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### Setting the Stage for Co-Production

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# Chapter 7

## Setting the Stage for Co-Production



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**Abstract** Participatory scenario visioning aims to expose, integrate, and reconcile perspectives and expectations about a sustainable, resilient future from a variety of actors and stakeholders. This chapter considers the settings in which transdisciplinary participatory visioning takes place, highlighting lessons learned from the Urban Resilience to Extremes Sustainability Research Network (UREx SRN). It reflects on the benefits of engaging in the co-production process and the challenges that must be considered amid this process.

**Keywords** Co-production · Participatory · Decision-making · Governance

### 7.1 Co-Production to Address Urban Resilience Challenges

Envisioning positive change can help urban leaders imagine and transition to more sustainable and resilient futures for cities. Cities face seemingly insurmountable and complex resilience challenges—supporting transparent and just governance systems, reducing environmental inequities, addressing failing infrastructure—all compounded by the uncertainties of climate change (Elmqvist 2018; Rosenzweig

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99

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and Solecki 2018; van der Heijden 2019). Collectively, we need to consider not just what can or could happen, but also what *ought* to happen to ensure a city is resilient in the face of climate change.

Imagining outside-of-the-box ideas in alternative future visions can inspire innovative solutions to meet city goals (Bai et al. 2016; Bennett et al. 2016; McPhearson et al. 2016; Pereira et al. 2018; Iwaniec et al. 2020; Chap. 6). In a complex system such as a city, envisioning the future must incorporate values and expertise from diverse communities and sectors. As a form of participatory engagement, we focus on transdisciplinary co-production of knowledge and solutions that reflect the diverse values, knowledge, and future expectations of the stakeholders involved.

Participatory processes can take many forms, and the engagement setting differs depending on the project goals, resources and capacities, and disciplinary perspectives (Miller and Wyborn 2018; Wyborn et al. 2019). In planning, participatory processes engage residents directly in decisions about their communities, exemplified by processes such as participatory budgeting. In this book and chapter, we refer to participatory to mean the engagement of diverse stakeholders, inclusive of decision-makers, community leaders, community members, or academics. Here, the participatory process is the active involvement of academic and non-academic stakeholders in sharing ideas or providing feedback through workshops, interviews, focus groups, or surveys. Co-production, on the other hand, more specifically refers to co-developing or co-learning new ideas or forms of knowledge together. Co-production of ideas goes beyond just sharing ideas or extracting information from a particular group; it often involves reconciling differences and finding new, shared understandings through an interactive and iterative participatory process.

In sustainability science, co-production is an instrumental approach to resilience and sustainability planning, or more generally to problem-solving, that involves active, collaborative engagement with diverse partners. This approach is often time-consuming and messy. However, we posit that a pluralistic co-production of ideas enhances our ability to advance future urban planning with more sustainable solutions for urban transformation (Pereira et al. 2018; Iwaniec et al. 2019; Elmqvist et al. 2019). Moreover, engaging an inclusive set of partners is key to developing legitimate, actionable, and salient research and policy agendas (Schwarz and Herrmann 2016; Acuto et al. 2018; Wyborn et al. 2019; Norström et al. 2020; Ruiz-Mallén 2020).

In this chapter, we briefly describe the co-production process in the Urban Resilience to Extremes Sustainability Research Network (UREx SRN). To inform the development of co-production visioning projects, we build on our collective experience from the UREx SRN, as well as existing literature, by highlighting some lessons learned on key elements of meaningful co-production and the challenges that can arise during the process.

