# Co-Governance and Resilience Justice

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*Abstract*

In co-governance, governance authority and management responsibility for resources, environments, or infrastructure are shared by the government and communities. Distinct institutions of co-governance emerge and evolve from the grassroots struggles of marginalized and oppressed communities for justice, empowerment, and resilience (capacities to adapt to disturbances and changing conditions). Instead of merely forming commons or merely making government processes/structures more participatory and

inclusive, these communities form new institutional structures that integrate governmental power and resources with community power and resources. We show that co-governance institutions arise less out of a concern for efficient and sustainable use of resources and more out of a concern for social equity and community capacities. Building on Ostrom's work on polycentric collective governance institutions and more recent scholars' studies of key features of co-governance, we articulate the design principles of co-governance institutions that are specifically aimed at equity (justice) and community resilience in marginalized and oppressed communities. Using examples of co-governance in both Global South and Global North regions, we explore how these design principles address resilience justice problems.

## I. Co-Governance

Elinor Ostrom (1990) changed how the world thinks about the governance of resources, environments, and infrastructure when she showed that the options weren't limited to centralized government control and decentralized private market transactions. She observed that people collectively govern and manage resources as commons and that a commons is a rational, functional form of governance. She further illuminated the essential features or design principles of commons that result in efficient and fair governance (Ostrom 1994; Polski & Ostrom 1999; McGinnis 2011).

Building on Ostrom's leadership in exploring real-world environmental, resource, and community governance examples to challenge binary thinking about governance options, other scholars have pushed beyond the boundaries of Ostrom's trinary taxonomy, examining a variety of hybrid governance institutions consistent with Ostrom's work on polycentric governance (Brandsen & Pestoff 2006; Ros-Tonen et al. 2014, 3000, 3003; Cooper et al. 2023, 2; Ibor et al. 2023, 348-49). There are governance systems that don't fall neatly into the government, market, or commons categories. Co-governance does not fit neatly into Ostrom's trinary taxonomy of government, market, or commons.

Co-governance is a system of shared governance power between the government and human communities (Arnold et al. 2021, 694). Co-governance arrangements have emerged out of the inadequacies and inequities of traditional governance structures. Co-governance arrangements might evolve from a merger or hybridization of government control and commons management of resources, environments, or infrastructure. State actors might believe that the efficiency, legitimacy, and/or efficacy of their governance functions might be improved if they were to rely more substantially on community members' expertise and roles. Commons often need support, resources, and legal authority from the state in order to function in modern society and therefore might

evolve towards a co-governance structure. Whether driven by top-down power or bottom-up activism or some nuanced mix of the two, co-governance institutions typically emerge in the context of the demands of local communities for more power and improved equity regarding the resources, environments, and infrastructure on which they depend (Boillat & Bottazzi 2020; Arnold et al. 2021; Parsons et al. 2021; Foster & Iaione 2022, 28-29, 40-41, 80-84; Megens et al. 2022; Arnold et al. 2024).

It's increasingly useful to think of co-governance as a distinct category of governance structure, not merely an addition of two other categories. Furthermore, co-governance is distinguishable from related concepts of co-management and co-production, although the three terms are sometimes used interchangeably in the literature and in practice (e.g., Birkes 2009; Light 2010). Specifically, co-management is the sharing of resource (or environmental or infrastructure) management authority and responsibility by both the government and one or more non-governmental entities, such as a community, resource-user group, or other stakeholder group (Mohamed 2002; Washburn 2022). Co-production refers to the collaboration of the public with government or experts in the production of services, infrastructure, goods, or knowledge (Brandsen & Pestoff 2006; Strokosch & Osborne 2020). The relationship between co-management and co-governance is often viewed as a blurred continuum in which shared management responsibilities can or should lead to greater devolution of governance power to community participants (e.g., Mohamed 2002). Likewise, co-production has been characterized as generating grassroots-empowering governance (Mitlin 2008).

While many co-governance systems incorporate co-management and co-production strategies, management and production activities are subsets of environmental, resource, and infrastructure governance. Co-governance involves governmental entities and human communities sharing power over planning, policy formulation, policy implementation, resource allocation, the nature and scope of power, the design and functioning of the governance system itself, and other aspects of governance (Arnold et al. 2021, 694-704; Arnold et al 2024, II.B.). For example, the involvement of an indigenous community with a government agency in the creation of a climate-adaptive watershed model (co-production) or in the management of water releases (co-management) is both smaller in scope and different in substance from the indigenous community have co-equal governance power over the entire watershed system (e.g., Arnold et al., 2023).

There are four essential features of co-governance. The first is ***shared governance power*** over environments, resources and/or infrastructure. The second is ***two categories of governance entities*** that share power with each another: 1) one or more governmental entities (i.e., state actors) and 2) one or more human communities (i.e., non-state

collectives). The third is a defined set of environments, resources, and/or infrastructure that is the ***object of shared governance power***. The fourth is one or more ***purposes for which co-governance arrangements have arisen*** instead of complete control of the environment, resources, or infrastructure by solely the government, solely private markets, or solely a commons.

The purposes of various forms of resource governance systems might include efficient management of the resource, productive use of the resource, sustainability of the resource, and/or concentration and maintenance of power over the resource usually by special interests or classes in society. Co-governance is a form of resource governance that especially serves two other purposes: the equitable control, management, and use of the resource and the resilience (i.e., adaptive capacities) of the systems – including human communities – of which the resource is a part. We refer to the combination of these two governance purposes as "resilience justice."

## II. Resilience Justice and Co-Governance

Resilience justice is a conceptual framing of justice and injustice that concerns the equitable and inequitable capacities and vulnerabilities of human communities (____). Marginalized and oppressed communities, especially low-income communities, communities of color, indigenous communities, housing-insecure communities, and others, typically have lesser capacities to adapt to disruptions, such as sudden shocks and changing conditions (____). They are more vulnerable to disasters, climate change, housing displacement, economic shocks, food insecurity, environmental contamination, health crises, and social and political unrest, among others (___). This is because marginalized communities don't have the same strength to resist unwanted disruptions, capacity to recover from disasters, flexibility to adapt, and power to transform in desired ways as non-marginalized communities (___). The pursuit of resilience justice seeks to transform governance systems in ways that empower marginalized, oppressed, and vulnerable communities and build their resilience and capacities to thrive in a dynamic and disruptive world (____).

Resilience justice thinking emerged out of the experiences of inequitably vulnerable communities in the Global South, indigenous communities, and low-income neighborhoods of color in the Global North (Boamah & Arnold forthcoming). It is a justice perspective on resilience and a resilience perspective on justice (Arnold et al. 2023, 226). It rejects the binary academic choice between structure and agency as essential social theory, instead observing that the struggles of the oppressed for justice involve both systemic forces and capacities for self-determination and individual and collective

flourishing (Arnold et al. 2023; Boamah & Arnold forthcoming). On one hand, resilience justice thinking builds on conceptualizations of environmental and social justice that oppose systemic oppression and domination, racism, colonialism, and structural class inequality (Arnold et al. 2021, 688-91; Arnold et al. 2022, 1422). On the other hand, resilience justice thinking is also based in the human capabilities theory of justice developed by Nussbaum (1999, 2000) and Sen (1999, 2005), Fineman's vulnerability conceptualization of justice (2008, 2010), and assemblage social theory (Delueze & Guattari 1987; DeLanda 2016), which shows that contested resilience ideologies in society are constantly being assembled, disassembled, and reassembled in dynamic ways (Boamah & Arnold, forthcoming).

The understanding and pursuit of resilience justice requires seeking out and listening to the voices of those who are members of marginalized, oppressed, and vulnerable communities, including their everyday life experiences (Speak 2012), histories (Arnold et al. 2023), and struggles against injustices (Cole & Foster 2001; Sze 2020). But resilience justice isn't just a perspective on grassroots struggles for justice. It's also an agenda for institutional transformation to empower marginalized, oppressed, and vulnerable communities. A central feature of this transformative agenda is the design and implementation of co-governance systems that integrate bottom-up grassroots power with top-down government resources and authority.

Many of the examples of attempted co-governance arrangements have arisen out of community activism for justice, resilience, and shared power with respect to green and blue infrastructure (GBI) (Arnold et al. 2021). GBI is the aquatic and biotic infrastructure on which communities depend (id., 671). GBI co-governance efforts have included stream and river restoration projects, parks, trees, wetlands, community gardens, and watershed planning (id., 704-723; Arnold et al. 2024).

Some of the co-governance arrangements have been promising but devolved into primarily top-down governmental control with enhanced community participatory opportunities or into essentially public-private partnerships between government agencies and nonprofit organizations. For example, activism by low-income communities of color in Los Angeles, CA, linked park equity goals with plans to restore the Los Angeles River and broadened the river-restoration governance regimes to engage neighborhood residents and marginalized communities' leaders as major participants in the planning process. However, control over the implementation of these plans then solidified in powerful interest groups, elites, and government agencies, resulting in restoration activities that stimulated substantial gentrification of the historically park-poor neighborhoods and displacement of low-income residents, residents of color, and the

unhoused (Boamah & Arnold forthcoming). These examples raise concerns about whether governmental entities will ever truly share power with marginalized, oppressed, and vulnerable community members as envisioned by a co-governance approach to resilience justice. For example, Foster and Iaione (2022) argue co-governance institutions should evolve towards bottom-up urban commons in which the government plays more of an enabling role than a co-creator or co-decider role, with governance power and resource management being vested primarily in community residents. Agrawal and Chhatre (2007) showed that forest co-governance institutions with substantial government involvement managed those resources in the Indian Himalayas less sustainably than decentralized indigenous governance institutions.

Nonetheless, co-governance is an important form of resource, environmental, and infrastructure governance to improve equity and community resilience for three reasons. First, there are many examples of communities and governments collaborating to create encouraging, equitable, and effective co-governance arrangements, despite the existence of disappointing examples. We should be studying and learning from both positive and negative examples by applying a resilience justice lens in order to identify the institutional design features that are more likely to empower marginalized communities and build the capacities of vulnerable communities.

