

Policy capacity mechanisms for addressing complex, place-based sustainability challenges

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The study explores the *capacity mechanisms that support effective place-based policymaking in response to sustainability challenges*. Policy capacity refers to the skills and resources needed to carry out policy functions, while effective place-based policymaking involves coordinated measures tailored to specific local conditions and involving diverse stakeholders. To understand capacity, the study examines nine dimensions at the individual, organizational, and systemic level, considering the capabilities of policy professionals, the frameworks established by organizations, and the systems that shape coordination, trust, and political legitimacy across multiple levels. The paper identifies initiatives that enable capacity development, mapping them across the different capacity dimensions, including data collaboratives, policy innovation labs, and collaborative governance regimes. These initiatives also shed light on the synergies and trade-offs that exist among capacities in government.

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The outputs of the workshops are a series of papers and a summary report that outlines future directions for place-based policies. This work will ultimately be relevant for policymakers at all levels of government who are interested in improving the design and implementation of place-based policies to contribute to equitable and sustainable economic futures.

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Executive summary

The skills and competences – the policy capacity – of government to tackle complex, place-based sustainability problems have repeatedly been highlighted, but remain abstract in how they are defined and developed within government. This paper looks at ways of enabling capacity within government while engaging with the communities in the places that are the target of place-based policies. Policy capacity is defined as the analytical skills for assessing current performance and future policy options as well as capacities to undertake medium- and long-term planning and strategic goal-setting. Capacity is divided into three dimensions of analytical, operational and political capacity as well as three levels of individual, organizational, and systemic. At the cross-section of these dimensions, nine elements of capacities are highlighted. The capacity-enabling initiatives highlighted in this paper include Policy Innovation Labs (PILs), Data Collaboratives (DCs), and Collaborative Governance Regimes (CGRs). These initiatives are set-up by government or with public money and specifically engage (local) stakeholders beyond government on place-based issues. They are collaborative in nature and try to capture place-specific challenges and stakeholders through establishing networked structures that serve as pathways for exchanging data or knowledge that is fed back into policymaking processes.

The paper finds that each form facilitates different dimensions of capacities and also serves a different purpose. From a more short-term, in-depth perspective into local challenges (PILs) to providing technical capacities for collecting and utilizing data – often across policy sectors as well as geographic locations (DCs). As well as combining a diverse set of autonomous stakeholders and creating a shared knowledge base (CGRs). In sum, capacity-building mechanisms need to be established in larger collaborative efforts – both across government and non-governmental stakeholders as well as across jurisdictions to effectively address place-based challenges through knowledge exchange and learning from best practices.

1 Introduction

Governments increasingly witness a combination of complex challenges and a call for more evidence-based policymaking given the advances in data analytics and access to information all over the world. However, in many parts of the world, governments are structurally unprepared for an engagement with diverse forms of evidence, including the stakeholders involved in producing and gathering such evidence. This has resulted in calls for a collaborative approach and a reconfiguration of relationships between levels of government and also the role of citizens. At the same time, complex, location-specific issues like those in the sustainability context are often ongoing and recurrent and are not being easily resolved through consulting scientific evidence, experts or citizens. They also manifest across different levels and scales. As a result, there have been calls for increasing capacity within government to address such problems in a way that is conducive to place-based needs. A lot of research and reports either identify ‘a lack of sufficient administrative, technical or strategic capacities’ (OECD 2019, 12) or state that the goal should be to increase governments’ capacity as ‘a critical part of fostering good public governance to achieve broad societal goals, such as promoting sustainable development’ (OECD 2020a, 9).

However, capacity mostly remains an abstract idea, highlighting that policy makers need to develop new skills and policymaking practices, embrace foresight, experimentation, evaluation and stakeholder interaction (OECD 2020b). Or that improving capacity includes ‘strategies such as improving organisational infrastructure, tools, resources and processes; workforce development; and establishing strategic units to support an evidence-informed approach across government’ (OECD 2020a, 10). In previous discussions on state capacity, the economic dimension was further very prominent. In these studies, capacity is understood as the government’s ability to generate growth and economic development. ‘Researchers have mostly relied on economic measures of capacity that have included the use of overall aggregate measures or national wealth and productivity such as real and nominal gross domestic product (GDP) growth, GDP per capita, factor productivity, inflation, unemployment, size of current account, and so on’ (Woo et al. 2015, 276). However, a pre-condition for economic success is that the economic institutions of the according government are trusted and have the skills and competences to make decisions on certain measures.

There is further a discussion on the interplay among resilience and capacity. To illustrate, the concept of capacity has been integrated into the notion of regional resilience, indicating the ability of local businesses to navigate shifts and disruptions in the market, technological advancements, and policy alterations (McGlade et al. 2006; Simmie and Martin 2010). This resilience-focused literature primarily centres around market dynamics and, adopting an evolutionary stance, by looking at how local political structures respond to changing environmental circumstances, encompassing both technological and political changes (Swanstrom 2008). The framework of regional resilience stands as an alternative viewpoint to the concept of a learning region, which places more emphasis on the policy-driven aspects of transformation (Pendall et al. 2007; Swanstrom 2008). However, the discourse surrounding regional resilience has increasingly spotlighted institutional and policy dimensions (Boschma and Martin 2010; Hassink and Klaerding 2010; Martin and Sunley 2006). Linked to the learning discussions, scholars have defined capacity as an entire system’s capacity in relation to the structures and procedures that allow learning to take place at all levels of the system – including in a multi-level governance context (Schout 2009; Borrás 2011). In contrast, some have also zoomed in on specific capacities. However both ways of defining capacity do not capture when the lack of capacities becomes a hurdle for learning or link specifically to policy outcomes.

From this discussion, a nested view of policy capacity has emerged. Policy capacity is thereby understood as the set of skills and resources within government necessary to perform policy functions (Wu et al. 2015). In order to identify different aspects of capacity, a distinction is made among three dimensions of analytical, operational and policy capacity as well as three levels - individual, organizational, and systemic. At the cross-section of these dimensions, different forms of capacities are highlighted that include, for example, individual technical knowledge (analytical capacity), entrepreneurial skills (operational capacity) or political acumen (political capacity). At the organizational level, capacity is defined as having access to external expertise and data (analytical), establishing collaborative mechanisms (operational), and political/stakeholder support (political). System level capacity encompasses data collection and analysis tools (analytical), mechanisms for intra-state (vertical and horizontal) coordination and planning (operational), as well as trust, legitimacy and accountability (political).

In the context of place-based policymaking, the need and availability of these capacities varies. Place-based policymaking is characterized by territorially grounded policies structured with a multi-level governance perspective and tailored to the unique attributes of individual regions (Wolfe 2011; Barca et al. 2012). Place-based initiatives are referred to as 'actions by on-the-ground actors who have ownership (and take the risks) in implementing ideas and actions, even if the initiatives are externally initiated and supported' (Brondizio et al. 2021, 67). While many of such initiatives are place-specific, they are connected in various ways with governments at multiple levels as well as potential non-governmental organizations. In fact, they are often 'intertwined in an inescapable interdependence among actors and levels of governance' (Brondizio et al. 2021, 67). This is especially pertinent for sustainability-related challenges, because they are often place-specific while also being affected by space-blind policies and are being perceived differently by a diverse set of stakeholders. An example of a space-blind and place-based relationship is that of water scarcity. National water quality standards can conflict with place-based policies that aim to allocate water resources or promote specific conservation practices based on regional needs. Thereby, strict water quality standards may limit the use of certain agricultural practices in one region, while another region may rely on those practices due to its unique conditions. Navigating this intersection requires careful coordination and the development of flexible frameworks that allow for both overarching and place-based policies to coexist harmoniously. Thus, place-based policies need to address future trajectories of specific locations while considering overarching policies that potentially have place-based implications and a set of stakeholders at multiple levels. This is a high bar for being effective in addressing place-based sustainability challenges and requires a specific set of skills and competences. Governments need the ability to understand the implications of different policy options based on knowledge from the region and from different stakeholders. This implies the capacity to engage with knowledge bases and input and having the ability to place and utilize it in the larger institutional context and with the financial resources available.

This paper focuses on this set of skills and competences by looking at structures that government is able to establish in order to facilitate capacity for creating effective place-based policies. These include Policy Innovation Labs (PILs), which are dedicated teams or entities focused on designing public policies, Data Collaboratives (DCs), partnerships among stakeholders to share and utilize data, and Collaborative Governance Regimes (CGRs) that entail processes which engage public agencies or levels of government across boundaries to carry out a public purpose. While each of the three arrangements serves a different purpose, they share certain characteristics. They all enable a collaborative set-up among stakeholders and have a data and knowledge sharing component. The three arrangements also actively embrace the complexity and dynamic of place-based challenges.

The paper finds that each form, PIL, DC or CGR, facilitates different dimensions of capacities and also serves a different purpose. PILs for example enable a more short-term, in-depth perspective into local challenges which means they are time-consuming for government officials and require a higher commitment over a limited amount of time. They are especially valuable when they identify gaps in skills and develop targeted trainings for officials to translate findings from PILs into policy-making efforts. DCs

can support government in providing technical capacities for collecting and utilizing data – often across policy sectors as well as geographic locations. However, they require a strategy as to which level of government is being targeted in order to provide useful insights for place-based policymaking. CGRs usually have a diverse set of autonomous stakeholders and therefore have value for creating a standardized framework for, for example, data collection or creating a shared knowledge base. They also are challenged by potentially diverging interests as well as have different levels of capacities across partners.

The paper defines policy capacity in the following section (Section 2) by outlining the nine dimensions of the capacity framework and linking the idea of policy capacity to the multi-level governance framework and capacity that is located outside of government, such as citizen science. In Section 3, attention is paid to capacity mechanisms and effective place-based policymaking, specifically in the context of sustainability challenges. Section 4 contains a detailed look at the three initiatives, policy innovation labs, data collaboratives, and collaborative governance regimes, by giving examples from Canada (Solutions Lab, Vancouver), the United Kingdom (UK Collaboratorium for Research on Infrastructure and Cities, UKCRIC), and the Lower Mekong River Basin Region (Mekong River Commission, Cambodia, Lao PDR, Thailand, and Vietnam). The final section, Section 5, concludes the paper by summarizing the findings.

2 Government Capacity

Capacity Definition and Taxonomy

Definition

Policy capacity is defined as “the ability to marshal the necessary resources ... to set strategic directions, for the allocation of scarce resources to public ends” (Painter and Pierre 2005, 3), or in a broader sense, the set of skills and resources necessary to perform policy functions (Wu et al. 2015). While policy capacity partially depends on the available skills and competencies, as well as the political orientation of policy makers, it also depends on the available financial resources and the legal constraints given by the overall institutional setting.

‘Given the government’s central role as policy maker, policy capacity is necessarily affected by political institutions and activities related to formulating, legislating, and implementing policies’ (Woo et al. 2015, 274). For instance, the legislative system shapes government elections and legislative processes (Lijphart 1991). Effective management of this system becomes pivotal in supporting governmental activities, constituting a crucial systems-level political competence necessary for sustaining office and realizing electoral, legal, and policy objectives. Additionally, the decentralization of administrative decision-making influences individual behaviour and policy outcomes by relocating policy discussions to the local level (Buchanan 1995). Governments must then adeptly manage these intergovernmental interactions to ensure effective governance (Woo et al. 2015).

This perspective on policy capacity results in a ‘nested’ view (depicted in Fig. 1) which has several significant deviations from prior attempts to defining policy capacity. To begin with, it does not confine itself to a specific function, stage, or task within the policy process; instead, it encompasses all policy processes – ranging from agenda setting and formulation to decision-making, implementation, and evaluation. This stems from the realization that the challenges faced by governments in executing these policy functions significantly vary, and competence in one task does not necessarily ensure effective performance in others. Simultaneously, it acknowledges the potential for skills and resources to be transferrable across tasks (Wu et al. 2015).

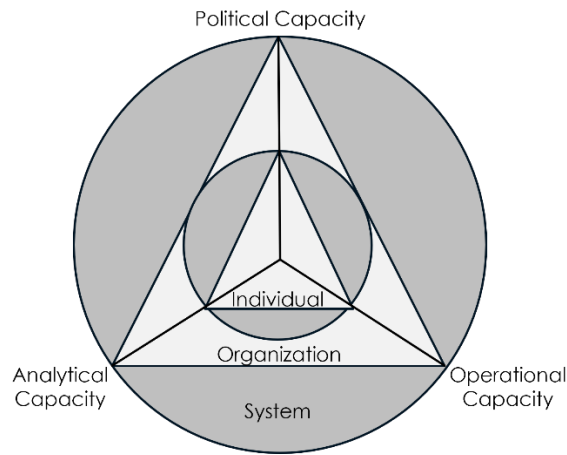


Figure 1. A nested model of policy capacity (Wu et al. 2015, 168).

At the individual level, policy professionals—such as policymakers, public managers, and policy analysts—play a pivotal role in shaping the effectiveness of diverse tasks and functions within the policy process. Their policy capacity hinges upon their comprehension of policy processes, proficiency in policy analysis and evaluation, managerial skills, and political acumen. Nevertheless, substantial individual policy capacity might not necessarily ensure policy effectiveness, as other resources and capacities are equally indispensable at the organizational and system levels for completing certain tasks. At the organizational level, the presence and efficacy of an information infrastructure, human and financial resource management systems, as well as political backing, can either enhance or diminish individual capabilities. For instance, organizations that excessively limit the autonomy of individual decision-making or erode morale among policy professionals could erode the agency's capability to fulfil its functions (Gleeson et al. 2011; Tiernan and Wanna 2006). Finally, the system-level describes wide-ranging and at times all-encompassing capacities through which other aspects might be shaped. In essence, capacity is understood as proficiencies and capabilities present within government agencies across three interconnected tiers: the individual realm (e.g., policymakers, decision-makers), the organizational sphere (e.g., agencies or programs), and the systemic level (e.g., encompassing the entirety of government or the broader macro-level institutional and structural contexts) (Mukherjee et al. 2021).

In addition, a distinction is being made among analytical, operational, and political capacities, which describe capacities that help ensure policy actions are technically sound, allow the alignment of resources with policy actions so they can be implemented in practice, and help to obtain and sustain political support for policy actions respectively (Wu et al. 2015).

Taxonomy

The nested understanding of policy capacity, which includes the three levels and three forms of capacity can be translated into the taxonomy shown in Table 1. This highlights nine forms of capacity covering different skills and competences as well as covers the individual, organizational and systemic level. It also allows a more nuanced discussion of different aspects of capacity.

Level of resources and capabilities	Skills and competences		
	<i>Analytical</i>	<i>Operational</i>	<i>Political</i>
<i>Individual</i>	Individual analytical capacity	Individual operational capacity	Individual political capacity
<i>Organizational</i>	Organizational analytical capacity	Organizational operational capacity	Organizational political capacity
<i>Systemic</i>	Systemic analytical capacity	Systemic operational capacity	Systemic political capacity

Table 1. Policy capacity: skills and competences (Wu et al. 2015, 167).

