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Helicopter Science

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INTRODUCTION

Well-deserved attention is being directed at the long-standing ethical problem of outsiders carrying out research in ways that do not adequately compensate their hosts. Various referred to as helicopter, parachute, parasitic, postal, safari, colonial, or neocolonial science, much of the focus is on international abuses indicated by failure to include locals as authors but the problem occurs whenever researchers from a dominant culture exploit people in marginalized communities. Here I discuss a diversity of ways to minimize damage due to power imbalances in science. I outline some of the responsibilities of the various parties that directly and indirectly condone, allow, commit, and suffer from helicopter science. I also caution against using absence of local authors as the sole indicator of helicopter science.

I feel qualified to discuss this ethical problem partially because, although I've yet to parachute into a study site, I'm guilty of the other violations. These breaches of what I now recognize as ethical science practices were mostly early in my career and attributable as much to youthful enthusiasm as to disregard for the welfare of my hosts; I've long since striven to redress the power imbalances that allow helicopter science practices to persist. I also recognize that it is easy for well-established researchers to preach against helicopter science and that it can be challenging for early-career researchers to avoid, especially those with limited funding and those conducting research in which there is little local interest.

There are many reasons to avoid perpetuation of helicopter science. First of all, taking undue advantage of hosts risks engendering bad feelings about science among non-scientists while inspiring distrust of visitors among local scientists. In some cases, the hostile receptions encountered by well-intentioned researchers

result from the actions of generations of culturally insensitive colonial and neocolonial scientists. Another reason to avoid helicoptering is that research designed to address local problems suffers greatly without local collaborations both in the quality of recommendations and the likelihood of uptake (Costello and Zulma 2000).

Decolonizing science is a worthy endeavor that requires a diversity of mitigation strategies due to the diversity of host characteristics, variation among scientists in power and resources, and where the research falls on the spectrum of curiosity-driven to problem solving. While I deplore the fundamental inequalities among scientists in funding as well as in access to equipment and information, I also recognize that these disparities are not disappearing; the first step is to increase awareness of the need for ethical behavior by visiting scientists.

RULES FOR AVOIDING HELICOPTER SCIENCE

Advice on avoiding helicopter science is now available in published articles with titles such as ‘Grounding the helicopters’ (Giller 2020), ‘Ten simple rules for Global North researchers to stop perpetuating helicopter research in the Global South’ (Haelewaters et al. 2021), and the delightful mixed metaphor ‘Closing the door on parachutes and parasites’ (Lancet Global Health 2018). These and other publications (e.g., Minasny et al. 2020, Pettorelli et al. 2021) focus on situations that involve visiting and local scientists among whom collaborations should start at the research planning stage and culminate in co-authored publications. Rather than repeating the advice in these papers, my intention here is to draw attention to other sorts of situations and solutions that need not involve co-authorship.

COLLABORATION CHALLENGES

Other than where previous experience with exploitative visiting scientists and unrelated political/cultural clashes have poisoned the well, true collaborations – that is, from design to publication – are relatively easy to secure in countries with well-developed and at least moderately well-funded scientific institutions with plenty of potential research partners. In such places, co-development of research proposals through co-production of publications should be the norm (Haelewaters et al. 2021). The alternative of securing local collaborators for already developed research projects relegates locals to roles as technicians and logistical coordinators, which demeans them while contributing little to local research development.

Lack of ready and able local collaborators is often used as an excuse for continued neocolonial science even in countries with established but underfunded research communities. For example, I worked for several years at a famous and well-funded research station hosted by a developing country in the tropics where few host-country scientists were engaged. Senior scientists at that institution, all expatriates, complained that their attempts to engage local researchers failed, so they were off the hook. It only became clear to me later that efforts to involve locals often failed because university-employed scientists needed paid consultancies to cobble together living wages and salary top-ups were disallowed, which precluded their effective collaboration.

Where local researchers have been transformed into highly paid consultants by international projects, the cost of local collaborators can exceed the budgets of all but the best funded researchers. Under such conditions, potential collaborators likely remain among junior scientists.

