viruses, and scaling wastewater-based epidemiology as a community sentinel[52-54]. In countermeasure development, initiatives such as the "100 Days Mission" coordinate research, regulation, and manufacturing to sharply compress the interval between detection and vaccine availability, while the One Health Joint Plan of Action (2022–2026) provides a cooperative roadmap to prevent, detect, and respond to emerging risks[55-57]. In parallel, curbing the infodemic through monitoring, rapid response, and psychological inoculation (prebunking) is essential, strategies shown to reduce adherence to false narratives, so that scientific evidence can effectively guide collective action amid interlinked climate and health crises[58-60].

CONCLUSIONS

The historical experience of 536 CE, marked by climatic catastrophes and pandemics, provides a potent metaphor for the existential risks of our time. While contemporary societies are equipped with vastly superior scientific and technological tools, these assets are rendered ineffective in the absence of collective action, ethical commitment, and political accountability. This historical analogy must not be interpreted as a fatalistic inevitability but rather as a call to vigilance: knowledge alone does not prevent collapse; it must be actively and responsibly mobilized.

The relevance of this analysis lies in its potential to inform evidence-based public policies, to promote a culture that values science, and to reinforce the urgency of international cooperation in the face of global threats. We are not as defenseless as we were in 536 CE, but we risk repeating history if we fail to act with lucidity, solidarity, and urgency.

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CONFLICTS OF INTEREST

The author declares no conflicts of interest.

AUTHOR'S CONTRIBUTIONS

HMS: participated in all stages of writing the text.

REFERENCES

1 Gibbons A. Eruption made 536 'the worst year to be alive'. Science. 2018 Nov;362(6416):733-4.

2 Büntgen U, Myglan VS, Ljungqvist FC, McCormick M, Di Cosmo N, Sigl M, et al. Cooling and societal change during the Late Antique Little Ice Age from 536 to around 660 AD. Nat Geosci. 2016 Feb;9(3):231-6.

3 Rosen W. Justinian's flea: The First Great Plague and the end of the Roman Empire. London: Penguin; 2007.

4 Büntgen U, Crivellaro A, Arseneault D, Baillie M, Barclay D, Bernabei M, et al. Global wood anatomical perspective on the onset of the Late Antique Little Ice Age (LALIA) in the mid-6th century CE. Sci Bull. 2022 Nov;67(22):2336-44.

5 Legg S. IPCC, 2021: Climate change 2021- the physical science basis. Interaction. 2021 Dec;49(4):44-5.

6 Steffen W, Richardson K, Rockström J, Cornell SE, Fetzer I, Bennett EM, et al. Planetary boundaries: Guiding human development on a changing planet. Science. 2015 Jan;347(6223):1259855.

7 Richardson K, Steffen W, Lucht W, Bendtsen J, Cornell SE, Donges JF, et al. Earth beyond six of nine planetary boundaries. Sci Adv. 2023 Sep;9(37):eadh2458.

8 Plowright RK, Reaser JK, Locke H, Woodley SJ, Patz JA, Becker DJ, et al. Land use-induced spillover: a call to action to safeguard environmental, animal, and human health. Lancet Planet Health. 2021 Apr;5(4):e237-45.

9 Desvars-Larrive A, Vogl AE, Puspitarani GA, Yang L, Joachim A, Käsbohrer A. A One Health framework for exploring zoonotic interactions demonstrated through a case study. Nat Commun. 2024 Jul;15(1):5650.

10 Tangcharoensathien V, Calleja N, Nguyen T, Purnat T, D'Agostino M, Garcia-Saiso S, et al. Framework for managing the COVID-19 infodemic: methods and results of an online, crowdsourced WHO technical consultation. J Med Internet Res. 2020 Jun;22(6):e19659.

11 Vosoughi S, Roy D, Aral S. The spread of true and false news online. Science. 2018 Mar;359(6380):1146-51.

12 Silva HM. Information and misinformation about climate change: lessons from Brazil. Ethics Sci Environ Polit. 2022;22:51-6.

13 Jansen E, Christensen JH, Dokken T, Nisancioglu KH, Vinther BM, Capron E, et al. Past perspectives on the present era of abrupt Arctic climate change. Nat Clim Chang. 2020 Jul;10:714-21.

14 Filippelli GM. Our hot future has arrived - are we prepared? GeoHealth. 2023 Sep;7:e2023GH000936.

15 Silva HM. Discovery of the hole in the ozone layer: environmental awareness and fighting scientific fake news. Ethics Sci Environ Polit. 2025;25:11-19.