Individual level

The 'individual analytical capacity' can be described as 'the ability of individuals in a policy-relevant organization to produce valuable policy-relevant research and analysis on topics asked of them or of their own choosing' (Howlett 2009; Howlett 2015, 174). Thereby recognizing that this capacity entails acknowledging the individual skills or competences of analysts and policy practitioners (Colebatch, 2006; Colebatch et al. 2011), alongside the analytical resources available to them. This form of policy capacity is not exclusive to governments; other entities such as independent government inquiries, non-governmental organizations (NGOs), and lobbyists also require it. The analytical capacity at individual level is thereby related in a nested fashion to other competences and capabilities of government. In order for these capacities to translate into high-quality policy analysis, these skills and competences require the availability of timely and appropriate information. In addition, Howlett (2015) points out that beyond the 'supply of qualified researchers' and the 'ready availability of quality data', there needs to be a demand for research and a procedures that encourages productive interactions among researchers creating a culture in which openness is stimulated and risk taking is acceptable (Riddell 1998; Howlett 2015). The 'individual operational capacity' dimension describes the skills of individual managers to perform key managerial functions. A key aspect, according to Tiernan (2015) is that there is an increasing focus on leadership in discussions of public sector reform while also promoting managerial reforms that focus on efficiency and technical skills. 'Individual political capacity' is defined as political knowledge or 'policy acumen' (Wu et al. 2010). Pal and Clark (2015) underscore the significance of perceiving politics not only within one's immediate purview but also in the broader context. They assert that an adept grasp of politics in both realms is vital for individual policy actors to effectively contribute to the policy process. In sum, identifying key stakeholders, comprehending their fundamental interests and ideologies, and grasping the intricate dynamics among them are integral attributes for successful public managers. Equally important is the capacity to discern the political trade-offs necessary to broker agreements among competing actors and interests.

Organizational level

At the organizational level, analytical capacity requires the availability of individuals with analytical skills in combination with processes for collecting and analysing data as well as an organizational commitment to evidence-based policy (Pattyn and Brans 2015). 'An efficient information system for collecting and disseminating information within and across public sector agencies is especially important in the context of the present day emphasis on evidence-based policymaking which requires not only the ability to analyse data but also its availability in a timely and systematic manner' (Wu et al. 2015, 169). Organizational operational capacity describes the internal organization of public agencies and their relationship with legislative and executive institutions as well as the training and goals of public servants working in them (Peters 2015). The final dimension at organizational level, organizational political capacity encompasses nurturing learning relationships with governance partners and the public. To succeed, governments must delineate an issue, engage the public's attention towards it, and actively involve them in its resolution. Importantly, Dunlop (2015) contends that establishing two-way communication empowers citizens to monitor state activities, engage in dialogues with state actors regarding issues of personal concern, and exert influence on political outcomes.

Systemic level

The conceptualization of systemic policy capacity builds on the concept of 'state capacity' in prior literature. At its core, existing interpretations of state capacity encompass the institutional and relational prerequisites that impact a government's capability to formulate and execute policies, as well as to establish and enforce

laws (Fukuyama 2004; Fukuyama 2013). Nonetheless, defining and quantifying this concept presents challenges, resulting in the coexistence of diverse understandings of 'state capacity' within the literature. In an early report by the World Bank (1997), for instance, the focus was on 'state capability' as the 'efficient ability to undertake and promote collective action'. However, much of the existing research on state capacity, rooted in the realm of public administration, emerged from the scrutiny of a state's 'strength' in managing economic development (Evans 1995; Weiss and Hobson 1995). This often entailed an exclusive emphasis on economic performance as a gauge of state effectiveness, accompanied by a general approach to understanding the sources of such effectiveness. In a more recent conceptualization, Woo et al. (2015) argue that at this level, legitimacy is a crucial foundation upon which other forms of policy capacity build upon. This is linked to the idea that governments that hold higher levels of trust have more room to manoeuvre and negotiate larger transitions and through which other aspects of policy capacity may be linked and leveraged. As an OECD report (2021) on trust points out:

Governments are operating in an increasingly complex and fast-paced environment, with growing expectations from citizens for an efficient and seamless interaction with their governments. Public satisfaction with administrative and social services, as well as perceptions of fairness and equal treatment, are strongly associated with trust in civil service. (Ibid, 67)

It also forms the boundary around which policymaking at the organizational and individual level take place. Specifically, the three sets of skills at systematic level include:

- Systemic analytical capacity: The overall condition of scientific, statistical, and educational infrastructure within a society that enables policymakers and professionals to access high-quality information necessary for conducting their analytical and managerial tasks (Hsu 2015).
- Systemic operational capacity: The coordination of governmental and non-governmental efforts to address collective problems (Hughes et al. 2015).
- Systemic political capacity: The so-called 'steering-level' capacity, which has the potential to shape all other capacities. This dimension is shaped by the level of trust in the political, social, economic and security spheres of policy action (Woo et al. 2015).

In the context of the development of the taxonomy, beyond establishing the categories, there also has been focus in the literature on highlighting the context and dynamic linked to establishing the capacities within government. For example, Dunlop (2015), highlights a dynamic perspective for organizational political capacity by mapping different types of the capacity onto policy learning dimensions. The underlying idea being that building capacity is a fundamentally dynamic exchange and that different learning environments enable new capacities and capacity in turn enables policy learning and ultimately policy change. Thereby, policy learning is defined as 'the updating of beliefs on the basis of new information and debate' (Dunlop 2015, 262). As for the context in which capacities are acquired and established, studies show that political structures and processes, such as election cycles, economic conditions, cost pressures on government, the media, as well as pressure groups and an informed and demanding public play a role. However, as Hughes et al. (2015) point out, 'how such powerful influences can be managed by the policy worker is at the core of governance capacity, and policy leadership development in particular' (Ibid, 242).

Since the establishment of the policy capacity taxonomy, there has been some discussion on updating or adding to the existing categories in light of the rise of big data analytics and behavioural dimensions of policy. As Mukherjee et al. (2021) point out, 'the availability of data, network analysis and modelling necessitate complex skills such as making use of software, models to produce insights that inform policy' (Ibid, 254), which necessitated a parallel emphasis on big data readiness at all three levels of capacity (Clarke and Craft, 2017; Giest, 2017; Giest and Mukherjee, 2018). One approach is to use data availability as a proxy of capacity. This has taken shape in the form of using the 'ready availability of quality data' (Riddell 2007) as measurement of capacity or using the idea of 'statistical capacity', which captures the dimensions of statistical practice, data collection, and indicator availability (World Bank 2014). This capacity measure has been linked to the Environmental Performance Index (EPI) and studies show that

indeed those countries performing better on data availability also score better in the EPI in terms of climate change, air quality, water resources, among others (Hsu et al. 2014). However, this measure is limited to the capacity within government and lacks dimensions to capture the ability of government to connect with other stakeholders to obtain additional insights in form of local knowledge or data. This is captured in the above outlined capacity framework in the category of 'organizational political capacities', which include – seen through a policy learning lens – 'that agencies develop and adapt organizational capacities that help them engage in productive learning relationships with their various audiences' (Dunlop 2015, 262).

There has also been some criticism around the use of the capacity dimensions. Some argue that the taxonomy needs further development in terms of how mechanisms link to the different capacities and it 'does not lend itself to drawing causal inference or developing a theory of policy capacity' (Mukherjee et al. 2021, 249). Another aspect that has been raised is that policy capacity can enable a 'dark side,' promoting self-interested, political, or economic 'rent-seeking' goals of policymakers (Chindarkar et al. 2017; Howlett and Mukherjee 2016). This happens in scenarios where high-capacity politicians make (economic) commitments for electoral gains based on their ability to identify relevant information, while more effective solutions are ignored. It can additionally facilitate the creation of 'placebo policies' as 'agenda management safety valves' (McConnell 2020, 965) or 'hidden agendas' (McConnell 2018), serving political objectives rather than addressing core policy issues. These aspects remain unexplored, particularly given challenges posed by global trends like populism and autocratization (Kelemen 2017; Maerz 2020; Norris and Inglehart 2019; Mukherjee et al. 2021).

Capacity and Multi-Level Governance

The levels highlighted in the capacity taxonomy do not directly translate into a Multi-Level Governance (MLG) understanding of policymaking, which includes supranational/ international, national and sub-national or regional levels as well as civil society and non-governmental stakeholders (Hooghe and Marks 2001). However, there are clear links between the two concepts, which include:

- Multi-level governance requires collaboration and coordination among different levels of government and non-governmental actors to address complex issues. Policy capacity, as defined above, provides the skills and competencies required for effective collaboration across levels, facilitating the sharing of expertise and resources.
- The policy capacity definition recognizes the importance of skills and competencies in policy processes. In a multi-level governance context, these skills become crucial for actors at various levels to engage in informed decision-making, policy analysis, and effective communication.
- Multi-level governance involves both horizontal interaction (across different jurisdictions) and vertical interaction (between different tiers of government). Policy capacity enhances the ability of actors to engage in constructive horizontal and vertical interactions, thereby improving the overall effectiveness of multi-level governance.
- Multi-level governance requires the effective implementation of policies across different levels. Policy capacity, particularly at the organizational and individual levels, ensures that policies are implemented with the necessary expertise, resources, and managerial skills.
- And finally, both concepts emphasize the engagement with non-governmental actors, including civil society organizations. Policy capacity contributes to effective engagement by enhancing the ability of both government and non-governmental actors to contribute constructively to policy discussions and implementation.

Recent studies look at the role of (national) MLG settings in shaping the policy capacity of cities. Based on a study of six major European cities, Cucca and Ranci (2022) find that there is a significant association between the characteristics of cities under consideration, their respective MLG frameworks, and their policy outputs. This has to do with the fact that MLG systems shape the regulatory as well as the financial

autonomy of cities and in this space of complex inter-governmental dynamics, policy capacity to develop and implement policies is formed. They find that

Institutional aspects related to the MLG framework, in addition to decision-making dynamics and the role of public and civil society actors, play a crucial part in either expanding or limiting the capacity of urban policy to effectively respond to social challenges. (Cucca and Ranci 2022, 1517).

The research further highlights that there is an inextricable connection between the trajectories of European cities and the dynamics and policy directions prevailing at both the European and national levels. While it's insufficient to conceive of a 'European city' as impervious to shifts in national policies, these cities can, however, exhibit a capacity for innovation and effective management of economic shifts and societal complexities—provided they are bolstered by a facilitating multi-level governance (MLG) system.

Financial Support from the Central State	Degree of regulatory local autonomy (urban, metropolitan, regional level)	
	High	Low
Weak	Unsupported localism	Constrained localism
Strong	Supported localism	Centralism

Table 2. A Typology of Multi-Level Institutional Governance Settings (Cucca and Ranci 2022, 1501).

The typology in Table 2 highlights MLG complexities that shape capacities at local level. Starting in the upper left corner, unsupported localism describes a scenario in which there is high local autonomy without the financial support from the state, resulting in a need for high levels of capacity at local level in order to carry out large-scale planning and looking for local funds or European programs. Constrained localism also describes weak financial support, but at the same time a low degree of local autonomy. This results in cities dealing with strict financial and sectorial regulation and scarce funding, which can lead to collaborative attempts among municipalities within the same metropolitan area in order to have supplementary place-based programs addressing local needs. In the lower column, supported localism captures strong financial support paired with a high degree of local autonomy. This, according to Cucca and Ranci (2022), creates locally based programs with room for setting specific goals and with high levels of involvement of local stakeholders in the planning activity. The final category centralism is a combination of strong national interventionism with generous financing. In this case, local governments have limited functional and institutional autonomy and depend heavily on state interventionism.

Capacity outside government

Even though the capacity of governments is the main component shaping policy capacity, Wu et al. (2015) recognize that “a wide range of organizations, such as political parties, NGOs, private businesses, and international organizations, as well as multiple government agencies, are involved in policy processes and thus their capacities affect the government’s own capacity to perform’ (Ibid, 167). This applies especially in the context of environmental issues, ‘where “super-wicked” problems of the commons like climate change (Levin et al. 2007) necessitate global environmental governance’ (Hsu 2015, 197). Hsu (2015) makes the point that due to varying levels of capacity across governments to acquire and use environmental knowledge, there is the case for ‘citizen scientists, independent watchdogs, private sector companies, and third-party organizations’ to be involved and potentially enhance capacity (Ibid, 198). Especially in the context of sustainability challenges, ‘environmental policy capacity is not restricted to

national policies, but instead increasingly relies on societal forces of all kinds' (Jänicke 1997; Hsu 2015, 203). In addition, 'assessing the actual and proper overall distribution of capacity between government and non-governmental actors and the difference between governmental and non-governmental analysts and policy advisory system members, including outside consultants, is a key question and central focus in research into policy analytical capacity' (Howlett 2015, 178).

Citizen Science

Looking at the role of outside, place-based expertise, citizen science projects have become an important resource for government in the context of sustainability challenges. Citizen science is rooted in co-production (Ostrom and Ostrom 1979) and participatory research (Hodgkinson et al. 2022; Hoppe 2010; Jasanoff 2003), and addresses societal challenges and holds substantial potential for policymakers and practitioners. Its impact is well-documented, encompassing environmental awareness (Johnson et al. 2014), public science education (Bonney et al., 2009), community resource stewardship (Vitos et al. 2013), and UN Sustainable Development Goals monitoring (Fraisl et al. 2020). Broadly defined, citizen science is a shift from expert-driven hierarchical knowledge to collaborative public participation (Bonney et al. 2009; Kullenberg and Kasperowski 2016), situated in participatory development literature (Cooke and Kothari 2001; Hoppe 2010).

Whereas many citizen science projects are the result of a research-driven collaboration, in recent years they have increasingly become a resource for government as well. Such 'intersectoral' collaborations are acknowledged for sustaining projects and creating effective interventions (e.g., Braun et al. 2006; Castro et al. 2021; Freitag and Pfeffer 2013). There is evidence that long-term partnerships that engage with relevant communities and align with local goals, create trust and ultimately high-quality data (Braun et al. 2006; Cunha et al. 2017; Chak 2018; Freitag 2017). Examples from the environmental policy space where knowledge is combined at a global scale include the generation and use of geographical information linked to the proliferation of open source data (such as the user-generated database Open Street Map), the 'World Water Monitoring Challenge', which encourages citizens to monitor local water quality or a similar initiative for air quality called 'The Air Quality Egg' (Hsu 2015). In a similar vein, local initiatives are increasingly being recognized. Various local initiatives involving civil society actors have been well-documented, particularly within the context of urban sustainability transitions and highlight the a shift towards emergent processes rather than planned endeavours (Huttunen et al. 2022). This implies that government needs the capacity to identify and connect with such local initiatives in different ways. This could be through the exchange of data and/ or knowledge, financial support or a more structured dialogue. To summarize, citizen 'can act as place- or practice-based experts in situations where lay knowledge can be more sensitive to local realities than abstracted scientific and expert knowledge' (Huttunen et al. 2022, 102714). However, a caveat to engaging with local – and especially marginalized – communities is that there is a danger of contributing to unequal power relations and there is a risk of only engaging with those already active or interested in sustainability issues or otherwise dominant groups.