Second, there are many circumstances in which a grassroots commons is not possible due to legal and practical constraints. Legislation might require government agencies to exercise at least some degree of power and oversight over particular resources, environments, or infrastructure. Constitutional, judicial, or international rules and/or political forces might prevent the legislation from being modified to expressly allow community control. Communities might be interested in shared governance of certain resources, environments, or infrastructure that have too large a scale or complexity to be governed effectively as a commons. Community-based governance of some commons might have significant negative externalities on other communities that could or should be moderated by government officials. Communities – especially marginalized, oppressed, and vulnerable communities – may lack the needed financial resources, personnel, knowledge, technology, networks, and other resources that government agencies have, despite having their own distinctive and valuable resources, knowledge, skills, and networks.

Third, the basic principle of community self-determination or self-governance bleeds over into community self-reliance and self-sufficiency. This “pull yourself up by your bootstraps” conceptualization of devolved community resilience is fundamentally unjust, because it doesn’t address the many intersecting and embedded systems of injustice and

their effects on the capacities of marginalized, oppressed, and vulnerable communities to solve and manage their environmental and resource problems entirely on their own. Any grassroots commons will exist in a world of grossly unequal power, wealth, and resources that is maintained by existing institutions and systems – a world in which the self-governance capacities of communities are affected by the domination of powerful groups and interests, racial violence and discrimination, the persistent effects of colonialism, class inequality, and other forms of oppression. We do not suggest at all that there is anything unjust about communities self-organizing to govern a commons or for grassroots commons to exist. But it's an entirely different thing to base a conceptualization of justice and preferred governance structure on the government leaving marginalized, oppressed, and vulnerable communities entirely on their own to create their own resilience justice through self-governed commons. Foster and Iaione (2022, 198-201) address this social-justice/self-governance tension by arguing for what they call "the enabling state," which refers to substantial government roles to encourage, facilitate, and support grassroots urban commons, including use of government resources and regulatory authority. They also call for evolving forms of co-governance in which government agencies and communities collaborate in governance partnerships with one another (id., 193-198). However, by differentiating between commons that are entirely community self-governed with little to no governmental involvement and co-governance arrangements in which governmental entities and communities share power, this Article examines the design features of co-governance that advance justice and build community resilience.

In exploring co-governance of GBI in the United States, we previously posited thirteen principles that should be applied to the design and implementation of GBI co-governance:

> "(1) Maximize bottom-up or grassroots-driven design and resist top-down or government-driven design.
> (2) Create processes of inclusion and power-sharing, not mere participation or consultation.
> (3) Expressly vest the co-governance structure with policy making and policy implementation decisions.
> (4) Provide sufficient public resources to create and maintain needed green and blue infrastructure and to build social capital, adaptive capacity, and political power within marginalized communities.
> (5) Engage in community organizing, capacity building, and empowerment.
> (6) Invest in and build social capital within marginalized communities.
> (7) Directly and honestly address difficult issues of racism and injustice, including the legacies and continuities of systemic racism, structural inequality, colonialism, and oppression.

(8) Don't be afraid of conflict, litigation, protest, and resistance, but don't dwell there; resisting power must become a pathway to exercising power for the good of the community and the cause of resilience justice.
(9) Litigation can be a useful disturbance or trigger to lead to power-sharing, addressing injustices, improving community resilience, and transforming the community's infrastructure.
(10) Integrate green and blue infrastructure policies with other policies designed to improve marginalized communities' resilience and reduce marginalized communities' vulnerabilities, particularly policies for fair and affordable housing and for equitable development.
(11) Create, restore, and transform green and blue infrastructure to be adaptive to disturbances, shocks, and changes, including disasters and climate change.
(12) Plan and create co-governance structures for resilience justice at multiple nested scales from the neighborhood level to the multi-neighborhood level to the city level to the regional level, and intentionally seek to share power at larger scales with marginalized and oppressed communities.
(13) Institutionalize co-governance systems and arrangements with legal and political authority, but design them with adaptive capacity, including flexibility, modularity, innovation, and experimentation." (Arnold et al. 2021, 729-730).

Foster and Iaione (2022, 192-218) recommend five core principles of an urban-commons approach to urban governance: 1) co-governance in which governance power is shared, collaborative, and polycentric; 2) the enabling state; 3) pooling economies; 4) urban experimentalism; and 5) tech justice.

We now seek to move beyond the narrower confines of the United States, GBI governance, and urban environments to explore __ examples of co-governance in both the Global South and the Global North. We seek to develop a more systematic set of design principles that could be used with any co-governance system for the purposes of advancing resilience justice among marginalized, oppressed, and vulnerable communities.

## III. Case Studies from the Global South and Global North

*State-Farmer Co-Governance of the Kpong Irrigation Scheme (KIS), Ghana*

The Kpong Irrigation Scheme (KIS) in Ghana presents an interesting case of co-governance arrangements for resilience justice. The KIS is the second-largest irrigation scheme in Ghana, which began operation in 1998, irrigating about 2,125 hectares of paddy rice farms and 1,140 hectares of banana farms (Ministry of Food and Agriculture, 2019). There are three main sections of the KIS. Sections A and B are gravity-fed irrigation systems servicing irrigated paddy rice farms, and Section C is serviced by a Re-lift Pumping Station and storage reservoirs for drip-irrigated banana farms. The irrigation infrastructure comprises irrigational canals (main canal, branch, and lateral canals), drainage systems (main drainage, branch, and lateral drainages), and access roads. The KIS is co-governed by smallholder farmers, a Scheme Management Entity (SME), and government entities, mainly the Ghana Irrigation Development Authority (GIDA). As described later, the smallholder farmers are presently organized into decentralized groups, Water Users' Association (WUAs), with shared authority and responsibility for co-governing the KIS (Kakuta, 2019).

Previously (before 2016), the smallholder farmers were organized into one farmers' cooperative group, Osudoku Agriculture Cooperative Society (OACS). The OACS operated the branch and lateral canals, drainages, and access roads connected to the irrigation scheme (Kakuta, 2019). The KIS office of GIDA was responsible for the construction, operation, and maintenance of the main irrigation canal, drainage, and access roads. This governing arrangement presented challenges, including unreliable water supply due to blocked/destroyed canals or delays in repairing the canals, poor leadership among the smallholder farmers, disputes, poor communication, and low crop yields (Ministry of Food and Agriculture, 2019). To address some of these challenges, the KIS and other government-owned irrigation schemes transitioned to a new co-governance arrangement in 2016. Through the support of the World Bank, the Government of Ghana enacted new legislation, L.I. 2230 (WUA Law), which is similar to other decentralized co-governing arrangements ushered in other Global South contexts (Aarnoudse et al., 2018; Blomquist et al., 2005; Cambaza et al., 2020; Dinar et al., 2005; Senanayake et al., 2015).

L.I. 2230 ushered in a legislatively supported co-governance arrangement by decentralizing, distributing, and sharing the authorities and responsibilities for managing the KIS and other government-owned irrigation schemes. Under this new legislation, the KIS is co-governed by three entities. The first is a private sector company contracted by GIDA to serve as the Scheme Management Entity (SME) responsible for (a) operating and maintaining the main canal, drainage, and access roads and (b) supplying water to each WUA based on contractual agreements. The second is the WUAs, each comprising 15 or more smallholder farmers, responsible for (a) operating and maintaining the branch and lateral canals, drainages, and access roads, (b) collecting Irrigation Service Charges (ISC)

and appropriate fees from its members, and (c) hold General Assembly meetings for all WUA members and form committee to perform co-governance functions, such as management, water allocation decisions with other WUAs, dispute resolution, and farmer welfare and productivity. The third is the KIS office of the GIDA, serving as a bridge between the WUAs and the SMES, facilitating dialogues and coordination among the WUAs, and providing technical assistance to the WUAs where needed.

The KIS's co-governance structure aims to ensure resilience justice. Resilience justice looks at remedying governance systems through, for instance, public policies to address the unequal adaptive capacities of groups and communities to disturbances and changes (Arnold et al., 2020). L.I. 2230 is a public policy aimed at empowering the WUAs and improving their capacities to communicate, manage, and plan for efficient and equitable water supply. Under this new legislation, the co-governance of the KIS manifests prominently through institutionalized shared decision-making, participatory process, accountability, and enforcement, which are key features of co-governance for resilience justice (cf. Arnold et al., 2020; Frimpong Boamah et al., forthcoming). The power structure is more decentralized and horizontal. For instance, GIDA's decisions about the KIS infrastructure (construction, repairs, and maintenance) are expected to be consultative and transparent, eliciting inputs and feedback from the WUAs. Decisions and implementation strategies to address erosion, salinity, siltation pollution, and encroachment of the KIS are shared among the GIDA, WUAs, and SME, with GIDA and SME being responsible for the main canals and the WUAs responsible for the branch canals. These decisions and activities are coordinated to avoid duplication of efforts and improve shared learning. Internal decisions made by the WUAs (e.g., ISC fees and water allocation) are made with input from members, with mechanisms for review and dispute resolution through the internal committees of the WUAs and/or consulting with GIDA. In times of water crises, such as drought, the allocation and use decisions are expected to be monitored and reviewed across WUA boundaries. The WUAs in KIS monitor, communicate and enforce such water allocation and use decisions, holding each other accountable for ensuring equitable water use, especially during drought conditions. The new co-governance arrangement of the KIS is nowhere near perfect and riddled with challenges and institutional ambiguities (discussed further in Frimpong Boamah et al., forthcoming; Kakuta, 2019). That said, it offers valuable lessons for thinking through the benefits and challenges of co-governing irrigation schemes in sub-Saharan Africa.