16 Fang X, Pyle JA, Chipperfield MP, Daniel JS, Park S, Prinn RG. Challenges for the recovery of the ozone layer. Nat Geosci. 2019 Jul;12:592-6.

17 Weatherhead EC, Andersen SB. The search for signs of recovery of the ozone layer. Nature. 2006 May;441(7089):39-45.

18 Andersen SO, Halberstadt ML, Borgford-Parnell N. Stratospheric ozone, global warming, and the principle of unintended consequences - An ongoing science and policy success story. J Air Waste Manag Assoc. 2013 May;63(6):607-47.

19 Andersen SO. Lessons from the stratospheric ozone layer protection for climate. J Environ Stud Sci. 2015 Jan;5:143-62.

20 Krummel PB, Fraser PJ, Derek N (Australian Government, Department of Climate Change, Energy, the Environment and Water, Commonwealth Scientific and Industrial Research Organisation, AU). The 2022 Antarctic Ozone Hole Summary: final report. Canberra (AU): CSIRO Environment – Climate, Atmosphere & Oceans Interactions; 2023 Jun.

21 Bhat S, Mohanta J. Ozone layer. Yearb Int Environ Law. 2023 Dec;34(1):yvae046.

22 Gensini GF, Yacoub MH, Conti AA. The concept of quarantine in history: from plague to SARS. J Infect. 2004 Nov;49(4):257-61.

23 Silva HM. Pope Alexander VII, President Bolsonaro, and pandemics: When humanity goes back. Ethics Med Public Health. 2022 Apr;21:100721.

24 Bergdolt K. Pandemics and the Dignity of Man: reflections on the history of disease. In: Reis A, Schmidhuber M, Frewer A, editors. A pandemics and ethics: development–problems–solutions. Berlin (GE): Springer; 2023. p. 7–24.

25 Ceccarelli A. Rome, 1656–57: The plague recounted by Genoese diplomacy. EuroStudium3w. 2021;(57):27–76.

26 Formica M, Strangio D. Resilience in papal Rome, 1656–1870: a city's response to crisis. Cham (CH): Palgrave Macmillan Cham, Springer; 2023. 327 p.

27 Silva HM. 100 years later, little has changed in Brazil: disinformation and pandemic. Afr Health Sci. 2021 Dec;21(4):1938–40.

28 Markel H, Lipman HB, Navarro JA, Sloan A, Michalsen JR, Stern AM, et al. Nonpharmaceutical interventions implemented by US cities during the 1918–1919 influenza pandemic. JAMA. 2007;298(6):644–54.

29 Leung NHL, Chu DKW, Shiu EYC, Chan KH, McDevitt JJ, Hau BJP, et al. Respiratory virus shedding in exhaled breath and efficacy of face masks. Nat Med. 2020 May;26(5):676-80.

30 Silva HM. A erradicação da varíola e o desafio das fake news científicas: lições do passado para o presente. Rev Interdiscip Sulear. 2023 dez;(16):116–23.

31 Silva HM. Return of poliomyelitis: A real risk in a country afflicted by scientific denialism. Vaccine. 2025 Jan;44:126449.

32 Fenner F, Henderson DA, Arita I, Jezek Z, Ladnyi ID, World Health Organization. Smallpox and its eradication. Geneva: WHO; 1987. (History of international public health; no. 6)

33 Aylward RB. Making history: from a public health emergency to a polio-free world. Bull World Health Organ. 2014 Jul;92(7):466.

34 UNICEF. European Region reports highest number of measles cases in more than 25 years – 2025 March. Media Brief. Geneva: Unicef; 2025. 9 p.

35 World Health Organization, UNICEF. European Region reports highest number of measles cases in more than 25 years. Geneva: WHO Europe. 2025.

36 Zarocostas J. How to fight an infodemic. Lancet. 2020 Feb;395(10225):676.

37 Ciotti M, Ciccozzi M, Terrinoni A, Jiang WC, Wang CB, Bernardini S. The COVID-19 pandemic. Crit Rev Clin Lab Sci. 2020 Sep;57(6):365–88.

38 Silva HM. Challenges and reflections on pandemic disinformation: The case of hydroxychloroquine and the implications for global public health. Value Health Reg Issues. 2024 Sep;43:101005.

