CO-PRODUCED research involves “processes that iteratively bring together diverse groups and their ways of knowing and acting to create new knowledge and practices to transform societal outcomes” [1]. Co-production is part of an evolving cluster of related approaches, including participatory research, Mode 2 science, civic science, post-normal science, joint knowledge production, action research, and community-engaged scholarship [2] (see glossary for definitions). Mainstream adoption of these practices is encouraged by a growing body of evidence showing that co-produced knowledge is more likely to be socially relevant, publicly accepted, and used in decision-making than knowledge produced by traditional academic research [1–5]. The future relevance of university scholarship is therefore tied to the establishment of co-production as a best practice for researchers and institutions [6].

Co-production requires a unique set of skills, not commonly taught in university curriculum. Effective engaged scholarship, as noted in Chapter 1, involves building meaningful partnerships beyond university walls, then investing in the establishment of ongoing collaborative processes with those partners [7–11]. Yet these elements of co-produced research may run counter to the expectations of traditional funders, who prefer pre-defined research objectives and more typical academic products. As a result, co-production can be a professional risk for researchers [7, 12–14].

“A key feature of successfully co-produced research is the amount of ‘advance work’ – such as building trust and revealing tensions and expectations between collaborators – that is needed before knowledge-generation begins. In fact, this advance work can have profound effects, as knowledge co-production processes are heavily influenced by the circumstances of their creation.”

-NORSTRÖM ET AL. 2020 [15]
PARTNERS IN CO-PRODUCTION

University researchers seeking to expand the impact and relevance of their work may seek collaborations with partners from multiple sectors. For example, Stanford University researchers have partnered with private sector companies and multilateral development banks to improve the sustainability of their supply chain and procurement decisions [16]. At the University of Maine’s Senator George J. Mitchell Center for Sustainability Solutions, the Collaborating Toward Climate Solutions (CTCS) initiative supports “on-the-ground problem-solving for the complex challenges that communities face.” The CTCS research team engages with municipal officials to co-develop climate change impact adaptations local communities can embrace and enact [17]. And, at the University of Minnesota, funding from a new grant was allocated to community partners so that they could powerfully shape the research agenda of a new urban sustainability initiative. [18]. These examples illustrate the potential of cross-sector collaborations to inform academic research and address pressing societal needs.

At the same time, private companies and well-resourced NGOs have vastly different access to resources, time, and expertise, compared to small community-based organizations. The process of co-production, therefore, must attend to power differentials between universities and their partners. Here we focus on best practices for working with under-resourced community partners, particularly those historically harmed or exploited by academic research. Crucially, then, establishing partnerships with these organizations is ethically bound to disrupt an extractive research mentality with a focus on building reciprocal relationships that foster mutual learning, uphold respect, and center the needs of community partners [19].

Critical to all processes is explicit, constructive, and recurring engagement with tensions across power relations as a source for transformation.

-Chambers et al. 2021 [20]

GUIDELINES FOR RESEARCHERS

Existing university-community partnerships offer emerging best practices for effective, responsive, and impactful co-produced scholarship. We synthesize guidelines from three long-term co-development initiatives from educational institutions across the United States. First, a University of Minnesota project working with tribal partners on social-ecological issues surrounding wild rice [21], then a University of Hawai’i collaboration with native Hawai’ians to develop culturally sensitive ecological research protocols [22], and, finally, a cross-disciplinary community-science project led by Cornell University [23].

The University of Minnesota’s researchers sought a partnership with tribal resource managers and inter-tribal organizations to evaluate threats to wild rice—an important cultural resource for tribes. Decades of exploitive research practices

How can institutions best support and incentivize co-production and engaged scholarship?
on behalf of the University had eroded trust between researchers and tribes. In order for the proposed project to be successful, a new model of collaboration was needed that centered the values of shared decision-making and mutual benefit. Together, and as equal stakeholders, these groups co-developed a protocol for holding university researchers accountable to the priorities and values of tribal members. In it, all partners made commitments to flexible timelines and objectives (which allowed them to prioritize the iteration and adaptation required to build trust), co-development of research methods, and appropriate commitment and compensation of partners over time [21].