Collaborators may also be challenging to find for esoteric research that does not figure among local research priorities; such research might be an unaffordable luxury for locals and engaging them in projects that do not address local concerns can even be damaging. For example, several decades back in Southeast Asia I watched with dismay when host country scientists at a governmental research institution with a mission to improve forest management were diverted to addressing the academically compelling but practically inconsequential questions related to the maintenance of tree species diversity in natural forests. Several local scientists were listed as authors on published papers, but at a cost to their institution's mission. I witnessed an even worse example of this phenomenon in South America when a visiting team of well-funded fluvial hydrologists absorbed much of the attention of an entire research organization that employed no scientist in this field.

I hesitate to stereotype, but as a driven American academic I often found it challenging to collaborate with more senior researchers employed by governmental research institutions in the tropics as well as closer to home. The challenges typically derived from our very different work cultures supported by different reward structures coupled with their bearing responsibilities that I did not share.

AUTHORSHIP IS AN IMPORTANT BUT OFTEN INADEQUATE AND SOMETIMES INAPPROPRIATE INDICATOR

The most familiar metric of helicopter science is co-authorship; here I argue for a broader range of ways to mitigate the damage done. My concern is that while authorship is bibliometrically tractable and revealing (e.g., Stocks et al. 2008; Hazlett et al. 2020), failure to include local authors is not always an indicator of helicopter science. I also worry that inclusion of local 'gift' authors is an expeditious but unethical way that researchers guilty of helicopter science can avoid this sort of scrutiny. Finally, authorship is not of value to some, especially non-academic collaborators.

Where authorship is the appropriate currency, criteria for authorship need to be revised to account for the ascendancy of open-access data, satellite-based studies, and multi-site comparisons while addressing the core problem of neocolonial science. In discussions about authorship with students I still often start with the old-fashioned idea that authorship is deserved by anyone who contributed at least three of the following five elements to the research: came up with the idea, collected the data, analyzed the data, drafted the manuscript, and secured the funding. Employment of this now outmoded criterion excluded from the ranks of authors the critical people who secured the research permits, arranged the logistics, acted as linguistic and cultural translators, and supplied critical local knowledge about the place, phenomenon, species, or ecosystem studied.

Ironically, pressure to include local researchers among increasingly long lists of co-authors has unwittingly engendered a group of professional co-authors that

contribute little but benefit from ‘gift’ authorships. The phenomenon of ‘token authorship’ provides a new twist to the problem of ‘author parasitism’ and may do more harm than good.

OTHER WAYS TO AVOID AND MITIGATE HELICOPTER SCIENCE

Among the many possible ways to avoid helicopter science, some should suit both visiting scientists and their hosts. Where experienced local scientists are not available to mentor or the community of scientists is especially small, for example, contributions to local capacity-building can be a suitable way to avoid helicopter science. My recommended focus is on training of researchers, not just field assistants; building competent cadres of technical and field staffs (e.g., para-taxonomists) is great, but not at the expense of the elevation of local scientists (Putz et al. 2018). If substantial mentoring is involved, priorities need to be shuffled, which can be difficult due to time and budget constraints. Thankfully, at least some funding agencies are beginning to recognize that helicopter science is unethical and will allocate funds to its avoidance.

Contributions to infrastructure development are great but should not be used to avoid the need for true collaborations that enhance local research capacities. Years back I worked at a research institution in the tropics where one group of visiting scientists was allowed to act with autonomy and impunity because their government had contributed several expensive and sophisticated pieces of equipment. Ironically, that equipment was not used due to lack of trained technicians and instructional manuals printed in a language unintelligible to the recipients; this seems like a common variety of ‘donor robbery’ (Costello and Zumla 2000).

RESPONSIBILITIES IN EFFORTS TO AVOID HELICOPTER SCIENCE

International Organizations and Professional Societies: Through supplemental agreements to the Convention on Biological Diversity, The United Nations exercises a leadership role in efforts to combat helicopter science related to the use of genetic resources (i.e., Nagoya Protocol, Cartagena Protocol on Biosafety, Bonn Guidelines). These and other policies are well intentioned, but strict rules often fail to accomplish their goals, can inspire cumbersome work-arounds, and sometimes result in perverse outcomes. Assuring that these policies are fair and non-arbitrary is a continuing struggle, but efforts to protect intellectual property and to promote equitable benefit sharing are commendable.