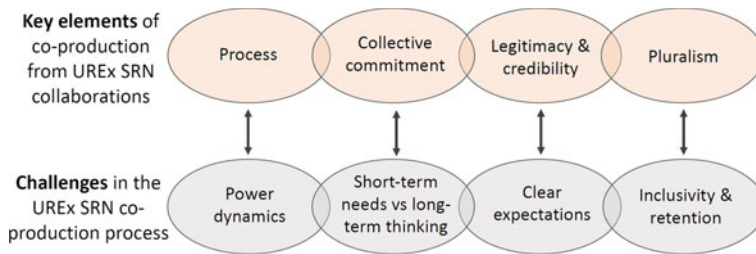
## 7.2 Co-Production of Positive Long-Term Visions in the UREx SRN

In the UREx SRN, the co-production approach was designed to guide a participatory process of long-term scenario visioning to address urban resilience and sustainability challenges in nine cities, each with their own unique partners and goals. The co-production process began in each city with an initial scoping phase. The scoping phase identified potential partners, needs of the city, preliminary shared goals, and key themes for the future visions. It was completed through three steps: (1) one-on-one discussions or world-café (i.e., round robin) idea generation with academic and non-academic partners, (2) a governance document analysis to capture the existing goals and strategies contained in city plans (see Chap. 3), and (3) a governance survey to capture a broader set of actors' visions and expectations beyond the formal, governmental (dominant) visions (see Chap. 6; Muñoz-Erickson et al. *under review*). The visioning process was intended as an intervention or catalyst in support of governance processes and dynamics in which the cities were already immersed. For example, in 2015 in Valdivia, Chile, a Sustainability Plan of Action (City of Valdivia 2015) was developed in collaboration with the InterAmerican Development Bank; the UREx SRN co-production process built upon the existing Sustainability Plan to further develop the goals with specific targets and to challenge the visions toward being even more ambitious, creative, and transformative.

The co-production of future visions occurred primarily through a participatory workshop setting. The workshops were designed to bring together different sectors and actors to deliberate and work toward a shared articulation of plausible and desirable futures—positive futures. The participatory workshops centered around developing alternative visions during facilitated small-group and plenary activities with approximately 35–45 participants (see Chap. 6). The scenarios formed the basis for framing the diverse challenges cities face, understanding and exploring feedbacks and tradeoffs of future decisions, as well as guiding pathways for future decision-making.

## 7.3 Elements of Co-Production

Drawing from our collective experiences and a significant body of literature, we highlight four key elements that have been critical in the UREx SRN approach to co-production: focusing on process, finding a collective commitment, ensuring credibility and legitimacy of the work, and capturing a diversity of perspectives (Fig. 7.1; Box 7.1).



**Fig. 7.1** Key elements and challenges that can arise in the participatory process of co-production

### 7.3.1 *Process and Outcomes*

Co-production centers process as much as it centers outcomes. Meaningful outcomes can include the emergence of new and shared knowledge, innovative solutions with targets, new relationships, or the development of new collective capacities. Achieving these goals requires an iterative process with flexible short- and long-term plans and a mix of creative forms of engagement (Cvitanovic et al. 2019). As a collaborative and inclusive endeavor, co-production includes academic and non-academic stakeholders as full equal partners, each contributing diverse expertise. It places stakeholders' knowledge, opinions, and aspirations at the center of the process. In practice, this requires active engagement and commitment throughout the project, including the initial framing and budgeting to equitably account for individuals' contributions.

### 7.3.2 *Collective Commitment*

Partners in meaningful co-production need a collective commitment—a shared goal to address the challenges of a particular place (Norström et al. 2020). The collective commitment can be determined in the initial scoping phase. The commitment must reflect an acknowledgement of the history and politics involved in that place and a willingness to listen, share, and learn new ideas as the project evolves. The process inevitably will involve challenges, such as reconciling contested meanings, exploring new uncertainties, and navigating power dynamics and dissent. However, by creating a deliberate space for co-learning around a collective goal, these problems can be addressed. The facilitators must make space for building rapport, trust, and meaningful relationships through an iterative, reflective, and flexible process. For example, through activities focused on unraveling assumptions and exploring new ideas, participants may find commonalities in which they reconcile contested meaning and build a shared—sometimes new—understanding of future urban resilience challenges (Galafassi et al. 2018).

