



LETTERS

Edited by **Jennifer Sills**

Stay true to integrated pest management

On 2 October 2020, the United Nations Food and Agriculture Organization (FAO) and CropLife International signed a letter of intent to establish a strategic partnership (1). Moving forward, CropLife International's aspirations should be closely scrutinized. Checks and balances are essential to ensure that private interests do not take precedence over the common good.

For decades, both the FAO and CropLife International have advocated the uptake of integrated pest management—an approach that strategically integrates different crop protection methods to safeguard crop yields, secure farmer livelihoods, and preserve natural capital (2). However, their respective interpretations of the system's core constituents, underlying principles, and ultimate goals differ substantially. The FAO emphasizes how preventing pests through good agronomy, biological diversity, and ecological processes can lower the amount of pesticide required, whereas CropLife International focuses on the responsible use of agrochemicals, with far less desirable results.

The FAO's interpretation of integrated

pest management has led to successes worldwide. Its Farmer Field Schools have transferred ecological concepts and non-chemical technologies to millions of small farmers, resulting in pesticide reductions of 92% in Bangladesh rice, 78% in India cotton, and 61% in Vietnamese tea (3). These FAO programs have attained pesticide cuts of 50 to 80% on millions of farms without yield loss (4), thus lifting farmers' profits, curbing energy use, and bolstering rural economies (5). Unfortunately, when some programs were dismantled in the mid-1990s, achievements were rapidly undone (6); Indonesia's pesticide use has since risen substantially.

Meanwhile, CropLife International's approach—i.e., pesticide-centered control—continues to proliferate across the globe (7, 8). For example, insecticide-coated seeds are zealously backed by chemical enterprises (9), even though their on-farm use violates integrated pest management principles, triggers resistance development, exacerbates pollution, and degrades the resilience of farmland ecosystems (10). By thus deviating from established decision-making criteria and tolerating technology integration that occurs by chance instead of by design, this approach leads to ineffective pest control and negative social-ecological outcomes (11). Agro-ecology, digital tools, and innovative farming schemes can all remediate chemical

Indonesia's use of pesticide has increased since programs to implement alternatives were dismantled.

dependencies, but agro-industry meddling constitutes a prominent hurdle (12).

Ultimately, globe-spanning alliances that include agro-industry should only be built to scale up environmentally compatible practices and to pursue agri-food system transformations that are protective of human and environmental health. In the spirit of integrated pest management, as correctly interpreted and implemented by the FAO, biodiversity and ecological safeguards should constitute plant health programs' first line of defense, whereas pesticide use needs to be consciously downgraded to a measure of last resort.

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Raising standards for global data-sharing

In their Policy Forum "How to fix the GDPR's frustration of global biomedical research" (2 October 2020, p. 40), J. Bovenberg *et al.* argue that the biomedical research community has struggled to share data outside the European Union as a result of the EU's General Data Protection Regulation (GDPR), which strictly limits the international transfer of personal data. However, they do not acknowledge the law's

flexibility, and their solutions fail to recognize the importance of multilateral efforts to raise standards for global data-sharing.

Bovenberg *et al.* express concern about the thwarting of “critical data flows” in biomedical research. However, the limited number of critical commentaries (1, 2) and registered complaints (3) indicate that hindered data exchange may not be a substantial global problem. Moreover, the authors concede that during the COVID-19 pandemic, data transfers remain ongoing because transfers “necessary for important reasons of public interest” are already provided in the law [(4), Article 49(1)(d)]. The European Data Protection Board (EDPB) has cautioned that transfers according to this derogation shall not become the rule in practice (5), but this conditional support for international COVID-19 data sharing shows that the law already provides suitable flexibility. This flexibility also shows the EDPB’s recognition of the pressing social need that biomedical research represents for the global research community during the COVID-19 pandemic, while also seeking to ensure that this remains the exception and not the beginning of a normalized practice.

Bovenberg *et al.* contend that pseudonymized data should not be considered personal data in the hands of an entity that does not possess the key needed for re-identification. This proposal runs against well-established guidance in EU member states such as Ireland (6) and Germany (7), and it does not take into account the cases in which identifiers remain attached to transferred biomedical data or in which data could be identified without a key.

Bovenberg *et al.* also neglect to state that the GDPR has special principles and safeguards for particularly sensitive re-identifiable data, not just for the protection of privacy but also for the security and integrity of health research data—aims that align with all high-quality scientific research. Respecting these standards (both technical and organizational) is fundamental to ensuring better data security and accuracy in the transferring of huge datasets of sensitive health data that are essential to global collaboration [(4), Articles 5 and 9, Recitals 53 and 54, and (8)]. Thus, these rules should not be subject to exemptions, which would result from not classifying pseudonymized data as personal data.