The Hawaiian project came about after decades of conflict between ecological researchers and local stakeholders. Working with a local grassroots community organization, the University of Hawai‘i co-developed the Kūlana Noi‘i (Research Standards) that, since 2018, have applied to all university-affiliated researchers studying natural resources integral to the livelihoods and cultures of native Hawai‘ians [22]. All researchers seeking to work in culturally relevant ecosystems in Hawai‘i must first complete training modules that emphasize nurturing community and habitat through relationships based in communication, respect, reciprocity, and self-awareness [22]. Then, they must agree to abide by the Kūlana Noi‘i in the field and in their research products.

A third example is the NOISE Project at Cornell University. This citizen-science research initiative prioritizes the voices of historically underrepresented communities in collaboration with researchers and educators [23]. NOISE has published a workbook called *Partnerships for Impact* that outlines best practices for researchers and community partners engaging in collaborative work. In addition to a focus on transparency and trust-building, NOISE recommends researchers spend time in and with those communities they wish to work alongside and take care to express genuine gratitude for the collaboration and the individuals involved. The NOISE project also notes that researchers have a responsibility to acknowledge and address past inequities, even those that pre-date university-community partnerships.

Further guidance based on a synthesis of best practices from the academic and practitioner literature suggests:

- Clarify the community and researchers’ expectations at each stage in the research process. Whenever possible, compensate community members/organizations for their expertise, time, and labor.

- Host project meetings off campus and consider renting rooms from community organizations in which to hold them. Provide parking passes and on-site childcare and pay attention to align meeting times with community schedules and commitments.

- Encourage reflection on the social and ecological history of the relevant research site and its legacy communities. Consider, as broadly as possible, how research might impact the web of relationships in the community.

- Establish consent practices, requesting permission to engage in new research and setting expectations around communication at each stage as the research progresses and changes over time.

- Explicitly address each party’s incentives and intentions, and collectively discuss potential points of conflict. Beyond the proximate
research objectives, how might the process of co-production challenge traditional power structures or status quos?

- Acknowledge the timeframe and limitations of the partnership, and seek any mutually beneficial opportunities to sustain research and knowledge exchange beyond the funding cycle of the specific project.

- Discuss intellectual property, including the ownership of and credit for co-produced knowledge. Determine who has input or control over how data is stored, analyzed, and distributed.

- Identify responsive grievance procedures so that community members and researchers alike know how to communicate about and quickly address moments when the project seems to have strayed from agreed-upon standards.

GUIDELINES FOR INSTITUTIONS

Institutions devoted to democratization of learning, community engagement, and scholarship for the public good are recognizing co-development as an integral component of engaged action-oriented scholarship [3, 6]. For these reasons, it is imperative that institutions remove institutional barriers that disincentivize co-production. The following institutional guidance draws on existing projects to advise university leaders interested in supporting co-production involving faculty, researchers, and students.

Join networks dedicated to engaged scholarship

Institutions that share their commitment to co-production can support each other’s initiatives and share emerging best practices. Networks include...

- The Talloires Network of Engaged Universities is the largest global coalition of universities centered around university-civic engagement. Members are “committed to strengthening the civic roles and social responsibilities of their institutions” [24].

- Campus Compact is a national coalition that is driven by relationships. It seeks to prepare students through “civic education and community development” [25].

Apply for engagement recognition

Independent foundations and other organizations may offer relevant certifications that attest to institutional commitments in the realm of engaged scholarship. One example is the...

- Carnegie Classification (see Chapter 1: Building an Engaged Campus). Receiving this classification signifies that an institution has proven, through data collection and evidence, that it fosters community engagement by building partnerships with community organizations [26].

Market engagement practices

Encouraging communities inside and beyond the university to adopt co-production requires that we lower the perceived risks of such work. Trumpeting existing initiatives in multiple venues will help build recognition of institutional commitments and provide positive reinforcement. Examples include...