### 7.3.3 *Credibility and Legitimacy*

The co-production process can produce actionable and credible knowledge for urban planning (Nevens et al. 2013; Muñoz-Erickson et al. 2017). It acknowledges that integrating diverse stakeholder perspectives has the essential role of making evident the complexities and needs of the system. Thus, drawing together the local knowledge of participants, co-production can improve capacity for developing credible strategies and solutions that account for the nuances of the city. Through the co-production process, participants describe all aspects of these solutions: the goals and targets of the interventions and who will benefit from them; the underlying values, knowledge, evidence, and potential tradeoffs; the envisioned actions, plus the needed roles and responsibilities to achieve those actions; and who is involved in implementation and governance. Thus, this collaborative process increases the legitimacy and credibility of shared solutions that can be championed by both communities and decision-makers.

### 7.3.4 *Diversity of Perspectives*

Co-production is a pluralistic process (Norström et al. 2020). The process can create new roles for partners, equalize power dynamics, and prioritize a more equitable representation of diverse perspectives. For example, participatory processes can be an opportunity for marginalized voices in the community to lead in idea generation and planning, thus contributing to future policy decisions. The process integrates scientific and non-scientific inquiry and various forms of knowledge—including those from impacted communities—blurring the distinction between the knowledge producer and the knowledge user (Muñoz-Erickson 2014). In addition, new networks are created in which marginalized communities are equal partners with—or in some instances, given preference over—the dominant voices and visions driving decisions on future urban resilience. Participation in the co-production process can also build multiple capacities, including adaptive (Eakin et al. 2014), anticipatory (see Chaps. 11 and 6), and transformative capacities (Wolfram 2016; Wolfram et al. 2019; Chap. 6).

#### **Box 7.1 Operationalizing co-production in the UREx SRN**

The **process and outcomes** of practitioner–researcher interactions in Hermosillo, Mexico: Through an iterative process, the Hermosillo city stakeholders and research partners engaged equally in the scenario development process through group discussions (virtual and in-person), joint research, and collective workshop design. The diverse forms of knowledge and ideas were reflected in both themes and goals of the ultimate scenario visions, which

ranged from addressing urban safety to extreme heat stress. After participatory visioning workshops, the transdisciplinary team formed thematic working groups, *Mesas de Trabajo*, to continue integrating the co-developed visions into upcoming governance plans. **Outcomes:** new partnerships, shared knowledge, continued engagement in *Mesas de Trabajo* beyond the participatory visioning workshop, contribution to planning documents.

**Collective commitment** from the practitioner-research team in Valdivia, Chile: A strong rapport and collective commitment existed between the city stakeholders and researchers, who shared an understanding of the city's challenges related to wetland conservation and flooding. Despite challenges and uncertainties throughout the process (e.g., funding, changing roles and jobs, election of new officials with different priorities, and evolving needs), an integrated future vision was co-produced through on-going engagement resulting from meaningful, trust-based relationships. Throughout, new ideas were openly explored and a common framework for urban sustainability, resilience, and transformations was developed and reconciled as needed. **Outcomes:** integrated vision with concrete strategies.

Enhancing **credibility and legitimacy** of governance frameworks for resilience in Portland, Oregon: Meaningful collaborations were formed with the Disaster Resilience and Recovery Action Group, the City of Portland, and UREx SRN that built on earlier participatory scenario efforts (Resilience Infrastructure Planning Exercise, 2018). The co-production process uncovered the complexities of the city's governance structures and the subtle, often-hidden barriers that needed to be overcome. The collaborations resulted in a shift in mindset from "resilience-as-harm-reduction" to "resilience-as-thriving" before and after a disaster. By synthesizing perspectives and finding areas of strategic overlap among different visioning participants, the credibility of shared strategies and goals was enhanced. **Outcomes:** emergent governance structures and shared principles for resilience.

