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REVIEW ARTICLE

Building capacities for transformative climate action: lessons from five fields of practice

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Abstract
Capacity building approaches have a deep history of mobilizing agency and enabling change across development, governance, and environmental contexts. It has also been recognized as a central means of implementation for supporting climate action in the Paris Agreement. Despite this, capacity building remains ambiguous, fragmented, and prone to cooption by vested interests, all of which can limit its effectiveness for transformative climate action. Given that the Intergovernmental Panel on Climate Change (IPCC) demonstrates the need for transformative climate action to reduce emissions and limit warming to 1.5°C, the experiences and practical insights from capacity building implementation can be leveraged to concretize the more theoretical literature on transformation. The purpose of this study is thus to synthesize the best practices and lessons learned from scholarship on capacity building implementation for enabling transformations in the context of climate change. This scholarship is synthesized from five fields that are known for their practitioner involvement and implementation focus, and where capacity building has been in wide use for several decades: international development, public health, community development, sustainability, and climate change. Four implications emerge as essential from the synthesis: the importance of enabling agency while navigating power dynamics between capacity building stakeholders; making space for local cultures and knowledge across every stage of capacity building; incorporating mechanisms for learning, collaboration and systems thinking; and going beyond technical, managerial, and technological framings to also build capacities for envisioning, creating, mobilizing, learning and inculcating desirable attitudes, behaviors and values.

Keywords Capacity building · Transformation · Climate action · Implementation

1 Introduction

Capacity building can be defined as the ability to set and pursue one's own agenda (Sokona 2021) through processes of developing and/or strengthening skills, instincts, abilities, processes and resources of countries, organizations, communities, and individuals usually

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supported by donors, implementing agencies, governments, or non-governmental organizations (UN n.d; UNEP 2002; Vallejo and Wehn 2016). With mounting climate change impacts and consequentially greater need for decarbonization and emissions reduction, capacity building has been recognized as a central means of implementation in the Paris Agreement (UNFCCC 2015). However, despite a deep history of attempting to develop technical and human skills and strengthen institutions for safeguarding development objectives and protecting vulnerable communities (Casado-Asensio et al. 2022; Khan et al. 2016), capacity building remains ambiguous and fragmented in the climate context (Klinsky and Sagar 2022; Khan et al. 2018). Due to the ambiguity in clearly defining what kinds of changes capacity building is meant to facilitate (Baser and Morgan 2008; Craig 2007), donors, practitioners, and policymakers often have flexibility in framing and implementation of capacity building. But this also makes capacity building easier to co-opt for vested interests, entrenches relationships between and within the Global North and Global South and may overall limit rather than expand pathways towards ambitious climate action (Nautiyal and Klinsky 2022; Konrad et al. 2022). By clearly linking capacity building to the specific kinds of changes that it seeks to enable, it becomes possible to cut through this ambiguity and identify the most useful and effective approaches for capacity building in the context of climate change. Such an endeavor will be valuable for leveraging experiences and practical insights from capacity building implementation and more effectively directing our resources and focus towards the changes needed to cope with climate change.

In this paper, I argue that mounting calls for deep, enduring, and radical shifts in sociopolitical and economic systems for facing global environmental and development challenges (IPCC 2022; Vogel and O'Brien 2022) collectively point towards the need for climate action and subsequently its means of implementation, including capacity building, to be *transformative* in nature. Hence, the aim of this paper is to identify capacity building approaches for enabling transformative climate action by asking: Based on practitioner and academic experiences and knowledge of implementing capacity building, what best practices and lessons learned emerge as essential for enabling transformation?

In the section that follows, I first outline the conditions for enabling transformation in the context of global environmental change and development. Following this, I describe the methodology for synthesizing capacity building practices and experiences from across five diverse literatures that have directly contributed towards capacity building literature in the past several decades. Finally, I outline best practices and lessons learned from capacity building and discuss implications that emerge from this synthesis for enabling transformations, thus highlighting areas of focus for future research and implementation in the context of climate change.

2 Conditions for enabling transformation

While transformation can have many definitions, it usually involves changes in the fundamental attributes of natural and human systems that may be initiated through human agency and can include changes in behaviors, values, or shifts in power (IPCC 2018, p. 559). In the context of global environmental change, several kinds of intentional and systemic transformations are being called for, including multi-sectoral decarbonization, large-scale shifts in finance and material flows, relations of trade, labor, and service, and changes in behaviors, values, and habits across multiple scales (Paterson 2021; Scoones et al. 2020; Patterson et al. 2018; Feola 2015). Together, these transformations require

consideration of synergies and trade-offs between development objectives and economic growth, as well as between forms of climate action including adaptation and mitigation (Burch et al. 2017; Winkler et al. 2015). Ultimately, these trade-offs make the pursuit of transformations an inherently *political* project that can be co-opted by powerful interests to reproduce current structures of oppression and inequity while continuing high-emissions trajectories of growth and development (Blythe et al. 2018; Paterson 2021; Scoones et al. 2020; Pelling et al. 2015). It thus becomes imperative to ask *how* we can enable transformations for ambitious climate action that go beyond short-term interests and simultaneously fulfill the needs and desires of people across diverse cultural and political contexts (Patterson et al. 2018; Burch et al. 2017; Feola 2015). In other words, what conditions, processes, and mechanisms do we need to leverage for meeting the political challenge of transformation?

