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Dr. Ryan Donohue
Office of Science and Technology Policy
Executive Office of the President
1650 Pennsylvania Ave NW
Washington, DC 20502

Re: To Improve Federal Scientific Integrity Policies
Federal Register Effective Date: 6-28-2021
Federal Register Page Number: 34064-34066

Dear Dr. Donohue,

Thank you for the opportunity to offer comments to the Executive Office of the President in response to the White House Office of Science and Technology Policy (OSTP) Request for Information to Improve Federal Scientific Integrity Policies.

The American Society of Agronomy (ASA), Crop Science Society of America (CSSA), and Soil Science Society of America (SSSA) represent more than 8,000 scientists from academia, industry, and government, 12,500 Certified Crop Advisers (CCA) and 781 Certified Professional Soil Scientists (CPSS), including many who work in federal agencies. We are the largest coalition of professionals dedicated to the agronomic, crop and soil science disciplines in the United States.

Federal agriculture scientists make discoveries that drive innovation and new technologies – keeping our nation's farmers, foresters, and ranchers competitive, creating jobs, and developing new industries. Private sector successes depend on the accurate and reliable research performed by federal scientists, and, as publishers of scientific research, we know the value of quality peer review of publications and research proposals, which lies at the heart of scientific integrity.

While federal research is trusted to be accurate and reliable, there is room for improvement in the collection and communication of federal agriculture science data. Scientific integrity is compromised if there are conflicts of interest, or even the appearance of such, and if data is not reliably available or usable, even if it is accurate. For this reason, OSTP is wise to ask questions not only about the policies concerning intentional suppression or distortion of findings, which obviously reduce scientific integrity and transparency, but also about the systemic challenges that undermine integrity, such as the need for automated collection and distribution of scientific information and inclusive research environments.

Work with scientific societies and publishers to reduce conflicts of interest

We in the agriculture research community are concerned about the suppression or distortion of findings that may come when there are conflicts of interest among researchers, publishers, and funders. The

New York Times reported that the e-cigarette company Juul recently "paid $51,000 to have the entire May/June issue of the American Journal of Health Behavior devoted to publishing 11 studies funded by the company offering evidence that Juul products help smokers quit."[1,2] There is a close association between agriculture researchers and agribusiness, with companies that supply fertilizer, seed, agrichemicals, equipment, and software funding a significant and growing portion of agriculture research. This presents potential opportunities for conflicts of interest in research and publications.

To prevent such conflicts of interest, OSTP should work with scientific societies and publishers to standardize publication requirements and best practices that reduce or eliminate conflict of interest issues. For example, researchers could be required to pre-register studies, which would reduce the chances of publishing only cherry-picked results. Additionally, researchers could be required to acknowledge all sources of financial support (e.g., funding, grants, sponsorship, in-kind) prior to submitting a manuscript for peer review, as opposed to only after the manuscript is accepted for publication. All commercial or financial relationships, present and future, that might be viewed as a conflict of interest should also be disclosed. Publishers should agree to disclose any agreement with research sponsors that could bias the results or interpretation of the research in any way.

OSTP could propose a ban on the use of federal funds to pay for publishing in journals that do not adhere to certain standards. For example, journals should make standard use of plagiarism software and have an easily identifiable ombudsperson to handle complaints. Publishers should retract articles with documented fraud or fabrication, and they must post notices that the article is retracted so that it is not cited again.

Open-source data infrastructure promotes scientific integrity.

One systemic challenge is that there is currently no publicly accessible data repository that is equipped to handle the magnitude and complexity of the data produced by modern agriculture research. Access to this data is essential for agriculture scientists to create decision support tools for climate-smart and economically sound agricultural practices, which, in turn, underpins modern efforts to establish carbon markets. It is not enough that scientists have access to the data via, for example, research publications, this data must also be available to Certified Crop Advisers and those who transfer the research outcomes to agricultural practitioners.

The U.S. Department of Agriculture (USDA)'s National Agricultural Library supports a small data repository that contains some of the data produced by USDA scientists, but this effort must expand to include all USDA-produced data, including historic datasets, data from conservation districts and the National Cooperative Soil Survey, and data from USDA-funded researchers and others. Furthermore, as imaging technologies rapidly advance, there will be a need to create infrastructure that can handle these even larger datasets in the near future. Soil survey data and USDA yield estimations are already key enables of the digital transformation occurring in agriculture and generate value for startups and established businesses alike. A right-sized data repository that can transparently handle current and evolving agricultural data needs will engender trust in the science underpinning agricultural progress.

The RFI asks about "good practices Federal agencies could adopt to improve scientific integrity, including in the communication of scientific information, addressing emerging technologies and evolving scientific

[1] https://www.nytimes.com/2021/07/05/health/juul-vaping-fda.html
[2] https://www.ingentaconnect.com/content/png/ajhb/2021/00000045/00000003

practices, supporting professional development of Federal scientists, and promoting transparency in the implementation of agency scientific integrity policies." Each of these goals is addressed by support for data infrastructure that ascribes to "FAIR" (Findable, Accessible, Interoperable, Reusable) principles.

