Response to Request for Information (RFI) from the Office of Science and Technology Policy (OSTP) to Support the Development of a Federal Environmental Justice Science, Data, and Research Plan (Document Number 2023-22527)

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1. Development and Use of Science, Data, and Research To Support Environmental Justice Policy

a. What kinds of Federal activities do you think should better include or consider data or research related to environmental justice? Are there specific data types of research you would prioritize?

The following activities should better include or consider data or research related to environmental justice:

- Development of FOAs and other types of funding mechanisms
- Research, development, and deployment activities
- Technology rollout

Particularly, these activities should be leveraged to encourage researchers to begin considering justice and equity further upstream in the development process (i.e., during early-stage research). These activities should also drive collaboration with and inclusion of impacted communities and minority groups. Further details are provided below.

Development of FOAs and other types of funding mechanisms
To enhance the integration of environmental justice in federally funded projects, funding mechanisms, including Funding Opportunity Announcements (FOAs), should encourage applicants to incorporate justice and equity from the early stages of R&D. Presently, FOAs tend to separate community impact from technical requirements, eliminating the opportunity for proper systems-level integration and increasing the risk of locking in inequities downstream. Approaches to integrating environmental justice into FOA requirements include: (i) increasing the specificity of requirements for Community Benefit Plans (CBPs), (ii) requiring environmental and community impact assessments, and (iii) requiring the application of socio-technical frameworks such as the Systemic Equity framework [1], Responsible Research and Innovation [2][3], Design Justice [4], Value-Sensitive Design [5], Asset-Based Community Development [6], or the Justice Underpinning Science and Technology Research (JUST-R) metrics framework

[7]. Implementation of these changes will require technical FOA teams to bring on additional members who are trained in equity or otherwise have an appropriate social science background.

Additionally, we recommend that the federal government releases more FOAs that mandate either: (i) the inclusion of impacted community groups in the implementation of the proposed projects or (ii) the structuring of proposed projects such that the majority of benefits go to underserved communities.

Research, Development, and Deployment (RD&D) Activities

The initiation of on-ground RD&D and the commissioning of new infrastructure projects (including energy and other industrial development projects) should be pursued in collaboration with impacted communities. The feedback and concerns of the communities should be actively addressed. Prior to engagement, the federal government should consider past harms that have been enacted by historical industrial activities and consider remediation plans in order to engage ethically and rebuild community trust. The federal government should collect data on water pollution, air pollution, incidence rates of relevant cancers and other ailments, and more. They should also seek such data or information on legacy harms from the community themselves.

Additionally, the federal government should consider potential equity impacts during the early stages of research and development. Tools for achieving this include the Justice Underpinning Science and Technology Research (JUST-R) metrics framework [7], green chemistry [8], agent-based modeling [9][10], the Human Readiness Level (HRL) scale [11], the Societal Readiness Thinking Tool [12], and life cycle impact analysis, among others. Early-stage analysis should include considerations of waste and disposal impacts, as these considerations can positively influence material selection and design.

Lastly, the federal government should encourage or fund prolonged, deep collaboration between communities or community-based organizations and the groups conducting the research. One method to achieve this would be to provide a set amount of discretionary funding to address additional community needs that may arise, in order to enable more effective realization of co-benefits of RD&D activities.

Technology rollout

The government should develop strategies to maximize technology adoption by minority groups. When technology is being deployed, ensure that minority groups are aware of, have access to, and benefit from the technology. Actively assess the impacts of the government's existing technology adoption programs targeted towards underrepresented groups, such as the Solar Energy Innovation Network (SEIN), Clean Energy to Communities (C2C), and the Local Energy Action Program (LEAP). Address communities' concerns and pain points regarding these programs, close gaps in impact, and implement other relevant improvements. If necessary, add new programs to the portfolio to meet a broader range of community needs.

b. What are the biggest opportunities for advancing research and development to support environmental justice-related decision making, both within the Federal research programs and in Federal extramural grant programs?