3 Capacity mechanisms and effective place-based policymaking

Defining effective place-based policymaking in a sustainability context

Place-based policies encompass a philosophy and strategy for fostering economic and societal development that recognizes the potential for enhancing well-being within the unique context of every city, region, and rural area. In recent years, there has been a heightened focus on place-based policymaking, extending its application across a diverse array of policy areas – including social and environmental sustainability (Beer et al. 2020). The sustainability context is one that is defined by challenges of “spatial resource-mandate” mismatch, where the principle of subsidiarity, aiming to delegate tasks to lower levels of governance, conflicts with the capacity to effectively execute them. This results from inadequate resources at lower levels, insufficient knowledge about local circumstances at higher levels, or a lack of collaboration within regions (Alber and Kern, 2008; Marshall, 2008). Addressing this global-local dilemma of sustainability challenges requires a multilevel governance framework with robust vertical connections, enabling national to local leadership with the necessary resources for sustainable organization (Wolfe 2011). This forms the basis of the place-based policymaking, which encompasses territorially grounded policies structured with a multi-level governance perspective and tailored to the unique attributes of individual regions (Wolfe 2011; Barca et al. 2012). The place-based approach centres on two core elements: Firstly, it underscores the significance of a place's social, cultural, and institutional traits (Barca et al. 2012). Secondly, it recognizes the involvement of various levels of government and diverse policy layers in addressing sustainability challenges. In contrast, space-neutral or aspatial policies give less attention to geographic context, assuming that policy should be centred around “mobility, agglomeration and thus, the promotion of specific urban sectors or technologies with little or no recourse to the regional context” (Barca et al. 2012, 140). However, even policies presumed to be space-neutral inevitably yield explicit spatial consequences, many of which could hinder the policy's objectives unless these spatial effects are considered (McCann 2023). This becomes particularly vital in an environmental context, where issues are intricate and, as defined by Levin et al. (2010), challenges become “wicked” or even “superwicked”. In addition, the uncertainty of sustainability challenges increases the complexity of decision making processes further, making it difficult to predict which level of governance is able to exert most influence on policy decisions (Di Gregorio et al. 2019). Di Gregorio et al. (2019) find that power dynamics among MLG levels prevent cross-level interaction and reinforce mismatches between governance systems and place-based issues.

“Wicked” problems defy resolution through conventional means and are marked by their ill-structured nature. This signifies the absence of a definitive solution, as diverse stakeholders perceive the issue differently and propose distinct approaches to tackle it. Consequently, there exists no singular right or wrong approach to such problems; rather, “the choice of explanation determines the nature of the problem's resolution” (Rittel and Weber 1973, 166). Place-based policies offer a means to address at least some of these hurdles by influencing the future trajectories of specific locales, acknowledging local

autonomy, and simultaneously considering national interests (Castle and Weber 2006). However, not all policies can be place-based, and many aspatial public policies unintentionally possess place-based implications. In essence, 'while the intention may be space-blind, the outcomes are rarely if ever space-blind or place-neutral' (McCann 2023, 22). This underscores the need for coordination between space-blind and place-specific initiatives, aligning their central objectives with various policy domains and levels of governance (Barca et al. 2012; Wolfe 2011). Wolfe (2011) notes that advancing toward place-based policies at regional levels "requires a new approach to the governance mechanisms for policy development that incorporate regional exercises to identify and cultivate their assets, undertake collaborative processes to plan and implement change, and encourage a regional mindset that fosters growth" (Ibid, 2).

This highlights two points: First, that it is important to identify (legacy) space-blind policies that impact or even limit local initiatives due to (hidden) trade-offs or a competition for resources. And second, to understand the characteristics of placed-based initiatives and how they connect to the larger ideas surrounding placed-based policymaking, such as the engagement of local communities and the timing and goals.

Evaluating the effectiveness of place-based policymaking

Policymakers grapple with the task of finding methods to assess the effectiveness of policy initiatives in specific places. Particularly challenging is the scarcity of information concerning the social repercussions associated with policy measures. This predicament primarily stems from the historical emphasis on economic impacts. This often leads to more policies targeting the same problem and/ or the same place. However, research shows that instead of more policies, better policies are needed. Policies need to be 'aimed at maximising the development potential of each territory, solidly grounded in theory and evidence, combining people-based with placed-based approach, and empowering local stakeholders to take greater control of their future' (Rodríguez-Pose 2017, 34). In addition, selecting indicators to be the basis for informed policymaking always involves certain tensions. Indicators help to simplify complex systems, however this simplification also can lead to results that poorly represent places or challenges.

'When an inadequate conceptual framework (or none at all) for dealing with this inevitable tension prevails, the consequences can include breeding complacency about conditions, mindlessly recording anything and everything as 'baseline data', and provoking unnecessary actions or implementing measures that ultimately turn out to be ineffective' (McCool and Stankey 2004, 297).

McCool and Stankey (2004) further raise questions about the indicators that the effectiveness of sustainability is based on, because technically and/or scientifically-defined measurements can differ significantly from community indicators. Citizen initiatives have often developed their own indicators that differ or are even at odds with the government. This implies that there needs to be a way to engage with stakeholders and citizens in order to identify what should be sustained, for whom, and over what time and spatial scale. As Holzer and Kloby (2005) state in the context of citizen participation, it is crucial for managers to adopt strategies capable of harmonizing day-to-day operations with meaningful interactions. However, implementing these strategies poses challenges since involving citizens in governmental processes often runs counter to the specialized, routine-driven, hierarchical, and impersonal nature of bureaucracies. Moreover, managers themselves require training to effectively engage citizens, gather data, and transform insights into meaningful knowledge that facilitate well-informed deliberation. Unfortunately, the training needed to equip employees with the skills essential for supporting citizen participation can often incur substantial costs – both in terms monetary and time-related resources. Berner et al. (2011) go one step further and establish an idea of effective citizen participation from the perspective of stakeholders themselves. They find that citizens differ in their way of understanding effective participation and focus on a two-way communication between all stakeholder groups and look for opportunities to be heard earlier in the process. In contrast, elected officials see participation as effective if there are limited complaints by citizens and when there is high voter turnout. For staff, citizens are a

valuable resource to provide information as well as to get other members of the community to understand potentially pressing or controversial decisions being made.

Effectiveness is further shaped by the institutional setting in which place-based policies are designed and implemented. If the institutional structure does not have transparent and reliable decision-making processes, it makes it harder to develop and realize place-based solutions due to potentially changing regulatory requirements. For example, 'a weak institutional context has the effect of exacerbating the problem of information asymmetry between regulators and regulated firms, thus increasing incentives for rent seeking and other opportunistic behaviour' (Araral 2014, 301).

Overall, it is clear that due to the specific character of place-based policies, the development of evaluation indicators and a universal framework to guide an impact assessment across jurisdictions and studies is difficult. This has to do with complex, local settings, a mix of policy interventions, varying timeframes, and spill-over effects across regions, which is often paired with a lack of appropriate data to understand the effects of these dynamics (Darvas et al. 2019). Consequently, the ways in which effectiveness is approached varies across locations and is influenced by the specific objectives and stakeholders associated with each place.

Effective placed-based policymaking through a capacity lens

The idea of capacity in the context of addressing place-based sustainability challenges is not new. Already in the early 2000s, researchers have argued that addressing climate change adaptation and mitigation occurs within the framework of adaptive and mitigative capacity, respectively (Brooks et al. 2005; Adger et al. 2005). Prior to that, research into climate change responses specifically was limited to estimations of specific climate change impacts and proposals for mitigation and adaptation responses, rather than investigations into the socio-political and institutional precursors to these responses. The premise was that science could address the knowledge gaps that hindered climate change efforts, and policymakers could rationally utilize this knowledge to create and execute efficient response strategies (Jasanoff and Wynne 1998, Irwin and Wynne 1996, Irwin 1995; Burch 2009). This introduction of capacity focused on the adaptive and mitigative capacities at group-level, including the structure of critical institutions and the allocation of decision-making authority, the ability of decision-makers to manage information, public perception of attribution as well as the ability of a system to undertake climate change mitigation (Yohe 2001). Following this, research found these capacity dimensions to be operating at a very high level of abstraction and being applied to very large groups. In response, a different framing of capacity was proposed that is defined as the human ability to manage both the generation of greenhouse gases and the consequences of their production (Adger et al. 2005). This idea was further broadened and response capacity was described as time and context specific, and culturally and regionally specific. 'It consists of a broad set of resources, many of which have previously been described as the determinants of adaptive and mitigative capacity. For instance, stocks of human and social capital, which are pools of resources that may be used in a multitude of ways, are elements of response capacity' (Burch 2009, 30). The advantage of this expansion lies in its capability to link response capacity with the fundamental socio-economic and technological trajectory of a particular society or community, thereby offering a fresh perspective to explore how capacity can be effectively translated into action (Burch 2009).

In this context, governance at different levels becomes a key focus when thinking about translating response capacity into action. 'For instance, at the municipal scale, cities possess stores of capacity in the form of financial resources, in-house technical skills and experience, and decision-making legitimacy and effectiveness. External to these factors, however, are the policies and practices at higher levels of government' (Burch 2009, 76). This applies to some municipalities more than others. As the MLG framework in Table 2 suggests, this is primarily the case in 'supported localism' scenarios where strong financial support is paired with a high degree of local autonomy. To account also for the so-called 'external' factors, the Wu et al. (2015) framework captures both the different levels as well as different types of skills.

Rather than treating capacity as a potential for tackling different place-based sustainability challenges, the framework encompasses the entirety of the policy process, from setting agendas and formulating strategies to making decisions, carrying out implementations, and conducting evaluations. This recognition arises from the understanding that the difficulties confronted by governments when executing these policy functions exhibit notable differences, and proficiency in one task does not guarantee proficiency in others. Additionally, it recognizes the possibility of skills and resources being adaptable across different contexts (Wu et al. 2015).

In recent years, in order to bridge knowledge and organizational gaps in government to address place-based issues, new forms of governance or institutional set-ups have been developed. Three forms are described in more detail below.

4 Capacity-enabling initiatives

Selection of capacity-enabling initiatives

As more data is collected and knowledge is more readily available, the pressure on government to incorporate this information into the policymaking process has been mounting. However, data collection points, such as sensors that measure water quality or sea levels in specific places are not enough to create evidence- and place-based policies. Policy research has shown that in order for such evidence to be acted upon, several things need to be in place, including an organizational setting in which knowledge can be integrated effectively and quickly as well as a way to connect to policymakers that are able to take this knowledge into account when making decisions that ultimately affect the region in question. Decision-makers have to understand the effect of overarching and place-based policies on a region while also being adaptable to an ever-changing and uncertain context. The core idea is that for policies to be effective, they must be able to adapt to conditions that cannot be anticipated.

The idea of capacity focuses on the process of knowledge transfer and learning – the ability to communicate, absorb, and learn from the knowledge pool in and beyond a certain place. To facilitate such processes in government, which is notoriously slow when it comes to change and knowledge absorption, there are structures that enable capacity within government to create effective place-based policies. The following section highlights three prominent ones that have been adopted in different parts of the world and specifically enable multiple levels of government to effectively address complex, place-based challenges. Those include Policy Innovation Labs (PILS), Data Collaboratives (DCs), and Collaborative Governance Regimes (CGR). They share common features that enable capacity within multi-level set-ups, including:

- They all enable collaboration between various stakeholders in order to gain insights into different perspectives as well as tap into various data sources. This specifically includes participatory elements through which citizens and often also stakeholders and experts, can highlight place-based challenges and potential solutions.
- Data and knowledge sharing plays a central role in the three arrangements – this can take different shapes by creating joint data bases, linking data sets or integrating place-specific data.
- The three arrangements acknowledge the complexity and dynamic of place-based challenges while also creating structures in or linked to government that encourage adaptability and flexibility in policymaking.

These elements form the basis for enabling capacity within government, because they become a resource and vehicle for different levels of government to, for example, equip individuals with analytical skills (individual analytical capacity) in combination with establishing processes for collecting and analysing place-based information (organizational analytical capacity).

Policy Innovation Labs

Defining PILs

Policy innovation labs (PILs) 'are increasingly being established and commissioned by governments to bring new insights and approaches to policy design and the delivery of public services' (The Policy Lab 2018, 4). Policy 'labs' are defined through their roles as 'dedicated teams, structures, or entities focused on designing public policy' (Fuller and Lochard 2016). PILs are thereby contributing to a rapid turn to experimental approaches within government (McGann et al. 2017, 1). As such PILs act as change agents and 'innovation catalysts' within the government apparatus (Bason 2017; Carstensen and Bason 2012). PILs, as organizations or units in the different sectors, were established with the aim of dealing with complex policy issues in innovative ways and are expected to respond and contribute to sustainability goals for example. The establishment of PILs has been a response to growing pressures on governments to delivery higher quality, more cost-effective, more citizen-centred, digitally sophisticated, and more innovative responses to increasingly complex challenges.

Due to the widespread use of the terms 'policy lab' or 'policy innovation lab', a substantial body of literature has emerged discussing various aspects of these labs. Global research indicates that many labs are relatively small organizational entities that operate for a limited duration (McGann et al. 2019). Fuller and Lochard (2016) discovered that within the European context, most policy labs were experimental initiatives and had an existence of approximately two years. Furthermore, these labs often depend on political support, which suggests the possibility of dissolution or reduced funding when 'political priorities change' (Timeus and Gascó 2018, 995). Comparisons are frequently drawn between innovation labs and think tanks, given their shared organizational traits such as a high degree of self-organization autonomy and the ability to span diverse policy domains (McGann et al., 2019). Thereby, innovation labs distinguish themselves through their co-production features, actively collaborating with individuals to develop solutions and incorporating participatory elements into their policy formulation processes (Tonurist et al. 2017). Additionally, PILs are often characterized by the wide usage of digital instruments to allow public transparency (Olejniczak et al. 2020)' (Wellstead et al. 2021, 194). Another important feature that many policy labs exhibit is that they share knowledge among each other and also learn from each other's successes and mistakes. The OECD's Observatory for Public Sector Innovation (OPSI), for example, is tracking case studies of innovation, which is something that PILs can tap into. Further, PILs can have significant leadership and engagement from senior staff and/ or elected officials, which creates strong links to government as well as provides a setting in which funding or other resources are provided.

Given the participatory elements that innovation labs incorporate in their ways of working, they are seen as entities that bring together different experiences and perspectives and thus benefiting policymaking 'by increasing the likelihood that the nature and underlying causes of problems will be understood' (McGann et al. 2019, 301). This is not least because citizens participate in implementing policy policies and are essential in making public services work (Osborne et al.2016; Bovaird and Loeffler 2012). This way of working has effects on the policymaking and decision-making processes. There is an emerging discussion about where policy innovation labs are effective. Policy labs play a crucial role in influencing at various levels of governance. Policy labs can shape the overarching concepts that guide policymaking, such as the balance between environmental conservation and economic development priorities. They contribute to the discourse on how these priorities are weighed and how place-specific concerns are factored into the equation. Moreover, policy labs impact the underlying logic of policy instruments, influencing the preference for particular implementation styles. This includes encouraging debates on the appropriateness of 'hard' regulations versus 'soft' approaches like moral suasion, all within the context of addressing local challenges and realities. Policy labs can also directly impact formal program objectives. They engage stakeholders in policy co-production, allowing for localized participation in determining the focus of programs, whether it's water conservation versus energy efficiency within a sustainable city development initiative. Policy labs bring together diverse perspectives to create tailored solutions that align with the

unique needs of specific places. When it comes to the practical implementation of policies, they influence the specific settings in which policy tools are implemented, ensuring that they align with the local context. For instance, they can contribute to adjusting the ideal levels of green spaces and parks or water conservation in a city, acknowledging the geographical and societal considerations of that specific area. Location-specific, policy labs also play a role in determining the specific calibrations of policy tools for effective implementation. This includes decisions like the demarcation of designated green parks or the expansion of rainwater harvesting requirements for new commercial buildings. These micro-level adjustments are essential for ensuring that policies have a meaningful impact on the ground. In essence, policy labs serve as dynamic platforms for linking place-based policymaking arguments to different levels of governance. They facilitate dialogue, innovation, and tailored policy solutions that resonate with the unique needs and contexts of specific places, fostering effective and responsive policymaking.