Over the past decade, substantial scholarship has discussed the requirements for transformation. While much of this scholarship has not been linked to capacity building, these requirements are outlined here to identify where capacity building approaches can contribute towards transformative climate action. Enabling agency and fostering relationships that support collective action is considered essential, particularly for the most marginalized groups to advocate for their interests, mobilize resources and organize for change (Wolfram 2016; Scoones et al. 2020). In this context, agency ought to be emancipatory and bottom-up i.e. communities and societies should be free to express their plural, diverse and contending visions and values, and pursue change through multiple pathways (Stirling 2014; Burch et al. 2017; Scoones et al. 2020). Learning, experimentation, creativity, and reflexivity are essential for critically questioning, deconstructing, and dismantling structures of power and control, overcoming marginalization, examining tensions between different ways of knowing, centering marginalized voices towards transformation (Chambers et al. 2022; Mehta et al. 2021; Linnér and Wibeck 2021; Wolfram 2016). These processes should take place in a participatory manner, with coordination and linkages between and within communities of practice and institutions across spatial levels (Hölscher et al. 2019; Fazey et al. 2018; O'Brien et al. 2013).

Transformations also require an awareness of systems dynamics and relationships across scales, between nature and human society, over time and across man-made administrative and governance boundaries (Chaffin et al. 2016; Olsson et al. 2014; Wolfram 2016). This awareness of systems dynamics should include local and context-specific knowledge in addition to a focus on multiscalar and global dynamics (Nightingale et al. 2020; Scoones et al. 2020). And finally, thinking about spatial-material configurations including institutions, technology, and infrastructures in relation to power and agency allows actors to create concrete pathways for mobilizing financial and material resources towards specific ends, with an understanding of how the impacts of such interventions might be distributed across contexts and between communities (Scoones et al. 2020; Pereira et al. 2020; Wolfram et al. 2019).

Overall, the conditions needed for transformation can be gleaned from the above scholarship (see Table 1). Given that capacity building has decades of experience in mobilizing agency and enabling change across development, governance, and environmental contexts, it can be effectively leveraged towards fulfilling these conditions for transformation. The question then remains: what best practices and lessons learned can be taken from capacity building thought and practice to enable transformation in the context of climate change? To answer this question, this paper synthesizes capacity building scholarship from across five fields to elaborate best practices and lessons learned, as well as the overall implications from decades of capacity building implementation for supporting transformation.

Table 1 Conditions for enabling transformation

Conditions for Transformation	Brief Description
Emancipatory and Bottom-up Agency	Enabling emancipatory and bottom-up agency for collective action (Stirling 2014; Burch et al. 2017; Scoones et al. 2020)
Social Relationships	Forming linkages and coordination between communities and networks (Hölscher et al. 2019; Fazey et al. 2018; Wilson et al. 2013; O'Brien et al. 2013); making space for voicing contending values and knowledge, particularly for marginalized groups and local knowledge (Nightingale et al. 2020)
Awareness of Systems Dynamics	Awareness and understanding of systems dynamics (Olsson et al. 2014; Wolfram 2016) in the context of broader sociopolitical struggles for change (Nightingale et al. 2020)
Learning, Experimentation, Creativity, Reflexivity	Practices for learning and experimentation, creativity, and reflexivity for questioning and dismantling structures of oppression and enabling plural visions to emerge (Chambers et al. 2022
Mobilization of Material, Technological and Financial Resources	Mobilizing of concrete and critical resources towards the realization of plural visions, particularly for the most marginalized groups (Scoones et al. 2020; Pereira et al. 2020; Wolfram et al. 2019)
Institutional Arrangements for Enabling the Above Conditions	Building and strengthening institutional arrangements for learning, participation, mobilization towards transformative change (Wolfram et al. 2019)

3 Methodology

The objective of this study was to identify best practices and lessons emerging from decades of capacity building efforts that can support transformative change in the context of climate change. To fulfill this objective, insights were synthesized from five fields of capacity building literature that are directly relevant to climate action and/or have a long history of implementing capacity building. Consisting of international development, public health, community development, sustainability, and climate change, all five fields are known for their practitioner involvement and implementation focus. Of these, capacity building in climate change itself was chosen because syntheses and reviews of literature in this area remain scant, which may result in the loss of insights from capacity building practices and theory in climate change in future endeavors.

