



Perspectives on Equitable Co-Production

Workshop Report

May 12-13, 2022 | Arlington, Virginia, USA

About the Project

This workshop was part of the project entitled “EAGER: Equity in Scientific Co-production Processes: Creation of a Framework” and funded by the National Science Foundation (NSF) through grant number 2135538. The project sought to understand how equity in the inputs, processes, and outcomes of the co-production process is perceived by different people engaging in this work in the context of federally funded climate change programs. The goal was to create a research-based framework for conducting co-production equitably, both to improve partnerships and advance studies of the process of co-production of knowledge.

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Disclaimer

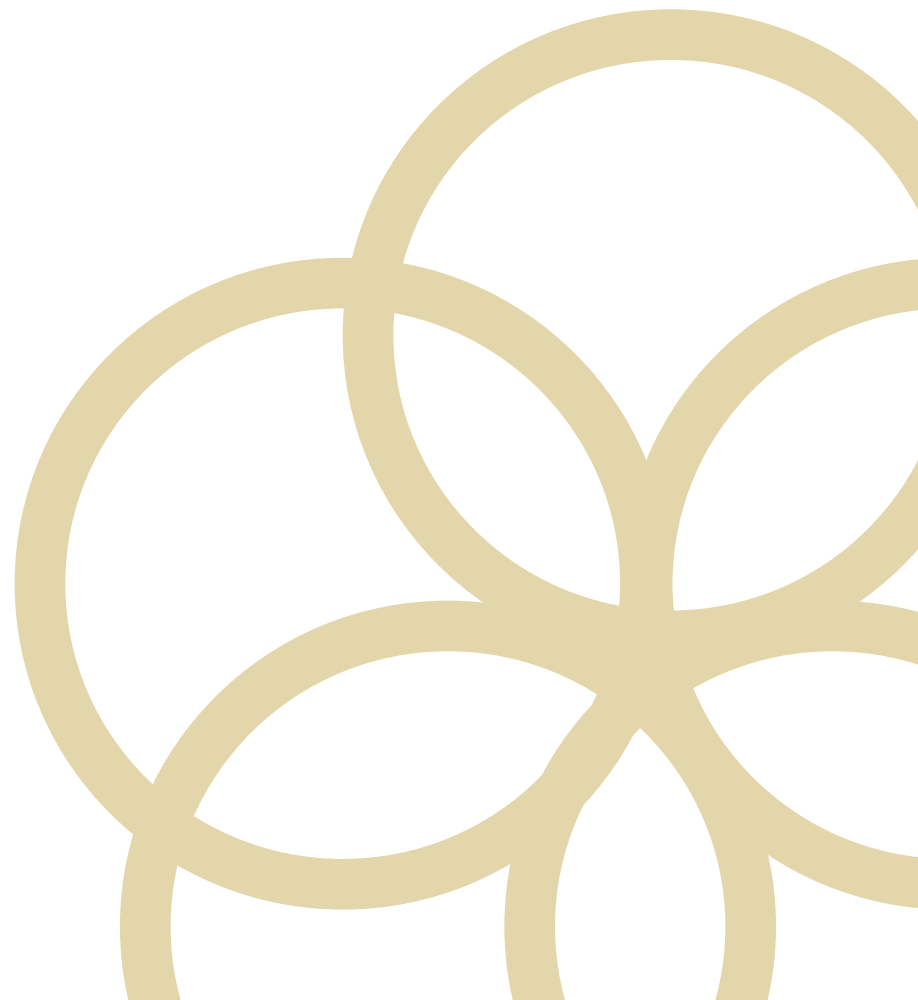
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Glossary of Acronyms

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| AAAS | American Association for the Advancement of Science |
| AGU | American Geophysical Union |
| CASC | Climate Adaptation Science Center |
| CAP | Climate Adaptation Partnerships |
| CSPO | Arizona State University's Consortium for Science, Policy and Outcomes |
| DOI | Department of the Interior |
| ITEP | Institute for Tribal Environmental Professionals |
| NASEM | National Academy of Sciences, Engineering, and Medicine |
| NOAA | National Oceanic and Atmospheric Administration |
| NSF | National Science Foundation |
| OSTP | Office of Science and Technology Policy |
| RISA | Regional Integrated Sciences and Assessments |
| USDA | United States Department of Agriculture |
| USGS | United States Geological Survey |

Executive Summary

The co-production of knowledge is increasingly recognized as an approach to conducting research intended to achieve a societal impact. In this study, we used a broad definition of co-production, defining it as “a process that brings together diverse groups to iteratively create new knowledge and practices (1).” However, co-production has been defined and conceptualized in a variety of ways (2,3), across multiple domains, including public administration, conservation, health, education, and climate change. Theoretical definitions have been introduced by scholars like Jasanoff (4) and Ostrom (5), but definitions can also be grounded in practice (6). For example, unique definitions of co-production have been advanced for work with Arctic Indigenous Peoples (7), in the context of resource management (8), and for a specific program (9). Other similar processes of engagement, such as community-based participatory research (10), action research (11), civic science (12), community science (13), and post-normal science (14) may have overlap with the concept of co-production and have been used to describe similar processes of collaboration. These distinctions and varying definitions have been discussed extensively elsewhere (see Mach et al. 2020, Wyborn et al. 2019).

In the context of co-production, power plays a crucial role in shaping interactions and outcomes. Some scholars and practitioners explicitly consider power dynamics as a central element in their definitions of co-production, recognizing how power imbalances can affect participation, decision-making, and the distribution of benefits. Others, however, might not emphasize power as prominently, focusing more on the collaborative aspects without explicitly addressing the underlying power structures. This leads to divergent objectives and priorities among projects claiming to be co-produced (2,3, 6). Chambers and colleagues (2) discussed how co-production projects in the context of sustainability usually emphasize one or more of six different goals, including: researching solutions, empowering voices, brokering power, reframing power, navigating differences, and reframing agency.

Because power dynamics are inherent in co-production (15), equity dimensions should be considered in these definitions and conceptualizations. Yet, in the context of government or academically led climate change research and programs, equity is a relatively new focus, even among programs that have been engaging a co-production approach for decades (9). Alternatively, in some recent work the concept of equity in co-production is explicit, but it has only been considered in a limited context (7). Here, we present a discussion about co-production that is informed by research, practice, and community perspectives across partnerships from a range of regions and topics. We are specifically interested in how different actors in these projects think about equity and work towards more equitable approaches in the context of their co-production work.

This understanding is needed, as the federal government has increasingly focused on co-production approaches in the design of their programs and funding calls, and most recently the Biden administration has called on federal agencies to more intentionally center equity for underserved groups of people in their work (16). Furthermore, with the Biden administration’s focus on environmental and climate justice, the opportunity for researchers and their societal partners to engage in co-production is expanding. Numerous programs within federal agencies have embraced a

co-production approach, such as the National Oceanic and Atmospheric Administration (NOAA) Climate Adaptation Partnerships (CAP; formerly called the Regional Integrated Sciences and Assessments or RISA program) (9,17), Department of the Interior (DOI) Climate Adaptation Science Centers (CASCs)(18), and the US Department of Agriculture (USDA) Climate Hubs.

However, the actual implementation of co-production processes varies significantly (1,19), with multiple implications for the design of equitable partnerships. Researchers, their partners, and funders have frequently cited many tensions and challenges in the successful implementation of co-production, including higher resource demands and few systemic structures for support (20). Practically implementing co-production, especially with people who have been underrepresented in or historically excluded from research activities, must consider fairness and the accessibility of co-production processes. While co-production is often cited as important for environmental governance, issues like power and equity are infrequently addressed (15). To explore this topic, we identified and studied three projects that centered on equity in co-production from three federal climate programs (CASC, CAP, USDA Climate Hubs) in three different regions of the U.S. (Alaska, Northeast, Southeast). We aimed to identify consensus or divergence in perspectives related to equitable co-production processes to elevate effective practices and link co-production research and practice.

Findings from interviews and a survey (explained further in Akerlof et al., 2023) informed a two-day hybrid workshop involving participants from the three case studies, as well as individuals representing research, governmental, non-governmental, and community organizations across the United States. Participants also included scholars of co-production, program coordinators, and people who participated in co-production projects on behalf of their communities. Several boundary spanners, those practitioners who work at the intersection of the production and use of science (21,22), also attended the workshop. The goals of the workshop were to discuss and build on what was learned from the three case studies, discuss the three distinct perspectives on equitable co-production that emerged from the pre-workshop research, and draft a framework for equitable co-production processes. During the workshop, participants considered the three perspectives on equitable co-production, defining equitable co-production for each and discussing the practical implications of each, including barriers and priorities for overcoming them. We aimed to address the question: How can federal climate programs support equitable co-production processes?