- Promote co-produced research through press releases, website features, podcasts, and alumni newsletters.
Chapter Two: Co-Production as Best Practice

- Host on-campus events to celebrate and promote co-produced research processes and products.

**Provide adequate funding**

As noted, traditional funders may sidestep co-production as it clashes with long-standing research practices and products. Spurring co-production at the institutional level, therefore, suggests universities establish their own funding mechanisms for building external relationships. These need not always be financial...

- Provide course credit and paid opportunities for students investing in building external relationships.

- Fund research that prioritizes external collaboration and co-production [5].

**Example:** The University of Vermont (UVM) Gund Institute for the Environment encourages collaboration by providing Gund Catalyst Awards. The purpose of the funding is to mobilize scholars and decision-makers to understand and address environmental problems through increased collaborative research. Awarded projects receive support from Gund Institute staff from the beginning in order to build relationships with partners outside of academia and work with those who would use the co-produced research [27].

- Facilitate equitable acquisition and distribution of project funding to researchers and community partners by removing bureaucratic barriers to paying non-university partners.

**Reform institution standards and practices**

Evaluation is a key part of university research. In the case of a new, less prescriptive form of research, co-production, evaluation must evolve. This applies to evaluating research objectives and outcomes as well as to evaluations of the quality of community partnerships and the value of co-produced research for academic careers...

- Adopt university-wide standards for evaluation of partnerships during and after project completion and build evaluation into funding awarded for co-production (see Spotlight on page 34).

- Reform tenure and promotion guidelines to reward investments in community engagement and external impact (see Chapter 4: Tenure & Promotion).

**Example:** The University of North Carolina at Chapel Hill utilized several task forces to assess consideration of engaged scholarship in tenure and promotion policies and practices. These various task forces convened over a decade to provide and revise campus-wide recommendations and guidelines for formally recognizing engaged scholarship in tenure and promotion. To this day, it is an ongoing and complicated process but with help from the institution and administration, the process continues to be supported and valued [28]. Continuing to reform tenure and promotion guidelines breaks down barriers for engaged scholars and allows them to take the time necessary to build relationships and participate in co-production.
Facilitate partnerships and provide trainings

Co-production is a high-touch process, requiring constant communication and, frequently, the ability to overcome historic inequities. It must be undertaken seriously and with adequate funding, staffing, training, and outreach...

- Facilitate processes that encourage and sustain partnerships and make it easier to start new partnerships. This includes development of memorandums of understanding, joint intellectual property agreements, hiring dedicated staff for maintaining relationships, and providing access to funding to sustain partnerships between sponsored grants.

- Provide training programs for faculty, staff, and students interested in engaged scholarship:

  **Example:** ESSA [29]: Based at Arizona State University, the Earth System Science for the Anthropocene (ESSA) reading group brings together interdisciplinary graduate students to discuss readings focused on five key themes: collaboration, team science, communication, solutions-driven research, and transdisciplinary scholarship centered around equity and justice. The ESSA reading group is part of a larger ESSA network that fosters collaboration among students, faculty members, and practitioners across disciplines.

  **Example:** DukeEngage [30]: DukeEngage at Duke University provides support for group programs and independent projects that connect students and faculty with communities, locally or globally, to address critical social issues. Projects may include a research focus, though research is not required. Students are immersed in the community they work in for a minimum of eight weeks, with the expectation that the relationship will foster mutual benefits and reciprocal learning. Each student engages in a formal reflection to derive meaning from their experience.

Create an environment for engagement

As noted above, holding co-production meetings off campus is often a way to shake off stakeholder inequities, but it is not always possible. Universities interested in sustained co-production efforts should take steps that make it easy for community stakeholders to participate in on-campus meetings, such as...

- Create welcoming collaboration spaces for hosting off-campus partners that provide free parking, rooms for breastfeeding mothers, access to on-site childcare, and interpreters.

