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Research and policy may need to prioritise in efforts to protect biodiversity and ensure food security, finds study

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To best protect ecosystems and human well-being, there is a need to prioritise how the scarce resources of time, funding and human labour should be allocated to be most effective. This study applies a prioritisation framework to 16 prominent environmental challenges in the areas of biodiversity and food security, based on three criteria: importance (scale), neglect (lack of research) and tractability (e.g. economic feasibility).

In the face of severe environmental challenges driven by ongoing global change, society must use its resources as effectively as possible to protect ecosystems and human well-being.

It is important to act now to avoid crossing any more tipping points, say the researchers of this study, and to implement evidence-based prioritisation to ensure that environmental research is used to its full potential and effectiveness.

To prioritise 16 prominent environmental challenges, the study applied a framework based on three criteria: (1) importance, (2) neglect and (3) tractability. If a problem is unimportant, there is no need to invest in its solution; if resources are already heavily invested in an issue, additional contributions may not make an appreciable difference; and, if a problem is intractable, investing resources in addressing it is likely to be futile. This framework[1] had previously been applied to animal welfare and other issues, but not to prioritise environmental challenges.

The researchers distinguish two areas of protection: **food availability** and **biodiversity.** To evaluate the importance of their 16 chosen environmental challenges[2], 140 international experts in the fields of food security and agriculture, and biodiversity and ecosystems were surveyed via two separate surveys (as there can be trade-offs between environmental protection for each of these areas). To evaluate their level of neglect, or the amount of research invested in a problem, the researchers performed an analysis of relevant literature. To evaluate tractability, they carried out iterative surveys of an expert panel of 11 participants. All scores were then aggregated by weighted averaging and integrated to form one priority score.

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Research and policy may need to prioritise in efforts to protect biodiversity and ensure food security, finds study (continued)

The top priorities differ between food security and biodiversity. For **food security,** therefore, the top priorities are pollinator loss, soil compaction and nutrient depletion; and for **biodiversity,** the main concerns are conservation, ocean acidification and land- and sea-use (especially habitat degradation). While climate change might be the most pressing environmental challenge and mitigation is clearly off-track, other issues rank higher because of climate change's high attention in research.

Research and policy agendas do not yet consistently cover these priorities, say the researchers, and so an additional effort towards these high-priority environmental challenges is needed to increase the effectiveness of global environmental protection. The environmental challenges considered in this analysis are not exhaustive, and so could be expanded in the future to cover emerging impacts (such as noise, light pollution and electromagnetic radiation).

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1. The framework was developed by NGO 80,000 Hours in collaboration with the University of Oxford. See: Wiblin, R., (2017) How to compare different global problems in terms of impact. https://80000hours.org/articles/problem-framework/; Todd, B., (2013) A framework for strategically selecting a cause. https://80000hours.org/ 2013/12/a-framework-for-strategically-selecting-a-cause/

2. The challenges slightly differed between the two areas of **food security** and **biodiversity** (with 16 for **food security** and 19 for **biodiversity,** considering their application to different ecosystems e.g. land versus sea use). Both considered: acidification (soil and freshwater), land/sea use, climate change, habitat/land degradation (other), chemical emissions, eutrophication, toxicants (eco- or human), erosion, water scarcity, salinisation, photochemical ozone formation and soil compaction. **Biodiversity** also considered ocean acidification, habitat fragmentation, biological invasions, hunting, fishing and habitat loss, while **food security** included land scarcity, nutrient depletion, pests and diseases and loss of pollinators.