Solutions Lab, Vancouver (BC), Canada

The Solutions Lab (SLab) is a public sector social innovation lab inside the City of Vancouver that began in 2017 with a focus on working with programs on the greenest city, healthy city, climate emergency, reconciliation, and equity policies and programs. It is 'a small and non-permanent public sector innovation lab, led from 'the middle' of the organization, and each year needs to iterate its work and secure funding, permission, collaborators and partnerships' (City of Vancouver 2022, 2).

While engaged in social and ecological policy and planning within the City of Vancouver, it became apparent that distinct processes, frameworks, and practices were necessary to address complex challenges differently. The prevailing methodologies were not yielding the desired transformative innovation outcomes. The 'Healthy City For All' strategy thus created the opportunity and resources for the Solutions Lab. The initiative was pursued over several years, with the Solutions Lab expanding and establishing a community of practice for city personnel and community partners. During this period, the lab also undertook applied and action research and forged partnerships.

In 2021, the Solutions Lab experimented with transitioning toward more network-oriented endeavours, exemplified by the 'Transforming Cities from within Learning Journey' and 'Community of Practice'. This community consists of teams from 12 cities across Canada, addressing intricate challenges at the nexus of climate, equity, and decolonization. Since then, the focus has been on continual exploration to discover how transformative innovation in the public sector can be nurtured, scaled, and enhanced across cities in North America.

In terms of financial resources, the Solutions lab received start-up resources through Vancouver city's innovation fund. The Solutions Lab grew out of a Staff Hub that brings together City of Vancouver staff to work on 'high priority complex challenges related to Healthy City for All, Greenest City, Engaged City, and Economic Action Strategy' (City of Vancouver 2018, 3). The Staff Hub received \$200,000 to cover expenses and test the concept. There was also a team on best practice research in order to adopt approaches that worked in other public sector labs.

SHIFTING FROM:	TO INCLUDE WHERE WE HAVE BEEN AND ALSO...
Expert team in innovation methods	Expert team in building capacities for innovation, and embedding knowledge, skills and tools
Innovation understood as creating public value for community being served	Considers sustainability, equity, reconciliation, and other values as well
Finding inventive prototypes on specific challenges	Implementing long-term, scaleable, systemic, embedded and high impact innovations
Design methods in toolkit	Expanded toolkit to include multidisciplinary methods (i.e. social innovation, collaborative leadership, transformative learning)
Evaluating creativity and invention, novelty, volume of projects and outputs	Evaluating scaling and embedding solutions, leadership, learning, outcomes, and others
Belief that creativity and disruption is what's needed to change government	Belief that culture change and building innovation infrastructure is what's needed to change government
Single lab focus	Movement building focus

Table 3. Focus of PILs and principles of the Solutions Lab (City of Vancouver 2018, 3).

The Solutions lab then started with four labs where teams of city staff and community partners work on complex challenges. In order to identify the themes of the labs, the guiding principle was to choose challenges that are at 'the centre of a City staff persons' desk; don't have a predetermined solution already in mind; and where there is a willingness from the staff lead(s) to work differently' (City of Vancouver 2018, 6). Once a topic was chosen, the focus was half on finding breakthrough solutions and the other half on professional development. This implied that there needed to be a commitment by the city for some of the staff to spend time on a specific topic in the context of a lab. Once a staff lead and question was confirmed, each lab developed a design brief as well as formed a multi-stakeholder lab team. An example of one of the labs is the one seen in Figure 2.

GETTING INTO THE WEEDS: PLANETARY HEALTH LAB



LAB QUESTION:

How might we equitably accelerate access to food that is healthy for both people and the planet?

WHO WAS INVOLVED?

Sustainability Lead (City of Vancouver); Social Policy Lead (City of Vancouver); and participants from different organizations and initiatives:
 Vancouver Humane Society
 Check Your Head
 Simon Fraser University Food Systems Lab
 Vancouver Economic Commission
 SFU/Food Systems Lab
 Vancouver Food Policy
 Vancouver Coastal Health
 UBC Sauder Marketing and Behavioural Science
 SFU Sustainability
 VCC Culinary Arts,
 Choices Market
 UBC Land & Food Systems

DESIGN BRIEF:

The food we eat, the ways we produce and consume it, and the social, cultural, and ecological contexts in which that happens have major impacts on both human health and environmental sustainability. This lab investigated ways in which the access end of the food system (i.e. consumption and procurement) could be leveraged to shift diets towards lower overall environmental impacts of our food system. It considered the intersections of *planetary health, human health, and food access, choice and equity*.

Figure 2. Planetary Health Lab Example (City of Vancouver 2018).

The lab, beyond pursuing the goals identified in the design brief, also has a municipal policy context. It is aligned with the city's long term commitments to reducing greenhouse gas emissions and ecological footprint ('Vancouver's Greenest City Action Plan' and 'Renewable City Action Plan'). It also makes links with the Health City Strategy in terms of healthy living and sustainable food systems and builds on Vancouver's Food Strategy by identifying new focus areas for diversity of voices and inclusion, financial accessibility and availability, and food system resilience (City of Vancouver 2022, 16). One of the main outcomes of this lab was that new collaborations were created between people and organizations that had not worked together before, and in some cases had been in conflict with one another because of very different values and approaches to the topic. In addition, one of the biggest challenges was the factor of time. Participants indicate that they do not have the time needed to adequately work on the complex challenge and thus work focuses on 'band-aid' solutions rather than larger changes.

Evaluation and Impact

One year in, in 2018, the Solutions Lab published the report 'Navigating complexity, The journey of the city of Vancouver's Solutions Lab (so far)' in order to reflect and evaluate the work that had been done in the four labs. One of the main findings from the first year was that the labs need 'more flexible and nimble processes in order to enable fuller participation by more people' (City of Vancouver 2018, iv). These findings were based on the idea of 'developmental evaluation' (DE) in order to learn and adapt the work as it was undergoing. The idea of DE is to evaluate what next steps are in the creation of an emerging program and raises questions, such as 'what are the options for the next iteration of the program?'. This was done in junction with a survey evaluation conducted with participants in all four labs.

These results show that respondents indicate that they approach their work at the city differently since participating in the labs. 'Some indicated working to understand a problem from multiple perspectives, especially those of end-users and individuals most affected by the problem. Others are taking the time to understand a problem more deeply before coming up with an immediate solution' (City of Vancouver 2018, 24). These insights into the processes and perspectives of participants resulted in outcome measures that included the following aspects:

- Shifting organizational culture:
 - Securing longer-term and more robust budget and senior leadership support;
 - Develop a City-of-Vancouver-centric culture and systems change evaluation framework to measure the impacts of the lab;
 - Lab work, and lab team members formally recognised/ rewarded internally and externally
- Building innovative infrastructure:
 - Creation of innovative infrastructures that can be scaled within the context of the Greenest city and Health city policy domains
- Unlocking the potential of people:
 - Portfolio changes for lab team and Community of Practice (CoP) members that add new work responsibilities resulting from their experiences in the Solutions Lab
 - Number of CoP members with active participation included in their annual performance plans
- Growing authentic partnerships
 - Partner organizations adopting tangible actions resulting from work on lab teams
 - Formal funding and/or partnership agreements with external organizations supporting lab work
- Tell stories of change
 - Continued evaluation of lab outcomes and impacts
 - Learning, critical reflection, measurement and reporting acknowledged as core practices of the Solutions Lab and all those involved.

Another question that is being raised in the context of PILs is when to end a lab. The Solution Labs report highlights that 'it typically takes a little while for root causes, stuck patterns, and deeply ingrained mental models to surface, and spending more time in that space is where we notice that participants shift their understanding of the challenge and are able to unearth these more systematic aspects of the challenge, particularly when complex challenges are working towards social and ecological justice' (City of Vancouver 2022, 14). This results in a process where activities are slowed down significantly to work on things such as collaborative problem framing and also to picking up pace when at a point to make decisions on how to move forward. There is also a general sense that labs profit from moving away from a 'tool and technique' approach toward more professional development in the public sector.

Based on these insights, Solutions Lab 2.0 was launched, which builds on the evaluation insights and experiences, including focusing on capacities within city government, moving towards professional development and how the impacts of learning-focused innovations can be evaluated.

Capacity-enabling elements for PBP

In the way PILs are structured more generally and the Solutions Lab in particular, they facilitate technical and operational capacity for individuals and organizations with a spillover effect into political capacities. For the latter, one of the labs, for example, created new connections between people and organizations that had not worked together before, and some even had been in conflict with one another because of very different values and approaches to the topic. The lab setting was able to facilitate capacities to overcome these divides. Timeus and Gasco's (2018) study, for example, specifically highlights that such labs facilitate

local government innovation capacity by contributing to aspects such as idea generation and knowledge management.

PILS span policy domains while also actively collaborating with individuals to develop solutions and incorporating participatory elements. Individual PILs also share knowledge among each other and thereby expanding the knowledge base available to policy makers (individual analytical capacity). PILS further engage with public, private stakeholders as well as organizations relevant to specific places. Thus, they contribute to the individual political capacity for policymakers to better understand the broader context, identifying key stakeholders and comprehending potential interests linked to a place-based problem being addressed.

As for capacities at the organizational level, the policy innovation lab is able to equip individuals with analytical skills in combination with establishing processes for collecting and analysing place-based information (organizational analytical capacity). Further, the links to government are built-in through public funding and, in the Solutions lab, a local commitment to have municipal officials join. There is limited evidence for more structural connection to legislative or executive institutions, but broadly speaking PILs support organizational operational capacity.

Especially relevant in the context of the Solutions Lab was the commitment by the municipal government to give officials the time to participate in the activities and think deeply about a problem. Basically, the PIL became a vehicle to justify facilitating individual capacities linked to local problems. This was paired with picking up topics relevant to local government by choosing challenges that were at ‘the centre of a City staff persons’ desk and without a predetermined solution. This set-up of high-intensity relationships is only sustainable for a limited amount of time. Thus, as is being observed beyond the Solutions Lab, PILS are usually relatively small organizational entities that operate for a limited duration (McGann et al. 2019). Hence, there is a trade-off between duration or a long-term mechanisms to enhance capabilities in government and the intensity at which PILS work with local communities and policymakers. Finally, PILs are dependent on political support, but are not building the political capacity to achieve it as it is clearly stated in the Vancouver Solutions Lab context where the city enabled for some of the staff to spend time on a specific topic in the context of a lab.

Level of resources and capabilities	Skills and competences		
	<i>Analytical</i>	<i>Operational</i>	<i>Political</i>
<i>Individual</i>	x	x	x
<i>Organizational</i>	x	x	
<i>Systemic</i>			x

Table 4. Policy capacity features of policy innovation labs.

Data Collaboratives

Defining DCs

Data Collaboratives are generally understood as partnerships or collaborations among diverse stakeholders, including governments, private companies, non-profit organizations, and research institutions, aiming to share and utilize data to address social, economic, and environmental challenges (Gurstein 2011;). These collaborations involve the pooling and analysis of data from multiple sources to generate insights, inform decision-making, and drive positive societal outcomes (Barlacchi et al. 2015 2015). DCs build on the notion of collaborative governance and information sharing and thus add socio-technical complexities to collaborations. In this context, challenges can arise in terms of ‘legal barriers, silos, proprietary nature of data, fears of misuse as well as privacy, ethical, and fairness issues’ (Ruijter

2021, 1). However, the ability to share data among different actors also enables government to tackle complex public problems (Susha et al. 2018). Ruijter (2021) identifies three interrelated levels relevant for data collaboratives: organizational, political and policy, as well as data and technical. The latter one refers to a pre-existing data sharing or information infrastructure. Political and policy elements include legislation and policies addressing data and privacy aspects as well as political support. Finally, organizational elements refer to pre-existing formal or information network structures (Ruijter 2021).

Thereby, data collaboratives often take the form of local living labs. A living lab is most commonly understood as a real-world environment where research and innovation activities are conducted in a collaborative manner among citizens, researchers, and public as well as private stakeholders. Living labs provide a space to experiment in the context of a participatory and citizen-centred design (Bergvall-Kåreborn and Ståhlbröst 2009). Living labs are 'intended to design, demonstrate and learn about the effects of urban interventions in real time' (Bulkeley et al. 2016, 13) while also having an explicit place-based focus. Especially relevant when it comes to data collaboratives is that such labs often seek to collect data in real-time, for example through smart applications and data management and control systems. Researchers and governments often have easier access to several sources of data when it comes to specific, local projects, such as the transformation of a former industrial site or the reconfiguration of an urban space. It is also a way to work with the public on open government data and make sense of some of the information gathered about specific places. Living labs also allow for an understanding of sustainability that is emergent rather than pre-defined, because they follow a more experimental, interventionist, incremental and 'learning by doing' governing approach. There has been discussion on the impact of living labs, since due to the specific character of living lab studies, the development of evaluation indicators and a universal framework to guide an impact assessment across jurisdictions and studies is difficult. A common element across living lab evaluation frameworks is the assessment of engagement and diversity of stakeholders and users and the lab's efficiency, effectiveness, utility, and sustainability. There is also a diversity in how living labs are evaluated, due to their inherent user-centric nature. Consequently, the ways in which evaluations are approached vary across locations and are influenced by the specific objectives and stakeholders associated with each living lab (Bronson et al. 2021).

UK Collaboratorium for Research on Infrastructure and Cities (UKCRIC)

The UK Collaboratorium for Research on Infrastructure and Cities (UKCRIC) is a network of interlinked urban infrastructure 'observatories', at sites across the UK, for the digital capture, mapping, sensing, monitoring, and testing of real urban infrastructure systems over the long term – with 15 partner academic institutions and 88 small- and medium-sized enterprises (SMEs) involved in project activities (UKCRIC 2022). The key objective is to capture the complex interrelations and interactions of real systems with the environment, people and society. The research is enabled by close collaboration with local government and industrial partners. UKCRIC is composed of three strands: infrastructure laboratories, Urban Observatories, and the Data & Analytics Facility of National Infrastructure (DAFNI). Infrastructure and urban observatories encompass monitoring and data collection systems that continuously track and analyse the performance of crucial infrastructure and urban systems in real-time. These observatories furnish essential data and insights into the behaviours and functionalities of these systems, enabling improved decision-making and the formulation of more effective solutions to the challenges faced by infrastructure and urban areas. DAFNI is the National Platform to meet computational needs in support of data analysis, infrastructure research, and strategic thinking for the UK's long term infrastructure and cities planning.