### *Co-Governance in UNESCO Biosphere Reserves*

Some UNESCO Biosphere Reserves (BR) are examples of co-governance. The overarching structure of UNESCO BRs is the same or similar for all of them, as they need to follow

specific strategies, roadmaps, action plans[1] and technical guidelines[2]. However, the specific features of each BR vary, depending on the particular characteristics of each landscape, ecosystem or social community. BR status is a widely respected international accolade, which fosters significant sustainable development appeal, and offers co-governance experiences and relevant engagement with positive regenerative economy and sustainability models[3]. Best practices in the area of UNESCO Biosphere Reserves can be defined as methods which optimally contribute to the biosphere program's goal of enhancing the relationship between people and nature with economic development that is both environmentally and socially sustainable. The Man and Biosphere Programme operates around several broad themes, including conserving biodiversity and restoring ecosystems, economic development and capacity-building, social wellbeing, and climate change mitigation and adaptation.[4]

*Small-Scale Fisheries in Uruguay*

Globally, small-scale fisheries (SSFs) are vital contributors to local and international social-environmental resilience despite societal marginalization. In Uruguay, fisher-transformed governance structures and co-management techniques offer clues into governance arrangements that increase resilience justice as well.[5] For small-scale artisan fisheries in Latin America, the adverse effects of climate change (widespread ecological mortalities) are compounded by local and external human drivers: market globalization, population growth, and inadequate resource governance.[6]Co-management emerged as a promising strategy to tackle the social-ecological impacts of climate change, to rectify top-down

[1] https://unesdoc.unesco.org/ark:/48223/pf0000247418 accessed 12 May 2024.
[2] https://unesdoc.unesco.org/ark:/48223/pf0000375692 accessed 12 May 2024.
[3] AD Barraclough, MG Reed, K Coetzer, MF Price, L Schultz, A Moreira-Muñoz, and I Måren (2023). Global knowledge–action networks at the frontlines of sustainability: Insights from five decades of science for action in UNESCO 's World Network of biosphere reserves. *People and Nature*, *5*(5), 1430–1444. https://doi.org/10.1002/pan3.10515; T de Melo Cartaxo, et al (2023). Feasibility Study for the development of a UNESCO Biosphere Reserve in Cornwall and the Isles of Scilly. Exeter Centre for Environmental Law. Available at https://www.exeter.ac.uk/media/universityofexeter/collegeofsocialsciencesandinternationalstudies/lawimages/research/BiosphereFeasibilityStudy.pdf accessed 12 May 2024
[4] Director General of UNESCO, Lima Action Plan for UNESCO's Man and the Biosphere (MAB) Programme and its World Network of Biosphere Reserves (2016-2025) (UNESCO, 2017) < https://www.edenproject.com/sites/default/files/2023-06/eden-project-annual-review-2021-22.pdf > accessed 12 May 2024.
[5] Trimble et a. "Envisioning desirable futures in small-scale fisheries: a transdisciplinary arts-based" Ecology and Society 29(1)
[6] Sofía Bausero-Jorcin, et al. "Assessing the performance of a participatory governance transformation in small-scale fisheries: A case study from Uruguay" Mar. Pol'y 160, 1 (2024).
Gianelli et al. "Operationalizing an ecosystem approach to small-scale fisheries in developing countries: The case of Uruguay" Mar. Pol'y 95, 180, 181 (2018).

governance shortcomings, and to increase community and ecological resilience.[7] While artisan fisheries only account for a fraction of the Uruguay's gross domestic product, small scale fisheries are a crucial social, economic, cultural livelihood for fishers. Because *fishers* are already marginalized, social vulnerabilities, weak fish management policies, dependence on middlemen, societal fisher marginalization, and catch declines created a socio-economic crisis. Consequently, the "New Fisheries law" passed in December 2013; this was the first time fisher participation was included in fisheries management. Until then, fishery management was prevailingly top-down, federally managed, and did not adequately protect local small scale fisheries.[8] This law implemented new co-management techniques to share power across fisheries, non-state actors, and state actors. It created "Fisheries Councils" to spread power across local, municipal, and national scales. The co-governance arrangement included: local councils, zonal councils, one national fisheries Council all presided over by the Direccion Nacional de Recursos Acuaticos (DINARA).

For yellow claim small scale fisheries, this co-management arrangement marked a pivotal step towards implementing co-governance techniques designed to increase efficacy, credibility, transparency, and equity in the decision-making processes.[9] Co-governance in small-scale shellfisheries typically involves collaboration between government regulators, local fishing communities, and environmental organizations to manage shellfish resources sustainably and ensure the livelihoods of small-scale fishers. Co-management embodies a collaborative framework wherein power is distributed among governmental bodies, fishing communities, external stakeholders (NGOs, academic institutions), and coastal resource players (boat owners, fish traders, lenders, tourism operators). This inclusive and participatory model not only guaranteed representation for all stakeholders but also delegated responsibility and authority for all fishery management decisions.[10]

From a resilience justice standpoint, both long-term adaptive community responses and coping responses, which enable survival during crises, are crucial for small-scale fishery resilience. Trimble et al.'s research indicates that Uruguay's development of co-management practices in small-scale fisheries has fostered cooperation and

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[7] *Id*. at 606, 613.

[8]Trimble et al. " Participatory evaluation for adaptive co-management of socialecological systems: a transdisciplinary research approach" Sus. Sci. 1092, 1093 (2019).

[9] Sofía Bausero-Jorcin, et al. "Assessing the performance of a participatory governance transformation in small-scale fisheries: A case study from Uruguay" Mar. Pol'y 160, 1 (2024).

[10] Mauricio Castrejón, & Omar Defeo, "Co-governance of small-Scale shellfisheries in Latin America: Institutional adaptability to external drivers of change," MARE Pub. Ser 13 605, 606 (2015).

communication among stakeholders.[11] However, trust levels have varied among participating actors, suggesting partial success.[12] Moreover, while fishery councils exert considerable influence in decision-making, ultimate authority remains with DINARA, indicating remnants of top-down governance. A resilience justice perspective advocates for shared power and autonomy. By enhancing access to resources, communication channels, and state support, co-governance techniques can bolster small-scale fisheries' adaptive capacity, enabling them to manage, adapt to, and influence changes more effectively.[13] Institutional arrangements must be flexible enough to address unique conditions to prosper.[14]

Despite being characterized as an institution with discrete rules and norms, certain organizational agreements fell short of establishing necessary co-governance principles. However, key design principles for effective co-governance are illuminated from this case study: necessary social capital, cohesion, rules, and hybrid government arrangements. Through participatory processes and shared decision-making, there was an increase in trust between different stakeholders, including fishers, government agencies like DINARA, the coast guard, NGOs, and local fishing communities. This trust is crucial for effective collaboration, fostered social capital amongst diverse actors, and cohesion to share resources, knowledge, and support amongst dispersed networks therefore enhancing local community resilience. Additionally, by involving local stakeholders in decision-making and management processes, co-governance initiatives can contribute to economic resilience within fishing communities. This may include better access to resources, improved market opportunities, and enhanced livelihoods, reducing vulnerability to external shocks. The absence of clear organization rules, however, can lead to ambiguity and inefficiency in decision-making processes. Often, different actors gave opposing responses regarding task division, an important component of adaptive comanagement.[15] Without established guidelines, there may be inconsistencies in how local decisions are made and implemented, potentially undermining the effectiveness of management efforts.

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[11]Trimble et al. " Participatory evaluation for adaptive co-management of socialecological systems: a transdisciplinary research approach" Sus. Sci. 1092, 1096 (2019).

[12] https://link.springer.com/article/10.1007/s11625-018-0602-1.

[13] Mauricio Castrejón, & Omar Defeo, "Co-governance of small-Scale shellfisheries in Latin America: Institutional adaptability to external drivers of change," MARE Pub. Ser 13 605 (2015).

[14] CITE: Ostrom: Institutional Analysis and Development Framework pg 17

[15] Trimble et al. " Participatory evaluation for adaptive co-management of socialecological systems: a transdisciplinary research approach" Sus. Sci. 1092, 1097 (2019).

*New Zealand Co-Governance*

New Zealand is embracing co-governance as a pivotal step to address historical colonialism injustices. For the Māori people, every inch of the Māori water and land in New Zealand holds special significant to the hapū and iwi of Tauranga Moana.[16] The environment is not only physically significant, but culturally and spiritually as well.[17] Therefore, successful co-governance of sacred waterways requires reconciling worldviews, recognizing capacity limitations, and actually sharing sovereign power between the British Crown and the Māori people in an inclusive and participatory manner. Since the signing of the Treaty of Waitangi in 1840 between the British Crown and Māori chiefs, the Māori people have retained ownership of their lands and resources, while granting governance authority to the Crown. The co-governance arrangement concerning the Maori people and Tauranga Moana harbor encompasses a collaborative framework between local iwi, such as Ngāi Te Rangi, Ngāti Ranginui, and Ngāti Pūkenga, and regional government authorities such as the the Bay of Plenty Regional Council.[18] Under this arrangement, community groups are responsible for identifying community values for freshwater, setting local limits on water quality and quantity, and developing local solutions for managing water catchment.[19] A similar arrangement exists in the Waipā River watershed.[20]

Co-governance, while a step toward realizing the Treaty principles, is still not the ultimate objective. Despite its implementation in managing areas like coastal regions and waterways, scholarly discourse indicates a need for deeper integration of Māori values into governance frameworks.[21] For example, the Waikato River Authority (WRA) was established following the Waikato-Tainui Raupatu Claims Settlement Act 2010 and

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[16](https://www.govt.nz/assets/Documents/OTS/Tauranga-Moana-Iwi-Collective/Tauranga-Moana-Collective-Statement-of-Position-and-Intent-22-Dec-2011.pdf

[17] Mauri (lifeforce) – the inherent lifeforce of living entities within a marine ecosystem.