Background

The Equity and Scientific Co-Production workshop was held May 12-13, 2022, online and in-person at the Carter School for Peace and Conflict Resolution at George Mason University in Arlington, Virginia, USA. The hybrid workshop was attended by 54 people, including the research team and assistants, with representatives from government, non-governmental, academic, and community organizations from across the United States. Workshop participants were recruited from the three case study projects included in the first phase of the project, the regional and national climate program offices (CASC, CAPS, and USDA Climate Hubs), and from projects supported by the American Geophysical Union's (AGU) Thriving Earth Exchange. While many participants worked in the domains of science, climate, and the environment, others represented health, informal education, and other sectors and disciplines. Because there are no unifying organizations or ways to determine a base population for people engaged in co-production work, we used a convenience approach to selecting and inviting workshop participants.

The hybrid meeting was facilitated in the room and online by the project team members. The hybrid format used a virtual meeting platform, which enabled and constrained participation and communication. The virtual meeting platform enabled participation by people who were not traveling because of the COVID-19 pandemic or who had other commitments. Members of the project team in the room were monitoring the chat and raising questions and comments from online in the physical space. Breakout rooms with in-person and online participants were held in separate physical spaces to reduce background noise and enable the online and in-person participants to mix. In-person participants were encouraged to join conversations via their computer to enable non-verbal language communication, but not everyone had a computer to do this. Virtual participants likely missed out on the more informal communication that took place between sessions. Although participants in the room used a microphone, audio quality may have been a challenge. Despite these challenges many virtual participants attended large portions of the workshop.

The workshop was part of a National Science Foundation-funded project investigating equitable co-production in the context of U.S. federally funded climate programs (#2135538). The overarching goal of the project was to develop a framework for considering equity in co-production. The workshop contributed to this goal by bringing together people with a diversity of experiences in collaboratively producing new knowledge and practices to better understand each other's perspectives and explore areas of commonality and difference. Specifically, we aimed to determine whether there are principles of equitable co-production that apply regardless of location, participants, or topic. The specific workshop objectives shared with the workshop participants prior to the workshop, included: "1. Share and learn how equitable co-production processes are conceptualized; 2. Identify guiding principles for equity considerations in co-production processes; 3. Generate recommendations for outcomes that facilitate these goals; and 4. Seed connections and collaborations among those working towards these outcomes."

All research project activities, including the workshop, were guided by ongoing input and feedback from a project advisory board (Appendix A). Before the workshop, the research team talked to leaders of regional U.S. federal climate programs, including the NOAA CAP, DOI CASC, and

USDA Climate Hub, to identify projects that center equity in co-production. These projects varied in institutional goals, budgetary allocations, collaborating entities, information recipients, operational lifespans, and other attributes (for more information see Akerlof et al. 2023).

Researchers conducted interviews with participants from each regional case study to identify a range of statements that constitute equitable co-production. The statements were used to inform a survey, which was sent to all interviewees, advisory board members, and other invitees to the workshop with experience in equitable co-production (n=34). The survey used Q Methodology (<https://qmethod.org/>), and asked “ideally, what should equitable co-production processes and outcomes look like?”, and participants sorted statements based on those “most different from my view” to those “most similar to my view.” A principal components analysis of the rankings resulted in three perspectives on equitable co-production that were named: Ways of Knowing & Power, Participants & Interactions, and Science as Capacity Building. Further information about the methods and results can be found in Akerlof et al. 2023.

The perspectives were named by the research team and include:

- **Ways of Knowing & Power:** This perspective focuses on respecting different knowledge systems and ways of knowing. Not only should communities have the right to give—or withhold—consent to any project that would affect them, their lands, or resources, but they should be in the driver’s seat of the project, including creating project goals and outcomes from the outset.
- **Participants & Interactions:** This perspective emphasizes the participatory and communicative dimensions of equitable co-production while honoring the expertise and experiences of communities and their rights to consent. Local groups should be involved, community members should have access to the information, resources, and technological tools they need to participate, and they should be able to engage in multiple ways.
- **Science as Capacity-Building:** Co-production outcomes factor more strongly in this perspective than the others. This perspective is defined by the desire to help people use science and help make science useful to individuals, build connections within and external to communities, and empower and build capacity for collective action. Boundary organizations¹ play a core role as partners on the project team with power over decisions and community buy-in and participation from the outset.

The workshop was designed to enable all the participants to expound on these perspectives through a variety of semi-structured sessions. The workshop included plenary-style sessions

Box 1. Hybrid Online and Public Event with the National Academy of Sciences

A public event was included as part of the workshop to expand the conversation. The recording of Dr. Alondra Nelson’s presentation, “Co-producing knowledge with communities: Equity in federal research programs” and subsequent discussion is available online: <https://www.nationalacademies.org/event/05-12-2022/co-producing-knowledge-with-communities-equity-in-federal-research-programs#sectionWeb-Friendly>

The “fish bowl” event that followed Dr. Nelson’s presentation is briefly described in an American Geophysical Union Thriving Earth Exchange blog: <https://thrivingearthexchange.org/blog/equity-in-co-production-the-fishbowl-conversation/>

1. Boundary organizations can be defined as intermediary scientific organizations that produce information useful in policymaking by bridging the “gap” between usable knowledge for policy making and the outputs of science. (37)



Participants gather for a fishbowl style discussion at the National Academy of Sciences.

with short presentations from thought leaders in equitable co-production (Appendix B), which are outlined in the agenda (Appendix C) and findings. There were also interactive exercises and small group discussions. A graphic recorder joined some parts of the workshop to visually document, in real-time, the key themes that emerged during presentations and discussions, and the artwork is displayed throughout this report.

Day 1 of the workshop began by giving participants time to introduce themselves to each other, review a dialogue agreement, and establish the foundation for the workshop. The research team briefly described the research project, the work that has been done to date, and the perspectives that emerged from the data analysis.

Next, there were several short, invited presentations followed by a discussion. The guiding questions for presenters included:

- What opportunities to conduct more equitable co-production are we missing?
- What do you think we all should know to begin this conversation (i.e., common terms, ideas)?
- Is there something specific you want to share, challenge, or otherwise ensure is part of the conversation?

During the afternoon of Day 1, breakout groups were formed, organizing people by the three perspectives. People were assigned to the group that reflected their perspective, based on their survey results, and anyone who did not complete the survey before the workshop selected the group that seemed like the best fit for them based on the definitions presented. The groups were asked to discuss the following questions:

- What is your consensus definition of co-production?
- What are your core consensus statements?
- Which statements do you think need to be added to the full group consensus statements?

Day 1 culminated with an event at the National Academy of Sciences, Engineering, and Medicine (NASEM) in Washington, D.C. The event featured an in-person and live-streamed presentation and conversation with the White House Office of Science and Technology Policy's (OSTP) Dr. Alondra Nelson entitled, "Co-producing knowledge with communities: Equity in federal research programs." The presentation was attended by the workshop participants and others, with more than 100 in-person attendees and more than 700 online. The presentation and conversation were followed by a reception and interactive community forum, which used a "fishbowl" style conversation (23) to discuss equitable co-production, which was led by Natasha Udu-gama from AGU's Thriving Earth Exchange, attended by approximately 80 people in person and about 1000 online.

On Day 2, the workshop began with reports from the breakout groups from Day 1 on the consensus definition of co-production, summaries of their discussions, and the process of reaching group consensus. This was followed by presentations and a discussion on pathways to more equitable co-production. The guiding questions for the presenters were:

- How will our society look different because of equitable co-production?
- What will it take to get there?

In the latter part of Day 2, the breakout groups reconvened around the three perspectives and were asked to identify the hurdles and pathways to more equitable co-production across multiple scales: individuals, projects or programs, community or region, agency, or institution. The guiding questions included:

- What needs to happen to make this perspective possible?
- From my position, what do I need to make this perspective possible?
- From my position, what can I give to make this perspective possible?

The workshop concluded with everyone reporting back from their breakout group discussions, and everyone engaged in a conversation about useful follow-up activities and next steps. The research team also outlined the communication products that were already underway because they had been defined in the initial research proposal.

Workshop Findings

The goal of the workshop was to draft a framework for equitable co-production in the context of U.S. climate programs. Specifically, the workshop aimed to provide a forum to discuss how equitable co-production processes are conceptualized across different contexts throughout the United States, recognizing that those working in the climate context likely have much to gain from hearing about co-production practices in other contexts, such as health. In addition, we aimed to identify shared guiding principles for equity considerations in co-production processes and associated guidance. We also intended to build connections and collaborations among interested parties to work towards these outcomes. The goals of the workshop were met, in that a framework consisting of three perspectives was generated (Figure 1). The framework includes three definitions of equitable co-production, unique barriers, and specific practices, opportunities, and pathways to consider when making co-production more equitable in the future.

Panel 1: Opportunities for More Equitable Co-Production

The workshop included two panel discussions from experts and thought leaders in equitable co-production across a breadth of contexts. These panels provided several valuable insights to seed the subsequent breakout group discussions. The first panel focused on opportunities to conduct more equitable co-production and specifically asked panelists to reflect on what opportunities we are missing and what common ideas are needed to begin this conversation. Panelists included Aparna Bamzai-Dodson, U.S. Geological Survey (USGS) Assistant Regional Administrator, North Central CASC (recording), Jacqui Patterson, Founder & Executive Director, The Chisholm Legacy Project, and Elizabeth Yeampierre, Executive Director, UPROSE.