Empowering **diverse perspectives** by co-producing future scenarios in Phoenix, Arizona: The series of scenario workshops in Phoenix was attended by a diverse group of community leaders and decision-makers, including representatives from federal, tribal, state, county, and city agencies, as well as non-governmental organizations and universities. Here, and across UREx SRN cities, creative and analytical activities captured the diverse ways in which desirable futures are envisioned among participants in the workshops. Co-production activities included different forms of scoping and framing (described above), structured knowledge-sharing conversations, World Cafés with a round-robin format to build ideas, individual and collective brainstorming, creative storytelling, and spatial and temporal participatory mapping. **Outcomes:** integration of different forms of scientific and non-scientific analysis and knowledge systems, including those from marginalized communities.



## 7.4 Confronting the Challenges of Co-Production

Co-production is touted as a way to improve decision-making and research on urban resilience; however, it entails important challenges, such as power dynamics, a tension between short- and long-term thinking, unclear expectations, and failure to include all relevant perspectives (Fig. 7.1; Box 7.2; Lemos et al. 2018; Wyborn et al. 2019; Jagannathan et al. 2020). Dealing with these challenges—which evolve throughout a project—requires flexibility, reflexivity, and open communication.

### 7.4.1 *Power Dynamics*

Power differentials underpin the interactions between groups that have patently diverse and competing agendas, priorities, assumptions, and ways of understanding the city. Uneven power dynamics surface while engaging with diverse stakeholders (Johnson et al. 2016; Frantzeskaki and Rok 2018; Turnhout et al. 2020). Although experienced facilitators and careful activity design can help to navigate power dynamics, they never fully go away and thus must be acknowledged and managed. Likewise, some degree of tension can be productive; a workshop where everyone agrees probably signals that disagreement is simply repressed, in which pre-existing power dynamics are “containing” new or radical ideas and forcing superficial consensus. This repression can lead to lack of engagement, distrust, and ultimately a loss of project legitimacy. Too much tension is equally detrimental. Walking this fine line is an art and a science, but facilitators can help by being transparent about goals and intentions, establishing and respecting boundaries, sitting with the tensions (rather than offering solutions), creating an atmosphere where people feel safe (but not necessarily comfortable), and centering and amplifying underrepresented voices. The organizing team should take care to structure activities such that all voices are equally valued and scrutinized. Moreover, the activities must work toward building bridges and weaving existing knowledge into something new, rather than forcing integration that may lead to privileging one form of knowledge over another.

### 7.4.2 *Short-Term Needs and Long-Term Thinking*

The UREx SRN workshops are often situated in a context that requires balancing long-term visioning with short-term needs. Addressing future resilience and climate challenges requires a long-term perspective paired with a long-term commitment to the (often slow) co-production process. The co-production visioning process requires that communities have the time, resources, and capacity to focus on long-term future visioning, alongside more urgent and immediate needs (Berbés-Blázquez et al. 2018; Turnhout et al. 2020). The long-term future can seem intractable or even irrelevant in

the face of current needs and challenges of communities vulnerable to flooding, heat stress, or other climate resilience challenges. Action is needed now. At the same time, investing in short-term solutions triggered by crisis events can result in maladaptation (Anderson et al. 2018). To facilitate this discussion, it is helpful to articulate the need for anticipatory, long-term futures in order to make better decisions today, as well as to reflect on the fact that problems of today are the product of past decisions. Ideally, co-production processes go beyond one-time initiatives toward a sustained process where both short- and long-term strategies are routinely explored, stress-tested, and evaluated to allow for exploration of uncertainties and generation of creative works.

### ***7.4.3 Clear Expectations***

There are often disconnects among the needs and priorities of partners from academia, communities, and civic and municipal organizations. For both academic and non-academic partners, it is critical to set clear expectations—acknowledging the limitations of the project, the scope of resources, and intended outcomes (Jagannathan et al. 2020). Expectations should be tailored based on the resources available to bridge existing, on-going work in cities with the co-production of long-term goals and visions. Likewise, clear guidelines should be set to ensure the products and follow-up are timely, accessible, and useful for partners. The value of products that can arise from the same work may vary greatly. For example, academic outputs in peer-reviewed journals, for which researchers will receive credit in their institutions, are often inaccessible to non-academic partners and may not highlight the most relevant outcomes or actionable pathways that practitioners need in implementing outcomes. There is, therefore, a need to develop a communication strategy that includes non-academic products, such as reports, websites, guides and manuals, or podcasts that speak to broader audiences. The project must set aside resources and time for continuous outreach and dissemination of findings with the team.

