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Open Access perpetuates differences between higher- and lower-income countries

When a group of concerned scientists initiated the Open Access (OA) movement in 2001 with the Budapest Open Access Initiative (<https://www.budapestopenaccessinitiative.org>), their primary objective was to facilitate free and universal access to scientific articles through the elimination of readers' subscription fees. For authors, the increased visibility and impact associated with OA papers came at the expense of high publication costs. Twenty years later, the number of OA science journals has skyrocketed (Piwowar *et al.* 2018), including those focused on ecological research. Now, many traditional ecology journals (those that have not become fully OA) offer OA options as hybrid journals, and funding agencies help cover the publication fees associated with OA (referred to as article publication or processing charges), which may add up to several thousand dollars per paper. On the one hand, scientific publishing has become a very profitable industry, with annual revenues averaging several billion US dollars and profit margins exceeding 30% (Larivière *et al.* 2015). On the other hand, the academic system has also indirectly contributed to the rise of OA by evaluating academics in part on how many times their articles have been cited; it has been reported that OA articles are cited more frequently than non-OA articles. Simultaneously, the number of predatory journals has increased dramatically in response to the large profits that can be attained (Beall 2012). Predatory journals, which mainly target young and inexperienced researchers through aggressive marketing (Xia *et al.* 2014; Clark and Smith 2015), lack proper peer-review processes, reducing the overall quality of science (Grudniewicz *et al.* 2019).

Unfortunately, scientists who lack adequate funding, especially those based

in lower-income countries, have been and continue to be largely restricted from OA publishing (Mekonnen *et al.* 2021). As a result, the OA movement has inadvertently maintained historical inequities. Whereas authors from wealthier countries often benefit from governmental resources, those in less wealthy countries typically lack such access; moreover, they are comparatively underpaid. Consequently, authors in lower-income nations often struggle to pay publication fees (Asubiaro 2019; Overland *et al.* 2021; Valenzuela-Toro and Viglino 2021). In addition, because most publishers stipulate that fees be paid in US dollars, euros, or British pounds, authors from countries that use other currencies can be affected by unfavorable exchange rates. If authors from lower-income countries are unable to pay for OA, then no one (without a subscription) can access their published work – and by hindering the dissemination of research, these journals are not truly OA (Sala 2022).

Some but not all OA and hybrid journals offer fee waivers to authors from countries classified by the World Bank as low income and lower middle income (for which fees are often waived entirely or partially, respectively). Nonetheless, residual costs may still be beyond the means of scientists from lower-income countries (Mekonnen *et al.* 2021). As a consequence, scientists based in parts of the world where external funding is limited are becoming less professionally competitive over time as the proportion of journals that offer OA continues to grow. In Brazil, for instance, despite having the highest level of investment in scientific research (Ciocca and Delgado 2017) and output among countries in Latin America, a US\$2000 OA fee to publish an article is equivalent to either the average pre-tax monthly salary of a tenure-track professor or roughly one-fourth of a regular personal research grant (<https://bit.ly/3tm61eT>). Moreover, many Brazilian grants prohibit researchers from using grant funds to pay for OA publication. As such, OA journals are contributing to the widening gap between researchers from low- and

high-income countries, restricting to an even greater degree the opportunities for and visibility of scientists from the Global South. Notably, most ecological studies are conducted in these countries, frequently by ecologists that come from the Global North (Trisos *et al.* 2021). An academic evaluation system that values not only output quantity but also scientific quality and relevance would also help to “level the playing field” between scientists from less wealthy and more wealthy countries.

If the OA movement had – from the beginning – included the perspective of scientists from lower-income countries, such inequity might have been anticipated and avoided. As it stands at present, to narrow the gap between regions, OA publishing fees must be evaluated more fairly. For example, fees could be waived for authors who lack grant money, or assessed based on the percentage of gross domestic product invested in research and development in the author's country. Moreover, there can be large disparities in income among countries within each income level (high, middle, or low), so grouping them in such a way is disadvantageous for those toward the bottom of each category. Because diversity increases productivity and innovation (Freeman and Huang 2014) and scientific impact (AlShebli *et al.* 2018), the global scientific community should strive toward guaranteeing equal opportunities for all scientists regardless of geographic location. Recent years have seen the emergence of a new movement with the objective of decolonizing science, and ecology in particular (Baker *et al.* 2019; Trisos *et al.* 2021), making this an ideal time to reconsider the advantages that OA publications can confer to increasing fairness. Scientific societies, research institutes, and universities worldwide must take a stand on this issue as well. The rapidly growing number of OA and hybrid journals (Solomon and Björk 2016; Mekonnen *et al.* 2021) could further raise barriers among world regions, thereby deepening inequalities. It is time for OA journals to be as bold and disruptive as they

once were, and revert back to their original goal: to provide free and universal access to researchers around the world.

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We dedicate this letter to the memory of Sue Kilham, an outstanding mentor and ecologist.

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Erratum

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In the June editorial by Collins et al. (2022; **20**: 271, doi.org/10.1002/fee.2518), one of the programs listed in the first sentence of the third paragraph was incorrectly displayed. Specifically, “journal club” should have appeared as “an Indigenous scholarship journal club”, rather than as “an Indigenous scholarship, journal club”. A corrected version of the sentence appears below:

Moving forward, we plan to expand our mentoring program by providing more diversified and mentor–mentee-specific programs including an Indigenous scholarship journal club, comprehensive exam support group, and learning community (*New Dir Teach Learn* 2004; doi.org/10.1002/tl.129).