There were several important ideas communicated by the panelists and discussed in the room. Informed by her work with tribal communities, Dr. Bamzai-Dodson discussed how partners want clear roles and responsibilities in co-production processes, to be integrated into the team, and engaged in early and frequent communication. The panel also discussed how success in co-production moves at the speed of trust and that academic partners should follow the lead of grassroots, community led efforts. Taken together, the speakers in this panel identified several existing frameworks (Box

Graphic recording from Aparna Bamzai-Dodson's remarks on opportunities for equitable co-production.

Ways of Knowing & Power

Participants & Interactions

Science as Capacity-Building

WHAT IS THE DEFINITION OF EQUITABLE CO-PRODUCTION?

Equitable co-production is collaboratively constructing a narrative based on active and equitable participation, mutual respect, and trust in order to meet the self-identified priorities of a distinct self-defined group or community with a commonality of goals.

Equitable co-production is an iterative process where people with varying backgrounds, ideas, and perspectives collaborate to address mutual priorities and improve outcomes.

Equitable co-production is a process, and the process should evolve and change to reflect the interests of the people involved. The group is dynamic through listening, learning, and doing together.

WHAT ARE THE BARRIERS TO EQUITABLE CO-PRODUCTION?

Funding: It is difficult to fund needed activities, and there is a mismatch between outputs desired by funders and by co-production partners.

Networks: It is difficult to find and access the people and peer networks that could provide solidarity and support.

Time: The time commitment for engaging in equitable co-production is significant, but also necessary.

Governance: The governance structures that enable communities to have the authority, resources, and time to commit to this work do not yet exist.

Communities: The community should be defined carefully, otherwise needed perspectives may be excluded.

Rewards Systems: Academic rewards systems continue to value traditional metrics, with poses ongoing challenges to academics engaged in this work.

Time: Researchers are often asked to facilitate co-production, but this is difficult to scale because time is limited.

Rewards Systems: Academic rewards systems continue to value traditional metrics, with poses ongoing challenges to academics engaged in this work.

Training: There is a lack of training, guidance, and instructional resources for people wanting to get started and increase their knowledge.

WHAT ARE THE PATHWAYS TO OVERCOME THESE BARRIERS?

Funding: Funders should expand their definitions of scholarship to include the outputs from co-production.

Funding: Funders should adopt more participatory funding practices.

Networks: Establish peer networks for ongoing professional learning.

Time: Be willing to slow down, and take the time needed to develop relationships and shared language.

Governance: Innovations in resourcing and governance are needed so all can equitably access co-production and democratic processes.

Research to Practice: Implementation science can be used to move evidence-based approaches into research and funding practices.

Teams: Co-production work should be conducted by multi-, inter-, and transdisciplinary teams.

Funding: Funders should adopt more participatory funding practices.

Funding: Funders should adopt more long term funding models. Training: Capacity building efforts are needed for people working on co-production at all career levels.

Recognition: Academic organizations must develop methods to recognize co-production efforts.

Figure 1. Framework for Advancing Equity in Co-Production

2) for guiding equitable partnerships but illuminated how they often are not known or put into practice by academic or government scientists engaging in co-production efforts.

Panel 2. Pathways to More Equitable Co-Production

Building on the first day, the second panel was focused on pathways to more equitable co-production. The panelists discussed how our society might look different because of equitable co-production, and reflected on what it will take to get there. The panelists included Devin Jefferson, Community

Science Catalyst, Science Museum of Virginia, E. Yvonne Lewis, Executive Director, Healthy Flint Research Coordinating Center, Mahmud Farooque, Associate Director, Consortium for Science, Policy, and Outcomes (CSPO), Arizona State University, and Ann Marie Chischilly, Executive Director, Institute for Tribal Environmental Professionals (ITEP).

Box 2: Resources for Advancing Equitable Co-Production

In discussing opportunities for more equitable co-production, panelists discussed and emphasized several studies, frameworks, and resources to guide this work:

- Bamzai-Dodson, et al. Critical stakeholder engagement: The road to actionable science is paved with scientists' good intentions. *Annals of the American Association of Geographers*, 114(1), 1–20. <https://doi.org/10.1080/24694452.2023.2242448>
- Jemez Principles for Democratic Organizing
- Just Transition Framework: <https://climatejusticealliance.org/just-transition/>
- The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research
- Principles of Environmental Justice: <https://www.ejnet.org/ej/principles.pdf>

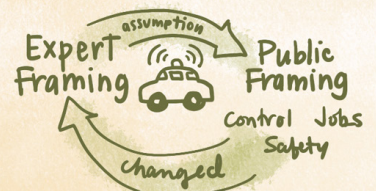
Dr. Farooque discussed the importance of framing, and developing an understanding of whose questions we are asking, noting the difference between expert framing and public framing that can lead to inaccurate assumptions. Drawing on work conducted in Richmond, Virginia, Mr. Jefferson described how local partnerships in air quality monitoring closed the gaps between information and local government action. The panel discussed the importance of deliberately creating spaces for dialogue and deliberation.

Definitions of Equitable Co-Production

The breakout groups, defined by the three perspectives—Ways of Knowing & Power, Participants & Interactions, and Science as Capacity Building—were first urged to identify a consensus definition of equitable co-production from their perspective. Each group generated distinct definitions and thought about the most important dimensions of equitable co-production in unique ways. This discussion of definitions was documented by a graphic recorder.

Graphic recording from Mahmud Farooque's remarks on pathways towards more equitable co-production.

reframing:
WHOSE QUESTIONS ARE WE ASKING?

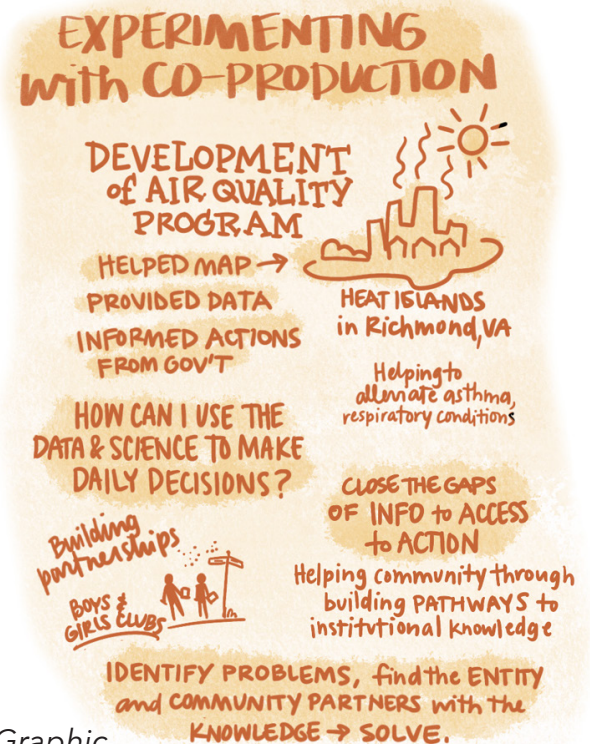


HUMAN GENOME vs Healthcare System vs Individual Healthcare Needs



The **Ways of Knowing & Power** group defined co-production as “collaboratively constructing a narrative based on active and equitable participation, mutual respect, and trust to meet the self-identified priorities of a distinct self-defined group or community with a commonality of goals.” This group emphasized the importance of co-designing aspects of the work, such as the timeline. For example, sometimes a long timeline is not wanted or needed, although this is often cited as a promising practice for co-production. While formulating the definition, the group brought forth three significant themes: the diversity of knowledge, mutual respect, and empowerment.

- **Diversity of knowledge:** This definition is rooted in the recognition that there are many forms of knowledge and types of knowledge systems, and each knowledge form has equal worth. Both existing and new knowledge are important and valuable.
- **Mutual respect:** Mutual respect encompasses attentive listening, cultivating patience, and refraining from exploitative approaches that disproportionately advantage the researcher over other participants. Every partnership needs to establish its own understanding of participation, ensuring the feasibility of informed consent.
- **Empowerment:** Empowerment was defined as reframing the work from problems or deficits to focusing on assets, priorities, and goals. It involves building, instead of taking. Furthermore, it acknowledges and addresses the contexts that have historically been, and frequently continue to be, marked by injustice.



Graphic recording from Devin Jefferson's remarks on pathways towards more equitable co-production.