From each field the most highly cited articles and those that most substantively described and engaged with capacity building as a focus of analysis were selected for synthesis. These articles were selected through keyword searches in Google Scholar and Scopus using 'capacity' and 'capacity building' in combination with terminology associated with each field (see Appendix A). The papers were screened to ensure that capacity or capacity building was indeed a primary conceptual focus. Because the most highly cited papers were often older, to ensure that more recent insights are not missed, similar searches for highly cited papers from 2015–2023 were also made. Through this strategy 10–15 older and 3–4 more recent (2015 onwards) peer-reviewed journal articles and grey literature from each field were identified with the exception of climate change, for which a total of

31 articles were included to accommodate the broader range of concepts in this field (e.g. adaptive capacity which is a tightly-knit and highly cited area of research). The goal of this approach was to ensure that key insights from academic and grey literatures in each field could be incorporated here. However, in a practitioner-driven field like capacity building, it is likely that many implementation insights are not captured in text, and as a result are missing from this synthesis.

The papers were coded In Nvivo using a combination of provisional and emergent coding. Here, provisional coding consisted of a set of codes pre-determined before coding the literature, based on the author's own knowledge and prior reading of capacity building literature (Miles and Huberman 1994). In contrast, emergent coding was done by close reading of the data (Charmaz 2006) and led to an expansion of codes on Nvivo. Pre-determined codes included types of capacities, goals, processes, scales of space and agency (i.e. individuals, organizations, communities, networks etc.) and codes that emerged from the literature included concepts such as capacity mobilization, creativity and innovation, and power (see Appendix B for complete codebook). After consolidation, a total of 79 codes (21 parent codes, 58 subcodes) remained. For data analysis, dominant ideas that frequently occurred across multiple fields were identified on Nvivo which then guided an in-depth reading of codes that corresponded to those dominant ideas, in order to identify best practices and lessons learned across the five fields. These were then mapped onto the conditions for enabling transformation identified above.

4 Capacity building best practices for transformation

This section synthesizes the best practices and experiences of capacity building that can enable the conditions of transformation (as outlined in Table 1).

4.1 Emancipatory and bottom-up agency

Enabling agency that empowers communities and societies to collectively mobilize and pursue their own needs and interests is considered essential for transformation (Stirling 2014; Burch et al. 2017; Scoones et al. 2020). While capacity building is seen as enabling agency for many different stakeholders and across scales and contexts, discussions in the literature are often centered around two contexts where tensions in building agency, and having ownership over capacity building and the ability to self-determine one's own futures are greatest. First, empowering communities and marginalized groups and organizations from the bottom-up is often a key goal of capacity building so they can make their own decisions, become self-reliant through access to funds, skills, resources, and social networks, and pursue structural shifts that reduce inequalities, promote human rights and improve their wellbeing (Aantjes et al. 2022; Gil-Rivas and Kilmer 2016; Ruiz Meza 2015; Allen 2006; Barker 2005; Beckley et al. 2008; Chinman et al. 2005; Craig 2007). Second, capacity building at the national level enables agency by strengthening the capability of developing country governments and national civil society organizations to commit to, act upon and maintain overall ownership of their development trajectories (Ika and Donnelly 2017; Brinkerhoff and Morgan 2010; Fukuda-Parr et al. 2002).

In community contexts, best practices for enabling agency include fostering widespread participation during every stage of capacity building that is inclusive of diverse

voices in terms of ethnicity, race, age, class and disability (Pereira et al. 2019; Cinner et al. 2018; Engle and Lemos 2010; Gupta et al. 2010; Chino and DeBruyn 2006; Barker 2005; Folke et al. 2002; Foster-Fishman et al. 2001). Diversity in participation can be accommodated by providing logistical support and mentorship, and building trust, transparency, and accountability of projects towards marginalized groups (Schauppenlehner-Kloyber and Penker 2015; Gupta et al. 2010; Cooke 2005; Foster-Fishman et al. 2001). For instance, a project in Korneuburg, Austria developed group building exercises that proceeded in stages to align the values of diverse groups and build a common knowledge base towards the goal of urban sustainability (Schauppenlehner-Kloyber and Penker 2015). For communities, agency can also be enabled when community members build their leadership skills (Barker 2005; Chaskin 2001) and form partnerships with governments, nonprofits, and the private sector (Barker 2005). Enabling the agency of individual community members by building their technical and social skills is also key so they can then come together to take control of their lives and pursue individual and collective change (Aantjes et al. 2022; Chinman et al. 2005).

A lesson learned in enabling bottom-up agency is the importance of reducing or eliminating disempowering impacts of capacity building while giving national governments and domestic actors complete ownership over the direction and scale of capacity building. Local and national development organizations are embedded in a global system where development agendas, goals and objectives, and compliance mechanisms are often dictated by donors, leaving domestic agents with limited opportunity and incentives to exercise their agency and have their voices heard (Andrews et al. 2017, pp. 40–47). This system can lead to continued aid dependence, focus on short-term outputs that donors want rather than long-term visions of development that are beneficial for developing countries, and ultimately the erosion of trust of citizens in their governments (Baser and Morgan 2008; Morgan 2005; Fukuda-Parr et al. 2002; Godfrey et al. 2002). At the community level, having local knowledge and institutions undermined or ignored can also erode confidence and trust in capacity building (Craig 2007; Allen 2006; Diamond 2004). 'Self-help' framings of development not backed with adequate financial and material support can further disempower communities, particularly those that are marginalized (Simpson et al. 2003; Allen 2006).