### ***7.4.4 Inclusivity and Retention***

Inclusivity and retention of diverse perspectives in the process—not just the most vocal or dominant views—is essential. It can be difficult to determine who to involve in the co-production process (Frantzeskaki and Rok 2018). Some projects may focus on expert-led discussions while others will feature community-led discussions or a diverse mix; regardless, the process will gain legitimacy with a balanced representation of appropriate partners, each open to disparate world views. Retention can also be a challenge, particularly as the co-production process and research outputs are typically slow. Co-production necessitates flexibility in daily obligations and work expectations; participating is a privilege of those with time, resources, and flexibility

(Frantzeskaki and Rok 2018; Cvitanovic et al. 2019). Likewise, participants' attention and time may be drawn to more pressing needs. For non-academic stakeholders, this may require resources, such as monetary compensation for transportation and child care, or approval by employers for time spent participating in the activities outside of daily responsibilities. On the other hand, academics may need to press for institutional support that acknowledges the time, effort, and relevance of participatory research and engagement with non-academic stakeholders.

### **Box 7.2 Confronting co-production challenges in the UREx SRN**

**Addressing conflict and power dynamics:** Conflicts will arise and are a signal of meaningful co-production through hard conversations. Yet, power dynamics must be managed to allow for equitable contributions. In the UREx SRN co-production process, small-group facilitators participate in pre-workshop training to help address power dynamics among participants, and activities are centered on negotiation and deliberate consensus building. Similarly, throughout the workshop, participants are asked to reflect on a set of “ground rules” agreed upon at the beginning, such as considering how much they are speaking and if they need to “step up or step back” in their role at the table.

**Reconciling short-term needs and long-term thinking:** Long-term, positive visioning is a useful tool to think beyond the current system constraints and to avoid focusing on small tweaks. However, current needs and short-term implementation plans must also be addressed. In Baltimore, Maryland, to center long-term visions addressing multi-jurisdictional watershed management on near-term transitions, the team met in a series of follow-up workshops to develop actionable implementation (5–10 years) timelines. The timelines highlighted short-term and specific metrics, budgeting, financing, and governance mechanisms, new partnerships, and communication and education strategies. In other cities, such as San Juan, Puerto Rico, and Hermosillo, Mexico, practitioner-research teams developed *Mesas de Trabajo* (working groups) to further address short-term implementation plans.

**Establishing clear expectations:** Setting expectations about timeline, commitment, resources, and anticipated outcomes early in the process is critical. With nine cities, a challenge in the UREx SRN co-production process has been maintaining meaningful engagement and producing context-dependent outputs on a timescale relevant to practitioner and community needs in all cities. Through a Knowledge-Action Taskforce, we work with city teams to offer a series of products, including the Future Cities podcast (in Spanish and English), the interactive Urban Resilience data visualization platform (<https://urex.urbansystemslab.com/>), story maps, reports and slides highlighting modeling and scenario outputs, as well as academic papers.

**Maintaining inclusivity and retention:** In UREx SRN visioning workshops, participants varied throughout the process and across the cities. For example, in Phoenix, Arizona and New York City, New York, emphasis was

placed on including local planning officials and community leaders, whereas in Miami, Florida and Syracuse, New York, participants comprised academics and city practitioners focused on resilience and recovery. Awareness of the ways in which local contexts, governance structures, and knowledge networks can affect participation is critical in keeping participants engaged and collectively working toward the desired outcomes. Across a network of nine diverse cities, the challenge of keeping participants engaged is significant and requires considerably more time, institutional and financial support, expertise, personal commitment to build meaningful relationships, as well as flexibility, creativity, diplomacy, and patience. A risk lies in opting for familiar partners and approaches, and to this end, regular UREx network evaluations have proven useful.