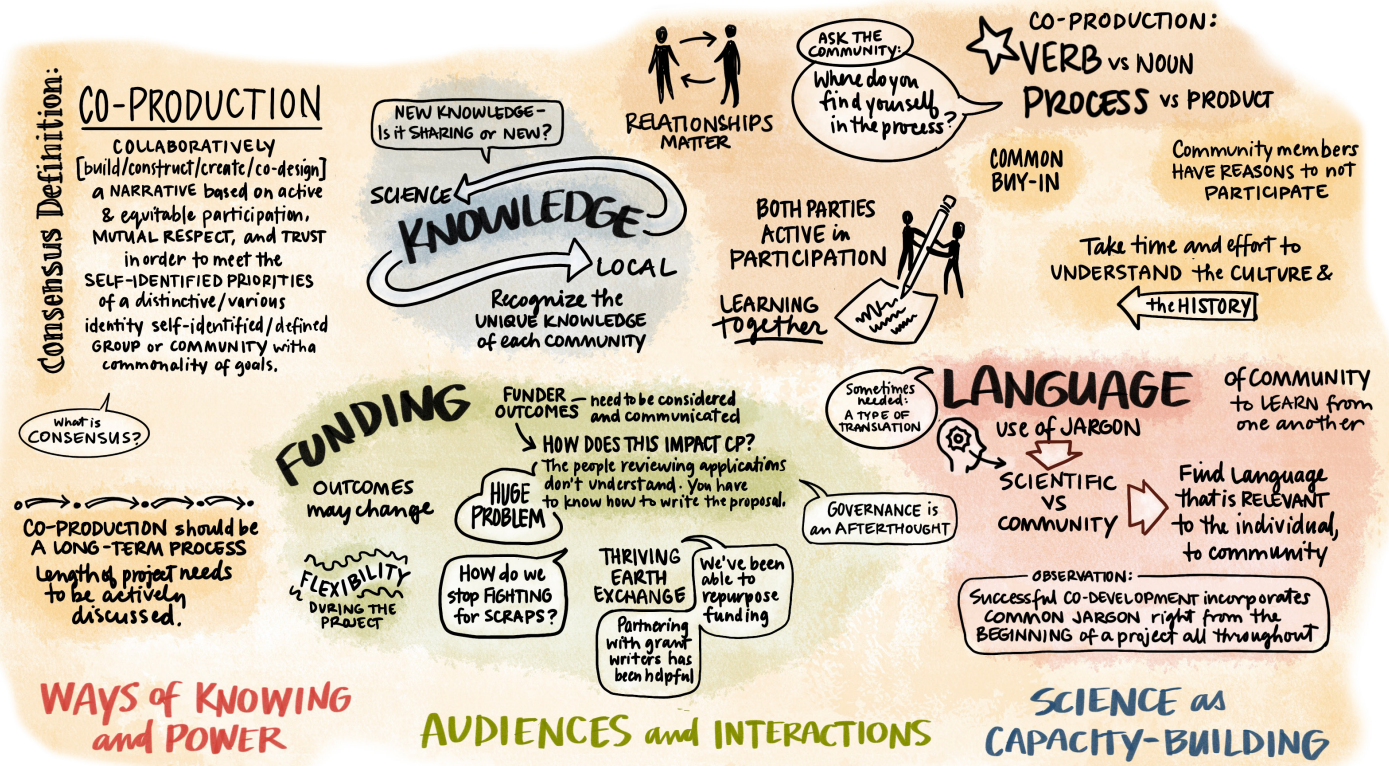


The **Participants & Interactions** group defined co-production as “an iterative process where people with varying backgrounds, ideas, and perspectives collaborate to address mutual priorities and

Box 3. Resources and Examples of Equitable Co-Production

In discussing pathways towards more equitable co-production, panelists emphasized several studies, frameworks, and resources to guide this work:

- RVAir Community Science Project: <https://smv.org/learn/rvair/>
- Health Flint Research Coordinating Center: <https://www.hfrcc.org/>
- United Nations Framework on Free Prior and Informed Consent: <https://www.un.org/development/desa/indigenouspeoples/publications/2016/10/free-prior-and-informed-consent-an-indigenous-peoples-right-and-a-good-practice-for-local-communities-fao/>
- The Status of Tribes and Climate Change Report: <https://www.bia.gov/news/status-tribes-and-climate-change-report-release>
- Participatory Technology Assessment process: <https://cspo.org/areas-of-focus/pta/>



Graphic recording from the group discussion on definitions of equitable co-production.

improve outcomes.” The process is built on collective expertise, through the equitable sharing of power and decision-making, and is grounded in mutual respect, listening, and trust. Participants in co-production should include people whose priorities are being addressed in the project and those who may be impacted. While formulating the definition, the group brought forth three significant themes: participation and engagement, governance, and meeting people where they are.

- **Participation and Engagement:** Understanding the cultural composition of the community is crucial, through social science or other means, as understanding the context enables less prominent voices to be invited in, meaningfully included, and amplified. Getting buy-in across the community contributes to long-term sustainability.
- **Governance:** Often what is missing in co-production is representation by governance. Co-production is not just about generating new knowledge, it is also about sharing and using the knowledge to achieve societal outcomes. Participating fully in the co-production of knowledge and testing and scaling up co-produced solutions requires appropriate governance structures that enable community members to be compensated for their time and that endow community members with appropriate authority. These structures do not yet exist. In addition, sometimes the people making decisions are not part of the community that is directly engaged in the co-production work. The absence of necessary governance structures can make co-production feel more like an exercise and not a process that can achieve the desired change.
- **Meet People Where They Are:** It is important to respond to the needs expressed by the community, and literally and figuratively, meet the community members where they are. This might mean learning about community knowledge, context, how the community communicates, and learning their jargon. This also involves researchers doing their homework ahead of time and understanding what kind of research has been done before. In addition, having the right intent when starting a new project is always necessary, but intent alone is insufficient.

The **Science as Capacity Building** group did not come to a consensus definition for equitable co-production but did agree on several points. Members noted that co-production is sometimes defined variously as a verb (a process) or a noun (a product), but that it should be a verb. The process should evolve and change in reflection of the people who are involved. The group itself cannot be static—it is important to ask people how they can fit into the process and what role they can play. The dynamism is in listening, learning, and doing together. As a result, the focal problem and outcomes may change throughout the process. To elaborate on these themes further, this group discussed how co-production includes:

- **Active Process:** Co-production is a process of co-developing, and co-creating, and it is consensus-based and democratic. It is an ongoing process that changes over time.
- **Involvement:** Many types of people should be involved. For example, in Alaska Native communities, different governance structures and subsistence roles may limit participation in a co-production process. In other communities, community members with less economic security or large family obligations may not be able to devote the time to these processes. The more traditional scientific members of the team should be multidisciplinary, possess various types of knowledge, be able to share many forms of information and be able to also contribute lived and learned experience. Anyone who could be harmed by or benefited by the information being generated should have the opportunity to be involved. However, it is not always possible to do this. For example, Thriving Earth Exchange relies on trusted community leads to bring all the perspectives to the table, but note that it is still difficult to balance the number of people with authentic and appropriate involvement.
- **Dynamism:** The process is dynamic and iterative, and collaboration should be intentional. The focus of the work can change depending on whether the goal is defining priority, trying to find solutions, or making decisions.

Taken together, the discussions revealed how people are considering and practicing many similar or complementary things when engaging in equitable co-production, but they may be talking about them and defining them in different ways. Each perspective defined equitable co-production in ways that reflect slight differences in what aspects of the process are prioritized over others.

Challenges to Equitable Co-Production

On day two, each breakout group was asked to consider the pathways to making equitable co-production possible based on their group's perspective. With a wealth of experience in the study and practice of co-production, each group discussed the unique challenges they face in their work.

The **Ways of Knowing & Power** group focused their discussion on funding, relationships, and communication. Concerning funding, the group discussed how it is difficult to pay for what is needed to engage in

Box 4: Challenges to Equitable Co-production Identified by the Ways of Knowing & Power Group

- Current funding methods make it difficult to pay for the things that are needed to engage in equitable co-production.
- Practitioners face persistent barriers in finding and accessing the people and peer networks that could provide solidarity and support.
- Co-production takes more time than conventional research practices, but the time to get to know each other and learn each other's jargon is a critical aspect of success.

equitable co-production, such as wages for community partners, for example. Challenges also emerge in deliverables and reporting, in so much that funders often value metrics that aren't aligned with the outputs of co-production. This leaves teams finding creative ways to repackage and present outputs that are agreeable to funders. Ultimately, funding agencies and foundations have a lot of power over the process, but co-production requires flexibility that has not been integrated into the funding processes.

Box 5: Challenges to Equitable Co-production Identified by the Participants & Interactions Group:

- Governance is often not considered or included in co-production efforts, but for the efforts to change outcomes, the partners must also include people who understand how structural change happens and have the power to make it happen.
- Communities must be defined carefully, because if they are not, important perspectives or diversity may be excluded.
- Academic reward systems continue to reward traditional metrics (i.e., peer-reviewed publications), which creates challenges for academics engaged in this work which may result in fewer publications or more societally relevant, but academically undervalued, outputs.

This group also discussed how relationships and access can be a challenge to equitable co-production. This includes person-to-person connections, peer support networks, and other spaces to exchange experiences, share practices, and lessons learned. The group discussed how you often know what spaces you want to be in, but you don't have access. This lack of access presents ongoing and repetitive challenges, which over time, can lead to turnover and burnout.

In addition, this group discussed the critical role of communication in equitable co-production. This involves taking the time to "get on the same page" and generate a common understanding of terms and phrases. They also recognized that sometimes concepts are not translatable across languages and knowledge systems. Nonetheless, it is important for all parties involved in the co-production process to learn each other's languages (professional, cultural, etc.) to enable productive exchange of ideas and for research to go smoothly. One member of the group noted how knowledge is power, and so we must be cognizant of sharing and communicating for comprehension.