Some best practices donors can take to meaningfully collaborate with on-ground governments, partner organizations and communities to create a flexible learning approach for defining goals, implementing actions, and tracking progress (Aantjes et al. 2022). This includes reflecting on and building capacities of organizations and stakeholders in the larger enabling environment to support the empowerment of target stakeholders (Bolger 2000; Baser and Morgan 2008). Additionally, by working with domestic policymakers, donors can ensure that accountability structures and planning processes place major control of financial resources domestically (Baser and Morgan 2008; Fukuda-Parr et al. 2002; Godfrey et al. 2002). Furthermore, ownership can be fostered by identifying and nurturing local leaders to determine objectives, propose and monitor and evaluate projects (Hagelsteen and Becker 2013).

Despite these insights, overcoming donor-recipient power dynamics continues to be harder to achieve in practice as demonstrated by a recent analysis of capacity development projects for Disaster Risk Reduction implemented by the Swedish Civil Contingencies Agency between 2006–2013. This analysis found that several project proposals, including budgets and reporting were developed and managed by external partners, who also often modified goals and processes to get visible results without consulting domestic actors despite recognizing local ownership as a 'guiding principle' in their visions (Hagelsteen

and Burke 2013). Thus, enabling the agency of domestic organizations and communities continues to be an area in need of further research and consideration by donors, policymakers and practitioners alike.

4.2 Social relationships

Social relationships and interlinkages between individuals, groups and networks are essential for mobilizing resources and taking collective action that can lead to transformative change. In the capacity building literature, social relationships (often referred to as social capital) describe patterns of interactions between different groups and individuals based on shared identities and interests, or within socially defined contexts such as markets or governments (Chaskin 2001; Beckley et al. 2008). Fostering relationships within communities or organizations through capacity building can increase social cohesion and trust, enhance social memory, create opportunities for inclusive participation and enable the co-creation and pursuit of shared values and visions (Hess et al. 2012; Lindner et al. 2010; Brinkerhoff and Morgan 2010; Pelling et al. 2008; Allen 2006; Fukuda-Parr et al. 2002; Folke et al. 2003). Additionally, coalitions and alliances formed across spatial levels, sectors and social contexts can also enhance access to decision-making spaces, resources, and other forms of support for taking collective action (Dapilah et al. 2020; Chaskin 2001; Gibbon et al. 2002; Loza 2004).

Best practices for fostering social relationships within communities include strengthening or building community organizations, religious or cultural community centers or platforms, and hosting events for periodic gathering, exchanging ideas and taking collective action (Barker 2005; Loza 2004; Polk 2011; Goodman et al. 1998). Improving skills around leadership, management, advocacy, collective visioning, problem-solving, collaboration, communication and conflict mediation through capacity building can further strengthen social relationships (Aantjes et al. 2022; Woodhill 2010; Foster-Fishman et al. 2001; Chaskin 2001; Baser and Morgan 2008; Goodman et al. 1998). However, donors and implementing organizations must consider the role of existing networks, interests, needs, languages, cultures and traditions that may have developed over long periods of time in response to local contexts when seeking to enhance social relationships (Chino and DeBruyn 2006; Simpson et al. 2003; Folke et al. 2003). An example of a capacity building model that does so is the Community Involvement to Renew Commitment, Leadership and Effectiveness (CIRCLE) process and philosophy designed by tribal visionaries to promote public health in Indigenous communities by centering personal and professional relationship building while honoring Indigenous worldviews such as a sense of belonging and interdependence with family, culture, and the environment (Chino and DeBruyn 2006).

In developing and promoting such models, donors must also be cognizant of power dynamics so that they contribute towards reducing rather than increasing marginalization, neglect, conflict, and oppression (Allen 2006; Foster-Fishman et al. 2001). For instance, a case study based in Bagri village facing high climate variability in Ghana highlighted how non-governmental organizations (NGOs) operating in the region formed organized groups consisting of poor households, including several female-headed households, and trained them in agronomic practices and diversification strategies while providing them with access to markets, agricultural inputs and new knowledge and technology (Dapilah et al. 2020). However, the benefits of these projects were mixed because the selection of households by external NGOs led to resentment by powerful households who undermined the social cohesion generated by these projects (Dapilah et al. 2020).

This points to the need for donors to consider social ties and 'invisible' networks within communities while designing capacity building interventions.

