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# A call for funding bodies to influence the reduction of environmental impacts in remote scientific fieldwork

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There is a growing consensus in the scientific community that there is a need to reduce the environmental impacts of scientific research, including the observations conducted in the field (Bezanson et al., 2013). Scientists conduct fieldwork in a broad range of disciplines (natural, human, and social sciences). Without fieldwork, there is no primary data to build knowledge for these disciplines, and even though fieldwork is fundamental for research, more and more scientists are gaining awareness of the problems associated with the environmental footprint of their work. Still, they need more effective resources or adequate incentives to assess or reduce it. Researchers' initiatives to quantify, understand and reduce their environmental footprint are growing rapidly in research labs [see, for example, the French Labos 1point5 initiative born in 2019 (Collectif Labos 1.5., 2023)], but these initiatives are carried by the research staff themselves without a framework by the funders. There is a need for the rapid construction of appropriate incentives by funders to implement mitigation measures. The nature of scientific fieldwork often requires working in sensitive environments, far away from the scientists' research laboratories, to understand the changes in the natural environment. Science needs to start prioritizing the reduction of the scientific impact of such fieldwork. This article is a direct call for international, national and local funding bodies to expand their considerations in funding decisions and support researchers in reducing the impact of science on sensitive environments. We propose that this can be achieved in three steps: (a) by requiring environmental impact assessments in the initial grant proposal and considering the relative scientific and environmental impact as well as the adequacy of mitigation measures as additional criteria in funding decisions, (b) by giving researchers the means to finance these measures, and (c) by following up on the status of the project after the fieldwork and evaluating the impact assessment. Regular surveys of the impact of the specific expeditions will further enhance our knowledge and improve the implementation of best practices in the field.

Gathering knowledge and data to improve our global understanding, whatever the research domain, is the first objective of any fieldwork, and the quality of science and research should not be compromised. Nonetheless, new practices that do not affect science, such as those listed above, should be considered. Including an impact assessment in funding applications and taking this assessment into account in funding decisions will bring more attention to reducing the deleterious impact of science on the environment. Such impact assessments should also support local governments in assessing and reducing environmental impacts. Indeed, in some regions, some indigenous organizations already require environmental risk assessments through their permitting process (Stevenson, 1996). These initiatives from local governance (to support mechanisms to evaluate and examine environmental impacts locally) should be supported by funding agencies and not overlooked regarding these issues. In this effort of environmental commitment, it is essential to ensure that no top-down decision is imposed outside the communities they affect. The methodology and tools for such impact assessments need to be open source, free and standardized across disciplines for it to be possible to compare different proposals. When choosing which projects to fund, one needs to consider that low-impact research can be less competitive than high-impact research (often taking more time, sometimes collecting less data but optimizing its use). However, prioritizing a project with a bigger relative reduction of the environmental impact over a project which has not attempted to reduce impact will encourage projects to implement scientific best practices to reduce their impact in fieldwork. Requiring impact assessments in funding applications will allow funding agencies to compare the emissions from various projects, promote low environmental impact initiatives, and likely increase the funding of existing dataset analysis. In summary, by implementing impact assessments, funding agencies will consequently be able to base funding decisions on both scientific and environmental impact and abandon projects with too high of an environmental impact.

Of course, all funding cannot go toward reductions of the environmental footprint of projects, as typically substantial costs are incurred when choosing the sustainable option. Therefore, we propose that funding agencies establish a dual counting of projects with an “environmental cost accounting” parallel to “financial accounting”. Thus, a virtuous project that reduces its environmental impact (decreasing its debit balance in the “environmental accounting”) would see its financial credit increase, making it possible to finance these reductions. Another option could be to release an additional financial envelope for environmentally sustainable projects. By giving researchers the means to fund their environmental impact reductions in the field, funding agencies will thus be able to encourage and take an active part in transforming research to make it more sustainable.

Finally, the funding bodies could set-up a post-funding calculation of the environmental footprint weighted by the primary scientific outcomes prioritized by each agency. This would prevent additional reporting burdens to the scientists and streamline the process by having one individual at funding agencies who is an expert assessing the impact of funded projects. Alternatively, one could develop a comprehensible and easy-to-use open-source software for the researchers to conduct this analysis. Following

up and making this assessment after the grant completion could have two benefits: (1) it will give the opportunity to provide feedback on whether the impact value was feasible/achievable and allow for projects to provide recommendations to future expeditions/campaigns, and (2) it encourages scientists to refine their research to maximize the scientific return for each unit of environmental impact. This encourages interdisciplinary science and science of opportunity and will optimize networking and collaborations of groups working on similar datasets in similar areas. It will encourage the optimization of time in the field by collecting/measuring for multiple teams, involving more projects, and consequently having a more significant scientific impact.

We must not forget the social consequences of research. Reducing the environmental impact of research activities is likely to benefit the local biodiversity and human populations. Giving researchers the tools to finance the reduction of their environmental impact in the field also means supporting a specific social justice by giving everyone the means to make better decisions when faced with contradictory injunctions. Beyond environmental impact, research activities have broader social implications, primarily where indigenous communities are concerned. We hope for such topics to be discussed in future workshops and interest groups following this initial call for funding bodies to support environmentally responsible research.

More consistent quantification of fieldwork impacts will ultimately allow for evaluation of the impacts on a community scale. We hope that funding agencies will play a key role in pushing for quantifying the environmental impact of remote fieldwork and, ultimately, the requirement to make improvements in critical areas whilst providing financial means to the researchers committed to this effort. Today, there is a unique opportunity to be part of a historic and necessary shift by supporting all those researchers calling for a transformation of research by changing the evaluation and funding criteria to focus on conducting science sustainably.

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## References

Bezanson, M., Stowe, R., and Watts, S. M. (2013). Reducing the ecological impact of field research. *Am. J. Primatol.* 75, 1–9. doi: 10.1002/ajp.22086

Collectif Labos 1.5. (2023). *Reducing the Environmental Footprint of our Research Activities*. Available online at: <https://labos1point5.org/>; <https://web.archive.org/web/20230109145354/https://labos1point5.org/> (accessed January 26, 2024).

Stevenson, M.G. (1996). Indigenous knowledge in environmental assessment. *Arctic* 49, 278–291. doi: 10.14430/arctic1203