UKCRIC focuses on how to make the system that constitutes the nation's infrastructure more resilient to extreme events and more adaptable to changing circumstances and contexts, and how it can provide services that are more affordable, accessible and useable to the whole population. UKCRIC 'provides the trans-disciplinary, systems-based research for the transformation of infrastructure and urban systems, generating economic opportunities for the UK...by engaging government, industry, academia and end

users, UKCRIC is de-risking, helping to prioritise, and providing evidence, analysis and innovation' (UKCRIC 2022, 3). UKCRIC received £196M of public funding (excluding primary funding for facilities) and has attracted £40M in research funding from commercial sources. It has so far produced one patent as well as one spin-off company.

Thereby UKCRIC conducts, among other domains, placed-based studies and urban observatories. Place-based research initiatives and urban observatories, also referred to as living labs, represent innovative approaches to research and development geared towards enhancing the sustainability, resilience, and adaptability of both infrastructure and cities. UKCRIC's place-based projects involve focused studies conducted within specific physical locations, enabling research and development to occur within real-world contexts. This approach facilitates the practical testing and demonstration of novel solutions on-site. Such an approach yields valuable insights into the feasibility of implementing new technologies and solutions, potentially expediting their rollout and commercialization. Both place-based research and infrastructure and urban observatories have the goal of advancing the sustainability, resilience, and adaptability of infrastructure and cities, ultimately contributing to a more sustainable development in targeted locations.

Oxford-Cambridge Arc

One of the place-based studies is the 'Oxford-Cambridge Arc'. The Oxford-Milton Keynes-Cambridge Arc is recognized as an economic asset, offering substantial growth potential for both local communities and the UK as a whole. Tapping into this potential necessitates innovative collaboration between businesses, local stakeholders, and the government. This collaborative approach in the context of the UKCRIC work aims to ensure that the gains from growth are accessible to local populations and the nation as a whole, all while safeguarding the natural environment. To ensure that developmental benefits align with sustainability and resilience goals, substantial breakthroughs are required in networked services such as transportation, energy, and water. This, according to the project description, calls for transformative innovations that can enhance the efficiency and effectiveness of these services, contributing to a more sustainable and resilient future (UKCRIC 2021).

UKCRIC set-up a collaboration of universities and the Arc Universities Group (AUG) – a network of universities between Oxford and Cambridge – in order to explore, for example, air quality.

Air quality

Cranfield's rapid study of air quality throughout the Oxford-Milton Keynes-Cambridge Arc utilized the data collected through their urban observatory. UKCRIC operates six urban observatories which are collecting vast amounts of open access data on parameters such as infrastructure condition, air quality, noise, and traffic flows. These facilities are designed to capture the complex interrelations and interactions of engineered systems with the environment, people and the economy. By deploying sensors across a variety of urban sites, this national 'observatory' enables the digital capture, mapping, monitoring and testing of real cities and infrastructure at a variety of scales, over time. These measures help to design Low Emission Zones in the Oxford-Cambridge Arc and air quality policy more generally.

Findings from these smaller projects are then used to provide integrated regional planning input. There are 'contrasting growth scenarios for new dwellings within the Arc' as well as the quantification of the 'implications of changing local needs for infrastructure services within the context of the national 'big picture' of population change, economic growth, technological innovation and climate change' (UKCRIC 2021, 14).

This also applies to the collaboration between the UKCRIC Urban Observatories of Newcastle, Birmingham and Manchester, The Alan Turing Institute and the UK Department of Transport to develop a digital twin in order to decarbonise transport and standardize this approach across the country. This stems from a history of UK cities having access to real-time metrics such as traffic flows, but developing individual

paths to tackle the problem. However, this can compound complex problems through a lack of standardization and consistency. And, in turn, national level policies might overlook place-based information relevant to an overarching strategy (UKCRIC 2023). Another aspect of the data sharing is that researchers, decision-makers in government and private bodies were unable to access secure data and sophisticated data models in one place. UKCRIC developed a trusted and independent platform (Data & Analytics Facility for National Infrastructure, DAFNI) which enables access to analytics needed for policy decisions.

Evaluation and Impact

In terms of impact, UKCRIC has links to other national research institutes including Alan Turing (data and digital), Henry Royce (materials), the National Composites Centre, the Productivity Institute and the Active Building Centre – catalysing a network of UK’s leading research institutes. UKCRIC is further actively supporting the National Infrastructure Commission (NIC), the Infrastructure and Projects Authority (IPA) and the Climate Change Committee (CCC). UKCRIC is also connected globally with research institutions including the Australian SMART Infrastructure Facility, JPI Urban Europe and TU Delft Next Generation Infrastructure (Netherlands).

Beyond aiming to be a ‘rigorous evidence base’ for government, UKCRIC has links to government in other ways that can lead to both impact as well as capacity-building. For example, researchers at UCL’s Department of Science, Technology, Engineering and Public Policy have established a ‘Competencies Framework for Infrastructure Policy Professionals’. The initial impetus for this study originated from the firsthand experiences of the Principal Investigator(s), who engaged with a diverse array of infrastructure and policy topics within academic research, practical applications, and educational contexts. Over recent years, a growing necessity has emerged to comprehend the fundamental competencies encompassing skills, knowledge, and behaviours essential for individuals operating at the intricate intersections of infrastructure and policy. The competencies framework tries to develop proactive implications for shaping the content and structure of degree programs and ongoing professional education, thereby equipping practitioners to effectively address the prevailing challenges within the sector. ‘This report summarizes the key research insights that that team believe have the capacity to inform research agendas across UKCRIC’s missions, and directly inform education across higher education and workplace training’ (Rivera et al. 2022, 3). The report shows that that practitioners within the infrastructure policy sector have a large amount of tacit knowledge and expertise that has been gained through experience and ongoing reflection, which is a valuable source of insight and guidance for researchers and those seeking to make practical change in the sector.

UKCRIC is present across all regions of England and Scotland, with plans for expansion into Wales and Northern Ireland. This widespread network contributes to regional growth and productivity, fostering extensive collaboration among academic institutions spanning various UK regions, and further strengthens and enriches partnerships with the private sector, local government, investors, citizens, and communities. The UKCRIC however recognizes that by not having one physical centre in the UK and at the same time covering a diverse set of topics is a challenge when it comes to coordination as well as ensuring that UKCRIC’s vision and capabilities can be effectively communicated and delivered – especially to policymakers. Therefore, the UKCRIC Coordination Node (CN) was created with the goal of being responsible for, among other things, influence and outreach activities, including informing national debates and policy formulation. ‘This is achieved through responses to calls for evidence or consultation processes’ (UKCRIC 2023, 36).

Capacity-enabling elements for PBP

The idea of data collaboratives more generally facilitates the policy analytical capacity of government by bridging potential information gaps both within government as well as among government and other

stakeholders. Data collaboratives also contribute to the identification, collection, analysis and incorporation of data and scientific knowledge into the decision-making process. However, this might be specific to certain government levels – especially in countries with highly decentralized modes of governing. For example, if a country has a highly decentralized mode of environmental policymaking, there might be highly varying levels of capacity per governance level or region with Data collaboratives potentially only targeting a certain level or region as well. For the UK example, UKCRIC focuses on linking knowledge across the UK and thus facilitating policy analytical capacity at national level with limitation to supporting capacity at regional or local level. This is especially relevant for place-based policymaking, since it highlights that there needs to be some thought being put into which level of government or region the data collaborative is targeting and what this means for the (de)centralized governance system in place. As Hsu (2015) points out, some government’s environmental agencies with greater capacity are able to collect a range of data using sophisticated technologies whereas others are not. And ‘such discrepancies become problematic when aggregated to a systematic scale: when comparing carbon emissions at the provincial versus national scale’ and can potentially lead to a loss of trust in the government’s analytical capacities. This shows a clear trade-off between capacities being supported at national or lower levels of government and how this affects data collections in a certain institutional context.

UKCRIC tries to partially address this by creating a virtual platform that is able to combine place-specific data, such as real-time metrics on traffic flows, with standardization and consistency mechanisms to have insights that contribute to policies that could be place-specific in certain regions, but also inform overarching policies at national level. This is an important enabler for operational analytical capacity at organizational and systemic level. But, it also has proven to be difficult to combine both as evaluations have shown that by not having one physical centre in the UK and at the same time covering a diverse set of topics is a challenge when it comes to coordination with policymakers. It further seems that UKCRIC has recognized a need for looking at and potentially enhancing individual-competences linked to data collection. This has to do both with the availability of skills training to (next-generation) policymakers as well as the ability to share existing knowledge and expertise in a way that it can be re-used in different regions. This is a strong facilitator for individual and organizational analytical capacity.

Level of resources and capabilities	Skills and competences		
	<i>Analytical</i>	<i>Operational</i>	<i>Political</i>
<i>Individual</i>	x		
<i>Organizational</i>	x	x	
<i>Systemic</i>	x	x	

Table 5. Policy capacity features of data collaboratives.

Collaborative Governance Regimes

Defining CGRs

Collaborative Governance Regimes are broadly defined as ‘the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished’ (Emerson et al. 2011, 2). CGRs have several distinct features compared to other collaborative set-ups. They often have a broad focus on public policy issues in contrast to more narrow organizational priorities. CGRs also encompass a diverse set of autonomous organizations that represent different interests or jurisdictions. In this context, they develop institutional and procedural norms and regulations that cultivate collaborative efforts. Finally, CGRs ‘enable repeated interactions among their participants through structured processes over time (distinguishing them from

one-off participatory workshops or short-term collaborative forums)' (Emerson and Nabatchi 2015b, 719). They are thus an effective way for local governments that want to address place-based issues and where the participants cannot accomplish their goals without one another and many challenges need to be addressed simultaneously with limited resources and lacking capacities (Puppim de Oliveira 2013). In sum, CGRs can be seen as a response to wicked problems that must be addressed in a continually evolving, complex governance context and require an adaptative response. They also have a certain degree of formalization, which supports decision-making processes and potential funding or evaluation procedures.

There are numerous approaches for evaluating the outcomes of intergovernmental cooperation, but assessing the performance of collaborations that transcend boundaries remains difficult and complex (Radin 2000). There is little consensus on what truly constitutes effective performance and conventional assessment methods do not effectively capture the dynamic and innovative characteristics of these intricate governance systems. Further, the ambition of cross-boundary collaboration to resolve complex public issues and delivering public services may have hindered the necessary critical examination of these rapidly proliferating governance models (Emerson and Nabatchi 2015b). In particular, Emerson and Nabatchi (2015b) point out that there is a distinction between process and productivity performance. Process performance focuses on the results of the collaborative process whereas productivity looks at the outcomes of collaborative actions. One element that is highlighted in the framework that is developed based on this distinction is that of 'capacity for joint action'. This includes the ability to foresee upcoming needs and challenges stemming from the results of collective actions both at the participant level and in relation to the intended objectives. This requires a consistent and enduring capability to produce outcomes, coupled with adaptability, responsiveness, and innovative thinking in response to evolving systemic conditions. To summarize, Emerson and Nabatchi (2015b), suggest, within the scope of CGRs, to look at evidence of CGR capacity in use that has contributed to the achievement of targeted goals (e.g., dedicated staff, resource acquisition, resource sharing), and evidence of CGR capacity available to continue to contribute to the achievement of targeted goals (e.g., fundraising strategy, strategic plan, shared theory of change).

Mekong River Commission (MRC)

The Mekong River Commission (MRC) operates as an intergovernmental entity facilitating regional discourse and collaboration within the geographical ambit of the Lower Mekong River Basin. It consists of three permanent bodies: The MRC Council, the Joint Committee and the Secretariat. In addition, there is an MRC summit, which is organized every four years and where heads of governments come together to assess outcomes of the collaboration. The MRC council is the decision-making body and is responsible for all policy-related matters concerning implementation as well as basin-wide strategies. The MRC joint committee coordinates all implementation efforts and is assisted by task forces, working groups, or expert groups. Finally, the MRC Secretariat consists of four divisions and one office, including an administrative, an environmental management, a planning and a technical support division. It is assisted by national-level consultants as well as technical experts from the region and all over the world. The establishment of the MRC in 1995 was predicated on the Mekong Agreement, an accord signed by Cambodia, Lao PDR, Thailand, and Vietnam. The MRC assumes the role of a regional forum engendering water-related diplomatic interactions and operates as an intellectual repository for the effective administration of water resources, thereby facilitating sustainable developmental pursuits within the designated region.

The member countries have developed five, cooperative procedures to address water management in the region, which include:

1. Data and information sharing: This is based on a 2001-agreement 'Procedures for Data and Information Exchange and Sharing' (PDIES).
2. Consultation on infrastructure projects: This builds on the 2003 'Procedures for Notification, Prior Consultation and Agreement' (PNPCA) collaboration.

3. Water use monitoring: The 'Procedures for Water Use Monitoring' (PWUM) was approved in 2003 to provide a comprehensive framework for monitoring water use and diversion.
4. Maintenance of flows: This builds on the 'Procedures for Maintenance of Flows on the Mainstream' (PMFM) from 2006 with the intent of having a mutually acceptable hydrological flow regime.
5. Water quality: In 2011, the 'Procedures of Water Quality' (PWQ) was signed to establish a cooperative framework on water quality.

These agreed-upon procedures are linked to a data portal to which member states contribute. This is then used as a joint database as well as a source of information and forecasting for the public. One example is the 'Rapid Basin-wide Hydropower Sustainability Assessment Tool (RSAT).

Rapid Basin-wide Hydropower Sustainability Assessment Tool (RSAT)

The RSAT provides a framework and methods to apply Integrated Water Resource Management (IWRM) principles for a Basin-wide approach to sustainable hydropower development. The approach considers broader environmental, economic, technical, social, strategic and cumulative impacts as well as institutional responses for sustainable development. The tool has been the basis for dialogue between Cambodia and Vietnam on the shared Srepok River Basin and has been applied at community level in Vietnam to facilitate discussions on how to protect and improve flood and drought conditions in the Cham Island Marine Protected Area.

The MRC is working on a dashboard that can visualize the data is being collected, which shows both the current status of different dimensions as well as the direction in which it is developing shown in the categories of: on track, increasing, stagnating/ increasing, decreasing or data unavailable.

Basin Monitoring Status & Trend

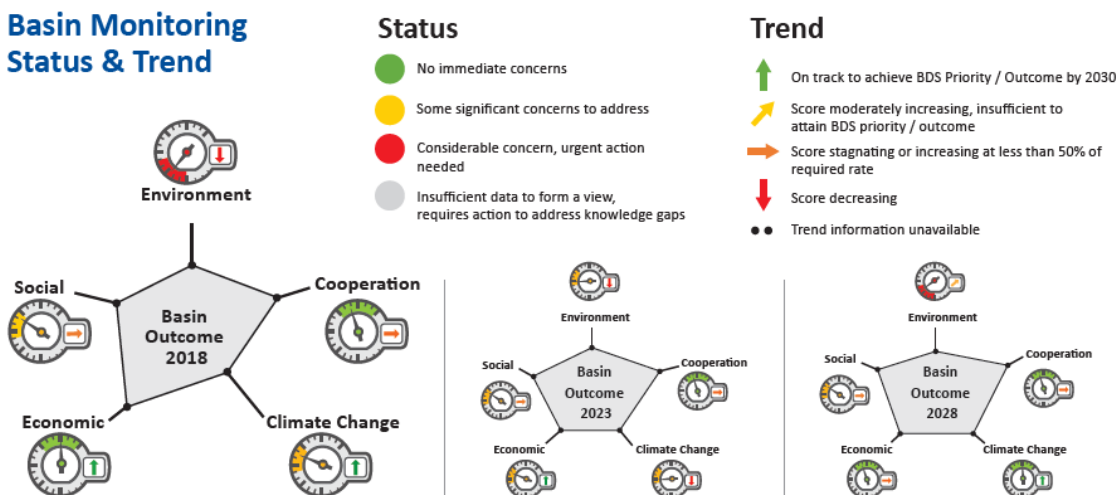


Figure 3. Sample representation of the MRC's dashboard (MRC 2021).