[18] Maxwell et. al. "He waka eke noa/we are all in the same boat: A framework forco-governance from aotearoa New Zealand" Marine Policy 121 1, 2 (2020).

[19] https://www.boprc.govt.nz/environment/fresh-water/co-governance-and-advisory-groups/

[20] Parsons et al. "Transforming River Governance: The Co-Governance Arrangements in the Waikato and Waipa¯ Rivers" In Decolonising Blue Spaces in the Anthropocene, 283–323. Palgrave Macmillan, Cham (2021).

[21]Maxwell et. al. "He waka eke noa/we are all in the same boat: A framework forco-governance from aotearoa New Zealand" Marine Policy 121 1, 2 (2020).

subsequent legislation expanded its iwi membership.[22] It serves as both the co-governance entity for the Waikato River and the sole trustee for WRCuT, managing funding for restoration projects in the Waikato and Waipā river catchments.[23] The WRA formally promotes a kaitiakitanga-based approach to river management. It focused on restoring and enhancing the mauri (life force), mana (power, authority and prestige), and health of the Waikato River and its tributaries.[24] Despite such embodied co-governance principles, ineffective values integration has resulted in off-loading workloads onto the Māori people, rather than assisting in their own governance with institutional resources. According to Maswell et al, some treaty settlements have compelled government agencies to engage more extensively with Māori in marine management endeavors. Heightened collaboration has increased workloads for some Māori people, who now provide technical input across planning processes. To address this, government agencies are investing in both internal and external capabilities to enhance collaboration with Māori stakeholders.[25] Emphasizing relationship-building rooted in empathy and understanding, agencies are revisiting and refining existing systems to better support co-governance and co-management efforts. Additionally, efforts are underway to bolster Māori capability and capacity to respond effectively to environmental challenges. This underscores broader concerns regarding power-sharing adequacy across groups within co-governance arrangements.[26]

Addressing current racism and rectifying past colonial injustices are key components of resilience justice. Since the beginning of formal British colonization in 1840, the settler-state intentionally excluded indigenous knowledge, values, and decision-making authority of the Māori tribes regarding ancestral lands and waters.[27] In contrast to legal systems that focus on individuals' rights to own, use, and control water, a resilience justice

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[22] Parsons et al. "Transforming River Governance: The Co-Governance Arrangements in the Waikato and Waipa¯ Rivers" In Decolonising Blue Spaces in the Anthropocene, 283–323. Palgrave Macmillan, Cham (2021).

[23] Parsons et al. "Transforming River Governance: The Co-Governance Arrangements in the Waikato and Waipa¯ Rivers" In Decolonising Blue Spaces in the Anthropocene, 283–323. Palgrave Macmillan, Cham (2021).

[24] Parsons et al. "Transforming River Governance: The Co-Governance Arrangements in the Waikato and Waipa¯ Rivers" In Decolonising Blue Spaces in the Anthropocene, 283–323. Palgrave Macmillan, Cham (2021).

[25] cite

[26] *Id*. at 7.

[27]Parsons et al. "Transforming River Governance: The Co-Governance Arrangements in the Waikato and Waipa¯ Rivers" In Decolonising Blue Spaces in the Anthropocene, 283–323. Palgrave Macmillan, Cham (2021).

frameworks encourages Indigenous parties and state actors to share authority on resource management through mutually-reinforcing relationships that enhance marginalized communities ability to sustain, bounce back, and adapt to changes. *Id*. Such authority must be explicitly delegated, therefore creating new institutional rules within the heterogenous system. Presently, although Māori worldviews have been acknowledged, recognized autonomously, and legally protected, existing co-governance systems may inadvertently exacerbate rather than alleviate structural inequalities in inclusive governance participation. Scholarship suggests current processes do not adequately consider the economic barriers that Māori face (lack of individual and collective resources). Id. Without adequate financial resources, the process of decolonizing co-governance arrangements will not be possible. *Id*.

Key institutional design principles that emerge from the Māori people's co-governance arrangement include the importance of shared visions, implementing equitable co-production processes, and increasing social capital. These principles emphasize the collaborative development of context-specific pathways to sustainable futures, fostering collective agency and guiding actions in the present towards desired outcomes. Social capital, encompassing trust, reciprocity, and connectedness within networks and groups, plays a crucial role in facilitating self-organization, collective action, and adaptive governance. In the context of co-management and adaptive landscape governance, managing relationships is often as significant as managing resources, highlighting the importance of bonding, bridging, and linking social capital across different scales and levels.[28] Institutionalizing a shared vision as a design principle for co-governance ensures alignment and commitment among stakeholders towards common goals, guiding decision-making, collaboration, and resource allocation. However, achieving this principle requires equitable co-production pathways, ensuring fair distribution of resources for both co-governance outcomes and participating community members. Addressing barriers to inclusive participation is essential to mitigate structural inequalities that may persist despite the presence of co-managed structures.

*Water Co-Governance*

National and international water policies commonly operate under the assumption that irrigation water rights and rural water management institutions are predominantly governed by top-down state or market actors, rather co-governance structures including nonstate actors in decision making, management, and engagement of the public

[28] M.A.F. Ros-Tonen et al. "From co-management to landscape governance: Whither Ghana's modified taungya system" Forests 2996, 3005 (2014).

resource.[29] However, in numerous regions worldwide, smallholder communities manage their own irrigation, groundwater, and drinking water systems with traditional, diverse, and often 'hybrid water rights' management frameworks.[30] Two examples of such management illustrate how co-governance techniques can lead to varying outcomes, as seen in Pesillo Imbabura, Ecuador, and the Requena-Utiel aquifer in Spain. Both case studies demonstrate that successful co-governance water management arrangements require effectively nurturing community autonomy, values, and social cohesion since water allocation rules are intricately entwined with diverse social norms.[31]

*Drinking Water and Groundwater Management in Ecuador*

In Ecuador, the Pesillo-Imbabura regional drinking water project developed against a background of political turmoil seeking equitable representation for indigenous groups. For over 50 years, indigenous groups in the Sierra of Ecuador (JAAP) managed their drinking water autonomously, independently dealing with poor managerial competence, insufficient capital investments, low operational budgets, deficient coordination, and political corruption, leading to erratic and sub-standard water.[32] To solve these drinking water deficits, the Pesillo-Imbabura Regional Drinking Water Project developed in the 1970s through community protests, petitions, and social mobilization.[33] The project sought to improve drinking water services for the 171,000 inhabitants across 5 municipalities in the northern region of the Ecuadorian Andean mountains. As the frequency and intensity of droughts were amplified by land degradation and climate change, water demand increased while new water sources were increasingly hard to find.[34]

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[29] Boelens et a. "Legal pluralism, hydraulic property creation and sustainability: the materialized nature of water rights in user-managed systems" Env. Sust. 11 55, 55 (2014).
Nictolis et al. "Keywords for Adaptive heritage Reuse" Open Heritage 1, 19 (2021).

[30] Boelens et a. "Legal pluralism, hydraulic property creation and sustainability: the materialized nature of water rights in user-managed systems" Env. Sust. 11 55, 55 (2014).

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[32] Mengens et al. "Construcción de co-gobernanza: desafíos del largamente esperado proyectoregional de agua potable Pesillo-Imbabura en Ecuador" Revista Latinoamerica de Desarollo Economico 95, 97 (2022).

[33] Mengens et al. "Construcción de co-gobernanza: desafíos del largamente esperado proyectoregional de agua potable Pesillo-Imbabura en Ecuador" Revista Latinoamerica de Desarollo Economico 95, 101 (2022).

[34] Mengens et al. "Construcción de co-gobernanza: desafíos del largamente esperado proyectoregional de agua potable Pesillo-Imbabura en Ecuador" Revista Latinoamerica de Desarollo Economico 95, 97 (2022).

The co-governance arrangement for the Pesillo-Imbabura drinking water project was formally proposed in 1995 and established in 2008 by the federal government through the creation of the National Water Authority (SENAGUA) to manage water resources and oversee the project. On paper, the institutional design was an example of co-governance between the 5 municipalities and 162 rural communities.[35] Utilizing Ostrom's collaborative model, community members established an organizational system to ensure the respect of community representatives' rights. However, governance concerns extended beyond drinking water alone, encompassing historical confrontations with institutional entities, unclear group boundaries for participation, unsustainable modifications to legal provisions, and a lack of institutional frameworks to enhance water and sanitation services, including community management schemes. In practice, indigenous communities in the Pesillo-Imbabura drinking water project felt excluded and desired more control over the project. Ongoing delays persisted due to coordination issues among donors, administrators, and disputes among beneficiaries. Despite the historical struggle and successful political representation through the creation of the drinking water organizations, power-sharing remained concentrated. Despite constitutional recognition of community management, the government and donors overlooked the principle of "hydraulic property creation," neglecting to link community struggles to finance the project with their contribution to infrastructure construction, water use rights, and system management authority.

An important principle of co-governance for water management is the notion of is the water use rights through the contribution of labor during the construction of water infrastructure.[36] This “hydraulic property creation” legally acknowledges water rights are formed when people contribute labor to build water infrastructure systems.[37] In this hydraulic property based governance mechanism, each individual user appropriates rights as the community constructs collective rights; individual rights to access water and participate in decision-making are directly linked to the collectively-owned infrastructure and sustain its collective management.[38] By collectively building water infrastructure and

[35] Mengens et al. “Construcción de co-gobernanza: desafíos del largamente esperado proyectoregional de agua potable Pesillo-Imbabura en Ecuador” Revista Latinoamerica de Desarollo Economico 95, 96 (2022).

[36] Mengens et al. “Construcción de co-gobernanza: desafíos del largamente esperado proyectoregional de agua potable Pesillo-Imbabura en Ecuador” Revista Latinoamerica de Desarollo Economico 95, 100 (2022).

[37] Boelens et a. “Legal pluralism, hydraulic property creation and sustainability: the materialized nature of water rights in user-managed systems” Env. Sust. 11 55, 57 (2014).

