Europasian Journal of Medical Sciences
EJMS

Editorial

Advancing Interdisciplinary and Transdisciplinary Research for Planetary Health in Nepal

Mandira Lamichhane Dhimal, Madhusudan Subedi, Meghnath Dhimal,Padam Simkhada

Human health is fundamentally shaped by the quality of the air we breathe, the water we consume, the food we eat, and the broader environmental conditions in which we live.

There is increasing recognition of the importance of planetary health. The Planetary Health Alliance (PHA), a global consortium of more than 550 universities and organizations from over 80 countries, defines planetary health as "a solutions-oriented, transdisciplinary field and social movement focused on analyzing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth" [1].

Planetary health emphasizes our deep interconnectedness with nature and all living beings, human and non-human, and its close nexus with the Sustainable Development Goals (SDGs). Achieving the SDGs ultimately depends on safeguarding planetary health.

Accordingly, the Lancet–Rockefeller Foundation Commission on Planetary Health has defined planetary health as "the health of human civilization and the state of the natural systems on which it depends" [2]. This definition highlights that protecting ecosystems and planetary systems is not separate from protecting human health; rather, they are fundamentally inseparable. Furthermore, planetary health connects our indigenous knowledge to modern knowledge, from mountain to ocean, from rural to urban areas, and from desert to rainforest, providing a basis for life-supporting systems on earth [3]. The planetary crisis is deeply rooted in global systems of production and consumption that disproportionately benefit wealthier societies while placing the heaviest burdens on the poorest and most vulnerable [4].For example, high-income countries drive most emissions and consumption, while low-income countries suffer harsher climate impacts and environmental degradation, bearing droughts, floods, crop loss, pollution, and unsafe work without sharing proportional economic benefits.Low-income countries such as Nepal contribute minimally to global greenhouse gas emissions, they remain hotspots of climate change impacts and severe air pollution [5]. Within these contexts, poorest communities which are already constraints by poor resources bear the heaviest burden.This raises profound questions of environmental justice and a growing ethical crisis in global governance, and questions of equity, responsibility and justice [2].

The planetary boundaries framework, introduced by Rockström et al. (2009) [6] and updated by Steffen et al. (2015) [7], identifies nine biophysical systems that regulate the stability of the Earth system. These boundaries define a "safe operating space" for humanity [7]. When these limits are transgressed, the Earth system becomes less stable, increasing risks for ecosystems and human health. According to the latest assessments, six of the nine planetary boundaries have already been breached: climate change, biodiversity loss (biosphere integrity), land-system change, biogeochemical flows (nitrogen and phosphorus), novel entities (such as pollutants, plastics, and synthetic chemicals), and freshwater change [8]. These transgressions interact with and reinforce one another, amplifying risk sespecially in least developed, climate-vulnerable countries like Nepal.

Nepal stands at the frontline of the planetary health crisis. Triple planetary crisis (air pollution, climate change and biodiversity loss) including degradation of water resources and increasing human–wildlife conflict are no longer isolated environmental issues. They are interconnected, mutually reinforcing threats that undermine the health, livelihoods, and wellbeing of millions. Addressing these complex challenges requires a fundamental shift from traditional, discipline-specific (siloed) research approaches toward interdisciplinary and transdisciplinary research methods that integrate knowledge across sectors, disciplines, and communities [9]. For example, climate change and air pollution are already reducing agricultural productivity, threatening food security, and increasing the risk of malnutrition especially among children and marginalized populations. These cascading risks illustrate the interconnected nature of planetary health: environmental degradation directly translates into human health impacts through complex socio-ecological pathways. Similarly, biodiversity loss and ecosystem disruption increase the likelihood of zoonotic spillover, as seen globally [10]. The frequent Ebola outbreaks in the Democratic Republic of Congo, the recent Andes hantavirus outbreak on a cruise ship, and the COVID-19 pandemic are powerful examples that underscore the importance of transdisciplinary research for planetary health, bringing together expertise from multiple disciplines and sectors to understand, prevent, and respond to emerging health threats.

Planetary health challenges are complex, systemic, and cross-scalar, cutting across ecology, climate, health, economics, culture, and politics, and shaped by power and inequality. Single-discipline and conventional multidisciplinary research cannot capture these interconnections. They demand interdisciplinary collaboration, where researchers co-design agendas, share methods, and integrate theories and data into a common framework. Beyond this, transdisciplinary approaches are essential: scientists, economists, policymakers, practitioners, communities, Indigenous groups, civil society, and youth must jointly define problems and

co-produce context-specific, actionable solutions that are both technically sound and socially legitimate.