One of the primary opportunities for advancing research and development (R&D) to support environmental justice-related decision-making within federal research programs lies in integrating energy and environmental justice principles early in the R&D process. Rather than relegating justice considerations to deployment and implementation alone, greater emphasis should be placed on understanding how basic design influences downstream impacts. This involves assessing the environmental and social implications of materials, considering factors such as extraction practices, labor laws, recyclability, toxicity, and disposal. The government would need to dedicate funding to building environmental justice decision-making tools in order to meet this need. This effort would require the integration of equity practitioners into technical teams.

The federal government should also work with academia to develop guidelines for interdisciplinary, systems-level education and research programs that span STEM and social sciences, at both the undergraduate and graduate levels. Structural reforms aimed at enabling and incentivizing this type of work, through updating departmental requirements, expanding criteria for grants and promotions, and reducing barriers to cross-departmental publication, would be required [13].

Another major opportunity for supporting environmental justice decision-making is to directly involve communities in research initiatives. Notify communities of research intent and collaborate with them to develop the appropriate research questions to meet their needs and build upon their assets. Conduct interviews and workshops in which you can learn about historical contexts, trends in environmental harms, and desired or preferred solutions. Continued engagement through community-based design and development can ensure that technology aligns with the needs, preferences, and lifestyles of the community. Additionally, FOAs should enable community-initiated research to give communities the opportunity to define their challenges and propose solutions entirely on their own. Many communities possess untapped innovation, experiential knowledge, and history that has been disregarded and can be leveraged for more context-specific solutions [14].

Finally, enhancing diversity and inclusion within the research community is critical for driving innovation. Racial minorities are underrepresented in STEM research, particularly in engineering [15][16]. In addition, research shows that although underrepresented groups produce novel scientific contributions at higher rates than majority groups, their novel contributions are adopted by other scholars at lower rates [14]. Thus, it is crucial to build more inclusive academic and professional environments to maximize progress. Additionally, a diverse staff can advocate for research topics that are relevant to their respective communities, producing novel ideas that are more broadly impactful [17].

c. What types of data and evidence, including Indigenous Knowledge as appropriate, do you find most important or most needed for advancing governmental decision-making related to environmental justice?

We find the following types of data and evidence to be the most important for advancing governmental decision-making related to environmental justice:

- Community-engaged and/or community-led impact assessments
- Traditional Ecological Knowledge (TEK)
- Other types of community-produced knowledge relating to local ecosystems, livelihoods, and histories (including those of environmental harm)

It is important to recognize that evidence can be experiential, orally recorded, or otherwise divergent from traditional formats of academic data. Non-traditional forms of evidence should be respected, and researchers should consider appropriate ways to integrate this type of information into their analyses, rather than excluding it in favor of formats that meet institutional guidelines that were not built with underrepresented communities in mind. It is crucial to work with communities to understand and mitigate their concerns, even if data corroboration is still pursued in parallel.

f. Please provide examples of data, research, local or Indigenous Knowledge, and/or science—or the lack thereof—that have been misused or misinterpreted in environmental justice-related decisions and actions?

One recent example in the energy field demonstrates the potential for analysis methods that rely on insufficient or improper definitions to perpetuate the reproduction of inequities. A data analysis tool called WattHome –which was designed to identify homes with low energy efficiency in order to qualify them for subsidies – failed to account for the unique challenges faced by the poorest households. The poorest homes were more likely to be disqualified from subsidies than higher income homes because the analysis assumed that low energy consumption necessarily indicated high energy efficiency of a home's technology and infrastructure. On the contrary, the low consumption in poor households may have been due to a lack of air conditioning or the deliberate practice of low-consumption behaviors to minimize energy bills. This kind of economizing behavior of financially stressed households has been previously documented in energy justice literature [18][19]. These findings further emphasize the need for more informed, context-specific, mixed-method data collection and analysis in pursuit of more just decision-making.

2. Identifying and Addressing Data Gaps and Inadequacies in Data Collection and Scientific Research Related to Environmental Justice

a. What data gaps or data collection challenges have you encountered related to patterns of historical or ongoing discrimination and bias (*e.g.,* related to income, race, color, national origin, Tribal affiliation, or disability)?