[38] Boelens et a. “Legal pluralism, hydraulic property creation and sustainability: the materialized nature of water rights in user-managed systems” Env. Sust. 11 55, 57 (2014).

appropriating rights through this labor, communities are autonomously represented in the legal process. This approach fosters justice by empowering communities to collectively manage resources, rather than consolidating top-down power or control despite bottom-up labor investments. The concept of hydraulic property creation aligns with resilience justice principles by emphasizing bottom-up design, providing sufficient resources for green and blue infrastructure, and use integrate infrastructure policies for community resilience.

*Drinking Water and Groundwater Management in Spain*

As demonstrated in Ecuador, mismanagement of groundwater can generate situations of inequity, injustice, aor dispossesion that exacerbates existing inequalities for marginalized communities.[39] In Spain, 44% of the Spanish aquifers are currently in  bad chemical or quantitative status (Greenpeace, 2022 ). CITE. Co-management of the Requena-Utiel aquifer has been highlighted as a promising strategy for groundwater governance to prevent aquifer depletion.[40] Currently, aquifer management power is shared among six heterogenous actors and operates according to the principle of "Water = Economy = Life" according to Sanchis Ibor et al. [41] The different co-governance stakeholders include the central water board (JCURU), the ucar River Basin Authority (CHJ), the urban supply systems managed by the city councils, private bottling companies, groundwater irrigation communities, and any other individual users.[42] Regulated by the Water Law, the JCURU replicates the structure of irrigation communities.[43] Its sovereign body, the General Assembly, comprises all aquifer users.[44] Additionally, there is an executive body, the governing board, consisting of 11 members elected by the General Assembly.[45] These members represent various types of users, including winery communities, individual agricultural users, industrial users, and municipal urban supply systems.[46] The votes for the governing board members are proportional to the volume of water rights held by each user group.

[39] Spain 348
[40] Id.
[41] 354
[42] 352
[43] 352
[44] 352
[45] 352
[46] 352

The emergence of Requena-Utiel's aquifer management arose due to aquifer depletion, legal changes, and community initiatives. The arrangement became institutionalized over time as stakeholders adhered to the co-governance institution's rules, which became further institutionalized when the public administration clarified the different operational rules for different water rights.[47]

> *Water management and allocation uses a dual model of water rights: surface waters are public, while groundwater was a private resource until 1985.*
>
> *"Groundwater irrigation communities - The groundwater irrigation communities perceived the mobilisation of groundwater resources as "a ray of light" for the region, as it made it possible to help agriculture, which was going through a very difficult situation due to insufficient rainfall."*
>
> *In 2022, a "Living Lab" brought together 28 diverse stakeholders to diagnose and brainstorm possible interventions to protect the local aquifer. Across three work-shops, participants*
>
> *"Governance strategies often follow a set of rules that benefit some while leaving others disadvantaged, especially in terms of the environment and social aspects. In the Requena-Utiel case, users established and upheld their collective agreement based on the principle of water-economy-life. A genuine shift towards sustainable governance, as argued by Agrawal et al. (2022), requires considering alternative scenarios, setting boundaries on economic growth, and rethinking economic approaches to prevent harming the environment and future generations." 359*
>
> *Similar to Ecuador, Spain developed two perspectives to address groundwater overexploitation: two perspectives have been adopted to address the control of groundwater overexploitation: "State (regulatory, monitoring or economic) instruments to control abstraction, and participatory mechanisms involving stakeholders through different arrangements (Villholth et al., 2019; Petit et al., 2021 )."*
>
> - *"From a policy perspective, this research shows that public authorities cannot simply create the formal institutions and wait for co-management to magically work."*
> - *"actions to provide and disseminate a good knowledge of the resources system, and to increase the flow of information between the water*

[47] 351

*authorities and the users (and between the users themselves) are fundamental."*

*Limits on Economic Growth required for Resilience Justice: "governance strategies are frequently based on a social contract that leaves some victims along the way, in environmental and social terms. In the case of Requena-Utiel, the users based and protected their collective (internal) agreement under the water-economy- life principle, which implicitly entailed rejecting the revision of their productive model and the assumption of certain sacrifices, made at the cost of environmental degradation and external costs. A real shift in governance towards sustainability (Agrawal et al., 2022) involves visualising alternative scenarios, putting limits on economic growth, and redesigning economic strategies to avoid passing on costs to the natural environment and future generations.*

*Mata Atlântica Biosphere Reserve, Brasil*

It is estimated that more than 20 thousand plant species occur in the Brazilian Atlantic Forest, which corresponds to approximately 35% of the species existing in Brazil, of which almost half are endemic species, which are found only in this biome. This richness is greater than that of some continents, such as North America, which has 17 thousand plant species, and Europe with 12.5 thousand. Given the history of destruction, much of this flora is threatened with extinction. The same can be said about the fauna that has this forest as its habitat. With regards to fauna, the biome is home to approximately 850 species of birds, 370 amphibians, 200 reptiles, 270 mammals, and 350 fish (BRASIL. MMA, 2018 – Mata Atlântica). This is one of the reasons that makes the Atlantic Forest a priority for the conservation of biodiversity at a global level, which is clear from the fact that the Atlantic Forest contains 4 of the 7 Natural Heritage Sites recognized by UNESCO in Brazil, 11 of the 25 Ramsar Sites, 163 of the 237 Important Bird Areas and, mainly because this biome is the largest of all Biosphere Reserves in the global network of UNESCO's MAB Program (Man and the Biosphere): the Atlantic Forest Biosphere Reserve.[48] Its Core Zones correspond to more than 700 Protective Conservation Units Integral and in its Buffer Zones live a few thousand people, in large part of traditional communities (indigenous, quilombolas, fishermen, etc.) who represent high sociocultural richness and great ethnic diversity.

[48] https://rbma.org.br/n/a-mata-atlantica/ accessed 12 May 2024.

Biosphere Reserves in Brazil are regulated by the Law of the National System of Conservation Units (No 9.985, of 18 July 2000, Sistema Nacional de Unidades de Conservação – Chapter VI, arts. 41-45), there is a National policy for Biosphere Reserves and Decree of 21.09.99 regulates the Brazilian Commissions for Biosphere Reserves.[49] An example that proves the benefits socio-environmental aspects of the agroecological system in the Atlantic Forest, refers to the activities of Participatory Certification developed by Association of Peoples of the Southern Atlantic Forest of Bahia (located in the municipality of Ilhéus/BA) which created the "Povos da Mata Agroecology Network", with the participation of family farmers represented by indigenous communities, quilombolas, farmers in general, settlers of Agrarian Reform and consumers (called of co-producers). The Network is the first of Bahia to be accredited by the Ministry of Agriculture, Livestock and Supply (MAPA), to issue organic certificates and seals of agricultural products and derivatives.[50] In a report on the challenges and pathways for sustainability of the Mata Atlantica Biosphere, it is emphasised that in accordance with Article 8 of the Convention on Biological Diversity, which highlights the importance of "respect, preserve and maintain knowledge, innovations and practices of local communities and indigenous populations with a lifestyle traditional traditions relevant to conservation and sustainable use of biological diversity", all socially differentiated groups in the Atlantic Forest must be involved, including caiçaras, fishermen, riverside dwellers, cleaners, quilombolas, indigenous peoples and several other rural populations generally called Traditional Communities. The Atlantic Forest, gateway to colonization Brazilian, historically, was the first contact and access to Brazil's landscapes and biodiversity, by people from different continents who, upon arriving, they had to relate and live with the biome. The miscegenation of these peoples among themselves and with people originating from different indigenous ethnicities local communities emerged, strongly linked to the territory and with great knowledge about the management of natural resources, both terrestrial and marine.

A specific initiative that has been widely highlighted within the Mata Atlântica Biosphere is its *Youth Program*. The main objective of the Mata Atlântica Biosphere's Youth Program is to establish a general structure to improve the socioeconomic development of young people living in the Atlantic Forest Biosphere Reserve and support their engagement in the fight for Biodiversity Conservation, Sustainable Development and Support for Education, Science and Research – the three basic principles of Biosphere Reserves across the planet. Its program strategy is based on two complementary approaches: visits to

[49] https://reservasdabiosfera.org.br/mab-no-brasil/ accessed 12 May 2024.
[50] C Ferreira Lino, and M Mendes do Amaral (2018). Mata Atlântica e Sociobiodiversidade: Desafios e caminhos para sustentabilidade. São Paulo: IA-RBMA. https://rbma.org.br/n/wp-content/uploads/2020/05/Livro-TFCA-FINALISSIMO.pdf accessed 12 May 2024.

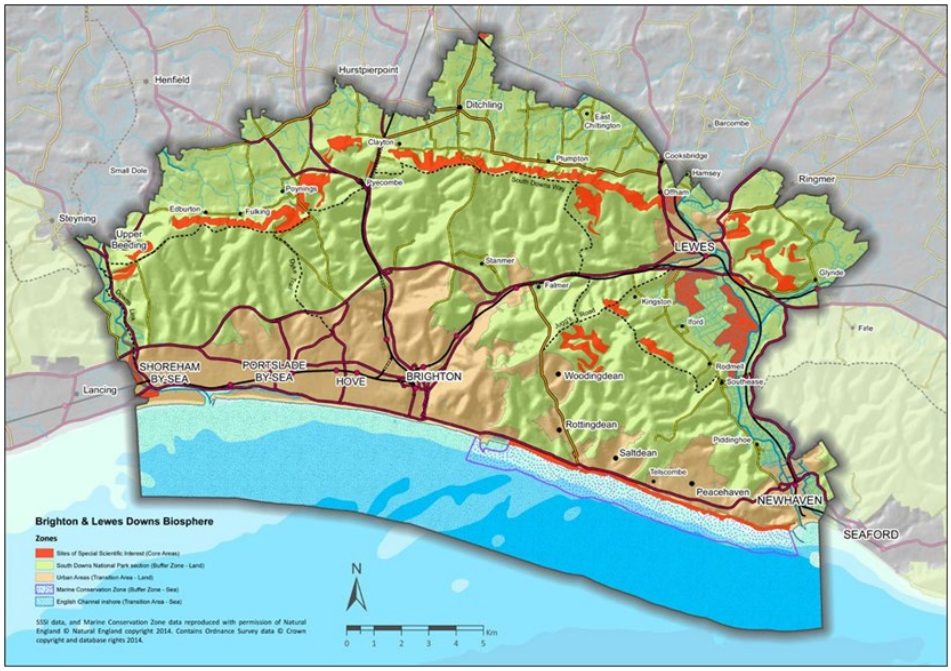
nature conservation areas, initially those close to the capitals, and within each of the 17 states that make up the Mata Atlântica Biosphere; and exchange, through exchanging experiences and holding events. Built on the premise that young people are partners, actors and holders of knowledge who are part of all stages of the decision-making process (strategic, planning, implementation and evaluation), the program will work in close collaboration with young people in the territory of Mata Atlântica Biosphere, to identify the main challenges they face.