4.3 Awareness of systems dynamics

Through an awareness of systems dynamics across spatial and temporal scales, communities and organizations can undertake analysis and implementation of capacity building at multiple levels, across contexts and involving coordination and communication between a wide range of stakeholders who perform complementary functions in pursuing transformations (Gil-Rivas and Kilmer 2016). Systems thinking lets capacity building practitioners determine which dynamics to leverage and what trade-offs to consider by drawing attention to boundaries, linkages, interconnections and flows between people, ideas and resources, as well as complex dynamics that describe how change takes place e.g. feedback loops, thresholds, delays, disorder, variation and inertia in systems (Hess et al. 2012; Morgan 2005). For instance, practitioners can consider how changing the political environment of a country would take more time and resources than a single capacity building project can handle but projects that are too narrow will be unsuccessful at transformation if disconnected from politics, power, and other systemic issues that affect outcomes (Bolger 2000; Brinkerhoff and Morgan 2010; Schauppenlehner-Kloyber and Penker 2015). An awareness of systems dynamics also means that capacity itself can be perceived as emergent which in turn can result in capacity building interventions that are more flexible, and based on learning, joint problem-solving and collaboration across levels and contexts (Gil-Rivas and Kilmer 2016; Polk 2011; Pereira et al. 2019; Liberato 2011; Brinkerhoff and Morgan 2010; Israel et al. 2010; Brownson et al. 2018; Hess et al. 2012) to allow capacities to develop organically.

Systems awareness also allows capacity building stakeholders to understand the connections between social and natural systems and find ways to work with rather than control them (Baser and Morgan 2008; Folke et al. 2002), for instance through coordination with those who possess local social and ecological knowledge e.g. Indigenous Peoples (Strigl 2003; Folke et al. 2003; Gil-Rivas and Kilmer 2016). This could mean finding ways to document, store and promote the use of traditional knowledge e.g. systems of observing weather and climate to plan agricultural activities (Granderson 2017). Seeing capacity as systemic would also mean recognizing both the benefits and possible barriers to capacity building that result from traditional values and rules in Indigenous and other local communities. For instance, in Tongoa Island, Vanuatu, traditional practices around land tenure, resource management, governance, leadership, customs, and relations can enhance their capacity to adapt to climatic variations and sociopolitical stressors but the patriarchy and hierarchy of resulting governance structures also result in the marginalization of women, youth and people with disabilities (Granderson 2017).

Other best practices for enhancing an awareness of systems dynamics combining qualitative and quantitative measures of assessment, introducing systems methods such as agent based modeling and social network analysis and analyzing how power dynamics influence change in the system (Baser et al. 2008; Brownson et al. 2018; Eakin and Lemos 2006). Systems thinking can also be incorporated into participatory processes for monitoring and evaluation by focusing on relationships and flows, and integrating both output and process-based indicators and measurements (Hess et al. 2012; Brinkerhoff and Morgan 2010; Morgan 2005).

4.4 Learning, experimentation, creativity, reflexivity

Processes that create opportunities for 'play' and foster learning, experimentation, creativity, and reflexivity are considered important for envisioning and taking concrete steps to enable transformation. Within capacity building, learning and experimentation have slowly gained prominence for building new skills and approaches, generating, absorbing, and processing information, thinking creatively (Cinner et al. 2018; Gupta et al. 2010), and unlearning/relearning existing rules, claims and procedures in the face of disturbances, surprise, crisis, and uncertainty (Hess et al. 2012; Baser and Morgan 2008; Folke et al. 2003). Drawing from a wide range of learning theories and practical experiences, learning is described as multi-level, iterative, and based on action-reflection cycles that create space for experimentation, flexibility, and the building of shared understandings through inclusion of diverse technical, managerial, sociopolitical and experiential knowledge (Aantjes et al. 2022; Periera et al. 2019; Cinner et al. 2018; Gee and Cooke 2018; Archer and Dodman 2015; Engle 2011; Israel et al. 2010; Pelling et al. 2008; Folke et al. 2003).

The literature outlines several best practices for fostering learning. Within research organizations and institutes of higher education, building a learning culture that links emotional and analytical intelligence with consideration of social needs and values across research and practice contexts is important (Periera et al. 2019; Schauppenlehner-Kloyber and Penker 2015; O'Rafferty et al. 2014). Such organizations can develop mission statements, training and research strategies, mentorship and coaching schemes on learning, research collaborations with alumni or other outside collaborators, or systematically seek and supporting learning-by-doing activities (Cooke et al. 2018; Kramer and Libhaber 2018). For instance, a research interest network of health service organizations in United Kingdom established themselves as a community of practice to drive collective learning which included nurturing research collaborations through dialogues and plans for seeking funding for capacity building, fostering skills on change management and innovation through workshops and trainings, and providing additional support to new and emerging researchers through mentorship and peer-support to build a culture of learning (Gee and Cooke 2018). Such activities can be supplemented in institutions of higher education by giving students credits for service, internships and class projects to conduct research and implementation alongside communities and practitioners (Shiel et al. 2016).

In development spaces, learning is facilitated through use of multiple approaches including mentoring, workshops, coaching, on-the-job training, dialogues, group discussions, and professional or academic courses (Baser and Morgan 2008; Fukuda-Parr et al. 2002). Capacity building experiences over the years point towards the need to approach learning as the steady circulation and absorption of knowledge over the long-term rather than as happening through one-off projects (Brinkerhoff and Morgan 2010; Morgan 2005; Fukuda-Parr et al. 2002). Another essential mechanism of learning in capacity building projects is sharing best practices and lessons learnt from monitoring and evaluation, which in turn should be built into a project through a careful consideration of outcomes, methodologies, and indicators that prioritize the perspectives, needs and ambitions of project recipients (Haglesteen and Becker 2013). Current monitoring and evaluation approaches often continue to be insufficient for the pursuit of transformative change due to pre-defined donor-determined goals and objective that hinder learning and innovation (Vallejo and Wehn 2016; Andrews et al. 2017).