The data base is also a starting point for strategies being developed for the region. The Basin Development Strategy (2021-2030) identifies a set of basin-wide development and management needs, trade-offs, challenges and opportunities. The strategy marks a shift from only focusing on water resources planning to a larger operational management plan, including 'transboundary coordination of operations of dams and other water infrastructure' (MRC 2021, xiii). It also looks more broadly at the socioeconomic development and vulnerabilities in the region that are linked to water needs and energy security. This has to do with the substantial trade-offs in the region between economic and environmental aspects of water resources development. These trade-offs stem from predominantly isolated national planning efforts, complemented

by regional planning endeavours that have primarily revolved around evaluating the tolerability of cross-border effects of national plans. Notably, no alternative plans or projects have been proposed for the participating countries to deliberate upon. Consequently, these regional evaluations have not resulted in noteworthy alterations to the water resources development plans at the national level (MRC 2021). This insight has led to plans that go beyond national infrastructure projects and include joint investment projects and national projects that have basin-wide significance and ultimately reduce such trade-offs. In order to do this, the MRC becomes a central platform to coordinate basin management operations as well as support data and information acquisition, processing and sharing as well as setting up an information management system.

Evaluation and Impact

Given the involvement of external funders of the Basin management structure, there are several review moments built into the development of the MRC structure. The 2019 review states that the availability of high quality data and information is critical to the MRC's capacity to deliver on its Core River Basin Management Functions. Participants of the review identify the existing knowledge base of the MRC and its unique record of historical data as one of the most valuable assets. 'The data underpins the procedures, studies, assessments, scenario testing and planning on which the regional knowledge base is built' (Bird et al. 2019, i). The MRC coordination was also facing challenges in combining the national-level activities with addressing issues that cross national borders while at the same time being partially externally funded. There was push for decentralizing activities, but, according to the review, this was overly ambitious given the varying capacities available in each country. Additionally, the lack of integration between regional and national monitoring networks has impeded progress. While decentralization should eventually enhance this integration as national agencies assume more control, operational efficiency has suffered in the short term. By the end of 2018, three activities had been fully transitioned to national agencies. Nevertheless, the performance of data collection and transmission for these activities has deteriorated. This decline is primarily attributed to resource shortages for the operation and maintenance of data collection stations. In some cases, external factors like changes in national telecommunications networks have exacerbated the situation, affecting the near real-time hydrometeorological parameters. Moreover, the absence of well-defined handover agreements specifying responsibilities and timelines has also contributed to the decline, particularly concerning the ad-hoc provision of socio-economic data. Specifically, the review highlights two aspects: First, that the overall scope of the monitoring efforts of the basin and the way that these efforts are integrated with national systems needs attention. And second, a focus on the supporting information and data management systems that enable more effective use of the outputs (Bird et al. 2021). Resulting in a recommendation to focus on 'technical and human capacity building' (Ibid, iv).

Regular refresher training and knowledge sharing especially at a national level is necessary to address high staff turnover and to instil good practice. Human capacity issues are further exacerbated when multiple systems are operating within a country as operators with experience at one type of station may not have knowledge and skills in how to operate and maintain another. All countries have automatic telemetry stations within their country that are not part of the HYCOS network. Greater alignment and harmonisation of systems could provide economies of scale in training for operators across the whole of the country network.

Impact-related points are also raised in the context of data collection. For example, the report highlights the need for sub-basin scale data for impact assessment purposes. The impact assessment further lacks socio-economic data in order to better understand the status and trends for socio-economic conditions for the whole of the basin.

Speaking to the evaluation of CGRs more generally, Emerson and Nabatchi (2015a) highlight that 'collaborators have to have explicit discussions about what success looks like with respect to achieving target goals, meeting participating organizations' needs, and strengthening CGR as a whole' (Ibid, 222).

Based on this, collaborators can agree on how to measure performance. Thereby, some measures can be done by the CGR, but others might require external support and evaluations.

Capacity-enabling elements for PBP

The challenges outlined for the Collaborative Governance Regime in the Mekong River Region are typical for cross-national coordination efforts that also address a nexus of different issues that are place-specific. Often short- and long-term effects of nexus challenges are at odds. When they are pressing short-term needs – economic or otherwise – it is a challenge for local actors to address long-term plans. This results in local actors being unwilling to invest resources into data collection. Additionally, even if there is willingness to do so, there is a lack of regional capacity and skills to take on data reporting. Capacity challenges also stem from the technical and administrative infrastructures in place. Place-based challenges are often the responsibility of separate entities, hampering both communication within countries as well as among national-level institutions (Giest and Mukherjee 2022).

In these larger or even cross-country arrangements, the development of local capacities relies significantly on interactions spanning multiple levels, yet the creation of institutions that can effectively bridge these disparities is imperative (Puppim de Oliveira 2019). Moreover, divergent interests often exist between local, national, and international stakeholders (Pinto and Puppim de Oliveira 2008). There has been less work on the interactive effects of international and (trans)national actors and processes and the types of causal processes that influence domestic policy. Cashore et al. (2019) identify two broad conclusions about the analytical, political and operational capacities in such settings. First, they suggest that concerted and proactive efforts are needed to overcome existing stasis and, second, they see a key role of a highly-skilled policy entrepreneur that is able to, among other things, engage transnational networks and at the same time examine the domestic historical context and policy setting through which global efforts might improve local problems.

Playing a dual role, CGRs can serve as catalysts for global endeavours but also act as facilitators for enhancing local capacity. These networks serve to establish connections between different tiers of governance, fostering collaborations at the local level and contributing to the consolidation of local collaborative efforts.

The MRC has, beyond the organizational linkages that were developed and are being institutionalized, a joint data platform which enables governments to see the same information in a standardized form and further gives the public a way to gain insight into the challenges linked to the region. This means that data collection efforts are matched with an organizational structure that is able to act across countries and with a focus on a specific region. This supports operational capacities at organizational and systemic level in that it creates relationships among public organizations in the region as well as enables coordination efforts across them. The MRC further has the potential to facilitate systemic analytical capacity by facilitating the scientific, statistical, and educational infrastructure within each of the member states, which ultimately enables policymakers and professionals to access high-quality information necessary for conducting their analytical and managerial tasks (Hsu 2015). From a long-term perspective, this could have spill-over effects for the systemic political capacity of member state governments as the ability to use place-based knowledge in policymaking in the basin region creates trust and legitimacy. Finally, the members in the MRC have different levels of capacity and thus there is an opportunity to exchange knowledge that exists in one country about the basin region, but not in another and thus facilitating organizational analytical capacity.

Level of resources and capabilities	Skills and competences		
	<i>Analytical</i>	<i>Operational</i>	<i>Political</i>
<i>Individual</i>			

<i>Organizational</i>	x	x	
<i>Systemic</i>	x	x	(x)

Table 6. Policy capacity features of collaborative governance regimes.

Summary

To summarize, different set-ups also facilitate different capacities within government and thus meet various place-based needs. For example, if place-based challenges span national borders, Collaborative Governance Regimes can facilitate operational capacities to build relationships and, if paired with a data infrastructure, enable analytical capacities. Short term set-ups are a good option for gaining in-depth insights and if skills training provides a long-term enabler for individual capacities

- **Policy Innovation Labs:** due to their participatory elements, they are seen as entities that bring together different experiences and perspectives and thus benefiting policymaking and thereby facilitate technical and operational capacity for individuals and organizations with a spillover effect into political capacities. However, PILS are usually relatively small organizational entities that operate for a limited duration and this creates a trade-off between duration or a long-term mechanisms to enhance capabilities in government and the intensity at which PILS work with local communities and policymakers.
- **Data Collaboratives:** are collaborations among diverse stakeholders, including governments, private companies, non-profit organizations, and research institutions, in order to share and utilize data to address social, economic, and environmental challenges. They facilitates the analytical capacity of government by bridging potential information gaps both within government as well as among government and other stakeholders. Data collaboratives are able to combine place-specific data with standardization and consistency mechanisms to have insights that contribute to policies that are place-specific in certain regions, but also overarching at national level. This is an important enabler for operational analytical capacity at organizational and systemic level.
- **Collaborative Governance Regimes:** is an overarching term for a diverse set of autonomous organizations that represent different interests or jurisdiction and that develop institutional and procedural norms and regulations that cultivate collaborative efforts. Such arrangements are able to match data collection efforts with an organizational structure that is able to act across countries and with a focus on a specific region. This supports operational capacities at organizational and systemic level, creating relationships among public organizations in the region as well as enabling coordination efforts among them.

In comparison, the three initiatives focus largely on analytical and operational skills and competences and due to their collaborative nature mostly target the organizational level. Some of them have spillover effects on political capacities, but more often, they are dependent on political will to support them. Also, because they are often set-up at arms-length of government, they cannot directly contribute to, for example, the reputation or legitimacy of government units.

Level of resources and capabilities	Skills and competences		
	<i>Analytical</i>	<i>Operational</i>	<i>Political</i>
<i>Individual</i>	DCs, PILs	PILs	PILs
<i>Organizational</i>	CGRs, DCs, PILs	CGRs, DCs, PILs	
<i>Systemic</i>	CGRs, DCs	CGRs, DCs	(CGRs), PILs

Table 7. Policy capacity features of policy innovation labs, data collaboratives, and collaborative governance regimes compared.

While there is evidence that having these capacities improves efficiency, measuring the success remains difficult. The specific character of place-based policies limits the development of evaluation indicators and a universal framework to guide an impact assessment across jurisdictions and studies. Consequently, the ways in which effectiveness is approached varies across locations and is influenced by the specific objectives and stakeholders associated with each place. However, effectiveness can be understood as a way to assess two things simultaneously: One, whether place-based community needs are met with the collaborative efforts that are being undertaken to tackle a specific problem, and second, whether effectiveness is achieved with respect to designing and implementing policy measures in a way that they display coherence, consistency, and congruence with each other (Howlett and Rayner 2007).

At the same time, the capacity mechanisms that these initiatives represent can be transferred and scaled for different scenarios. After the identification of the most pressing capacity gaps in connection to a place-based challenge, the best capacity-enhancing mechanisms can be chosen. This can start in an experimental setting first – for example with one policy innovation lab – or based on the insight that a larger-scale collaborative effort is needed by starting broader. This would mean, setting up a collaborative governance regime with neighbouring jurisdictions. This goes hand-in-hand with evidence that the type of capacity-building initiatives fits with the MLG setting as well as the place-based problem.

Building PBP capacities in the future

Capacity is a key component for government to identify gaps in place-based knowledge and skills needed as well as how to fill these gaps by connecting to other stakeholders (in the context of initiatives such as a Collaborative Governance Regime). Because capacity is a somewhat abstract idea, the policy capacity framework is able to break-down capacity elements relevant for the whole policymaking process and thereby pinpoint capacity gaps at individual, organizational, and systemic level. In addition, the type of capacity can be identified through the categories of analytical, operational, and political capacity. This, is also one piece to moving closer to effective place-based policymaking. How capacity gaps are filled and who is engaged in this process plays a vital role for properly framing place-based sustainability challenges and from there, finding ways to effectively manage and address them.

Due to the place-specific nature of the initiatives, their impact is difficult to measure. This is something that both the capacity and the place-based policymaking research struggle with since it is more about developing capacities to identify and manage place-based challenges well rather than developing impact indicators. This, in turn, makes it difficult to categorize such efforts as a success or failure. In addition, within each of the initiatives, there a version of how to implement them. For example, policy innovation labs alone can include established teams (or organizations, or institutes) set up specifically for innovative activities for public policy making and physical spaces set up to conduct workshops or other stakeholder activities. Parallel to that there are also related organizations such as living labs, research institutes, and nudge (behavioural economics) groups as well as private sector organizations contributing to policy making. Wellstead et al. (2021) estimate that there are well over 450 lab-like entities worldwide. Moving forward, this highlights a need for policymakers being able to identify the following elements:

- The type of MLG setting, including supported, unsupported, constrained or centralistic;
- Capacity gaps within government based on the nested capacity framework and linked to the place-based challenge;
- Collaborative arrangements that match the challenge and fill capacity gaps within government; and
- Time and space parameters in terms of long-term vs. short-term arrangements and the level(s) of government being targeted.

As the examples show, these processes can be supported by always require the insights and experiences of policymakers and This also means that throughout the steps, there should be an and participatory mechanisms in place. Without proper identification that is shared across stakeholders, data collection and analysis

Type of MLG setting:

- Supported/
- Unsupported/
- Constrained
- Localism
- Centralism

change, however h specific places. it-in skills training a problem frame ing of indicators.

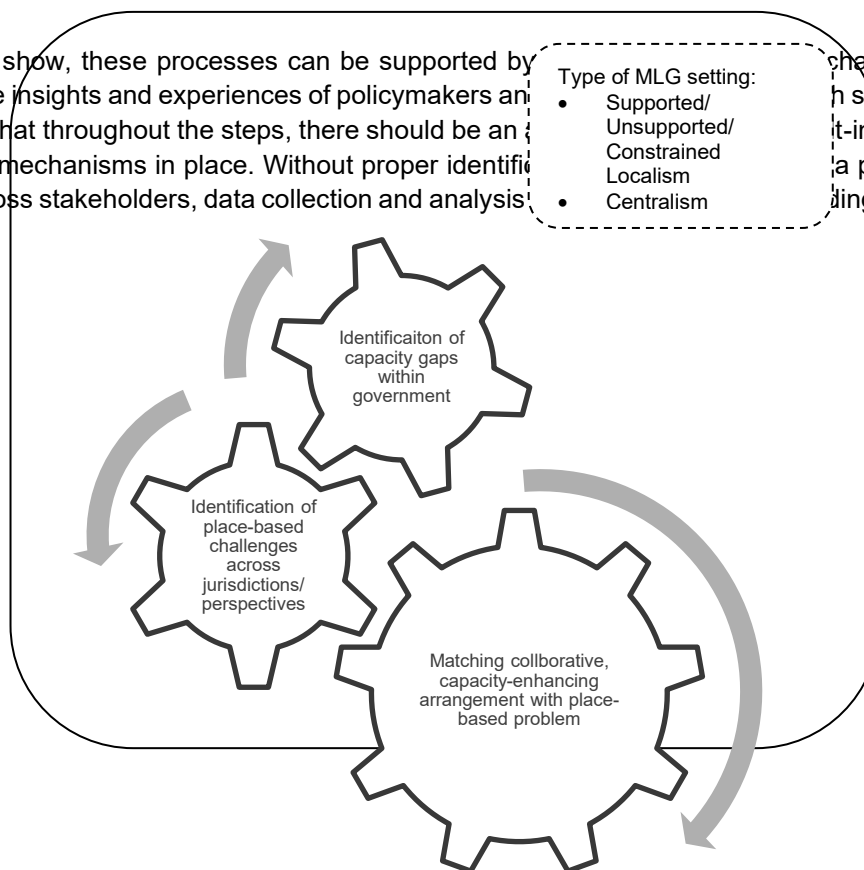


Figure 4. Depiction of Capacity mechanisms addressing complex, place-based sustainability challenges.