The **Participants & Interactions** group discussed how the challenges to equitable co-production include governance, defining communities, and academic reward systems. They discussed how relationships and sharing information are important, but that equitable co-production is also about better outcomes. They discussed the critical, yet overlooked role of governance, and how governance structures do not yet exist that are needed to support community members to be able to devote substantial time and effort to co-production, that enable communities to apply for funding, and that give the communities sufficient authority to influence policies and programs.

Relatedly, this group also discussed how defining "communities" as partners in co-production can be problematic. The word "community" can sometimes be limiting, prescriptive, or only refer to so-called underserved communities. Communities are sometimes defined by those outside it, which can affect the way the group is represented and whether it accurately captures the diversity.

Finally, this group discussed how federal and academic reward systems continue to present challenges for researchers who want to engage with communities. In general, co-production work is

not rewarded the way it could and should be rewarded.

The Science as Capacity Building group discussed how limited bandwidth, institutional barriers and a lack of guidance are all obstacles to equitable co-production. They described how limitations in time and the ability to engage are problematic. For researchers, having to say no to societal partners that want to work together has implications for equity and access and presents ethical dilemmas. In essence, researchers are often left deciding who gets to partake in the benefits of being engaged in co-production, and who does not.

Box 6: Challenges to Equitable Co-production Identified by the Science as Capacity Building Group:

- Researchers are often asked to facilitate this work, but because time is limited, they cannot say yes to every potential partner who wants to engage in co-production, leaving researchers to make decisions with ethical implications for those who benefit from science.
- Academic and government funding bodies and reward systems continue to reward traditional metrics (i.e., peer-reviewed publications), which create challenges for academics engaged in this work which may result in fewer publications or more societally relevant, but academically undervalued, outputs.
- There is a lack of training, guidance, and instructional resources (e.g., case studies) available for people who want to increase their knowledge and improve their skills for engaging in equitable approaches to co-production.

Like other groups, **Science as Capacity Building** discussed institutional barriers, noting how researchers are being evaluated on the number of journal articles published and not on contributions to relationship and trust building with communities. In addition to academic institutions, funding institutions also play an important role in supporting this work. This group acknowledged that projects must be funded at the appropriate levels, but that the number of funding opportunities available for this type of work is limited.

Finally, this group discussed how more guidance is needed on how to engage in equitable co-production for researchers and partners alike. There was an interest in collecting and sharing case studies about what is working and designing guidelines or principles for engagement. This is especially true for individuals who might be the only person doing this work in their department or community, because knowing where to go for help can be very challenging.

Approaches & Needs to Move Forward

On day two, participants were urged to discuss the things that are needed to overcome the obstacles to equitable co-production that had been previously identified by their groups. Each of the breakout groups was asked to discuss what they needed to make this perspective possible and what they were willing to give to make this perspective possible. This discussion revealed how people are identifying and engaging in creative actions to support their co-production efforts. The discussions revealed a range of solutions and workarounds to barriers, promising practices, and illustrative examples, and calls for changes to the broader institutions that shape research activities, such as universities, agencies, and funders.

The **Ways of Knowing & Power** group identified several solutions, including adapting funding models, creating inclusive networks, and making space for developing shared language. When it

comes to adapting funding models, the group focused on deliverables to funders and alternative funding models. For example, they discussed how definitions of scholarship should be expanded to include the breadth of valuable outputs and outcomes that are co-created between researchers and societal partners. For example, if the co-production partners decide together that the most useful thing they co-create is a report because that is what is needed, will the funder consider that a legitimate output or will they also be expecting a peer-reviewed publication?

This group discussed how often the products that communities need are not aligned with the desired deliverables of funders. They would like to be able to share the deliverables they are most proud of and deem most meaningful, versus repackaging the outputs to meet the desires of funders. This group also discussed the need for alternative and community-based, participatory grant-making approaches. For example, the Arctic Funders Collaborative (<https://www.arctic-funders.com/>) includes youth in the process of reviewing proposals and determining what efforts are funded. Another example is the Bureau of Indian Affairs (BIA) Tribal Resilience Program (<https://www.bia.gov/bia/ots/tcr>), which has funding calls that include funding streams for a variety of different types of activities so that funding can be more flexible to the needs of the applicants, including everything from relocation planning to regional liaison positions.

This group also discussed how there are not many opportunities for people to share ideas about equitable co-production, as was provided in this workshop. One suggestion was to create more peer networks and exchanges to disseminate successful approaches and build relationships. This is built on the assumption shared by this group that anything is possible when we establish person-to-person connections and see each other for who we are. This includes peer-to-peer support networks, with inclusive policies, to enable people to self-identify the spaces, networks, and people with whom they want to be in a community. The NSF-funded Rising Voices Center for Indigenous and Earth Sciences (<https://risingvoices.ucar.edu/>) at the National Center for Atmospheric Research (NCAR), which is a network of Indigenous leaders, scientists, students, and educators that advance science through collaborations, mentoring, and sharing capacity, was shared as one such example network. The group also discussed the great potential for learning if there was a network where people could join each other's projects for a week or month-long exchange and if there was more effort put towards sharing lessons learned.

Finally, this group also emphasized the importance of taking time in a new project to establish shared language and meanings to make relevant informa-

Box 7: Pathways to Overcome Obstacles to Equitable Co-production Identified by the Ways of Knowing & Power Group:

- Funders and other organizations can expand their definitions of scholarship to be more inclusive of the kinds of outputs generated through co-production efforts.
- Funders can change their grant-making processes to better support co-production, by using more participatory grant-making approaches, for example.
- Peer networks and opportunities for professional learning, through exchanges, for example, should be established to build relationships, foster peer learning, and foster the spread of successful approaches to co-production.
- Individually, we must be willing to slow down and take the needed time to establish relationships and shared language. Our institutions must be equipped to support this practice.

Box 8: Pathways to Overcome Obstacles to Equitable Co-production Identified by the Participants & Interactions Group:

- At a societal level, innovations in resourcing and governance are needed to enable everyone to equitably access co-production and democratic processes if they would like to do so. This includes services like access to healthcare or daycare.
- Implementation sciences could be used to study the behavioral changes that are needed for academic institutions to better support co-production processes. Rewards and funding that make the biggest difference should be adopted based on evidence of effectiveness.
- Funders need to be given more guidance on how to shape their programs in ways that support equitable co-production.
- Co-production should be undertaken by multi-, inter-, and transdisciplinary research teams.

tion accessible. This is a principle that could apply to equitable co-production across a range of contexts and settings.

The **Participants & Interactions** group discussed how at the project level, projects must begin with communication, establishing intent, and promoting trust. They also discussed how at broader scales, equitable co-production needs innovations in resourcing and governance to support inclusive processes and long-term relationships. For example, this group discussed the need for better social infrastructure, such as healthcare or daycare, so that people have an expanded ability to engage in deliberative activities if they would like.

This group also discussed opportunities to overcome barriers in academic structures, rewards, and funding. In academic rewards systems, there needs to be more clarity about changes in behavior at the individual level and changes at the organizational scales to support equitable co-production. For example, at the organizational level, equitable co-production might be improved by employing more staff into boundary spanning roles who have time to focus on developing and maintaining relationships and whose promotion criteria reward effort spent on relationships rather than the number of publications, as is the case for scientists. This group also discussed how implementation science, the study of strategies and methods that help people use evidence-based practices (24), might help elucidate the behavioral changes needed among researchers or other individuals to close the gap between what is known about equitable co-production and what people do. An example of this is the Multi-Tiered System of Supports (MTSS) positive behavioral interventions and supports (PBIS) from the context of K-12 education, which is a framework for helping teachers provide evidence-based social, emotional, and behavioral practices to equitably support the needs of all learners. The MTSS is a framework that accounts for both individual teacher behavior, as well as changes at the school or institutional level (25).

With respect to funding, this group discussed the need to work backward from the desired outcomes or behaviors to provide funders with more clarity on how they can support this work. They also discussed how funders need to implement more flexibility when funding co-production work. Finally, they also noted how multi-, inter-, and transdisciplinary team research, including the social and behavioral sciences, should be encouraged.

The **Science as Capacity Building** group discussed opportunities to improve equitable co-production through changes in funding processes, increased long-term investments, training, and institu-

tional structures.

The Science as Capacity Building group had many suggestions for how to change funding practices. First, they discussed how funding agencies need to include explicit language in calls for proposals that address co-production and expectations for how investigators will engage in co-production. This group also discussed the need for a role for societal partners, practitioners, and boundary spanners in funding proposal review processes. For example, community members could be included in review panels. As an example, the NOAA CAP program includes community members in the panel selection and review process. However, this group also noted that this must be done in ways that do not burden community members. They also discussed how reviewers should receive training that will better equip them to evaluate these processes.