However, being aware of regional, state and local differences, considering the heterogeneity (in beliefs, religion, gender, education, etc.) and the wide age range that characterizes Brazilian youth, the general structure of the program should be seen as a guideline for adaptations in each region, supporting the construction of more accurate diagnoses and the search for solutions to face their main specific challenges. Thus, the basic functions of Mata Atlântica Biosphere are emphasized as educational strategies with a constructive vision and preventive philosophy in valuing individual and collective relationships in the environment where young people live and interact.[51]

*The Brighton & Lewes Downs Biosphere "The Living Coast," UK*

UK BRs offer comparable context for learning which can be applied to other places. One example is Brighton & Lewes Downs Biosphere Reserve, known as "The Living Coast".[52] A diverse and ecologically rich area located along the South Downs and Sussex coast. The Living Coast BR is home to over 300,000 people and visited by over 12 million visitors each year.[53] A diverse landscape covering approximately 390 km2. The BR encompasses up to 2 miles offshore, constituting one quarter of the area.[54]

[51] https://rbma.org.br/n/programa-de-jovens/ accessed 12 May 2024.
[52] https://thelivingcoast.org.uk/ accessed 12 May 2024.
[53] https://thelivingcoast.org.uk/about accessed 12 May 2024,
[54] https://thelivingcoast.org.uk/documents/Biosphere_Management_Strategy_2014-19.pdf accessed 12 May 2024; https://thelivingcoast.org.uk/documents/TheLivingCoastManagementStrategy2020-2025.pdf accessed 12 May 2024.



Source: The Living Coast – The Brighton & Lewes Downs Biosphere [55]

Non-statutory and politically neutral, the Brighton & Lewes Downs Biosphere Partnership includes nearly 40 public and private sector entities, such as local authorities, educational institutions, community organizations, and voluntary bodies.[56] The involvement of various stakeholders, including town and parish councils, universities like Sussex and Brighton, Shoreham Port, the South Downs National Park Authority, RWE Rampion Wind Farm, and the Sussex Inshore Fisheries and Conservation Authority, emphasizes the importance of engaging multiple sectors in conservation and sustainable development efforts.[57]
The Living Coast is a substantial urban area, with Brighton & Hove, within its boundaries.[58] The "Changing Chalk - Greening the Cities" project,[59] funded by the National Lottery Heritage Fund, brings wildflowers from the South Downs into urban areas of Brighton and Hove, presents a unique opportunity to find innovative approaches that balance the needs of both people and the environment. Integrating nature into community food growing projects, green roofs, and private gardens, means the region can support more local biodiversity and enhance the connection between people and nature.[60]

[55] Ibid.
[56] Ibid.
[57] https://thelivingcoast.org.uk/partners accessed 12 May 2024.
[58] https://thelivingcoast.org.uk/about accessed 12 May 2024.
https://thelivingcoast.org.uk/documents/TheLivingCoastManagementStrategy2020-2025.pdf accessed 12 May 2024.
[59] https://thelivingcoast.org.uk/project/changing-chalk-greening-the-cities accessed 12 May 2024.
[60] https://thelivingcoast.org.uk/documents/Biosphere_Management_Strategy_2014-19.pdf 12, accessed 12 May 2024.

The Stanmer Park Restoration Project restored 20 hectares of rundown parklands through partnership between Brighton & Hove City Council, Plumpton College, and the South Downs National Park Authority and received £5.1m funding from various sources, including the National Lottery Heritage Fund, the BIG Lottery 'Parks for People' scheme.[61] The BioCultural Heritage Tourism project,[62] received £3.5 million from Interreg, to promote sustainable tourism and heritage preservation in the BR. The Living Coast promotes sustainable marine tourism through water-based activities like yachts and fishing boats trips to the Rampion Offshore Wind Farm[63] showcasing the possibility to incorporating sustainable energy projects into tourist offerings. Co-financed by Interreg and the European Regional Development Fund through the BRs BioCultural Heritage Tourism Project, The Homeward Bound Festival[64] celebrates coastal cultural heritage and maritime industries.

Brighton and Hove BR use #WeAreTheLivingCoast to promote sustainable, local businesses and producers who reduce environmental impacts to support the local economy.[65] The idea is promoting consumption of locally produced food, agricultural heritage and sustainable food systems, supporting local producers and encouraging the use of locally sourced ingredients[66], while strengthening the regional economy, reducing food miles, promoting a healthier, more resilient food supply chain.
The Living Coast has several recent housing developments which maximise biodiversity, creating open spaces within housing sites.[67] At Albion Hill housing estate, Brighton, local downland wildflowers have been planted above the road in the housing estate. Prioritising biodiversity conservation and integrating green spaces into housing developments, 15 hectares classified as "housing land" have been transformed into community gardens, parks, and natural habitats.[68] Residents can enjoy better access to nature, leading to improved physical and mental well-being and fostering a greater sense of community. Furthermore, The Living Coast's emphasis on enhancing residents' quality of life through access to higher quality jobs, affordable housing, and community infrastructure[69] aligns with the vision of sustainable and inclusive development. Higher quality jobs and affordable housing options can improve livelihoods of residents and

[61] https://thelivingcoast.org.uk/project/stanmer-park-restoration-project accessed 12 May 2024.
[62] https://thelivingcoast.org.uk/project/biocultural-heritage-tourism accessed 12 May 2024.
[63] https://thelivingcoast.org.uk/active-and-outdoors accessed 12 May 2024.
[64] https://thelivingcoast.org.uk/project/homeward-bound-festival accessed 12 May 2024.
[65] https://thelivingcoast.org.uk/documents/Biosphere_Management_Strategy_2014-19.pdf accessed 12 May 2024.
[66] https://thelivingcoast.org.uk/local-produce-and-crafts
[67] https://thelivingcoast.org.uk/documents/Biosphere_Management_Strategy_2014-19.pdf 74
[68] https://thelivingcoast.org.uk/documents/Biosphere_Management_Strategy_2014-19.pdf
[69] Ibid.

foster a thriving local economy. The Living Coast serves as an exemplary model of environmental preservation and sustainable development.[70]

*North Devon Biosphere, UK*

The first UK biosphere set up in 2002, the North Devon biosphere encompasses all the catchment areas which drain North Devon extending to the twelve nautical mile territorial sea line. It is rural, a coastal area in the South West of the UK, its landscapes have been shaped by human activity of agriculture and fishing. North Devon is dependent on tourism, retail and health and social care as key economic sectors.[71]
North Devon BR is a charity with an additional trading arm (Community Interest Company) to access funding and additional forms of revenue. Amongst the 34 members of the North Devon BR partnership are: representatives from landowners, managers and marine sector including National Farmers Union and North Devon Fisherman's Association; Business Support organisations such as Barnstable Chambers of Commerce and Mole Valley Farmers; Research and academia including universities of Plymouth and Exter as well as those further afield such as Portsmouth University and University of Liverpool; Local Authorities from across Devon; Devon Wildlife Trust, Royal Horticultural Society and National Trust as illustrations from the Voluntary Sector; and Statutory bodies such as North Devon Care Commissioning Group, Devon and Severn IFCA, Natural England and Environment Agency.[72]

North Devon report seeing an improvement in the quality of the tourists who visit. Tourists want to get involved with what's happening locally, make a difference, leave no footprints. They are working on a project with France investigating tourist behavior and spend in an effort to take pressure off tourist hot spots (coastal areas) and develop alternative things for tourists to do away from the coast through the creation of a tourism map. This type of joined up working enhances visitor management.[73]
Representatives of North Devon Biosphere shared in a Local/National workshop held in the University of Exeter in 2023 that fishermen initially were suspicious about what

[70] de Melo Cartaxo et al. 2023.

[71] Office for National Statistics, 'Economic Activity Status, England and Wales - Office for National Statistics' (2022) <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/economicactivitystatusenglandandwales/census2021> accessed 12 May 2024; Devonomics, 'Labour Market Overview' (Devonomics, 2022) <https://www.devonomics.info/overview/> accessed 12 May 2024.

[72] North Devon Biosphere, 'Partners' (North Devon UNESCO Biosphere UK, 2023) <https://www.northdevonbiosphere.org.uk/biosphere-partnership.html> accessed 12 May 2024.