We have observed the following data gaps related to patterns of historical or ongoing discrimination and bias:

- Data on the actual health outcomes of minority communities that are located in close proximity to toxin- and pollutant-intensive sites (including manufacturing facilities, mines, metal and mineral waste sites, liquid waste dumping sites, flaring and other waste burning sites, and transportation infrastructure development sites). In many locations, studies uncovering the health impacts of legacy environmental harms are limited, putting the burden on the communities themselves to uncover these trends [20].
- Granular, local-level data on environmental health impacts. Lack of granularity of environmental health data poses challenges for critical environmental justice analysis. For example, in a region of Louisiana along the Mississippi River, known by many locals as “Cancer Alley,” researchers have been unable to verify the community’s suspicions of a correlation between the high concentration of petrochemical plants (contributing to some of the worst air quality in the country) and the incidence rate of cancer. However, the state database on cancer incidence is organized at the level of census tracts, which encompass areas too large to uncover health differences between close-by neighborhoods that may have significant differences in emissions [21]. More granular data would enable more detailed impact studies capable of identifying challenges in specific locales.

We have observed the following data collection challenges related to patterns of historical or ongoing discrimination and bias:

- Failure of some industrial facilities to report and monitor their discharge of pollutants with accuracy and completeness [22].
- Low frequency of data collection in minority communities. For example, it has been shown that counties with higher percentages of Black residents have disproportionately fewer environmental inspections [23].

3. Encouraging Participatory Science and Meaningful Engagement for Communities

a. What role should the Federal government play in collecting, storing, and managing community-derived data, including information collected from communities with environmental justice concerns?

In the response below, our definition of “community-derived data” is any data that is collected within a community, either by community members or other external researchers.

Collecting Community-Derived Data
If community-derived data collection is proposed by the federal government, then the government should work with the community to explain the purpose of the data collection, agree on what should be collected, and collaboratively develop a clear data collection plan.

The federal government should also provide support that enables communities to initiate their own data collection. These resources can include technical guidelines, recommendations, and training for data collection, and, where possible, they should incorporate input from communities regarding their own relevant methods, metrics, and strategies. There should also be opportunities for interested target communities to develop their own methodology and report it to the federal government for review and approval such that communities can independently conduct their studies in the manner that they deem the most appropriate.

In cases where a high degree of procedural and methodological standardization is required, government officials should collect the community-derived data with one or more community members working as compensated assistants or consultants. In other words, if the federal government leads the data collection, they should make every effort to do so alongside the community. There should be paid liaisons who can communicate directly with the community and hold the federal government collectors accountable. If there is an agreement wherein the community consents to not having direct involvement, then the government can collect the data independently, but they should thoroughly specify the purpose and methods. In any case, the collection approach needs to be decided through consultation with the community.

Note that each community may differ in terms of: community members' level of civic engagement; community members' available time; the distribution of household education levels; overall interest levels in a project or initiative; and other factors which may influence the their decisions about whether and how to engage. Nevertheless, it is not appropriate to assume what a community's preferences might be simply based on these factors. Conduct proper consultations, providing full disclosure about what the data collection seeks to achieve and why.

Storing and Managing Community-Derived Data
Communities should be allowed to store and manage their own data, while the federal government retains a separate copy, protecting it for privacy as applicable. For collaborative projects between the government and communities, the federal government should provide financial assistance for communities' required data management tools such as cloud storage or other software subscription services. The federal government should openly communicate with each community about what they are using its data for, and they should share any related findings.

b. What suggestions do you have for use of community-derived data in Federal decisions with varying needs for quality assurance, reproducibility, and peer review across different decision contexts?

We recommend the following:

- Publicly share recommended data collection guidelines, procedures, and metrics for a range of different environmental justice-related topics that communities may be interested in studying. Publish these recommendations online and actively share them by working with local government agencies, NGOs, and other community-engaged organizations to disseminate information about the standards. Conduct information sessions or workshops to provide further hands-on training to the public. These practices can help to improve overall data quality and standardization across communities.

- When collecting community-derived data, adopt some of the quality assurance principles employed by the field of citizen science. For example, establish clear protocol, provide training, define a maximum acceptable level of error, require that multiple participants collect the same data and reach consensus, weight contributions by volunteer performance, provide or establish standardized data collection tools, require collectors to include metadata and documentation, conduct pilot studies to identify and address potential issues prior to project launch, or require expert and/or peer review [24-26].