39 Silva HM. A plausible hypothesis for the higher Covid-19 mortality in Brazil. Afr Health Sci. 2023 Dec;23(4):48–50.

40 Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, et al. Global trends in emerging infectious diseases. Nature. 2008 Feb;451(7181):990–3.

41 Silva HM, Soares EM. Pathogens, people, and the planet: a systematic review of biodiversity decline, zoonotic spillover, and climate-driven health vulnerabilities. Biodiversity. 2025 Aug;26:1–20.

42 Rockström J, Steffen W, Noone K, Persson Å, Chapin FS, Lambin EF, et al. A safe operating space for humanity. Nature. 2009 Sep;461(7263):472–5.

43 Ali AH, Thakkar R. Climate changes through data science: understanding and mitigating environmental crisis. Mesopotamian J Big Data. 2023 Dec;2023:125–37.

44 Smith CL, Rojas C, Zurynski Y, Partington A, Braithwaite J. From policy to practice: building a resilient, climate aware health system from the ground up. Clim Change. 2025 Mar;178:69).

45 World Health Organization. WHO guidance for climate-resilient and environmentally sustainable health care facilities. Geneva: WHO; 2020.

46 Gkouliaveras V, Kalogiannidis S, Kalfas D, Kontsas S. Effects of climate change on health and health systems: a systematic review of preparedness, resilience, and challenges. Int J Environ Res Public Health. 2025 Feb;22(2):232.

47 Corvalan C, Villalobos Prats E, Sena A, Campbell-Lendrum D, Karliner J, Risso A, et al. Towards climate resilient and environmentally sustainable health care facilities. Int J Environ Res Public Health. 2020 Nov;17(23):8849.

48 Carlson CJ, Albery GF, Merow C, Trisos CH, Zipfel CM, Eskew EA, et al. Climate change increases cross-species viral transmission risk. Nature. 2022 Apr;607(7919):555–62.

49 Olivero J, Fa JE, Real R, Márquez AL, Farfán MA, Vargas JM, et al. Recent loss of closed forests is associated with Ebola virus disease outbreaks. Sci Rep. 2017 Oct;7(1):14291.

50 Rulli MC, Santini M, Hayman DTS, D'Odorico P. The nexus between forest fragmentation in Africa and Ebola virus disease outbreaks. Sci Rep. 2017 Feb;7(1):41613.

51 Fernandez M, Matta G, Paiva E. COVID-19, vaccine hesitancy and child vaccination: Challenges from Brazil. Lancet Reg Health Am. 2022 Apr;8:100168.

52 Shu Y, McCauley J. GISAID: Global initiative on sharing all influenza data—from vision to reality. Euro Surveill. 2017 Mar;22(13):30494.

53 Hay AJ, McCauley JW. The WHO global influenza surveillance and response system (GISRS) - a future perspective. Influenza Other Respir Viruses. 2018 May;12(5):551-7.

54 Bivins A, North D, Ahmad A, Ahmed W, Alm E, Been F, et al. Wastewater-based epidemiology: global collaborative to maximize contributions in the fight against COVID-19. Environ Sci Technol. 2020 Jun;54(13):7754–7.

55 Saville M, Cramer JP, Downham M, Hacker A, Lurie N, Van der Veken L, et al. Delivering pandemic vaccines in 100 days—what will it take? N Engl J Med. 2022;387(2):e3.

56 World Health Organization, United Nations Environment Programme, World Organisation for Animal Health. One Health joint plan of action (2022–2026): working together for the health of humans, animals, plants and the environment. Geneva: WHO; 2022.

57 Dzau V, Swaminathan S, Baker C, Bright RA, Castillo J, Chuan TC, et al. The 100 Days Mission: how a new medical-countermeasures network can deliver equity and innovation. Lancet. 2023 Oct;402(10412):1507–10.

58 Cook J, Lewandowsky S, Ecker UKH. Neutralizing misinformation through inoculation: exposing misleading argumentation techniques reduces their influence. PLoS One. 2017 May;12(5):e0175799.

59 van der Linden S, Roozenbeek J, Compton J. Inoculating against fake news about COVID-19. Front Psychol. 2020 Oct;11:566790.

60 Roozenbeek J, van der Linden S, Goldberg B, Rathje S, Lewandowsky S. Psychological inoculation improves resilience against misinformation on social media. Sci Adv. 2022 Aug;8(34):eabo6254.

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