[73] de Melo Cartaxo et al. 2023.

becoming a BR would mean for their business and their ability to continue their traditional way of fishing off the coast of Devon. However, having seen the benefits of collaborative and sustainable working practices the fishermen are now one of the biggest advocates of what BR designation brings to the region with fishing data showing the catches within the biosphere are sustainable.[74]

Another example of the benefits which can be reaped from collaborative working via the mechanism of the BR which North Devon gave is peer-facilitated networks. Farmers within the biosphere are enabled to work together more effectively for example community bulk buying fertilisers which reduce costs to the individual farmer.[75]
Based on their successful experience, The advantages North Devon suggests for UNESCO Biosphere status include: an alignment of purpose for all North Devon stakeholders; the partnership of 34 organisations governs collaboratively; the management plan defines a ten-year strategy for the area; being a biosphere adds value to the local plan; looking at white space beyond designated areas; is a voice of reason; and, brings in finances for every £1 (one British pound sterling) spent/invested by local government (DDC and town councils) the BR brings in £25 (twenty-five pounds) for other local communities and organizations.[76]

*Anacostia Neighborhood and the 11th Street Bridge Project, Washington, DC, USA*

The Anacostia River watershed in Washington, DC, and Maryland, has been the object of a series of plans and environmental restoration projects, some of which were driven by grassroots community activism, some of which were top-down government-driven efforts, and some of which involved some mix of shared power that failed to sustain community power or protect neighborhoods from gentrification and displacement (Arnold et al. 2014). In 2015, having learned hard lessons about gentrification and displacement from a U.S. Navy Yard restoration and development project in the Anacostia River watershed, a nonprofit organization – Building Bridges Across the River ("BBAR") – and the District of Columbia city government partnered in the creation and development of a plan to build a greenway bridging the Navy Yard and low-income, predominantly African-American neighborhoods along and near the Anacostia River. BBAR is a nonprofit organization that collaborates with community stakeholders and elected officials to fund and oversee educational, health, cultural, recreation, and social service programs to revitalize Southeast Washington.[77]

[74] North Devon Biosphere Reserve. 2023. <https://www.northdevonbiosphere.org.uk/marine.html> accessed 12 May 2024.
[75] Ibid.
[76] de Melo Cartaxo et al. 2023.
[77] *Our Story,* https://bbardc.org/our-organization/ (last visited April 13, 2024).

The 11th Street Bridge Project is a major green space project that will transform the 11th Street Bridge that connects the Anacostia and Fairlawn neighborhoods with the Navy Yard neighborhood and build the District's first elevated park to unite the communities on either side of the river. The Anacostia neighborhood, a neighborhood located across the Anacostia River from the Navy Yard neighborhood, is also being targeted for development and revitalization.

In 2009, the District's Director of the DC Office of Planning envisioned the construction of the park using the piers of the old bridge after a new highway was constructed, and from 2011 to 2013, the idea was discussed at hundreds of community meetings.[78] The idea was later formalized and given to BBAR for planning and implementation, including the formulation of an Equitable Development Plan ("EDP"), and the hiring of an Equitable Development Manager to ensure the implementation of the EDP.[79] The District government has appropriated funds for half of the project while the other half BBAR funds through a mix of donations from corporations, foundations, and individuals, and federal grants and tax credits.[80]
BBAR planned the 11th Street Bridge Project and construction began in late 2023. BBAR's EDP[81] for the Bridge details its seven-step process for development:

1. Identify stakeholders such as residents, municipal leaders, business owners, and NGOs
2. Establish geographic area of impact and collect data
3. Engage stakeholders
4. Release EDP to the community
5. Implement strategies
6. Conduct ongoing evaluations of strategies
7. Celebrate early wins.

The EDP identifies several goals for equitable development of the Project, including affordable housing, workforce development, and support for small businesses. The EDP then details specific strategies to achieve these goals. For example, a strategy to achieve its goal of workforce development is workforce training for residents in pre- and post-construction jobs. BBAR claims that over 150 construction jobs have been filled by

[78] Nufar Avni, *Bridging Equity? Washington, D.C.'s New Elevated Park as a Test Case for Just Planning*, 40 Urb. Geography 1, 5 (2018).
[79] *Id*. at 6.
[80] *Building Bridges Across the River FAQs,* https://bbardc.org/bridge-park-faqs/ (last visited February 18, 2024).
[81] *Equitable Development Plan,* https://bbardc.org/wp-content/uploads/2024/02/2024_11t-St-Bridge-EDP_Web-Version_1-11-24.pdf (last visited February 24, 2024).

residents.[82] A second goal is support for small businesses. The EDP's strategies to accomplish this goal are to support small businesses that operate on the bridge post-construction, to provide grants for micro-loans for small businesses, and to connect businesses on either side of the river. To that end, BBAR has commissioned a mobile kiosk that supports Ward 8[83] businesses by providing technical assistance and free retail space.[84]

Finally, the EDP identifies three strategies to achieve its objective of creating and improving opportunities for "affordable, available, and accessible housing options."[85] In the Anacostia neighborhood, roughly three-quarters of the 4200 residents rent their homes,[86] 90 percent of residents are African American, and the median household income is less than half the general median income in D.C.[87] However, the median sale price of homes has multiplied by 2.5 between 2014 and 2018.[88]

The EDP's first strategy is to partner with city agencies and nonprofits to educate and inform residents about existing opportunities such as tenant opportunities to purchase their buildings and tenant rights and resources.[89] Second, the EDP proposes to increase the number of Anacostia neighborhood homeowners by providing down payment and closing cost assistance through the Ward 8 Homebuyers Club, working with organizations that provide support for home repairs for "economically marginalized multi-generational homeowners," and providing tenants' rights workshops in surrounding neighborhoods.[90] Third, the EDP proposes to advocate for policies that "preserve existing affordable housing and spur the creation of new affordable units" in the surrounding neighborhoods, by partnering with the Douglass Community Land Trust, the D.C. Housing Authority, and the D.C. Department of Housing and Community Development.[91] The EDP pledges to "support more community-driven housing solutions in Ward 8 such as community land trust or social housing models."[92]

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[82] *Equitable Development Plan, supra* note 81, at 17.
[83] Ward 8 contains Anacostia Neighborhood and 15 other "East of the River" neighborhoods in Washington, D.C. *See* https://planning.dc.gov/page/about-ward-8, (last visited April 13, 2024).
[84] *Equitable Development Plan, supra* note 81, at 6.
[85] *Id*. at 12.
[86] Hoffer, *supra* note 61.
[87] Kalen Breland, *DC's Anacostia River is a National Model for Sustainable Urban Development*, (March 26, 2020), https://www.earthday.org/d-c-s-anacostia-river-is-a-national-model-for-sustainable-urban-development/.
[88] Isabelle Anguelovski, *The Unbearable Whiteness of Greening*, Barcelona Laboratory for Urb. Envl. Justice Sustainability, (September 2, 2019), https://www.bcnuej.org/2019/09/02/is-gentrification-in-washington-dcs-anacostia-whitewashing-black-culture/.
[89] *Id*.
[90] *Id*.
[91] *Id*.
[92] *Id*.

As one of its first initiatives, BBAR helped stand up the Douglass Community Land Trust (CLT), which runs independently of BBAR. BBAR boasts that two-thirds of the Douglass CLT board members are Ward 8 residents who determine overall strategy, select partners, and review ground leases.[93]

The EDP also boasts that through BBAR's partnership with the Ward 8 Homebuyers Club, 131 renters have realized their dream of becoming homeowners. [94] Finally, the EDP claims that over three million dollars have been raised for property acquisition by the CLT, which has 233 affordable units already in its portfolio and a goal of over 1000 units by 2028.[95] The prices on the CLT homes remain affordable due to deed restrictions which prevent the selling price of the home from going a set amount above the purchase price.[96]

The 11th Street Bridge Project's EDP does meet several of Arnold's co-governance framework principles.[97] First, the EDP itself integrates its green infrastructure plan with policies designed to improve the Anacostia neighborhood residents' resilience and reduce the communities' housing vulnerabilities, as described above. It also expressly vests a co-governance structure with policy-making and policy implementation decisions, since BBAR established a Community Land Trust with a board that is made up of two-thirds of Ward 8 residents.[98] The establishment of this board is also indicative of "actual inclusion and power sharing, not mere participation or consultation."[99] Finally, BBAR's process for planning and development has been inclusive from its inception, maximizing bottom-up design and engaging in community capacity building.[100]

Media articles are overwhelmingly positive regarding the EDP and its strategies.[101] However, the EDP has not been entirely free from critiques. Urban Planning scholar Nufar Avni writes that some members of the community continue to be skeptical of the "real" intentions of the project and are concerned that the partnership between BBAR and the District may result in the "NGOization of justice" that shifts the responsibility away from the government and into private hands.[102] In an interview with a community organizer, the organizer complained the park is targeted at middle-class residents of the Anacostia

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[93] *Equitable Development Plan*, *supra* note 81, at 5.
[94] *Id*.
[95] *Equitable Development Plan*, *supra* note 81, at 15.
[96] Kaela Roeder, *Community-controlled affordable housing model could address gentrification in Southwest Washington*, Street Sense Media, (August 18, 2021), https://streetsensemedia.org/article/gentrification-navy-yard-housing-model-displacement/.
[97] Arnold, *supra* note 1, at 729.
[98] Equitable Development Plan, *supra* note 81, at 5.
[99] Arnold, *supra* note 1, at 729.
[100] *Id*.
[101] *See generally* Roeder, *supra* note 96, and Breland, *supra* note 87.
[102] Avni, *supra* note 78, at 2.

neighborhood, and the process has excluded poor residents, who are most likely to be impacted by the project.[103]

Nufar points out, too, that some residents may not want the park to be built at all. In that respect, the EDP is not truly equitable, it is a compromise at best.[104] Some residents felt there were better ways to invest the planned 40 million dollars in the community, such as in better education, transportation, employment opportunities, and healthcare services, and that the development of the park was just another indication that the "real" goal of the project was to bring development and gentrification to the area.[105] In this regard, despite its EDP and engagement and empowerment of members of the community, the 11th Street Bridge Project could still be viewed as a "top-down" green project with city planners identifying what is best for the community, rather than community members themselves determining how to use the funds. Nufar concludes by saying that "participation does not guarantee equity."[106]

It is too soon to know if the EDP touted by Building Bridges Across the River will prevent the gentrification and displacement spurred by the river restoration and bridge project. However, BBAR has learned from the failures of both the Navy Yard project and green gentrification failures nationwide and has used those lessons learned to develop a plan that is one of the most inclusive and equitable of any green infrastructure project at least in the District, if not across the nation. The establishment of the CLT, implementation of specific strategies to ensure the accomplishment of equity goals, the hire of an implementation manager, and extensive community engagement and participation demonstrate that the strategy has potential for success and is a potential model in co-governance approaches to GBI.