- When comparing or aggregating multiple community-derived datasets, group those that utilize similar methodologies and data quality practices together. It may be necessary to exclude incongruous studies from comparative analysis and simply describe them qualitatively as needed.

c. What are the priority decision contexts in which community-derived data should be applied?

The following are key decision contexts in which community-derived data should be applied:

- Setting criteria for allocating funding to research projects (especially for projects related to technology that may impact local communities during its life cycle)
- Developing criteria for granting permits to organizations whose proposed operations could impact the community
- Approving new industrial construction or waste siting projects in or near a community
- Developing requirements for environmental and social impact assessments

d. What other actions could the Federal government take to encourage use of community-generated data in state or local decision making?

Actions the federal government could take to encourage use of community-generated data in state and local decision-making falls into five main categories: Awareness and Training, Funding Requirements, Standards and Guidelines, Certification, and Community Engagement Guidance.

Awareness and Training: The federal government could raise state and local-level awareness about the value of community-generated data, as well as provide some guidance on how to obtain and utilize such data. A potential avenue for doing so would be to create a series of online training videos about community-generated data and encourage state and local government agencies to share it with their employees, particularly researchers and analysts.

Funding Requirements: The federal government could require state and local governments that are applying to relevant federal funding sources to include community-generated data in their proposed activities. An example of federal funding sources that may include such a requirement are grants to pursue activities in environmental monitoring, pollution prevention, coastal management, or climate adaptation. This could increase the amount of community-generated data that is available in state and local databases used for decision-making.

Standards and Guidelines: The federal government could develop standards and guidelines, for use by state and local government actors, regarding how to compile community-generated data and use it to contribute to broader analysis that can guide policy.

Certification: In collaboration with academic partners and community-based organizations, the federal government could develop a data collection certification program through which community groups could earn a designation of "Certified Collector" from the government by demonstrating their understanding of how to collect data in a manner that meets federal research standards. Alternatively, project leaders could submit their methodologies to certify individual projects as "Collection Standards Compliant." Just as an appliance can be certified by EnergyStar, a community project could be certified for robustness of data collection, making it easier for state and local decision makers to accept the results and incorporate them into decision-making.

Community Engagement Guidance: The federal government could publish guidance on how state and local government actors can build deeper collaboration with communities. This could include guidance on how local governments can (i) communicate what decisions are currently in contention and what kinds of data they lack to make informed decisions and (ii) develop pathways for communities to share their data and policy interests, either in response to government communication or through independent initiation of sharing. Recommended collaboration and engagement methods could include town hall meetings, online platforms, and more.

f. What practices could ensure that effective, respectful, and meaningful public engagement is built into the research process?

The following are practices that could ensure that effective, respectful, and meaningful public engagement is built into the research process:

- Develop and implement a robust policy for free, prior, and informed consent (FPIC) in Indigenous communities.

- Develop a broader framework for consent which expands to any community that may be impacted by the activities of the federal government.
- Share the research intent with the community early on in the research project and seek their feedback and recommendations on the research intent. Keep the community involved and engaged throughout the research process, or, at a minimum, clearly informed throughout the process.
- Require research teams to have a community liaison who can provide neutral communication between the communities and the government. The liaison should either be a resident of the community or possess sufficient linguistic, cultural, and historical understanding of the community.
- Seek community input on what research is needed to support them in reducing negative impacts to health, environment, and livelihoods.
- Provide sufficient time for communities to respond to requests for information, data, or feedback. Ask communities if they require support or guidance in responding to these requests, and provide the required support where possible.

g. What methods, processes, or structures do you know of for respectfully collecting, maintaining, and analyzing information with communities?

Facilitate a collaborative approach with impacted communities when analyzing environmental data. Encourage communities to contribute their perspectives and interpretations of the data, recognizing that their on-ground context may enable them to conduct a more complex evaluation. In the final analysis or related publications, include the community's viewpoint, even in cases of disagreement. Perceived explanations for observed trends may significantly influence community sentiments, behavior, and even well-being, and, thus, should not be ignored. It is particularly important to consider community perspectives in view of historical occurrences wherein communities have observed dangerous trends that were not identified by or confirmed by researchers [21].