The Science as Capacity Building group also discussed how long-term funding opportunities are limited, and that both flexibility and long-term investments are critical for equitable co-production, likening co-production partnerships to marriage. This group discussed the need for flexibility in funding practices to acknowledge the difficulties in scoping an entire project before the proposal is due. Long-term funding enables people to be paid for their time, participation, and contributions in meaningful positions. Without long-term support, there are higher risks of overburdening people and burnout.

This group also discussed the need for training, capacity building, and institutional changes. One pathway by which to build capacity is to create an evidence base and stories about what is already happening and working through programs like the Rita Allen Civic Science Fellowships (<https://civicsciencefellows.org>), which supports 18-month fellowships that enable the application of evidence-based approaches to community engagement to build better connections between science and society. For example, Blake McGhghy, a former AAAS Civic Science Fellow, researched and wrote a report to explain how science-society relationships develop and how to nurture them to better connect science with local priorities (26). This group also discussed the need for universities to recognize the contributions that individuals (faculty, staff, students) make in convening communities for co-production.

Box 9: Pathways to Overcome Obstacles to Equitable Co-production Identified by the Science as Capacity Building Group:

- Funders can change their grant-making processes, such as giving societal partners, practitioners, and boundary spanners a greater role in reviewing and selecting proposals, with fair compensation for engaging in this work.
- Funders should may develop more long-term funding opportunities and flexible funding models to support partnerships and co-production work.
- Training and capacity-building opportunities in public engagement are needed at multiple scales.
- Universities need to find ways to recognize the contributions individuals (faculty, staff, students) make in convening communities for co-production.

Discussion

The objectives of the workshop were met, and in several cases, aligned with or built upon prior recommendations for engaging in more equitable approaches to co-production of knowledge. There are multiple lines of evidence to demonstrate how the workshop advanced conversations about equitable co-production, especially in the context of federal climate programs, but also more broadly. Notably, the workshop elevated the experiences of co-production partners, program coordinators, and planners whose views aren't always visible in more theoretical discussions about co-production presented in the literature. This knowledge lies in isolated practices, and the workshop played an important role in convening people to share and codify their learning from practice and experience.

The first workshop objective was to share and learn how equitable co-production processes are conceptualized across the United States. During the workshop, each group generated unique definitions of equitable co-production. Those definitions shared common ideas about *relationships* and *actionability*. With respect to relationships, each group thought about this a little differently, but all included ideas about coming together in mutual partnerships defined by respect. Figuratively and literally, the relationships should be made in a way that enables people to meet where they are, giving adequate resources and time to generate a shared understanding, and valuing all contributions equally. The importance of relationships in co-production has been described extensively and there is growing recognition that more practical guidance is needed to help people start and nurture equitable partnerships (27).

The definitions also shared a focus on making practical contributions to society, although the framing of the contribution varied in important ways. Some groups focused on addressing needs, and others focused on assets and empowering a community's vision. This outcome aligns strongly with Chamber's and colleagues' (2021) research about the goals of co-production. They discuss how co-production can focus on researching solutions, empowering voices, brokering power, reframing power, navigating differences, and/or reframing agency. Each of these goals has a propensity towards unique challenges or opportunities. As each group in the workshop shared their definition, other groups recognized and identified ways their definitions were different (or even how they wished they could change them). These conversations demonstrated the value of having explicit conversations at the start of a project about the perceived goals, how the process should be defined, and what factors make the process equitable.

The second objective was to identify guiding principles for equity considerations in co-production processes. A singular set of guiding principles was not generated during the workshop, but while presenting their definitions, a variety of guiding principles for equitable co-production were identified. Although guiding principles were not converged on, the workshop fostered awareness and discussion about multiple, useful, existing frameworks for equitable co-production, such as the Jemez Principles for Democratic Organizing, the United Nations Framework on Free Prior and Informed Consent, Participatory Technology Assessment, and the Belmont Report, for example. Presenters showed how these frameworks can be applied and used in a variety of different co-production contexts and situations. For example, the environmental justice principles are a powerful

tool to improve the process and outcomes of co-production, and already include principles and practices related to distributive, procedural, and recognition justice (28). This tracks closely with the workshop discussions about fair access to resources, fair decision-making processes, and respect for multiple knowledge systems.

The third workshop objective was to generate guidance for outcomes that would facilitate achieving these goals. From the discussions about barriers and pathways forward, workshop participants articulated future considerations from their perspectives, including adapting funding mechanisms, building capacity at all levels, bridging research and practice, and supporting community-led advocacy efforts (Table 1).



Participants share perspectives on co-production during the fishbowl style discussion at the National Academy of Sciences.

Funding Mechanisms

First, many groups discussed the challenges related to funding and equitable co-production, and they presented ideas for funders. First, participants expressed the need for more funding for this kind of work, especially funding models that are flexible enough to evolve as partners assess the needs of the project. They added that in funding calls, funders could clearly define co-production so that it can be evaluated accordingly. They suggested that proposals with co-production could be reviewed by community members and reviewers trained in co-production. For projects that rely on co-production, funders could expand their definitions of scholarship and metrics of success to include the outputs and outcomes that are co-defined by the people working together. While the literature on co-production has started to address the important role of funders (29), the need to foster shared definitions about co-production across funders, researchers, and societal partners has not been discussed extensively in the co-production literature.

Related to funding, there was a persistent recognition that it takes a lot of time to get this type of work started, have conversations, and build trust. To address this barrier, participants discussed the need for long-term investments in projects so that people, especially community partners, can develop sustained careers versus one-off opportunities for engagement. Funding boundary spanners who are skilled at facilitating conversations and processes to support the partnership is one way to overcome the obstacle of time, but the potential downside of relying on boundary spanners is that they may then reinforce the boundaries (30). Because time is a limiting factor, researchers are sometimes placed in the difficult position of having to choose who to work with, and grappling with the issue that it is not possible to engage deeply with everyone who might be interested. This raises ethical questions of who gets the potential benefits of engaging in co-production.

Table 1. Summarized Feedback from Workshop Participants About Equitable Production

| To improve: | Workshop participants suggested the following guidance: |
|---------------------------------|--|
| Funding Mechanisms | <ul style="list-style-type: none"> • Additional funding for co-production work, especially through flexible funding models, may enhance a broader range of activities and the natural evolution of the work. • Defining co-production in proposal solicitations helps applicants better understand funders expectations • Proposals that include co-production could be reviewed by compensated community members and other reviewers skilled in co-production practices. • Expanding the definition of scholarship to include outputs co-defined by those involved in co-produced projects could promote engagement and buy-in. |
| Capacity Building at All Levels | <ul style="list-style-type: none"> • Expand training in co-production, across multiple roles and career levels, especially for those just getting started. • Foster communication spaces for ongoing support and guidance for those trying to expand their co-production skills. • Provide opportunities to shadow the work of other people and other co-production projects. • Facilitate peer networks to share promising practices and means to overcome barriers. |
| Bridging Research & Practice | <ul style="list-style-type: none"> • Develop more spaces, such as workshops, where practitioners and scholars of co-production are brought together to share and learn from each other. • Use implementation science, as well as other social sciences focused on the processes of generating science and its use, to build and apply evidence-based approaches to co-production. • In addition to research, identify and share stories, such as those from practitioners or community members, about promising practices in co-production. |
| Community Advocacy Tools | <ul style="list-style-type: none"> • Develop a set of questions to ask researchers when being approached about co-production so communities are better equipped to advocate for their desires from the partnership. • In the management of projects, allocate more time and tools for teams to discuss expectations and generate shared understandings. • Foster career opportunities at the community level to help avoid the stress and burnout associated with repeated, short term engagement efforts. |

Note: The term “promising practices” used here is credited to Daniel Aguirre, founder of Pueblo Collab, who uses this term to describe ideas that have promise but must be sufficiently vetted before being called a “best practice.”

Capacity Building at All Levels

A second recommendation is related to capacity building at all levels. Participants noted the need to expand training and capacity building to engage in equitable co-production for all people in the process, but especially for those just getting started. Many climate programs have opportunities for capacity building, and this has been discussed in the literature (31). Another example, in the Arctic research context Cana Uluak Itchuaqiyag and Corina Qaaqraq Kramer have started *Respectful Research* (<https://respectfulresearch.com/>), which offers consulting and training in effective community engagement in equitable arctic research. There was also a wish to delve more explicitly into the ethical dimensions involved in undertaking co-production work, particularly among those people new to the work.

For those who have longer term experience working on equitable co-production, the need for ongoing support and guidance was expressed. The participants reflected that they learned a lot of what they knew about co-production through experience. They discussed how more opportunities to shadow other people and learn from other projects would be valuable. There was also an interest in having a peer network or community of practice as a space to share practices, evidence about what works, and other training opportunities. There was also an interest in creating spaces to share frustrations, ideas, and “workarounds” to barriers across different programs and settings.

Bridging Research & Practice

The final workshop objective was to seed connections and collaborations. The workshop provided a space for a diverse group of people engaged in co-production, with a variety of types of roles, to listen and learn from each other. There was a strong desire to continue to build the evidence base and stories about promising practices, as well as lessons learned, in equitable co-production. One group also discussed the need to integrate evidence from co-production research into practice and suggested that implementation sciences may provide a framework to advance evidence-based practices in organizations. At the end of the workshop, people wanted more spaces to bridge academic and practice-oriented perspectives on equitable co-production for more shared learning.