Related to learning, there has been growing attention in capacity building to fostering creativity, experimentation, and reflexivity especially in newer fields such as

sustainability. These new capacities are seen as valuable for envisioning, co-constructing and pursuing change by challenging assumptions, values, and beliefs, enabling free and open exchange of knowledge and ideas (Pahl-Wostl 2009; Pelling et al. 2008; Folke et al. 2003) and enhancing critical thinking about power, justice, and inequalities with recognition of race, ethnicity, and cultural diversity (Archer and Dodman 2015; Armitage 2005; Labonte and Laverack 2001; Goodman et al. 1998). These capacities can be fostered by weaving diverse knowledge, perspectives, and emotions using embodied and arts-based methodologies are also emerging as important (Pereira et al. 2019; Cinner et al. 2018; Chinman et al. 2005). An example of such a project is the Museums of the Future Now project where speculative artworks were used to stimulate conversation about people's dreams, desires and values about the future (Pereira et al. 2019).

Ultimately, fostering learning, experimentation, creativity, and reflexivity requires engaging with multiple ways of knowing through a wide variety of processes. These are still emerging discussions in the capacity building literature and an area for further exploration and research.

4.5 Mobilization of material, technological and financial resources

Material, technological, and financial resources need to be mobilized and accessible by those seeking to implement transformation. Capacity building can enable this mobilization by supporting communities or organizations in developing skills for accessing and managing money, material resources, people, or information (Beckley et al. 2008; Cooke et al. 2018). These skills include effective leadership, social relationships, and skills for advocating and collaborating (Chaskin 2001; Foster-Fishman et al. 2001; Goodman et al. 1998), as well as resourcefulness i.e. the ability to repair, reorganize or otherwise use existing resources to respond to challenges (McBean and Rodgers 2010).

Overcoming challenges in donor-recipient relationships that complicate the flow of resources in capacity building is essential for successful resource mobilization, especially when it comes to financial resources which can be short-term and limited whereas capacity needs of communities and countries are complex, varied and long-term (Hess et al. 2012; Strigl 2003; Crisp et al. 2000). Conversely, long-term aid dependence itself can also be considered problematic as it can threaten local ownership and reduce the value of capacity building to merely a resource flow for powerful actors (Potter and Brough 2004; Godfrey et al. 2002). The use of creative mechanisms of fund distribution such as pooled investment funds that countries can draw from based on their self-determined needs (Okuba and Michaelowa 2010; Fukuda-Parr et al. 2002), and longer-term grants or endowed positions such as career funding or national grant awards (e.g. for building research capacity in African countries, see Whitworth et al. 2010), can overcome this problem by channeling capacity building resources towards long-term and domestically-owned solutions. Overall, however, more clarity is essential on how resource mobilization and access can be improved via capacity building to enable transformation.

Another capacity building approach focused on resource mobilization is that of technology development and transfer which seeks to incorporate new technologies into communities or institutions while equipping them with knowledge to utilize it through training programs (Chinman et al. 2005; Cinner et al. 2018). While technology transfer is sometimes criticized for not engaging local communities or contexts sufficiently, this challenge can be reduced by utilizing participatory approaches focused on understanding local circumstances and technology needs (Fukuda-Parr et al. 2002; Chinman et al. 2005). Additionally,

technology transfer should pay attention to the wider regulatory environment comprising of factors such as globalization, role of private sector in technology, digital divide in access to technology between countries and regions of the world, and effects of intellectual property rights and patents on innovative technology development (Strigl 2003; Eakin and Lemos 2006; Fukuda-Parr et al. 2002; Yohe 2001; Lusthaus et al. 1999).

Finally, capacity building processes can leverage the latest technology to become more effective themselves. For instance, access to knowledge from around the world can be improved through e-learning and certification, online courses educational resources, chat rooms and games, videoconferencing, website development and the use of knowledge platforms for learning (Loza 2004; Strigl 2003; Folke et al. 2003). Information technology can also create communities of practice that make it easier to locate expertise for collaboration and peer-to-peer learning (Fukuda-Parr et al. 2002). Adopting financial or data management systems can help organizations further strengthen their functioning (Sewankambo et al. 2015).