## 7.5 Moving Co-Production Forward

Co-production presents important benefits and opportunities for urban transformation and resilience planning. There is value in creating a space for creativity, interacting with new individuals, and co-learning. Yet, co-production is at times aspirational in its goals and the challenges of this process must be acknowledged and addressed. When careful attention is paid to the process of collaborative engagement, the co-production process has potential to build capacity for on-going co-learning and continued engagement in resilience planning.

## References

- Acuto M, Parnell S, Seto KC (2018) Building a global urban science. *Nat Sustain* 1(1):2. <https://doi.org/10.1038/s41893-017-0013-9>
- Anderson SE, Bart RR, Kennedy MC et al (2018) The dangers of disaster-driven responses to climate change. *Nat Clim Change* 8(8):651–653. <https://doi.org/10.1038/s41558-018-0208-8>
- Bai X, van der Leeuw S, O'Brien K et al (2016) Plausible and desirable futures in the Anthropocene: a new research agenda. *Global Environ Change* 39:351–362. <https://doi.org/10.1016/j.gloenvcha.2015.09.017>
- Bennett EM, Solan M, Biggs R et al (2016) Bright spots: seeds of a good Anthropocene. *Front Ecol Environ* 14(8):441–448. <https://doi.org/10.1002/fee.1309>
- Berbés-Blázquez M, Iwaniec D, Grimm N et al (2018) Positive visions for sustainable, resilient, and equitable cities. *The Nature of Cities*. <https://www.thenatureofcities.com/2018/04/21/positive-visions-sustainable-resilient-equitable-cities/>. Accessed 15 Jun 2020
- City of Valdivia (2015) Plan de Acción de Valdivia, Chile. Programa Ciudades Emergentes y Sostenibles (CES). <https://webimages.iadb.org/PDF/PLAN+DE+VALDIVIA+27-05.pdf>. Accessed 07 Jul 2020