This workshop led to several community-of-practice virtual gatherings that continued to facilitate the workshop conversations for several months. Workshop participants, as well as others working in this space, have continued to convene independently, such as through sessions at the American Geophysical Union Fall Meeting focused on equitable co-production to share projects and lessons (32). A special collection of articles focused on equity in co-production is currently in production. Many of the articles aim to advance the convergence of multiple perspectives on equitable co-production—including research, community, boundary spanners, practitioners, and other perspectives.

Community Advocacy Tools

Finally, one of the most important points that came up throughout the workshop was that equitable co-production is demanding for everyone involved, but especially for the communities being asked to engage in these activities. We didn’t start the workshop with a specific definition of community, although perspectives on the term “community” arose regularly. Community can be defined using quantitative measures as, “a subset of nodes within the graph such that connections between the nodes are denser than connections with the rest of the network (33).” In the public health context, prior research has defined a community “as a group of people with diverse char-

acteristics who are linked by social ties, share common perspectives, and engage in joint action in geographical locations or settings (34).” The diversity in definitions demonstrates the need for more intention in defining the community when pursuing work with communities.

With that context in mind, there was interest in co-creating tools with communities with questions to ask researchers or other possible partners before engaging in co-production work. A community led tool such as this could empower communities to advocate for their priorities and negotiate how they want to engage (i.e., funding, influence on the process, support with a policy or decision, etc.). There was also a discussion about the need for more long-term funding to enable career opportunities at the community level. Participants noted that providing money to fund staff in community organizations is helpful, but providing amounts that do not fund a whole position means that it’s hard to sustain long term employees or positions. If community organizations are constantly trying to find or fill positions with short term engagements, then it is more likely for people to experience additional stress and burnout. Having stable long-term positions would give communities the autonomy and more power in the process to decide whether and how they want to engage. For researchers or governmental partners, there was agreement that more time should be invested in fostering shared understandings of the goals of working together with their partners, including open discussions about what they can and cannot do from their position in co-production processes. Together, everyone needs to create time and space in the process to understand the perspectives that everyone is bringing to the table and to iterate on what the partnership will look like if it is successful.

In conclusion, a long list of additional potential future actions was generated at the end of the workshop (Table 2). This was a list of activities that workshop participants may consider, to overcome the institutional barriers to pursuing co-production work that centers equity. The list is organized by a framework called Incremental Radicalization (35) in development by Mahmud Farooque, which provides seven categories of strategies for overcoming the institutional challenges of bridging science and democracy in the United States.

| If you want to: | Workshop participants suggested the following guidance: |
|------------------------------------|---|
| Socialize Ideas & Create New Norms | <ul style="list-style-type: none"> • Host a Rita Allen Civic Science Fellow (https://ritaallen.org/civic-science/fellows/) in your organization • Write a policy forum or perspective piece in a major science journal • Invite funders and/or agency decision makers to co-production meetings or workshops • Increase awareness about what equitable partnerships should look like among community serving organizations • Co-produce and co-lead sessions at relevant conferences (or other knowledge/practice sharing venues) for scientists, community representatives, etc. • Use professional social media platforms to share information about equitable co-production • Learning and adapting charters like the Africa Charter (https://parc.bristol.ac.uk/africa-charter/) |

| | |
|-----------------------------------|---|
| Innovate Theory & Practice | <ul style="list-style-type: none"> • Experiment with co-production activities and adjust accordingly • Consider recognizing and rewarding co-production in hiring, tenure decisions, and research-grade evaluations • Acknowledge failures as potential learning opportunities • Identify, expand, and scale on-call capacities available to support communities facing disaster |
| Evaluate Impacts & Outcomes | <ul style="list-style-type: none"> • Evaluate whether the objectives of co-production projects are being met to better understand the funding landscape • Create community-driven metrics for diversity, equity, inclusion, and justice in co-production • Provide evaluation criteria for co-production proposals • In future research, assess co-production projects by the definitions developed in this workshop • Work with web data aggregators to track efforts • Search for examples of projects, beyond the peer-reviewed literature, and highlight successful co-production projects through case studies |
| Train Scholars & Practitioners | <ul style="list-style-type: none"> • Provide short courses, training, and fellowships accessible across disciplines and organizations • Offer training for scientists and community representatives to participate together • Invite community members to provide training and mentorship for research or academic partners • Provide co-production tips to communities to increase knowledge about best practices • Exchanges at the community level, to experience, learn, and bring practices home • Fund a quality assurance certification to review localized co-production efforts |
| Build Communities of Practice | <ul style="list-style-type: none"> • Community and spaces to share existing approaches • Form a virtual group (e.g., social media groups, e-mail list, etc.) • Identify organizations that could connect more organized communities with less organized communities for peer-to-peer learning • Share Institutional Review Board processes across communities • Contribute to the Community Science Exchange (https://communitysci.org/) • Make connections between existing networks doing similar work |
| Grow Networks of Networks | <ul style="list-style-type: none"> • Hold more co-production themed “Fishbowl” style events² • Create cohorts of co-production based on this gathering • Invite funders into the discussion about equitable co-production • Engage in community conversations to share information or invite others |
| Integrate Institutional Processes | <ul style="list-style-type: none"> • Consider proposal review guidelines and ways to add community participation • Dedicated resources to review and evaluate federal grant applications • Publish a National Academies of Science, Engineering, and Medicine report on co-production • Consider time spent on co-production as research (rather than service) • Foster inter-agency collaborative spaces |

2. Fishbowl is a facilitated dialogue activity that is a more participatory alternative to an expert panel. The fishbowl has chairs in the middle and panelists rotate in and out of the middle chairs from the audience to answer questions and have a discussion. (23)

Limitations

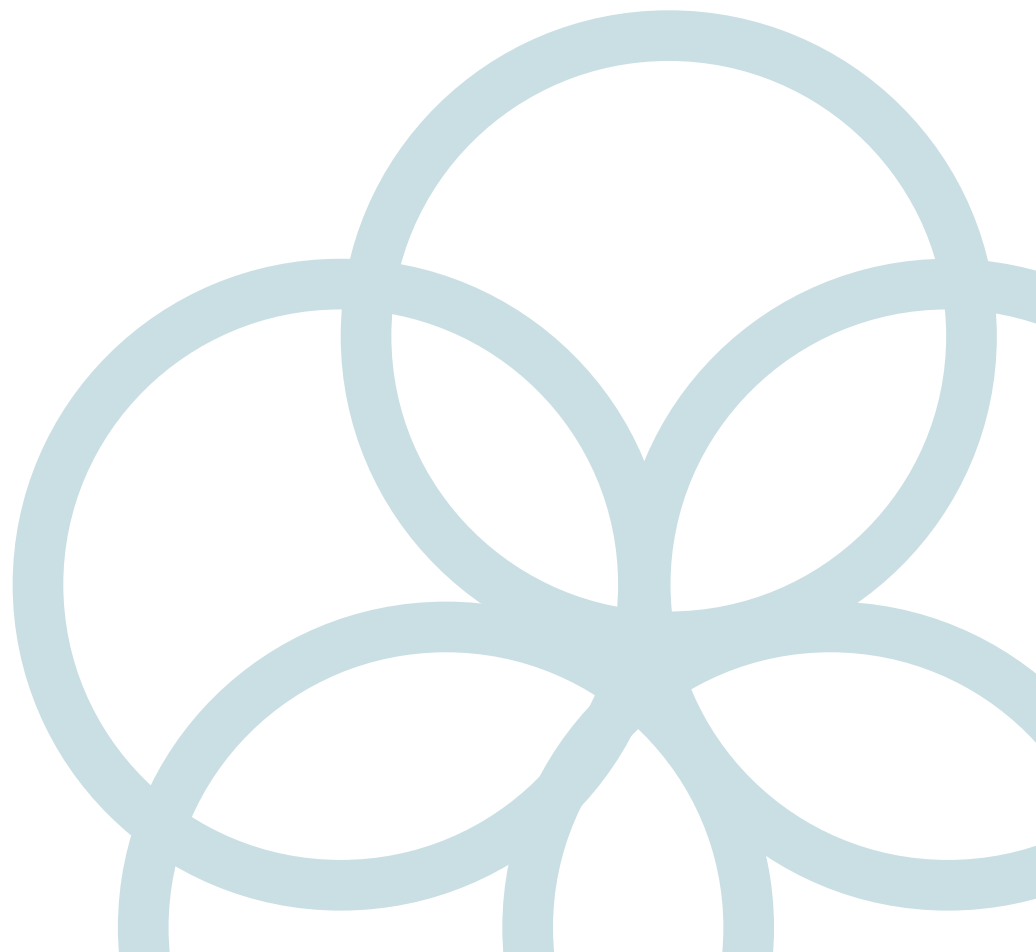
The workshop did not include a formal evaluation, but there were several lessons learned and some limitations to note. Strengths of the workshop included the location, the hybrid nature, and the inclusion of the public event at the National Academy of Sciences. The hybrid nature of the workshop enabled broad participation, including people who were not yet comfortable with in-person meetings due to the ongoing COVID-19 pandemic, people who were very busy with limited time to participate, and those who were unable or unwilling to travel. The project provided funding support for several participants to attend, which was an asset for ensuring the workshop was attended by diverse participants. Workshop organizers provided additional levels of support for those traveling to Washington, D.C. for the first time, such as arranging meals and rides to and from the workshop and related events. The ability to participate in a workshop like this is more likely to be possible for people who have the privilege, ability, time, and resources to step away from a job or other responsibilities. This may have excluded potential participants with important viewpoints to contribute to this discussion.