For example, a modern, searchable database that rivals NIH's Genbank or the National Oceanic and Atmospheric Administration's National Climatic Data Center, with a budget that matches the amount and complexity of the data it houses, would vastly improve the communication and utilization of the excellent agriculture data federal scientists are already producing. To address "emerging technologies and evolving scientific practices," USDA should hire specialists to create data extraction and upload software wizards or templates for automatic extraction, standardized formatting of data and metadata, and depositing of data directly from research and farm equipment, and these data specialists should work with equipment designers and advisers in the field to harmonize standards from the start. This would increase the immediate utilization, and trust, in the data, as it would reduce the opportunity for user-errors in inputting data.

To further reduce the likelihood of errors, USDA should support the training of federal scientists, and scientists whose research or education is supported by USDA grants and fellowships ("professional development"), in the collection, formatting, and uploading of data into the FAIR repository so that new data can begin to populates the repository immediately. To promote and ensure transparency, considerable thought should be put into data management, data provenance, long-term sustainability, preservation and curation practices, and importantly, data privacy, especially where working farms are concerned.

What is needed is a well-supported, open-source, thoughtfully designed data repository that ascribes to FAIR principles and employs automatic uploads of data where possible. Also necessary is funding for adequate training of Certified Crop Advisers, who will work with the primary data collectors, and of end users, including scientists, to engender trust in the data the repository houses. Such a system would reduce unintentional data distortions and make intentional data distortions difficult. Furthermore, the repository would have the additional benefit of enabling researchers to develop new tools and software for searches, analytics, and modeling.

Research integrity is bolstered by the dissemination of non-significant results.

A second systemic issue is the lack of data from experiments that produced negative or non-significant results. Currently, in the absence of a repository for housing such data, these results are rarely published or otherwise available to the research community, leading to multiple researchers wasting resources by attempting similar experiments.

There are journals specifically created to publish negative data as a service to the community. In 2018, the American Society of Agronomy and Crop Science Society of America began publishing the *Agrosystems, Geosciences & Environment* journal to fill this need. This high-quality, peer-reviewed journal focuses on providing a publishing platform for negative results, time-limited studies, and regional findings. But non-significant data is more difficult to capture. The Societies suggest the creation of study registries, which researchers would be required to use and update if they have received a federal grant. If the research is successfully published, then a link to the publication could be provided, but if the study yielded results too weak to publish, or if the research needed to be taken in a different direction, that crucial information would be available to other researchers considering the same line of study.

Safe and inclusive research environments strengthen scientific integrity.

There is always bias in science. It can come from the questions researchers ask or do not ask, the methods used to collect data, the accessibility of conferences or publications where the research is presented, and the identities of the researchers themselves. Scientific data need not be intentionally distorted for it to be doubted by communities that have traditionally been left out of the scientific process.

For example, there is a stark racial disparity in Covid-19 vaccinations in the United States, with about 47% of white Americans receiving the first dose of the vaccine but only 34% of Black Americans.[3] While surveys have shown Black Americans to be considerably more concerned about contracting or spreading the virus, they are significantly less likely to say they will get the Covid-19 vaccine than other groups. According to a Pew survey, "Black adults express less confidence in the coronavirus vaccine research and development process – a judgment closely aligned with intent to get vaccinated."[4]

Inclusive research environments that support a diversity of scientists and engage in multidimensional and multicultural outreach will engender trust in the scientific community. Such an environment begins when people committed to the idea of fostering such an environment receive the regular training and constant support needed to make it a reality. Federal agencies should encourage universities to provide implicit bias training for faculty, post-doctoral researchers, and students to begin building awareness of what a safe and inclusive environment is.

Additionally, the Federal government should encourage and reward culturally responsive mentorship programs, which can positively engage a more diverse group of students in STEM fields. And because there is a gap between what is known to be effective in mentorship and what is often practiced in academia, programs should include scientifically-based best practices that result in "intentional, inclusive, and effective" mentorship, as reported by the National Academies of Sciences, Engineering and Medicine.[5] For example, funding agencies could require mentorship education and mentoring plans in grant applications, with required reporting of outcomes and diversity metrics.

Agricultural institutions may confront extra challenges creating inclusive research spaces because so many are located in small, rural communities, which are less diverse than suburban or urban places.[6] This fact of geography can lead to a smaller number of diverse candidates applying to fill faculty and other research positions and to fewer diverse candidates accepting such positions when offered. New faculty of color can and should be supported despite a less diverse community at large, and universities can use aggressive, active recruitment strategies for minority and women candidates. One such strategy

[3] https://www.kff.org/coronavirus-covid-19/issue-brief/latest-data-on-covid-19-vaccinations-race-ethnicity/
[4] https://www.pewresearch.org/fact-tank/2021/03/09/black-americans-stand-out-for-their-concern-about-covid-19-61-say-they-plan-to-get-vaccinated-or-already-have/
[5] National Academies of Sciences, Engineering, and Medicine. 2019. The Science of Effective Mentorship in STEMM. Washington, DC: The National Academies Press. https://doi.org/10.17226/25568.
[6] https://www.pewsocialtrends.org/2018/05/22/demographic-and-economic-trends-in-urban-suburban-and-rural-communities/

is dual hiring, since small cities are less able to support two professionals and women are more likely to be in dual career relationships than men[7].

Thank you for your consideration of these factors that contribute to scientific integrity. Our societies stand ready to work with you to ensure the nation's food and agriculture research enterprise is trusted, reliable, and robust.

[7] Schiebinger, Londa L., Andrea Davies Henderson, and Shannon K. Gilmartin. *Dual-career academic couples: What universities need to know*. Michelle R. Clayman institute for gender research, Stanford University, 2008.