Funders: Funding agencies should strive to rectify historical geopolitical inequities in the international community of science (Costello and Zulma 2000) and facilitate development of equal research partnerships. To demonstrate that they are exercising their moral responsibility to help build research institutions in the countries and regions where the projects they fund are carried out, they could stipulate that the research be carried out through local institutions. To avoid the common criticism that visiting scientists never bother to return their results to their hosts, funds should be reserved for this purpose. To assure public access, researchers funded by the National Institutes of Health (NIH) in the USA, for example, are required to upload their papers to an open-access digital archive within

12 months of publication (<https://www.nih.gov/health-information/nih-clinical-research-trials-you/what-is-nih-public-access-policy#:~:text=The%20Public%20Access%20Policy%20ensures.gov%2Fpmc%2F>). Funded researchers should also be expected to publish in local outlets, present seminars, and give guest lectures in their host area. Finally, funds for exchange programs should be made available; such experiences help solidify collaborations and help young scientists establish research networks.

I am still irked by a comment by the panel on an unsuccessful grant I submitted to the U.S. National Science Foundation two decades back. The proposal was likely flawed in numerous ways, but I was shocked by the criticism that too much funding was allocated to building Bolivian science, which seems like an endorsement of helicopter science; I can only hope that the NSF has long since mended its ways but much of the language on their website suggests otherwise. Happily, the Dutch funding agency (NOW-WOTRO) has taken steps towards curtailing the abuses that stem from unbalanced power relationships among scientists (Giller 2020); researchers with approved pre-proposals are funded to organize compulsory workshops at their study sites in which local collaborators and other stakeholders participate. Similarly, the European Union's guide to ethical science (<https://www.globalcodeofconduct.org/>) is commendable in many ways but also seems threatening to many kinds of science and scientists....I just hope there is sufficient flexibility in the application of these guidelines to accommodate a variety of scientists and situations.

Publishers and Journals: Despite some recent advances, poorly funded researchers around the world are still often stymied by the cost of publishing. As a gesture towards reducing power imbalances, page charges could be on sliding scales indexed by World Bank estimates of gross national income per capita or waived for researchers from developing countries, as is the policy of journals such as *Molecular Biology and Evolution* (https://academic.oup.com/mbe/pages/Open_Access#apcs). Restricted access to published research also solidifies the disproportionate power of the wealthy; despite great programs like Research4life (<https://www.research4life.org/>) and efforts like that of 'cOAlition S' (<https://www.coalition-s.org/about/>) to require research funded by public grants be published in open access journals or otherwise made immediately available, many publications remain behind paywalls.

Journals could also help in the campaign against helicopter science by requiring explicit and transparent rationales for authorship decisions and statements about how helicopter science was avoided. They could also provide more free or at least heavily discounted help for authors for whom English is not their first language and assure that manuscripts are not rejected solely on the basis of the quality of their prose.

Research Institution Administrators and Senior Scientists: Responsibility for educating researchers about helicopter science should be shared by administrators especially those who run international programs. While assisting researchers with the administrative challenges of conducting research abroad, they should provide clear guidance on matters related to helicopter science. The responsibility for teaching young scientists about what neocolonial science looks like and how it should be avoided falls squarely on the shoulders of senior

scientists. For example, professors should set the tone in their labs by encouraging students to collaborate early in their research careers.

Research Hosts: While the anti-helicopter science literature focuses on abuses by visiting scientists, research hosts (e.g., property owners, families, clans, ethnic or cultural groups, regional or national governments, universities, research institutions, and regional and national governments) have responsibilities as well. In particular, those who host researchers need policies and protocols that strike a balance between being so burdensome or strict as to unnecessarily impede or even preclude research and being so loose as to allow helicopter science to continue.

Two examples of host communities that have taken upon themselves to codify what they consider respectful interactions with researchers are the 'San Code of Research Ethics' (Schroeder et al. 2020) and the 'Institutional Review Board of the Cherokee Nation' (<https://irb.cherokee.org>). The clarification of core values embodied in these documents should serve to promote equitable benefit sharing between researchers and the hosts on whom they depend.

FINAL WORDS

Collaborations in which all parties equitably benefit are often challenging and time consuming. Good advice is available, but the difficulties should not be diminished. For visiting scientists to find appropriate compensatory mechanisms beyond co-authorship, they need to take the time to develop a degree of cultural competence. The key point is that there is no single solution to the helicopter science problem. What needs to be emphasized is that the problem deserves to be recognized and solutions sought.

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