Some of the other limitations and challenges we faced in the workshop included having enough time to establish a shared understanding of the goals of the workshop, addressing the jargon related to co-production, and trying to accomplish a lot in less than two full days. Because the participants of the workshop came from such a diversity of backgrounds, lived experiences, professions, and levels of experience with co-production and climate work, we should have taken more time to establish a shared understanding of the purpose of the workshop at the beginning, especially with those attendees who had limited engagement with the project up until that point. In addition, even though the focus of the workshop was bridging more academic conceptions of co-production together with more practical perspectives, there were several instances where jargon got in the way of a shared understanding. In the future, it would be valuable to include more practitioners in the organizing team, as compared to academics. Ultimately, what we tried to do was very difficult in two days, emphasizing the importance of continuing this dialogue in meaningful ways.

Finally, this workshop relied on a convenience sample of participants and so the results are likely not generalizable to all situations and contexts. This sampling approach was appropriate for a small, exploratory study of this nature, but the selected participants undoubtedly shaped the results of this workshop. If the workshop was larger or used different methods to recruit participants, other perspectives may have emerged. Furthermore, a different group of people may have discussed these topics in different ways. For example, despite talking about equity, the notion of power and power sharing did not explicitly come up as much as one might expect. We encourage future researchers in this area to attain a broader sample that is more likely to have more diverse views which would be more likely to yield more broadly generalizable results.

Conclusion

In conclusion, this project set out to better understand how to generate more equitable co-production processes and projects through the development of a framework. We approached this goal by first studying three case studies of equitable co-production projects, then administering a survey to a larger group of people involved in co-production, and finally holding a workshop to discuss these perspectives. The workshop was successful in meeting most of its objectives, by revealing how there are unique definitions of and perspectives on equitable co-production, suggesting some pathways for advancing this work, and establishing new relationships between academics and practitioners interested in this work. There were some limitations, including recruiting a representative group of participants and needing to find shared meanings across a very diverse group of people in a short amount of time. However, in general, the workshop achieved its goals, generating further evidence for prior claims about equitable co-production as well as new insights.



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Appendix A: Project Advisory Board

- Sean Carter, Senior Scientist, National Climate Adaptation Science Center, USGS
- Julian Reyes, National Coordinator, USDA Climate Hubs
- Caitlin Simpson, CAP Program Manager, NOAA
- Jerica Richardson, Senior Vice President for Equitable Justice & Strategic Initiatives, National Urban League
- Elizabeth Yeampierre, Executive Director, UPROSE
- Natasha Udu-gama, Director, Thriving Earth Exchange, American Geophysical Union
- Ann Marie Chischilly, Executive Director, Institute for Tribal Environmental Professionals (ITEP)
- Karen Cozzetto, Co-Manager, Institute for Tribal Environmental Professionals (ITEP), Northern Arizona University

(Note: Positions are those held at the time of the workshop.)

Appendix B: Workshop Presenters

- Aparna Bamzai-Dodson, Assistant Regional Administrator, North Central CASC
- Ann Marie Chischilly, Executive Director, Institute for Tribal Environmental Professionals (ITEP)
- Mahmud Farooque, Associate Director, Clinical Associate Professor, Consortium for Science, Policy and Outcomes, School for the Future of Innovation in Society (SFIS); Arizona State University
- Devin Jefferson, Community Science Catalyst Science, Museum of Virginia
- E. Yvonne Lewis, Executive Director, Healthy Flint Research Coordinating Center
- Jacqui Patterson, Founder & Executive Director, The Chisholm Legacy Project
- Elizabeth Yeampierre, Executive Director, UPROSE

(Note: Positions are those held at the time of the workshop.)

Appendix C: Workshop Agenda

Updated 5-13-2022

Perspectives on Equitable Co-production May 12-13, 2022

Online and In-Person Logistics Information

“How would society change if we could improve co-production practices to make them more equitable?” By bringing together people with a diversity of experiences in collaboratively producing new knowledge and practices across the United States, we have an opportunity to better understand each other’s perspectives and explore areas of commonality. Are there certain principles of equitable co-production that we agree frequently apply, regardless of where a project is being conducted, with whom, or what it is about? If so, what needs to happen to make sure that those principles can be met?

The goals for the workshop are to:

- (1) Hear how equitable co-production processes are conceptualized across the United States;
- (2) Identify shared guiding principles for equity considerations in co-production processes;
- (2) Generate recommendations for outcomes that would facilitate achieving these goals; and
- (3) Seed connections and collaborations among interested parties to work towards these outcomes.

Zoom Meeting Link

<https://gmu.zoom.us/j/94241529599?pwd=VzI0a2ZJWWM2SUDlWEZnRjVWozUT09>

Meeting ID: 942 4152 9599

Passcode: EQUITY

One tap mobile

+13017158592,,94241529599#,,,,*571912# US (Washington DC)

+12678310333,,94241529599#,,,,*571912# US (Philadelphia)

Dial by your location

+1 301 715 8592 US (Washington DC)

+1 267 831 0333 US (Philadelphia) Meeting ID: 942 4152 9599

Passcode: 571912

Find your local number: <https://gmu.zoom.us/u/ae2itKE4w>

Join by SIP

94241529599@zoomcrc.com

Updated 5-13-2022

May 12, 2022

All times U.S. Eastern

| | |
|------------------|---|
| 9:00 - 10:00 am | Registration (<i>Breakfast and coffee provided in person</i>) |
| 10:00 - 11:15 am | Workshop Welcome, Goals, and Participant Introductions |
| 11:15 - 11:30 am | Break |
| 11:30 - 12:00 pm | What have we learned? - Research Findings |
| 12:00 - 12:30 pm | Opportunities to conduct more equitable co-production Panel of short talks with Q&A: <ul style="list-style-type: none">• Jacqui Patterson, Founder & Executive Director, The Chisholm Legacy Project (online)• Elizabeth Yeampierre, Executive Director, UPROSE (online)• Raychelle Aluaq Daniel, Arctic Executive Steering Committee Deputy Director, White House Office of Science & Technology Policy (in-person)• Aparna Bamzai-Dodson, USGS Deputy Director, North Central CASC (online) |
| 12:30 - 1:30 pm | Break (<i>Box lunch provided in person</i>) |
| 1:30 - 2:50 pm | Discuss Perspectives on Equitable Co-production - Breakout Groups - Report Backs |
| 2:50 - 3:00 pm | Summary and Charge for Day 2 |
| 3:00 - 4:00 pm | Break (<i>Travel to National Academies of Sciences in person</i>) |
| 4:00 - 7:00 pm | Co-producing knowledge with communities: Equity in federal research programs – A Conversation with White House Office of Science and Technology Policy's Dr. Alondra Nelson <i>In person and online please register HERE.</i> |

Updated 5-13-2022

May 13, 2022

All times U.S. Eastern

| | |
|---------------------|--|
| 9:00 - 9:30 am | Registration (<i>Breakfast and coffee provided in person</i>) |
| 9:30 - 9:45 am | Workshop Welcome, Goals, and Team Agreement |
| 9:45 - 10:15 am | Report Back from Yesterday's Breakout Groups |
| 10:15 - 10:45 am | Pathways to More Equitable Co-production Panel of short talks with Q&A: <ul style="list-style-type: none">• (TBC) Anne Marie Chischilly, Executive Director, Institute for Tribal Environmental Professionals (online)• Mahmud Farooque, Associate Director, Consortium for Science, Policy and Outcomes (CSPO); Clinical Associate Professor, School for the Future of Innovation in Society (SFIS); Arizona State University (in person)• Devin Jefferson, Community Science Catalyst, Science Museum of Virginia (in person)• E. Yvonne Lewis, Executive Director, Healthy Flint Research Coordinating Center (in person) |
| 10:45 - 11:00 am | Break |
| 11:00 am - 12:00 pm | Creating Consensus Guidelines for Equitable Co-production - Breakout Groups |
| 12:00 pm - 1:00 pm | Lunch Break (<i>Box lunch provided in person</i>) |
| 1:00 - 2:00 pm | Report Back from Breakout Groups |
| 2:00 - 2:15 pm | Break |
| 2:15 - 3:30 pm | Actionable next steps and collaborations <ul style="list-style-type: none">- Discussion of follow on activities- Breakout groups- Report backs |
| 3:30 - 3:45 pm | Closing and Next Steps |



Download this report online at:
http://cspo.org/report/equity_coproduction_workshop



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