These steps do not occur in a vacuum, but take place in a complex context that consists of numerous, layered and interrelated conditions – political, legal, economic, social, and cultural. One aspect is that of political and power dynamics. ‘Power is rarely distributed evenly, and the patterns of influence and control create conditions that not only shape public perceptions but also shape the individual perceptions and inclinations of potential collaboration participants’ (Emerson and Nabatchi 2015a, 43). This also implies that when the above listed initiatives of PILs, DCs or CGRs are set-up, in some contexts it might matter who is setting them up and who is leading individual labs for example. Stakeholders that initiate can come from a variety of organizations or groups. Initiators can come from one or more government agency, elected officials, research institutions or non-governmental organizations as well as civic groups. They may also come from the private sector. In this context, they might exercise their formal or informal authority in order to frame a wicked problem. This can potentially lead to resistance or non-participation. More generally speaking, power imbalances between stakeholders can make collaboration difficult over time (Ansell and Gash 2008).

Closely linked to this aspect is that of the history of a specific place or region. In this context, scholars point to ‘localized capabilities’ (Maskell and Malmberg 1999) that stem from characteristics which are unique to a region, such as local infrastructure, resources, institutions, and available knowledge and skills. This also means that in setting-up these initiatives, stakeholders have an important role in connecting the region’s historical legacy and capacity-building.

Conclusions

Complex, place-based challenges, such as climate change related changes, can often not be solved, but need to be managed well by government. Such challenges often provoke divergent views about the very nature of the issue, its importance and appropriate responses. Decision-makers therefore need the capacity to demonstrate that the issue is well-managed and help stakeholders negotiate a shared understanding and meaning about the problem and its possible solutions. Such capacity is crucial for democratic legitimacy and achieving civic outcomes (Head 2018). Policy capacity is generally understood as the analytical skills for assessing current performance and future policy options as well as capacities to undertake medium- and long-term planning and strategic goal-setting (Howlett 2015). Thereby, policy capacity is separated into the three dimensions of analytical, operational and political capacity as well as the three levels of individual, organizational, and system. At the cross-section of these dimensions, different forms of capacities are highlighted, such as technical knowledge (analytical capacity), entrepreneurial skills (operational capacity) or political acumen (political capacity) at individual level. Capacities at organizational level include access to external expertise and data (analytical), collaborative mechanisms (operational), and political/ stakeholder support (political). Finally, system level capacity encompasses data collection and analysis tools (analytical), mechanisms for intra-state (vertical and horizontal) coordination and planning (operational), as well as trust, legitimacy and accountability (political). In the context of effective place-based policymaking, government needs the capacity to identify (legacy) space-blind policies that impact or even limit local initiatives due to (hidden) trade-offs or a competition for resources. And understand the characteristics of place-based initiatives and how they connect to the larger ideas surrounding place-based policymaking, such as the engagement of local communities, and the timing and goals.

Complex problems thus highlight a need for capacity-building at every level of government to facilitate skills needed to adapt to emerging events across different groups of stakeholders. This means going beyond the narrower scope of delivering pre-defined outputs such as new roads or upgrades to utility networks, to think more rigorously and creatively about the framing of the policy problem, and the potential solutions ranging from policy and regulation to technology upgrades. The fragmentation of responsibilities and expertise across the domains of public policy, planning and engineering can undermine a more holistic and integrated approach to defining problems and solutions.

In the context of the limited resources within government to dedicate towards capacity-building, this paper looked at new forms of enabling capacity within government while engaging with the communities in the places that are at the centre of policymaking. Specifically, this includes Policy Innovation Labs (PILs), Data Collaboratives (DCs), and Collaborative Governance Regimes (CGRs). These arrangements share that they are set-up by government or with public money and specifically engage (local) stakeholders beyond government on place-based issues. They are collaborative in nature and try to capture place-specific challenges and actors through establishing networked structures that serve as pathways for exchanging data, knowledge that is fed back into policymaking. In fact, opposite to what the name of place-based policies suggests, capacity-building mechanisms need to be established in larger collaborative efforts – both across government and non-governmental stakeholders as well as across jurisdictions to effectively address place-based challenges through knowledge exchange and learning from best practices.

References

- Adger, W.N., Arnell, N.W. and E.L. Tompkins. 2005. Successful Adaptation to Climate Change across Scales. *Global Environmental Change* 15, 77-86.
- Alber, G. and K. Kern, K. 2008. Governing climate change in cities: Modes of urban climate governance in multi-level systems. International conference on Competitive Cities and Climate Change, Milan, Italy, 9 - 10 October, 2009. Paris: OECD, 71 - 196.
- Ansell C. and A. Gash. 2008. Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory* 18(4), 543-571.
- Araral, E. 2014. Policy and regulatory design for developing countries: a mechanism design and transaction cost approach. *Policy Sciences* 47(3), 289-303.
- Barca, F., McCann, P., and A. Rodriguez-Pose, A. 2012. The case for regional development intervention: Placed-based versus place-neutral approaches. *Journal of Regional Science* 52(1), 134–152.
- Barlacchi, G., De Nadai, M., Larcher, R., Casella, A., Chtic, C., Torrìsi, G., Antonelli, F., Vespignani, A., Pentland A., and B. Lepri. 2015. A multi-source dataset of urban life in the city of Milan and the Province of Trentino. *Scientific Data* 2, 150055.
- Bason, C. 2017. *Leading public design: Discovering human-centred governance*. Policy Press: Bristol, UK.
- Beer, A., McKenzie, F., Blažek, J., Sotarauta, M., and S. Ayres. 2020. *Every place matters*. Taylor & Francis.
- Bergvall-Kåreborn, Birgitta and Anna Ståhlbröst. 2009. *International Journal of Innovation and Regional Development* 1(4), 356-370. Berner, Maureen, Amos, Justin, and Ricardo Morse. 2011. What constitutes effective citizen participation in local government? views from city stakeholders. *Public Administration Quarterly* 35(1), 128-163.
- Bird, J., Chandrapanya, K., and B. Docker. 2019. Review of the Decentralisation of Core River Basin Management Function Activities, Undertaken for the Mekong River Commission as part of the Mid-Term review of the Strategic Plan 2016-2020. Available at: <https://www.government.nl/binaries/government/documenten/reports/2019/02/22/mekong-river-commission-strategic-plan-2016-2020---mid-term-review/Mekong+River+strategic+plan+2016-2020++Mid+term+review.pdf>
- Bonney, R., Cooper, C. B., Dickinson, J., Kelling, S., Phillips, T., Rosenberg, K. V. and J. Shirk. 2009. Citizen Science: A Developing Tool for Expanding Science Knowledge and Scientific Literacy. *BioScience*, 59(11), 977–984. <https://doi.org/10.1525/bio.2009.59.11.9>.
- Borras, S. 2011. Policy learning and organizational capacities in innovation policies. *Science and Public Policy* 38(9), 725–734.
- Boschma, R. and R. Martin, R. 2010. *Handbook of Evolutionary Economic Geography*. Cheltenham, UK: Edward Elgar.

- Bovaird, T., and E. Loeffler. 2012. From engagement to co-production: The contribution of users and communities to outcomes and public value. *Voluntas*, 23(4), 1119-1138.
- Braun, K. L., Tsark, J. U., Santos, L., Aitaoto, N., and C. Chong. 2006. Building Native Hawaiian capacity in cancer research and programming: A legacy of 'Imi Hale. *Cancer*, 107(S8), 2082–2090. <https://doi.org/10.1002/cncr.22157>.
- Brondizio, E., Andersson, K., de Castro, F., Futemma, C., Salk, C., Tengo, M., Londres, M., Tourne, D., Gonzalez, T., Molina-Garzon, A., Lopes, G., and Sacha Siani. 2021. Making place-based sustainability initiatives visible in the Brazilian Amazon. *Current Opinion in Environmental Sustainability* 49, 66-78.
- Bronson, Kelly, Devkota, Rachana, and Vivian Nguyen. 2021. Moving toward Generalizability? A Scoping Review on Measuring the Impact of Living Labs. *Sustainability* 13, 502-518.
- Brooks, N., Adger, W.N., Kelly, P.M. 2005. The determinants of vulnerability and adaptive capacity at the national level and the implications for adaptation. *Global Environmental Change* 15, 151–163.
- Buchanan, J.M. 1995. Federalism as an ideal political order and an objective for constitutional reform. *Publius: The Journal of Federalism* 25(2), 19–28.
- Bulkeley, Harriet, Coenen, Lars, Frantzeskaki, Niki, Hartmann, Christian, Kronsell, Annica, Mai, Lindsay, Marvin, Simon, McCormick, Kes, van Steenbergen, Frank, and Yuliya Voytenko Palgan. 2016. Urban living labs: governing urban sustainability transitions. *Current Opinion in Environmental Sustainability* 22, 13-17.
- Burch, Sarah. 2009. Local responses to climate change : an exploration of the relationship between capacity and action. University of British Columbia, Vancouver. Available at: <https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0067519>.
- Carstensen, H. V. and C. Bason. 2012. Powering collaborative policy innovation: Can innovation labs help? *The Innovation Journal* 17(1), 2–26.
- Cashore, Benjamin, Berstein, Steven, Humphreys, David, Visseren-Hamakers, Ingrid, and Katharina Rietig. 2019. Designing stakeholder learning dialogues for effective global governance. *Policy and Society* 38(1), 118-147.
- Castle, E.N. and B.A. Weber, B. A. 2006. Policy and place: Requirements of a successful place-based policy (Working Paper AREc 06-01/ RSP 06- 01). Available at: <http://ir.library.oregonstate.edu/xmlui/handle/1957/9263>.
- Castro, A., Esmond, S., Perez, S., Scott, C., Jackson, T., and S.R. Passmore. 2021. Building Sustainable Organizational and Community Capacity for Research Partnerships: A Decade of Experience. *Progress in Community Health Partnerships: Research, Education, and Action* 15(4), 553–560.
- Chak, C. M. 2018. Literature Review on Relationship Building for Community-academic Collaboration in Health Research and Innovation. *MATEC Web of Conferences*, 215, 02002. <https://doi.org/10.1051/mateconf/201821502002>.
- Chindarkar, Namrata, Howlett, Michael, and M Ramesh. 2017. Introduction to the Special Issue: Conceptualizing Effective Social Policy Design: Design Spaces and Capacity Challenges. *Public Administration and Development* 37(1), 3-14.
- City of Vancouver. 2018. Navigating Complexity, The Journal of the City of Vancouver's Solutions Lab (so far). Vancouver, Canada.
- City of Vancouver. 2022. Tending to what we want to grow, Continuing on the journey of Vancouver's Solutions Lab. Vancouver, Canada.
- Clarke, Amanda and Jonathan Craft. 2017. The vestiges and vanguards of policy design in a digital context. *Canadian Public Administration* 60(4), 476-497.

- Colebatch, H.K. 2006. What work makes policy? *Policy Sciences* 39(4), 309-321.
- Colebatch, H.K., Hoppe, R., and M. Noordegraaf. 2011. *Working for policy*. University Press, Amsterdam.
- Cooke, B. and U. Kothari. 2001. The case for participation as tyranny, in: B Cooke and U Kothari (eds), *Participation: The New Tyranny?*, pp 1-15 (London: Zed Books).
- Cucca, Roberta and Constanzo Ranci. 2022. Urban Policy in Times of Crisis: The Policy Capacity of European Cities and the Role of Multi-Level Governance. *Urban Affairs Review* 58(6), 1493-1522.
- Cunha, D.G.F., Marques, J.F., Resende, J.C.D., Falco, P.B.D., Souza, C.M.D. and S.A. Loiselle. 2017. Citizen science participation in research in the environmental sciences: Key factors related to projects' success and longevity. *Anais Da Academia Brasileira de Ciências*, 89(3 suppl), 2229–2245. <https://doi.org/10.1590/0001-3765201720160548>.
- Darvas, Zsolt, Collin, Antoine M., Mazza, Jan, and Catarina Midoes. 2019. Effectiveness of cohesion policy: learning from the project characteristics that produce the best results, *Budgetary Affairs*. Study requested by the CONT committee, European Parliament. Available at: <https://www.bruegel.org/sites/default/files/wp-content/uploads/2019/06/cohesionpolicyep.pdf>.
- Di Gregorio, Monica, Fatorelli, Leandra, Paavola, Jouni, Locatelli, Bruno, Pramova, Emilia, Nurrochmat, Dodik R., May, Peter H., Brockhaus, Maria, Sari, Intan M., and Sonya D. Kusumadewi. 2019. Multi-level governance and power in climate change policy networks. *Global Environmental Change* 54, 64-77.
- Dunlop, Claire A. 2015. Organizational political capacity as learning. *Policy and Society* 34, 259-270.
- Emerson, K., Nabatchi, T., and S. Balogh. 2011. An integrative framework for collaborative governance. *Journal of Public Administration Research and Theory* 22(1), 1-29.
- Emerson, K., Nabatchi, T., and S. Balogh. 2011. An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory* 22(1), 1-29.
- Emerson, Kirk and Tina Nabatchi. 2015a. *Collaborative Governance Regimes*. Washington, D.C.: Georgetown University Press.
- Emerson, Kirk and Tina Nabatchi. 2015b. Evaluating the Productivity of Collaborative Governance Regimes: A Performance Matrix. *Public Performance and Management Review* 38(4), 717-747.
- Evans, Peter. 1995. *Embedded Autonomy: States and Industrial Transformation*. Princeton, NJ: Princeton University Press.
- Fraisl, D., Campbell, J., See, L., Wehn, U., Wardlaw, J., Gold, M., Moorthy, I., Arias, R., Piera, J., Oliver, J. L., Masó, J., Penker, M., and S. Fritz. 2020. Mapping citizen science contributions to the UN sustainable development goals. *Sustainability Science* 15(6), 1735–1751.
- Freitag, A. 2017. Factors Determining Participation Quality in Collaborative Water Quality Research. *Environmental Sociology*, 3(3), 248–259. <https://doi.org/10.1080/23251042.2017.1289592>.
- Freitag, A. and M.J. Pfeffer. 2013. Process, Not Product: Investigating Recommendations for Improving Citizen Science “Success”. *PLoS ONE* 8(5), e64079. <https://doi.org/10.1371/journal.pone.0064079>.
- Fukuyama, F. 2004. *State-building: Governance and world order in the 21st Century*. Ithaca, NY: Cornell University Press.
- Fukuyama, F. 2013. What is Governance? *Governance* 26(3), 347-368.
- Fuller, M. and A. Lochard. 2016. *Public Policy Labs in European Union Member States*. Luxembourg: Publications Office of the European Union.