- Provide trained facilitators with experience in co-production and external engagement and train faculty, staff, and students in inclusive facilitation techniques such as Art of Hosting (https://artofhosting.org/).
Norström et al. published a 2020 synthesis of best practices in evaluating co-produced scholarship in sustainability fields. The goal of the synthesis was to develop principles that funders, program managers, and university administrators can use to evaluate co-produced research projects [2]. They suggest an assessment scheme based on four principles of successful co-produced research [2, 15]:

1. **Context-based:** Ensure co-produced processes are grounded in an understanding of a specific challenge: the origins of the challenge; its particular socio-economic, political, and ecological contexts; and the cultures, beliefs, and needs of those affected.

   **Assessment:** Ensure the assessment itself uses concepts and language appropriate to the place, issue and participants, and that participants themselves negotiate the terms of the assessment [31].

   **Guiding questions:**
   - Did the request for co-production originate from an entity already affected by the issue?
   - Are the goals of the co-production process linked to the existing priorities of partners?
   - Will the process strengthen existing skills and relationships between participants working in the context?
   - Will the skills and outputs developed during the process be useful to participants following completion of the initial project [32]?

2. **Pluralistic:** Ensure processes include a range of perspectives, knowledge, and expertise from partners representative of different genders, ethnicities, and ages.

   **Assessment:** Use a mix of quantitative and qualitative indicators to document the participation of stakeholders. Instead of waiting until the end of the project to interview or survey participants, utilize video diaries or short, periodic surveys throughout the process to evaluate group dynamics and research impact [33, 34]. Participatory evaluation methods (see glossary) such as participant surveys or focus groups can be used to link participant representativeness, interactions, and input to outcomes like knowledge gains, decision-making capacity, and network quality [31, 34, 35].

3. **Goal-oriented:** Articulate clearly defined, shared, meaningful intentions and objectives that are related to the specific challenge.
Assessment: Develop a theory of change (see glossary) for the project that outlines expected outputs, outcomes, and impacts, so that these can be evaluated throughout and after the project. Evaluating co-produced research processes can be done in layers. Proximate assessment may center around building new relationships, understandings, and social networks [35]. Other short-term indicators may focus on changes in capacity to address a given challenge, or increased attention given to the issue by media and non-academic publics. Medium-term indicators relate to the degree to which project outputs are used by partners or other non-academic actors to inform actions or policies, and can be tracked with indicators that link knowledge generation to decision-making [35, 36]. Fulfillment of larger-scale, longer-term, or less tangible goals can be difficult to attribute to the co-production process, but several approaches can help:

- Contribution analysis establishes causality through incremental changes attributed to interventions throughout a process [37].
- Developmental evaluation and related approaches use real-time rapid feedback data to enable a project to continually evolve to meet its goals over short and longer terms [38–40].
- To track progress on large-scale, long-term social or environmental objectives, include ongoing monitoring as a project goal that allows for continued assessment beyond the project timeline.

See Chapter 3: Metrics for Assessing Research Impact for more information about measuring attention, uptake, and impact.

4. Interactive: Ensure processes produce ongoing learning, active engagement, and frequent, quality interactions among participants.

Assessment: Capture the nature, frequency, and quality of interactions among participants through quantitative metrics derived from attendance lists or meeting minutes, or through richer qualitative approaches using interviews or open-ended surveys. Assessment should also capture learning, how perceptions of participants change or stay the same throughout the process, the degree to which a shared perspective on the problem emerges, and participants’ perceptions of equity of process [36]. Shared perspectives will not always result from co-produced processes, but there should be evidence of mutual respect of different knowledge systems and perspectives, and evidence that language and terms are communicated effectively and understood by all participants [41].
# HOW-TO GUIDES AND TOOLKITS