4.6 Institutional arrangements for enabling the above conditions

Institutional arrangements can foster social learning, trust, flexibility, diversity, reflexivity, participation, and transparency towards achieving collective action (Engle and Lemos 2010; Gupta et al. 2010; Pahl-Wostl 2009; Tompkins and Adger 2005). As an important capacity building approach, strengthening institutional arrangements includes goals such as improving financial, data, resource, and project management, improving coordination and communication across and within departments, formulating and implementing legislation, building administrative, logistical and operational skills, boosting new attitudes, motivations, emotions and behaviors, and defining clear visions of change (Andrews, Pritchett and Woolcock 2017; Wang et al. 2012; Armitage 2005; Barker 2005; Baser et al. 2008; Tompkins and Adger 2005). Additionally, institutional arrangements that are stable, reliable, and well-supported, with mechanisms to embed learning and creativity can more successfully adapt to complex problems such as climate change (Aantjes et al. 2022; Folke et al. 2003).

An example of institutional strengthening comes from a cross-sectoral governance network in the Gothenberg Region, Sweden (HUR2050) that was formed to promote alternative ways of thinking about sustainable urban development that go beyond pro-market approaches (Polk 2011). The network utilized consensus and scenario-building processes to coproduce and disseminate documents outlining their goals, definitions, and frameworks for sustainable development, while promoting dialogue and building trust between government officials across levels and sectors through lunch workshops, coffee breaks and dinner conversations that resulted in a constellation of formal and informal relationships across the region (Polk 2011). Overall, the network paved the way for several new initiatives and projects and led to the formation of working, task and reference groups that promoted coordination and planning across the region, strengthening institutional capacity and learning of local governments as a result (Polk 2011).

Beyond the local level, multilevel and multilateral institutional arrangements (e.g. South-South collaboration networks) rather than one-off projects can play a significant role in sustained knowledge transfer, resource sharing and research across contexts (Kramer and Libhaber 2018; Sewankambo et al. 2015; Whitworth et al. 2010). To strengthen the global knowledge landscape, these arrangements can redistribute 'centres of excellence' more equitably between developed and developing countries, connecting local/regional findings to global policy, and directing resource access accordingly (Pereira et al. 2019;

Strigl 2003). They should also foster 'epistemological inclusiveness' of local, Indigenous and experiential ways of knowing with emphasis on issues of local relevance (Armitage 2005; Folke et al. 2003; Gee and Cooke 2018). Relatedly, institutional arrangements can enhance knowledge about capacity building itself by linking international agencies, consulting firms and NGOs that possess capacity building experience to other knowledge systems that can benefit from those experiences (Lusthaus et al. 1999).

5 Implications for capacity building towards transformation in the context of climate change

Based on the above synthesis of several best practices and lessons learned for enabling transformation that come from decades of capacity building across five fields of implementation (summarized in Table 2), the following implications emerge as important for researchers, practitioners and donors engaging in capacity building in the climate change context.

1. A strong focus in capacity building implementation should be on enabling the agency of local, subnational, and national stakeholders for pursuing their own climate and development agendas.

Across the fields of capacity building, there is widespread consensus that capacity building is most effective when it enables agency for pursuing domestic agendas. However, the biggest challenge here comes from imbalances in power between donors, governments and implementing partners, and on-ground local communities that affect ownership, access, and impact of capacity building (PCCB 2023, p. 28-30; UNFCCC 2023; Nago and Krott 2022; Andrews et al. 2017) despite emerging efforts to make donor-recipient relations more equitable (e.g. see Casado-Asensio et al. 2022; USAID 2022; OECD 2023). Thus, if capacity building is to unlock desirable transformations in the context of climate change, there is need for accountability structures and financial arrangements that improve access for and transfer ownership of capacity building to recipients, while building open and flexible mechanisms for knowledge sharing, learning and collaboration across all stages of capacity building.

2. Making space for local knowledge, respecting local traditions, values, relations and institutions, and inviting diverse perspectives and epistemologies is central for successful capacity building that unlocks plural and desirable transformations.

The need to respect local knowledge, culture and history is another recommendation that emerges from across several fields without which transformation as a political project runs the risk of co-optation by vested interests and approaches designed by more powerful top-down actors. Capacity building initiatives should build approaches and practices that respect and integrate local values and traditions and inculcate 'epistemological inclusiveness' from the beginning (Pereira et al. 2019; Chino and DeBruyn 2006). Participatory mechanisms that strengthen skills around social relations, leadership, collaboration, joint problem-solving, communication, and conflict resolution while making space for discords and disagreements in a respectful manner are essential here (Fukuda-Parr et al. 2002;

Table 2 Summary of best practices and lessons learned from capacity building for enabling transformation