Where there are discrepancies in data interpretation between researchers and communities, the researchers should pursue understanding of the reasons behind this. If necessary, they should consider involving a neutral third party, such as a private consultancy, to facilitate efforts towards defining mutually agreeable conclusions.

h. What mechanisms of submitting community-derived data to the Federal government for use in decision-making would you find the most useful?

An online platform would be useful for submitting community-derived data. The platform might include multiple choice questions to help file the submission within the appropriate category of data for easier parsing and usage by the federal government. However, it would be critical to build awareness of the platform and provide training on how to use it.

Mail-in submissions should also be an option, where applicable. Some communities have limited access to the internet or may not feel comfortable navigating an online platform.

4. Ethical Standards, Privacy Protections, and Other Requirements for the Development and Use of Science, Data, and Research

a. What systems or approaches to privacy protections, attribution, and ethical standards have you encountered or developed that have been useful in community-derived experiential data?

The following social science research guidelines (many of which are part of the Institutional Review Board process) have been useful for community-derived experiential data:

- Provide participants with informed consent forms.
- Obtain community consent through documentation signed by community representatives.
- Take steps to minimize the risk of coercion and undue influence, particularly of the most vulnerable participants.
- Communicate in the native language.
- Conduct risk analysis, including questions such as:
    - What are the possible risks or harm (physical, psychological, legal, social, political) to the participants?
    - What is the estimated probability of these risks (e.g., low, medium, high, or more precisely if possible)?
    - What steps will be taken to minimize the risks?
    - If a participant experiences injury, harm, or considerable distress, what plans will be made to alleviate the injury, harm, or distress?
    - What risks might exist for communities that are involved in the study?
    - What risks might exist for the researcher(s)? How have you planned to minimize those risks?
- Evaluate if there are any benefits to the community.
    - Describe the direct benefits (if any) for participants from your study (other than compensation).
    - Describe the indirect benefits of the study (i.e., contribution to new knowledge).
- Consider what information will not be disclosed to participants (regarding the study purpose, procedure, and risks) and whether research secrecy poses ethical challenges. Describe those challenges. Only proceed with incomplete disclosure if a robust justification (reviewed by an equity expert) can be provided.
- Establish a policy for handling data of a personal or sensitive nature.
- Evaluate if confidentiality/anonymity is required. Consider this within your research team, and then discuss it with the community. Once a decision has been made, develop a procedure to ensure confidentiality or anonymity if needed.
- Explain where and for how long the data will be retained.
- Obtain permission to use exact quotes from interviews.
- Provide results to the community and discuss them together.
- Decide how participants will be informed of results that may indicate they may be at risk.
- Create a plan for giving participants the opportunity to withdraw from the study.

5. Research Coordination and Public Access to Federal Data

b. How can the Federal government better collaborate across Federal agencies, and partner with State, Tribal, territorial, and local governments, academic institutions, the private sector, the non-profit sector, and other entities to accelerate the development of data, research, and techniques to address gaps and inadequacies in data collection and scientific research that may affect agencies' ability to advance environmental justice?

Collaboration across Federal agencies
One strategy to improve collaboration across agencies is to create a forum for sharing major goals, initiatives, datasets, and other relevant information. For example, the Environmental Protection Agency (EPA), Office of Clean Energy Demonstrations (OCED), Office of Energy Efficiency and Renewable Energy (EERE), Clean Energy Corps (CEC), Energy Information Administration (EIA), and other key agencies could convene once a year to discuss their ongoing work, challenges, and findings related to environmental justice. This would present an opportunity for cross-agency sharing and discussion, help agencies identify ways to support one another, and potentially lead to the launching of inter-agency projects to achieve specific goals or complete critical tasks.

Partnering with Academia
Partnering with academia could involve providing funding to academic institutions for environmental justice-related research or helping to coordinate the development of a consortium of academic research institutions dedicated to this work. Academic institutions with a history of environmental justice scholarship and who have strong partnerships with environmental justice communities should be put in positions of leadership to guide such consortia and initiatives. After the establishment of such a consortium, the federal government could provide some co-management and guidance in order to maximize the relevance of the research to the government’s environmental justice goals. Further funding and support for the efforts mentioned may be provided by the academic institutions themselves, state governments, or the private sector.