- Cvitanovic C, Howden M, Colvin RM et al (2019) Maximising the benefits of participatory climate adaptation research by understanding and managing the associated challenges and risks. *Environ Sci Policy* 94:20–31. <https://doi.org/10.1016/j.envsci.2018.12.028>
- Eakin HC, Lemos MC, Nelson DR (2014) Differentiating capacities as a means to sustainable climate change adaptation. *Global Environ Change* 27:1–8. <https://doi.org/10.1016/j.gloenvcha.2014.04.013>
- Elmqvist T (2018) *The urban planet: knowledge towards sustainable cities*. Cambridge University Press, Cambridge, UK
- Elmqvist T, Andersson E, Frantzeskaki N et al (2019) Sustainability and resilience for transformation in the urban century. *Nat Sustain* 2(4):267–273. <https://doi.org/10.1038/s41893-019-0250-1>
- Frantzeskaki N, Rok A (2018) Co-producing urban sustainability transitions knowledge with community, policy and science. *Environ Innov Soc Trans* 29:47–51. <https://doi.org/10.1016/j.eist.2018.08.001>
- Galafassi D, Daw TM, Thyresson M et al (2018) Stories in social-ecological knowledge cocreation. *Ecol Soc* 23(1):23. <https://doi.org/10.5751/ES-09932-230123>
- Iwaniec DM, Cook EM, Barbosa O et al (2019) The framing of urban sustainability transformations. *Sustainability* 11(3):573. <https://doi.org/10.3390/su11030573>
- Iwaniec DM, Cook EM, Davidson MJ et al (2020) The co-production of sustainable future scenarios. *Landscape Urban Plann* 197:103744. <https://doi.org/10.1016/j.landurbplan.2020.103744>
- Jagannathan K, Arnott JC, Wyborn C et al (2020) Great expectations? reconciling the aspiration, outcome, and possibility of co-production. *Curr Opin Environ Sustain* 42:22–29. <https://doi.org/10.1016/j.cosust.2019.11.010>
- Johnson JT, Howitt R, Cajete G et al (2016) Weaving indigenous and sustainability sciences to diversify our methods. *Sustain Sci* 11:1–11. <https://doi.org/10.1007/s11625-015-0349-x>
- Lemos MC, Arnott JC, Ardoin NM et al (2018) To co-produce or not to co-produce. *Nat Sustain* 1(12):722–724. <https://doi.org/10.1038/s41893-018-0191-0>
- McPhearson T, Iwaniec DM, Bai X (2016) Positive visions for guiding urban transformations toward sustainable futures. *Curr Opin Environ Sustainability* 22:33–40. <https://doi.org/10.1016/j.cosust.2017.04.004>
- Miller CA, Wyborn C (2018) Co-production in global sustainability: histories and theories. *Environ Sci Policy*. <https://doi.org/10.1016/j.envsci.2018.01.016>
- Muñoz-Erickson TA (2014) Co-production of knowledge–action systems in urban sustainable governance: the KASA approach. *Environ Sci Policy* 37:182–191. <https://doi.org/10.1016/j.envsci.2013.09.014>
- Muñoz-Erickson TA, Miller CA, Miller TR (2017) How cities think: knowledge co-production for urban sustainability and resilience. *Forests* 8(6):203. <https://doi.org/10.3390/f8060203>
- Nevens F, Frantzeskaki N, Gorissen L et al (2013) Urban transition labs: co-creating transformative action for sustainable cities. *J Cleaner Prod* 50(1):111–122. <https://doi.org/10.1016/j.jclepro.2012.12.001>
- Norström AV, Cvitanovic C, Löf MF et al (2020) Principles for knowledge co-production in sustainability research. *Nat Sustain* 1–9. <https://doi.org/https://doi.org/10.1038/s41893-019-0448-2>
- Pereira LM, Hichert T, Hamann M et al (2018) Using futures methods to create transformative spaces: visions of a good Anthropocene in southern Africa. *Ecol Soc* 23(1):19. <https://doi.org/10.5751/ES-09907-230119>
- Rosenzweig C, Solecki W (2018) Action pathways for transforming cities. *Nat Clim Change* 8:756–759. <https://doi.org/10.1038/s41558-018-0267-x>
- Ruiz-Mallén I (2020) Co-production and resilient cities to climate change. In: Nared J, Bole D (eds) *Participatory research and planning in practice*. Springer International Publishing, Cham, Switzerland, pp 1–11
- Schwarz K, Herrmann DL (2016) The subtle, yet radical, shift to ecology for cities. *Front Ecol Environ* 14(6):296–297. <https://doi.org/10.1002/fee.1288>

- Turnhout E, Metzger T, Wyborn C et al (2020) The politics of co-production XE “co-production”: participation, power, and transformation. *Curr Opin Environ Sustain* 42:15–21. <https://doi.org/10.1016/j.cosust.2019.11.009>
- van der Heijden J (2019) Studying urban climate governance: where to begin, what to look for, and how to make a meaningful contribution to scholarship and practice. *Earth Syst Gover* 1:100005. <https://doi.org/10.1016/j.esg.2019.100005>
- Wolfram M (2016) Conceptualizing urban transformative capacity: a framework for research and policy. *Cities* 51:121–130. <https://doi.org/10.1016/j.cities.2015.11.011>
- Wolfram M, Borgström S, Farrelly M (2019) Urban transformative capacity: from concept to practice. *Ambio* 48(5):437–448. <https://doi.org/10.1007/s13280-019-01169-y>
- Wyborn C, Datta A, Montana J et al (2019) Co-producing sustainability: reordering the governance of science, policy, and practice. *Annu Rev Environ Resour* 44:319–346. <https://doi.org/10.1146/annurev-environ-101718-033103>

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