Dutch Academy of Science proposes research agenda for planetary health

Health impacts of climate change, biodiversity loss, and other global environmental changes are expected to escalate if these changes continue at their current pace. Billions of people worldwide will face serious health risks by the end of this century, but scientists have only just begun to study the effect of global environmental changes on human health and how this impact can be abated. As a result, there are enormous gaps in knowledge. In a report published in 2023, the Royal Netherlands Academy of Arts and Sciences identified the main knowledge gaps and drew up a comprehensive research agenda.[1]

Previous overviews of research priorities[2–5] were used to produce an initial inventory of knowledge gaps in planetary health, and missing areas were filled in by adding knowledge gaps mentioned in subfield-specific publications—eg, on a particular environmental change (such as biodiversity loss), a specific pathway (such as infectious diseases), or a specific policy aspect (such as governance issues). Input from 80 experts in the Netherlands and abroad was used to further complete and improve the longlist of knowledge gaps, which in its final iteration had 115 specific knowledge gaps organised into 38 research themes, and four main areas. The panel lists these areas and some examples of knowledge gaps in each.

This inventory was followed by a priority setting exercise, in which a selection of experts was asked to rate longlist items on relevance for policy. Four planetary health research priorities emerged: (1) integral analyses of the effects of global environmental changes on human health, across different environmental changes or different health dimensions; (2) research guiding and supporting transformative change, for example by analysing the health implications of redesigning the economy; (3) research on more effective methods to induce individual and collective behaviour change, for example by developing more effective governance mechanisms; and (4) research guiding and supporting mitigation and adaptation strategies for the health-care sector.

In its report, the Academy concludes that in view of the potentially catastrophic effects of global environmental change on human health, the new field of planetary health research should be promoted and further developed. This will require more funding, both by creating new funding opportunities and by revising the priorities of existing research programmes that are generally not yet in line with the new realities of global environmental change. Research will need to be interdisciplinary and should range from fundamental and strategic studies to applied and implementation studies, using transdisciplinary approaches wherever needed.

Several general observations can be made. The first is that there is an important mismatch between the seriousness of the health risks of global environmental change and the availability of research funding to further scientific understanding of these risks. The evidence on the human health effects of global

Panel: **Examples of open research questions in planetary health research**

Understanding the impacts of global environmental change on human health

- How does biodiversity loss affect ecosystem services, and what are critical threshold values beyond which human health will be affected?
- What is the effect of combinations of global environmental changes (eg, climate change, deforestation, and biodiversity loss) on the spread of infectious diseases?

Developing mitigation and adaptation strategies to protect human health against global environmental change

- What incentive schemes for switching to renewable energy have the largest health co-benefits and avoid a widening of health inequalities?
- What is an optimal diet for western Europeans, taking into account climate change, biodiversity protection, health effects, and affordability?
- What is the environmental impact of medicines, single-use gloves, and other materials and equipment used in health care, and which should be prioritised for replacement?

Promoting the implementation of mitigation and adaptation strategies

- How can international environmental treaties help advance national health policies so that environmental protection goes hand-in-hand with health improvement?
- How can health-care professionals ensure their patients' behaviour is beneficial for their own health, while minimising greenhouse gas emissions and other environmental impacts?

Enabling research on global environmental changes and health by improving data and methods

- How can integrated planetary health information systems be created that help to monitor health risks and assess the effectiveness of countermeasures?
- How can better models be developed to forecast the health impacts of climate change, including interactions with other developments (eg, economy and demography)

environmental changes is incomplete, pathways are insufficiently understood, the effectiveness of mitigation and adaptation policies has not yet been firmly established, and it is currently unclear how timely policy and behaviour change can be realised. The long list of knowledge gaps is the direct result of gross underinvestment in planetary health research.

The second general observation is that, although research capacity is concentrated in high-income countries, most of the negative health impacts of global environmental change will occur in the Global South, which is more vulnerable to these environmental changes, and whose population often lacks the resources for taking countermeasures. However, because the prosperity of high-income countries is based on centuries of them having a larger ecological footprint, these countries are largely responsible for environmental changes elsewhere in the world and their health consequences. This includes responsibility for the research that is necessary to counteract the negative health impacts in the Global South.

Third, the research agenda for planetary health far exceeds the possibilities of a single country such as the Netherlands. Therefore, international cooperation will be essential, not only between researchers, research institutes, and academies of science, but also between research funders. It is encouraging to note that the European Commission has recently decided to allocate some financial resources to planetary health research, but much more will be needed. In addition to expansion of European funding, alignment of national research priorities and involvement of international philanthropies would also be of great help.

Finally, if climate change, biodiversity loss, and other global environmental changes continue at their current pace, the foundations for human health will be seriously jeopardised. The report by the Royal Netherlands Academy of Arts and Sciences therefore makes a strong plea for scientists and health-care leaders to speak out, to clearly communicate the risks of global environmental change, and to actively advocate for evidence-based solutions.

I declare no competing interests.

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2 Whitmee S, Haines A, Beyrer C, et al. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–*Lancet* Commission on planetary health. *Lancet* 2015; **386:** 1973–2028.

3 Ebi KL, Harris F, Sioen GB, et al. Transdisciplinary research priorities for human and planetary health in the context of the 2030 agenda for sustainable development. *Int J Environ Res Public Health* 2020; **17:** 8890.

4 HERA Consortium. EU research agenda for the environment, climate and health. Montpellier: Inserm Transfert, 2022.

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