Additionally, the federal government could work with academia to develop relevant interdisciplinary academic programs, especially at the graduate level, to support the environmental justice needs of the country. They could also recruit students from these academic programs to join environmental justice-focused research labs or other federal government teams with this focus.

Partnering with Local and Tribal Governments
The federal government could utilize the resources of local and tribal governments to support or carry out regional and localized data collection on its behalf. Alternatively, this kind of detailed and localized data collection could be carried out by private sector consultancies. Such decentralized data collection practices may present opportunities to increase the comprehensiveness of federal data.

Partnering with the Non-Profit Sector
A valuable way to partner with the nonprofit sector would be to work with NGOs or other community organizations who already possess relevant data, insights, and information about specific local contexts, and integrate their findings into ongoing work within the federal government. Deeper understanding of such localized information may enhance the overall impact potential of environmental justice-related activities.

c. What kinds of tools and resources would help communities and local decision makers better access data and information and address environmental justice in decision making?

Improving Access to Data and Information
Having user-friendly websites and platforms would improve access to data and information. User-friendliness should be defined by user experience and feedback studies. Additionally, short video training should be provided on the website in order for the public to understand how to view and interpret available data.

Addressing Environmental Justice in Decision Making
For communities and local decision makers to better address environmental justice in decision making, they need to be able to disaggregate data to understand the context, shortcomings, and risks in their specific jurisdictions. Ease of sorting and disaggregating data sets by location, as well as location characteristics (e.g., ethnic makeup, remoteness, proximity to industrial sites, population density) is required in this context. It should be possible to disaggregate the data by the metrics that are the most important to the communities themselves - and this may need to be determined through deeper engagement via community surveys and workshops. Additionally, communities need resources that will help them to be aware of what projects are planned and ongoing. This might be achieved through an online public listing of projects, searchable by zip code.

Another valuable tool to support decision-making would be a platform that reports environmental and energy justice performance data (including health, pollutant exposure levels, energy access, average outage duration, etc.) alongside information on existing local environmental policies. This would help to draw connections and correlations in terms of the effectiveness of policies and regulations.

Finally, detailed understanding of public data is required to make informed decisions. Thus, datasets published by the federal government should include easily accessible information about where the data come from, how frequently they are collected, when data sets were last updated, and other key contexts. Ensuring information about data limitations is easy to find and comprehensive is important to ensure that researchers do not face undue challenges in data analysis and interpretation. Users of federal data sources should not have to expend additional time and effort to find relevant background information to understand the limitations of these datasets.

d. What recommendations do you have for improving the public accessibility of data and information produced or distributed by the Federal Government, including through the use of digital and spatial formats, where appropriate?

We recommend the following to improve public accessibility of data and information:

- Ensure that data visualizations are user-friendly. To validate this, conduct trials with participants from outside the development team who are not familiar with the dataset(s). Evaluate how effectively they can locate and properly interpret specified data or information that is represented in the visualization. Use the results of the study to identify features that require modification. Additionally, teams may conduct surveys and interviews regarding the user-friendliness of their visualizations, including open-ended questions where possible to gather a greater depth and breadth of feedback.

- Where possible, include the corresponding raw datasets (and their metadata) alongside published analyses and visualizations. This enables the public to manipulate and analyze the background data according to their preferences, such that they may derive insights tailored to their specific needs and interests.

- Provide accompanying training materials, both in text and video formats, alongside interactive data tools. Explain how to navigate the interactive platforms, how to view and interpret in-platform charts and visualizations, and how to download the background data.

- Create and maintain an easily navigable and user-friendly data hub containing all datasets and data platforms published by each agency. This would increase the ease of locating desired data by eliminating the need to navigate through several key clicks in order to locate a particular page on which a dataset is housed. If users find it difficult to locate data by using the existing link structures, then they can reference the hub. This resource should be equipped with an advanced search function, allowing users to filter the options and find specific types of data.

- Follow inclusive publishing practices for charts and visualizations. This includes providing alt text for the visually impaired and providing labels and legends in multiple major U.S. languages.

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