The purpose of the GDPR’s strict rules is to ensure that when personal data are transferred to non-EU countries, the level of protection ensured in the European Union is not undermined. The EU’s Court of Justice decisions (9, 10) make it clear that ensuring an adequate level of protection in non-EU countries, especially independent

oversight and judicial remedies—which the Court found lacking in the United States—is a matter of fundamental rights. This discrepancy is an opportunity for non-EU countries, including the United States, to raise their data protection standards to the level of the European Union’s, not for the European Union to decrease its own standards in a regulatory race to the bottom. We encourage research organizations and country delegations to work with the European Commission, national data protection authorities, and the EDPB to craft interoperable rules on data sharing applicable for biomedical research in ways that do not undermine fundamental rights owed to data subjects.

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Response

Dove *et al.* suggest that despite the lack of viable mechanisms for transferring research data from Europe to other countries, in practice such transfers take place anyway. However, the fact that some transfers continue to occur in circumstances of regulatory ambiguity is not a solution; rather, these exceptions exacerbate the legal, regulatory, ethical, and operational challenges. Issues of cross-border research data transfer in the wake of the latest Court of Justice decision abound, and the General Data Protection Regulation (GDPR) has stalled at least 40 U.S. National Institutes of Health clinical and observational studies on risk

factors and exposures for cancer (1).

Dove *et al.* point to the European Data Protection Board (EDPB) guidance on COVID-19 as evidence that GDPR contains sufficient flexibilities, but this guidance specifies that the ability to make such cross-border transfers should be temporary (2). COVID-19 research, like much other research, requires longitudinal study of data over many years. A “temporary measure” does not suffice in the long term.

In dismissing our proposal that pseudonymized data need not always be considered personal data, Dove *et al.* assert that such an approach is unrealistic given the guidance in certain EU Member States. However, those rules concern anonymization generally and do not focus on the more protected and secure research context. The European Court of Justice in the Breyer case and several commentators in the research community have proposed that a contextual approach to pseudonymization could permit pseudonymized data to be treated as anonymized when adequate safeguards are in place (3–6).

Dove *et al.*’s assertion that some identifiers remain attached to transferred biomedical data mistakenly ignores that all identifiers will be removed, as discussed in our Policy Forum. Any subsequent attempt to reidentify deidentified data would either require unauthorized access, breach of law and contract, or both. This risk cannot be completely prevented, but it exists both outside and within the EU. What matters is that the EDPB contends that both pseudonymization and encryption with the keys retained solely under the control of the data exporter could provide effective supplementary measures (7).

Dove *et al.* suggest that our proposals will lead to a “regulatory race to the bottom,” but they do not recognize that the U.S. and EU laws are each imperfect in their implementation. The EU Court of Justice expressed concern about particular elements of the U.S. national security regime (notably lack of redress to a judicial authority), but the types of pseudonymized data transferred in the course of scientific research are unlikely to be of interest to the U.S. intelligence community (8). Dove *et al.* hope that the United States and other countries will “raise their data protection standards to the level of the European Union’s,” but they overlook the fact that the GDPR itself does not protect subjects from use of their data for national surveillance intelligence (9, 10). In addition, they neglect to acknowledge that the EU Fundamental Rights Agency has documented the limited individual redress to a judicial authority existing in EU Member States under their

national surveillance laws. Notably, only “in four Member States [out of 27], an expert body’s decision or preliminary assessment can be appealed before a judge” (10). Thus, 23 Member States’ legislation present gaps to data protection that are similar to those in the United States.

We believe that the European Union should resolve this double standard before insisting on the higher standard for non-EU countries. In the meantime, our solutions offer a balanced approach to the trade-offs between privacy, global science, and public health.

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TECHNICAL COMMENT ABSTRACTS

Comment on “Global distribution of earthworm diversity”

S. W. James, C. Csuzdi, C.-H. Chang, N. M. Aspe, J. J. Jiménez, A. Feijoo, M. Blouin, P. Lavelle Phillips *et al.* (Reports, 25 October 2019,

p. 480) incorrectly conclude that tropical earthworm communities are less diverse and abundant than temperate communities. This result is an artifact generated by some low-quality datasets, lower sampling intensity in the tropics, different patterns in richness-area relationships, the occurrence of invasive species in managed soils, and a focus on local rather than regional richness.

Full text: [dx.doi.org/10.1126/science.abe4629](https://doi.org/10.1126/science.abe4629)

Response to Comment on “Global distribution of earthworm diversity”

Helen R. P. Phillips, Maria J. I. Briones, George G. Brown, Thibaud Decaëns, Erin Cameron, Nico Eisenhauer

James *et al.* claim that there are areas of concern in our work. We believe that they have misunderstood the methods behind our paper and that differences in scale have been overlooked. Once those misunderstandings have been resolved, their remaining criticisms are either not sustained or agree with our statements. To advance the field, we recommend additional sampling using comparable methodologies in underrepresented areas.

Full text: [dx.doi.org/10.1126/science.abe4744](https://doi.org/10.1126/science.abe4744)



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