One weakness of the EDP is that, as Nufar pointed out, the impacted community is stuck in a participatory and advisory role, rather than vested with true decision-making authority about the project itself. Because the neighborhood group was given an "advisory" position, the group was forced into a more conciliatory role and was therefore unable to effectively leverage its position to gain concessions from city planners.[107] While the EDP strives to be as equitable as possible, and is light years ahead of the examples of flawed implementation discussed above, to be truly equitable, BBAR would need to share its authority with community members. The problem is that while the residents of the

[103] *Id*. at 9.
[104] *Id*. at 12.
[105] *Id*.
[106] *Id*. at 13.
[107] Checker, *supra* note 39, at 222.

Anacostia neighborhood were heavily engaged throughout the design and planning phases, the nonprofit corporation itself is not truly inclusive.

Although the Douglass CLT is a co-governance structure, the planning, development, operation, and maintenance of the GBI project, managed by BBAR, is not. A true co-governance structure would share authority and responsibility with community members in the planning, development, operation, and maintenance of the GBI.

*Parkland Neighborhood Community Garden and Plaza, Louisville, KY, USA*

Community gardens are beneficial to local communities in many ways, including enhancement of nutritional and physical health and community connection (Dickinson, et. al., 2003). The Parkland neighborhood in Louisville, KY worked to create a community garden in 2013, and the creation of this garden is an example of co-governance.

The Parkland Community Garden resulted from collaboration between governmental entities and community involvement in an example of co-governance- Parkland neighborhood Metro Council member Attica Scott worked closely with a group of elected residents and The Parkland Community Garden was formed (WDRB, 2013). The Parkland neighborhood is a predominantly Black and low-income community with vacant properties, a high rate of violence, and is considered a food desert (WDRB, 2013). Among vacant properties in the neighborhood there was a parcel of government-owned urban renewal property, and neighborhood residents secured this property as a community garden space by working with Rep. Scott and Louisville Metro Government to develop a license agreement to designate the space as a community garden (Louisville Metro Government, 2014). Additionally, the Jefferson County Cooperative Extension Service, the University of Louisville Center for Environmental Policy and Management, and the Network Center for Community Change provided support through education, planning, and organizing support (Louisville Metro Dep't of Ecc. Growth & Innovation).

Co-governance refers to a collaborative approach to governance where multiple stakeholders, including government bodies, community organizations/ residents, and/or private entities share responsibility and decision-making power in managing public affairs or resources (Arnold, et. al, 2021). Co-Governance aims to foster inclusivity, transparency, and accountability by engaging these various stakeholders in the decision-making process and reflects a recognition that complex societal issues require input and participation from diverse perspectives to achieve effective and sustainable solutions.

The Parkland neighborhood was in desperate need of a local green space to improve quality of life and access to fresh produce (WDRB, 2013). The Parkland Neighborhood Community Garden was a collaborative solution to begin to meet this need, and had multiple governmental, non-profit, and resident stakeholders share in the power and decision-making process. In the first year of operation, the Parkland Community Garden saw 45 families and over 400 volunteers participate (WDRB , 2013). Currently, this co-governance arrangement still sees success. Community support and use of the garden led to a need to expand green space access and the Parkland Plaza, a community designed space, opened in July of 2022 in a space that was previously an unused asphalt parking lot (WDRB, 2022). Parkland Plaza transformed from asphalt into a green space with a natural playground and community venue space and adds a park-type space to the Parkland neighborhood, which ironically has no parks (WDRB, 2022). As with the community garden, multiple public, private, and community resident stakeholders came together to determine the needs, wants, and most effective solution steps for the problem of the lack of green space in the Parkland neighborhood.

The Parkland Community Garden and Parkland Plaza co-governance arrangement facilitates resilience justice in several ways. This arrangement shares structure among multiple stakeholders and is truly inclusive. Louisville Metro Government held urban renewal land as a resource and provided funding to build the structures (WDRB 2013, WDRB 2022). Knowledge was a collaboration between governmental, non-profit, and resident input. Power was multifaceted, as elected residents served to plan the garden and Metro Council Representative Attica Scott advocated for funding and land use (WDRB, 2013), and governmental and non-profit representatives assisted to ensure progress. This shared structure was a hybrid bottom-up and top-down arrangement, and inclusive in ensuring that residents were an integral part of the planning process. This arrangement facilitated equity and community resilience through empowering community members to design their local green spaces. The inequity of living in a neighborhood with no parks, vacant properties, violence, and little access to fresh produce was recognized, and the community garden and plaza are steps of progress to build community resilience overall.

There are several institutional design elements of this co-governance arrangement. Both the Parkland Community Garden and Parkland Plaza resulted from the inclusion of resident perspectives and influences in planning, leading to a hybrid bottom-up and top-down governance arrangement that maximized grassroots (bottom-up) driven design and resisted government-driven (top-down) oversight. The initial Parkland Community Garden co-governance agreement has also seen growth: sufficient infrastructural resources provided to keep the garden operating and additional resources dedicated to building social capital, fostering community connections, and empowering marginalized groups

within the community through training, education, and capacity-building initiatives led to a successful Parkland Plaza just nine years later (WDRB, 2022). Both green spaces invest in and build social capital by creating spaces for meaningful interactions, fostering trust among residents, and promoting collaboration and mutual support within a community that previously had little access to green spaces (WDRB, 2022).

Based on the successful experiences that the Parkland Community Garden and Parkland Plaza have seen over the past decade, talks have begun to expand similar green spaces into the southwest part of the district and to increase green space access in the Parkhill neighborhood overall (WDRB, 2013, 2022). This example of inclusive co-governance demonstrates the power that planning can have when inclusion and equity are recognized in the process.

## V. Co-Governance Design Principles for Resilience Justice

*[This section will be further developed when our team has more opportunity to reflect on and discuss our case studies with one another, prior to WOW7.]*

Examples of co-governance in practice show that they are varied in their structure, functions, processes, and participants. Some have emerged out of more top-down government initiation, whereas others have emerged from bottom-up grassroots self-organization. Nonetheless, all the examples we studied arose in the context of activism within and by marginalized, oppressed, or vulnerable communities for more equitable power over the environments, resources, or infrastructure that enable them to thrive in disruptive and changing conditions. Co-governance arrangements evolve and may become increasingly institutionalized. Nonetheless, there is significant variation in how formal or informal co-governance arrangements are and in their subject matter and scope. There is no one-size-fits-all to the design of co-governance.

However, there are some fundamental design principles that can be identified from examining in what ways co-governance in practice advances or fails to advance resilience justice. All of the co-governance examples we studied contribute to the equity and resilience of marginalized, oppressed, or vulnerable communities, yet all of them fall short of achieving resilience justice goals and principles. Power sharing is not easy for governments or communities, and both justice and community resilience often remain somewhat elusive goals in many different types of governance systems. If co-governance is to be improved, it is necessary to know the most essential design features institutional design purposes for advancing resilience justice. We posit that seven features are especially important. They are:

1. **Sharing Structure**. The co-governance arrangement is based on shared: a) power, b) knowledge, and c) resources by d) one or more governmental entities and e) one or more human communities. As a result, this is a hybrid bottom-up and top-down governance arrangement. However, given the power disparities between government agencies and marginalized, oppressed, and vulnerable communities, bottom-up or grassroots-driven design should be intentionally sought and maximized, whereas top-down or government-driven design should be resisted or constrained.

2. **Defined Subject Matter**. The subject matter of the co-governance arrangement is defined or there is a method of defining or redefining the subject matter, with respect to scope, scale, and object/purposes. The defined subject matter communicates and clarifies which are the environments, resources, infrastructure, and the like that are to be co-governed.

3. **Resilience Justice Purposes**. The core purposes of the co-governance arrangement include facilitating equity and community resilience, opposing oppression, and empowering communities. The co-governance arrangement is likely to have other core purposes, but these are essential.

4. **Inclusive Processes**. The co-governance processes are inclusive, not merely participatory, including with regards to participation in the co-governance arrangement, decision making, and implementation of the decisions. This means that community members are included as co-decision-makers, not merely as advisory participants. Who is included is bounded, though, by the other features of the co-governance arrangement – the particular human communities and governmental entities that form the governance-sharing structure, the defined subject matter of the co-governance arrangement, the resilience justice purposes, social-capital and capacities, rules, and institutional functions.

5. **Social Capital and Capacities**. The participants in the co-governance arrangement, particularly in its human communities, have capacities to cooperate and engage in shared problem solving, trust one another, share information and resources, and resolve conflict.

6. **Rules**. The co-governance arrangement has a system of rules regarding its authority (whether formal or informal), the roles and responsibilities of its participants, decision rules, and accountability and feedback, among others. The rules might be contested and evolve over time (i.e., institutional evolution), but long-term uncertainty about or instability in the essential rules that govern the co-governance arrangement are likely to

make it less effective and equitable, perhaps even leading to institutional decline and collapse.

7. **Hybrid Institutional Functions**. The co-governance arrangement has both enabling and constraining functions (from institutional theory) and both bridging and bonding functions (from social capital theory). *[More about these features here.]* Co-governance arrangements often arise because institutions and organizations that function more narrowly on one end or the other of these spectrums lack the mix of functions needed for power-sharing, justice-seeking, and resilience-building governance arrangements.

## VI. Conclusion

*[To be written.]*

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*To do: organize & standardize; incorporate references from inserts with footnotes & others; delete unused resources.*


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