Understanding crises such as air pollution, wildfires, biodiversity loss, and climate impacts require collaboration across forestry, epidemiology, meteorology, engineering, economics, social sciences, geography, data science, and public health. Effective planetary health policies must be informed by diverse perspectives, including social and natural sciences, health sciences, political science, gender, economics, environmental justice, and social equity.

In conclusion, Nepal must adopt a new research paradigm that transcends disciplinary silos and centers justice, equity, and community resilience. By fostering collaborative research ecosystems, promoting cross-sectoral innovation, and engaging communities as equal partners in knowledge creation and equitable sharing of benefits, Nepal can become a regional leader in planetary health in South Asia, safeguarding both human wellbeing and the ecosystems on which it depends.

AUTHOR AND ARTICLE INFORMATION

Author(s) with their Primary Affiliation
Mandira Lamichhane Dhimal[1*], Madhusudan Subedi[1,2], Meghnath Dhimal[3] and Padam Simkhada[4]
[1]Planetary Health Research Centre, Kathmandu, Nepal
[2]Patan Academy of Health Sciences, Lalitpur, Nepal
[3]Nepal Health Research Council, Kathmandu, Nepal
[4]University of Chester, Chester, United Kingdom
Corresponding Author Prof. Madhusudan Subedi
Email: madhusubedi@pahs.edu.np
ORCID: https://orcid.org/0000-0001-6495-0601

Author's Contributions All authors read and agreed on the manuscript and responsible for all aspects of the preparation of this manuscript.
Ethics Approval and Consent to Participate N/A
Conflict of Interest None declared.
Funding Support No external funding was received for this research.
Availability of Data and Materials NA
Acknowledgments The author gratefully thanks an anonymous reviewer for a thorough review of an earlier version of the manuscript and many helpful comments and suggestions that helped bring clarity and improved the writing.

Received 19 June, 2026 **Accepted** 29 June, 2026 **Published Online** 30 June, 2026.

REFERENCES

1. Planetary Health Alliance. What is planetary health? [Internet]. Planetary Health Alliance; [cited 2026 May 30]. Available from: https://planetaryhealthalliance.org/what-is-planetary-health (planetaryhealthalliance.org)
2. Whitmee S, Haines A, Beyrer C, Boltz F, Capon AG, de Souza Dias BF, et al. Safeguarding human health in the Anthropocene epoch: report of the Rockefeller Foundation–Lancet Commission on planetary health. Lancet. 2015;386(10007):1973-2028. https://doi.org/10.1016/S0140-6736(15)60901-1
3. Bingham B, Redvers N, Hillier S, Riley T. Indigenous knowledges, One Health, and planetary health: building bridges for the response to climate change. In: Antonelli G, Penna F, Chaturvedi E, Cilento A, editors. Planetary Health – Laws, Policies and Science on the "One Health" Approach. Cham: Springer; 2025. p.151-179. https://doi.org/10.1007/978-3-031-90621-3_9
4. Hasan MN. Unequal burdens and shared fates: rethinking climate justice through reparative action and global solidarity. Environ Sociol. 2025;11(3):273-81. https://doi.org/10.1080/23251042.2025.2487964
5. Dhimal ML, Parajuli K, Subedi M, Bishowkarma K, Parajuli RT, Kadel I, et al. Nepal as a hotspot of the combined impacts of air pollution and climate change: research gaps and way forward. J Nepal Med Assoc. 2026;64(297):320. https://doi.org/10.31729/jnma.v64i297.9451
6. Rockström J, Steffen W, Noone K, Persson Å, Chapin FS III, Lambin EF, et al. A safe operating space for humanity. Nature. 2009;461(7263):472-5. https://doi.org/10.1038/461472a
7. 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;347(6223):1259855. https://doi.org/10.1126/science.1259855
8. Kitzmann NH, Caesar L, Sakschewski B, Rockström J, Andersen L, Bechthold M, et al. Planetary Health Check 2025: a scientific assessment of the state of the planet. Potsdam (Germany): Potsdam Institute for Climate Impact Research; 2025. https://doi.org/10.48485/pik.2025.017
9. Pham LT, Kumar P, Dahana WD, Nguyen DH. Promoting global health transdisciplinary research for planetary health: towards achieving the 2030 Agenda for Sustainable Development. J Glob Health. 2023;13:03007. https://doi.org/10.7189/jogh.13.03007
10. Massé F, Gladkova E. Spatializing zoonotic disease dynamics from a political ecology perspective: reconceptualizing spillover as structure. J Polit Ecol. 2025;32(1):1-22. https://doi.org/10.2458/jpe.5810