- Giest, Sarah and Ishani Mukherjee. 2018. Behavioral instruments in renewable energy and the role of big data: A policy perspective. *Energy Policy* 123, 360-366.
- Giest, Sarah and Ishani Mukherjee. 2022. Evidence integration for coherent nexus policy design: Mediterranean perspective on managing water-energy interactions. *Journal of Environmental Policy & Planning* 24(5), 553-567.
- Giest, Sarah. 2017. Big data for policymaking: Fad or fasttrack? *Policy Sciences* 50(3), 367-382.
- Gleeson, D., Legge, D., and D. O'Neill. 2011. Negotiating tensions in developing organizational policy capacity: Comparative lessons to be drawn. *Journal of Comparative Policy Analysis: Research and Practice* 13, 237-263.
- Gurstein, M.B. 2011. Open data: Empowering the empowered or effective data use for everyone? *First Monday* 16(2), <https://doi.org/10.5210/fm.v16i2.3316>.
- Hassink, Robert and Claudia Klaerding. 2010. Evolutionary Approaches to Local and Regional Development Policy. In Pike, A., Rodriguez-Pose, A., Tomaney, J. (2010) *Handbook of Local and Regional Development*. London: Routledge.
- Head, Brian. 2018. Forty years of wicked problems literature: forging closer links to policy studies. *Policy and Society* 38(2), 180-197.
- Hodgkinson, I. R., Mousavi, S., and P. Hughes. 2022. New development: Citizen science—discovering (new) solutions to wicked problems. *Public Money & Management* 42(2), 133–136.
- Holzer, M. and K. Kloby, 2005. Public Performance Measurement: An Assessment of the State-of-the-Art and Models for Citizen Participation. *International Journal of Productivity and Performance Management*, 54, 517-532.
- Hooghe, Liesbet and Gary Mark. 2001. Types of Multi-Level Governance. *European Integration online Papers* 5(11).
- Hoppe, R. 2010. *The governance of problems: Puzzling, powering and participation*. Bristol: Policy Press.
- Howlett Michael and Jeremy Rayner. 2007. Design principles for policy mixes: Cohesion and coherence in 'new governance arrangements'. *Policy and Society* 26(4), 1-18.
- Howlett, M. 2009. Policy analytical capacity and evidence-based policy-making: Lessons from Canada. *Canadian Public Administration* 52(2), 153-175.
- Howlett, M. and I. Mukherjee. 2016. An Asian perspective on policy instruments: Policy styles, governance modes and critical capacity challenges. *Asia Pacific Journal of Public Administration* 38(1), 24–42.
- Howlett, Michael and M. Ramesh. 2016. Achilles' heel of governance: Critical capacity deficits and their role in governance failures. *Regulation and Governance* 10, 301-313.
- Howlett, Michael. 2015. Policy analytical capacity: The supply and demand for policy analysis in government. *Policy and Society* 34, 173-182.
- Hsu, Angel. 2015. Measuring policy analytical capacity for the environment: A case for engaging new actors. *Policy and Society* 34, 197-208.
- Hughes, A., Gleeson, D., Legge, D., and V. Lin. 2015. Governance and policy capacity in health development and implementation in Australia. *Policy and Society* 34, 229-245.
- Huttunen, Suvi, Ojanen, Maria, Ott, Anna, and Helo Saarikoski. 2022. What about citizens? A literature review of citizen engagement in sustainability transitions research. *Energy Research and Social Science* 91, 102714.
- Irwin, A. 1995. *A Study of People, Expertise and Sustainable Development* (1st ed.). Routledge.
- Irwin, A. 2015. Citizen science and scientific citizenship: same words, different meanings? In *Science communication today-2015: Current strategies and means of action*. PUNÉditions universitaires de Lorraine.

- Irwin, A. and B. Wynne. 1996. *Misunderstanding Science? The Public reconstruction of Science and Technology*. Cambridge, UK: Cambridge University Press.
- Jänicke, M. 1997. The Political System's Capacity for Environmental Policy. In: Jänicke, M., Jörgens, H., and H. Weidner (Eds.), *National Environmental Policies, A comparative study of capacity-building*. Springer Berlin, Heidelberg, 1-24.
- Jasanoff, S. 2003. Technologies of Humility: Citizen Participation in Governing Science. *Minerva*, 41(3), 223–244. Jasanoff, S. and H. Simmet. 2017. No funeral bells: Public reason in a 'post-truth' age. *Social Studies of Science* 47(5), 751–770.
- Jasanoff, S., and B. Wynne, 1998. Science and decisionmaking. *Human Choice and Climate Change*, S. Rayner and E. L. Malone, Eds., Battelle Press, 1–87.
- Johnson, M. F., Hannah, C., Acton, L., Popovici, R., Karanth, K. K., and E. Weinthal. 2014. Network environmentalism: Citizen scientists as agents for environmental advocacy. *Global Environmental Change*, 29, 235–245.
- Kelemen, R.D. 2017. Europe's other democratic deficit: National authoritarianism in Europe's Democratic Union. *Government and Opposition* 52(2), 211-238.
- Kullenberg, Christopher and Dick Kasperowski. 2016. What is Citizen Science? – A Scientometric Meta-Analysis. *PLoS One* 11(1), 10.1371/journal.pone.0147152.
- Levin, K., Cashore, B., Bernstein, S., and G. Auld. 2007. Playing it forward: Path dependency, progressive incrementalism, and the "super wicked" problem of global climate change. Paper presented at International studies association convention, Chicago, IL, February 28th–March 3.
- Lindblom, C. E. 1959. The Science of Muddling Through. *Public Administration Review* 19(2), 79–88.
- Levin, K., Cashore, B., Bernstein, S., and G. Auld. 2010. Playing it forward: Path dependency, progressive incrementalism an the 'super wicked' problem of global climate change. In Conference Paper, climate change: global risks, challenges, and decisions congress, 10-12 March 2009, Copenhagen, Denmark.
- Lijphart, A. 1991. Constitutional choices for new democracies. *Journal of Democracy* 2(1), 72-84.
- Maerz, S., Lührmann, A., Hellmeier, S., Grahn, S., and S.I. Lindberg. 2020. State of the world 2019: Autocratization surges–resistance grows. *Democratization* 27(6), 909–927.
- Marshall, G. R. 2008. Nesting, subsidiarity, and community-based environmental governance beyond the local level. *International Journal of the Commons* 2(1), 75–97.
- Martin, R. and P. Sunley. 2006. Path Dependence and Regional Economic Evolution. *Journal of Economic Geography* 64(4), 395-437.
- Maskell, P. and A. Malmberg. 1999. Localised learning and industrial competitiveness. *Cambridge Journal of Economics* 23(2), 167-185.
- McCann, P. 2023. "How Have Place-Based Policies Evolved to Date and What Are They For Now?", Background paper for the OECD-EC High-Level Expert Workshop Series on "Place-Based Policies for the Future", Workshop 1, 14 April 2023, <https://www.oecd.org/cfe/regionaldevelopment/place-basedpolicies-for-the-future.htm>.
- McConnell, A. 2018. Hidden agendas: Shining a light on the dark side of public policy. *European Journal of Public Policy* 25(12), 1739–1758
- McConnell, A. 2020. The use of placebo policies to escape from policy traps. *Journal of European Public Policy* 27(7), 957–976.
- McCool, Stephen F., and George H. Stankey. 2004. Indicators of Sustainability: Challenges and Opportunities at the Interface of Science and Policy. *Environmental Management* 33(3), 294-305.

- McGann, Michael, Blomkamp, Emma, and Jenny M. Lewis. 2019. The rise of public sector innovation labs: experiments in design thinking for policy. *Policy Sciences* 51(3), 249-267.
- McGlade, J., Murray, R., Baldwin, J., Ridgway, K., and B. Winder. 2006. Industrial Resilience and Decline: A Co-Evolutionary Framework. In: Garnsey, E. and J. McGlade (ed.), *Complexity and Co-Evolution*, chapter 6, Edward Elgar Publishing.
- Mekong River Commission (MRC). 2021. The integrated water resources management–based Basin Development Strategy for the Lower Mekong Basin 2021–2030 and the MRC Strategic Plan 2021–2025. Vientiane: MRC Secretariat.
- Mukherjee, Ishani, Coban, M. Kerem, and Azad Singh Bali. 2021. Policy capacities and effective policy design: a review. *Policy Sciences* 54, 243-268.
- Norris, P. and R. Inglehart. 2019. *Cultural backlash: Trump, Brexit, and authoritarian populism*. Cambridge University Press.
- OECD. 2019. *Making Decentralisation Work: A Handbook for Policy-Makers*, OECD Multi-level Governance Studies, OECD Publishing, Paris. <https://doi.org/10.1787/g2g9faa7-en>.
- OECD. 2020a. *Building Capacity for Evidence-Informed Policy-Making: Lessons from Country Experiences*, OECD Public Governance Reviews, OECD Publishing, Paris, <https://doi.org/10.1787/86331250-en>.
- OECD. 2020b. *Managing Environmental and Energy Transitions for Regions and Cities*, OECD Publishing, Paris. <https://doi.org/10.1787/12c9ffe3-en>.
- OECD. 2021. *Building Trust to Reinforce Democracy*. OECD Publishing, Paris. <https://doi.org/10.1787/b407f99c-en>.
- OECD. 2022. *Regional Governance in OECD Countries: Trends, Typology and Tools*, OECD Multi-level Governance Studies, OECD Publishing, Paris. <https://doi.org/10.1787/4d7c6483-en>.
- Olejniczak, Karol, Borkowska-Waszak, Sylwia, Domaradzka-Widła, Anna, and Yaerin Park. 2020. Policy labs: the next frontier of policy design and evaluation? *Policy and Politics* 48(1), 89-110.
- Osborne, S.P., Radnor, Z., and K. Strokosch. 2016. Co-Production and the Co-Creation of Value in Public Services: A suitable case for treatment? *Public Management Review* 18(5), 639-653.
- Ostrom, V. and E. Ostrom. 1979. Public goods and public choices. In *Alternatives for delivering public services* (pp. 7–49). Routledge.
- Painter, M. and J. Pierre. 2005. Unpacking policy capacity: Issues and themes. In: *Challenges to State Policy Capacity*, ed M. Painter and J. Pierre, 1-18. Basingstoke, UK: Palgrave Macmillan.
- Pal, L.A., and I.D. Clark. 2015. Making reform stick: Political acumen as an element of political capacity for policy change and innovation. *Policy and Society* 34, 247-257.
- Pattyn, Valerie and Marleen Brans. 2015. Organizational analytical capacity: Policy evaluation in Belgium. *Policy and Society* 34, 183-196.
- Pendall, R., K.A. Foster and M. Cowell. 2007. *Resilience and Regions: Building Understanding of the Metaphor*, Institute of Urban and Regional Development (IURD) Working Paper 2007-12, University of California, Berkeley.
- Peters, B.G. 2015. Policy capacity in public administration. *Policy and Society* 34, 219-228.
- Pinto, R.F. and J.A. Puppim de Oliveira, J. A. 2008. Implementation challenges in protecting the global environmental commons: The case of climate change policies in Brazil. *Public Administration and Development* 28(5), 340–350.

- Puppim de Oliveira, Jose A. 2019. Intergovernmental relations for environmental governance: Cases of solid waste management and climate change in two Malaysian States. *Journal of Environmental Management* 1(233), 481-488.
- Radin, B. 2000. *Beyond Machiavelli. Policy Analysis comes of age.* Washington, DC: Georgetown University Press.
- Riddell, N. 1998. *Policy research capacity in the federal government.* Ottawa: Policy Research Initiative.
- Riddell, N. 2007. *Policy research capacity in the federal government.* Ottawa: Policy Research Initiative.
- Rittel, Horst W.J. and Melvin M. Weber. 1973. Dilemmas in General Theory of Planning. *Policy Sciences* 4, 155-169.
- Rivera, Felipe, Rodriguez, Karina I., Chana, S., McArthur, J., and Carla Washbourne. 2022. *Establishing a Competencies Framework for Infrastructure Policy Professionals. Final Report to UKCRIC, V1.3 29/07/22.*
- Rodríguez-Pose, Andrés. 2017. The revenge of the places that don't matter (and what to do about it). *Cambridge Journal of Regions, Economy and Society* 11 (1), 189-209.
- Ruijter, Erna. 2021. Designing and implementing data collaboratives: A governance perspective. *Government Information Quarterly* 38, 101612.
- Schout, A. 2009. Organizational learning in the EU's multi-level governance system. *Journal of European Public Policy* 16(8), 1124–1144.
- Simmie, J. and R. Martin. 2010. The economic resilience of regions: Towards an evolutionary approach. *Cambridge Journal of Regions, Economy, and Society* 3(1), 27-43.
- Susha, I., Grönlund, A., and R. van Tulder. 2018. Data driven social partnerships: Exploring an emergent trend in search of research challenges and questions. *Government Information Quarterly* 36(1), 112-128.
- Swanstrom, T. 2008. *Regional Resilience: A critical examination of the ecological framework.* IURD Working Paper 2008-07. Berkeley: University of California, Berkeley, Institute of Urban and Regional Development.
- Tiernan, A. 2015. The dilemmas of organizational capacity. *Policy and Society* 34, 209-217.
- Tiernan, A. and J. Wanna. 2006. *Competence, capacity, capability: Towards conceptual clarity in the discourse of declining policy skills.* Paper presented at the govnet international conference. Australian National University, Canberra, Australia.
- Timeus, K. and M. Gascó. 2018. "Increasing Innovation Capacity in City Governments: Do Innovation Labs Make a Difference?" *Journal of Urban Affairs* 40 (7), 992–1008.
- Tõnurist, P., Kattel, R., and V. Lember. 2017. Innovation labs in the public sector: What they are and what they do? *Public Management Review* 10, 1455-1479.
- UK Collaboratorium for Research on Infrastructure & Cities (UKCRIC). 2022. *Impact Report 2022.* London, UK.
- UK Collaboratorium for Research on Infrastructure & Cities (UKCRIC). 2021. *UKCRIC and the Oxford-Cambridge Arc.* London, UK.
- UK Collaboratorium for Research on Infrastructure & Cities (UKCRIC). 2023. *Enabling a resilient and sustainable future 2021-22.* London, UK.
- Weiss, L. and J.M. Hobson. 1995. *States and Economic Development: A Comparative Historical Analysis.* Cambridge, England: Polity Press (Blackwells).

- Wellstead, Adam, Gofen, Anat and Angie Carter. 2021. Policy innovation lab scholarship: past, present, and the future – Introduction to the special issue on policy innovation labs. *Policy Design and Practice* 4(2), 193-211.
- Wolfe, David. 2011. The strategic management of core cities: Path dependence and economic adjustment in resilient regions. *Cambridge Journal of Regions Economy and Society* 3(1), 139-152.
- Woo, J.J., Ramesh, M., and Michael Howlett. 2015. Legitimation capacity: System-level resources and political skills in public policy. *Policy and Society* 34, 271-283.
- World Bank. 1997. *The state in a changing world. World Development Report. 1997*; World Bank: New York, NY.
- World Bank. 2014. AGI Data Portal.
- Wu, X., Ramesh, M., and M. Howlett. 2015. Policy capacity: A conceptual framework for understanding policy competences and capabilities. *Policy and Society* 34(3–4), 165–171.
- Yohe, G. W. 2001. Mitigative capacity: the mirror image of adaptive capacity on the emissions side. *Climatic Change* 49, 247-262.