<table>
<thead>
<tr>
<th><strong>Collective Impact Forum</strong></th>
<th>Offers resources for “collective impact work” and a self-assessment tool to determine readiness for undertaking co-production initiatives [42].</th>
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<tbody>
<tr>
<td><strong>Co-create</strong></td>
<td>Offers a publicly available curriculum for undertaking projects co-designed by multiple stakeholder types, e.g., users, customers, employees, and partners [43].</td>
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<tr>
<td><strong>NIHR INVOLVE</strong></td>
<td>Provides a handbook called “Guidance on co-producing a research project” that discusses the key principles of co-produced research [11].</td>
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<tr>
<td><strong>Co-production Portal</strong></td>
<td>A web portal toolbox, from the Swiss Academy of Sciences, that offers a search tool to explore methods and tools for co-producing knowledge, submitted by transdisciplinary practitioners [44].</td>
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<tr>
<td><strong>i2S</strong></td>
<td>A toolkit from the Australian National University that is committed to promoting Integration and Implementation Sciences (i2S) as a new discipline centered on improving research impact on complex real-world problems. The i2S website houses extensive resources on tools, approaches, and case studies, as well as opportunities for sharing resources (journals, conferences, etc.) [45].</td>
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<tr>
<td><strong>ODI (now the Digital Societies programme)</strong></td>
<td>Offers “ROMA: a guide to policy engagement and policy influence”, which is a roadmap for diagnosing problems, developing strategies to address problems, and monitoring and learning from actions [46].</td>
</tr>
<tr>
<td><strong>“Doing Science Differently: Co-producing Conservation Outcomes”</strong></td>
<td>A synthesis paper on co-production best practices from the Luc Hoffmann Institute that is aimed at conservation scientists [6].</td>
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<tr>
<td><strong>“A practical guide for sparking co-productive agility”</strong></td>
<td>A practical roleplay guide, developed by researchers, that can be used to “spark dialogue on how to foster co-productive agility in any setting.” This teaching tool allows people to reflect on roles often taken on during co-production processes with the intention of fostering more agile actors, who have a willingness to navigate the various tensions and agendas of those involved [47].</td>
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<tr>
<td><strong>“Why Am I Always Being Researched?”</strong></td>
<td>This is “a guidebook for community organizers, researchers, and funders to help us get from insufficient understanding to more authentic truth.” Power dynamics among these groups have created an uneven field on which research is designed. Chicago Beyond created this guide to shift the power dynamics and rethink how research is conducted [48].</td>
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COSTS OF CO-PRODUCTION

Compared to conventional research, co-production takes relatively more facilitation expertise, participant commitment, and time to develop and produce research. Co-production is dependent upon having or setting aside the time to build and maintain relationships, access to funds to support community partners throughout the engagement, and flexibility with regard to evolving timelines and expectations for final products [3]. In this way, co-produced research can be both riskier and costlier than traditional disciplinary research that is not dependent on relationships with outside partners. Community partners may become fatigued if they are consistently sought out for advice or collaboration [7] and researchers may find themselves without recognized knowledge products if collaborations fall apart. Lemos et al. 2018 emphasize that the close interaction between researchers and community members may be taxing or intimidating. Both parties may feel that they do not have “the training, personal inclination, understanding of each other’s context or organization support to participate in co-production” [7]. Oliver et al. 2019 [3] describe some of these risks, summarized below. We encourage researchers to consider both the costs and the potential benefits of co-produced research, recognizing that not all aspects of the process of co-production can be controlled.

Recreated from Figure 1 from Oliver, K., Kothari, A. & Mays, N. The dark side of coproduction: do the costs outweigh the benefits for health research? Health Res Policy Sys 17, 1–10 (2019).
Chapter Two: Co-Production as Best Practice

CONCLUDING THOUGHTS

Research shows that co-produced research helps to bring diverse groups together and results in knowledges considered more socially relevant, informative for decision-making, and widely accepted by the public. Making co-production part of the research university toolkit means administrators and leaders must remove barriers that disincentivize co-production and offer adequate resources and necessary support for all stakeholders. Co-production is not, in other words, without its costs. Understanding those costs—whether they accrue to the institution or its partners—and finding ways to remediate them is part of establishing best practices. We highlight a few of the universities and programs that have been effective in promoting co-production as a form of engaged scholarship. Following in their footsteps will lead to more widespread adoption of co-production, and a shorter learning curve with regards to the best practices most appropriate to each undertaking.

REFERENCES