Condition for Transformation	Best Practices and/or Lessons Learned
Emancipatory and Bottom-up Agency	• Fostering widespread participation inclusive of diversity • Building leadership, technical and social skills of individuals • Reducing or eliminating disempowering impacts through meaningful donor-recipient collaboration and fostering domestic ownership
Social Relationships	• Strengthening or building community organizations, platforms, or opportunities for interaction • Improving individual skills around leadership, management, advocacy, collective visioning, problem-solving, collaboration, communication, and conflict mediation • Incorporating local contexts into relationship-building • Being cognizant of power dynamics, including 'invisible' networks
Awareness of Systems Dynamics	• Considering trade-offs and scope of capacity building interventions • Designing flexible capacity building approaches based on learning, joint problem-solving and collaboration • Working with rather than seeking to control social and natural systems through coordination with local and ecological knowledge-holders • Combining systems methods, participatory processes and analysis of power dynamics in capacity building
Learning, Experimentation, Creativity, Reflexivity	• Building a learning culture that links emotional and analytical intelligence with multiscalar and multi-contextual consideration of needs and values • Incorporating several processes of learning including mentoring, coaching, on-the-job training, dialogues, group discussions, courses • Fostering creativity, experimentation, and reflexivity through arts-based, embodied and emotive methodologies that weave diverse knowledge, perspectives and emotions together
Mobilization of Material, Technological and Financial Resources	• Building skills for accessing and managing finances and material resources, people and information • Using creative mechanisms for long-term and stable funds distribution that gives ownership to domestic stakeholders • Using participatory approaches to understand local technology needs and regulatory environments • Leveraging on local technology to improve effectiveness of capacity building e.g. online courses, chatrooms, games, videoconferencing and knowledge platforms

Table 2 (continued)

Condition for Transformation	Best Practices and/or Lessons Learned
Institutional Arrangements for Enabling the Above Conditions	• Building stable, reliable, well-supported institutional arrangements for improving management, coordination and communication, legislation, administrative, logistical, and operational skills and boosting new attitudes, motivations, emotions, and behaviors while defining clear visions of change • Building multilevel and multilateral institutional arrangements to strengthen the global knowledge landscape • Enhancing knowledge about capacity building through knowledge sharing

Gil-Rivas and Kilmer 2016; Pereira et al. 2019). Leveraging the knowledge and experiences of local implementing partners, government officials and marginalized communities in every stage of decision-making, and incorporating their values and visions in the planning, implementation and monitoring and evaluation of capacity building is important for achieving this. Additionally, there is need to synthesize and learn from practical insights for navigating power dynamics and utilizing justice and equity frameworks and tools in capacity building to enable collective action while protecting vulnerable and marginalized groups (Bolger 2000; Baser and Morgan 2008; Archer and Dodman 2015).

3. Mechanisms for collaboration, learning and systems-thinking should be incorporated throughout capacity building implementation and research.

Peer-based models of learning and collaboration that bring together North–South and South-South donors, governments, implementing partners and capacity building recipients, along with long-term engagement in capacity building of research institutions, universities and the private sector situated in the Global South is essential for sustaining capacity building efforts and achieving long-term environmental and development goals (Khan et al. 2018; Woodhill 2010; Strigl 2003). Building a culture for flexible and open learning and systems-thinking within and across organizations, departments and communities is also needed for meeting the challenges of uncertainty and complexity in adapting to climate change impacts (Periera et al. 2019; Schauppenlehner-Kloyber and Penker 2015; O'Rafferty et al. 2014). Towards this end, capacity building interventions can engage directly with practitioners, teachers, and researchers from the field of education, as areas like popular education and ecopedagogy (Freire 1970; Kahn 2010), social and organizational learning (Ensor and Harvey 2015; Reed et al. 2010; Levitt and March 1988), experiential learning (Kolb 2014), and Indigenous pedagogy (e.g. Grande 2015) can offer insights into the psychological, sociocultural, organizational and political dimensions of learning for achieving political and social change.

4. Capacity building initiatives must go beyond technical, managerial, and technological capacities to build capacities for envisioning, creating, mobilizing, learning, and inculcating desirable attitudes, behaviors and values that are often rendered invisible by donors and/or practitioners.

Capacity building initiatives should continue to build human skills, cultural capacities, and capacities for imagining and realizing desirable transformations over time. While there is growing recognition that capacity building in its widest form can contribute towards many different dimensions of social, political, and cultural life (Chino and DeBruyn 2006; McBean and Rodgers 2010) and many emerging capacities are already being discussed in newer fields such as sustainability, how to build these capacities and what challenges exist in doing so in capacity building remains largely unknown. More research and implementation focus, including allocation of resources for exploring and building these capacities is needed in the context of climate change.

Overall, more conceptual clarity is needed in the field of capacity building on how to enable agency through capacity building, mobilize capacities into collective action, sustain the outcomes of capacity building and retain capacities over time, and monitor and evaluate capacity building as well as measure its impacts on transformative climate action. Further research into how different capacity building approaches contribute towards different kinds of changes i.e. incremental change, desirable, undesirable, and plural transformations can demonstrate which approaches are most needed for effective action in the context of climate change. Moreover, capacity building approaches for addressing climate change can also be strengthened through closer engagement between academic and practitioner literatures on transformation, climate policy and implementation to ensure that insights from science and technology as well as from the practice of capacity building are effectively integrated towards achieving transformation. Ultimately, continued effort in creating comprehensive frameworks and theories of change for capacity building that can account for its full complexity rather than avoid discussions around power and politics, culture and knowledge can contribute towards unlocking capacity building's fuller potential for transformative climate action.

6 Conclusion

Capacity building as a central means of implementation for coping with climate change can develop/strengthen much-needed skills, instincts, abilities, processes, and institutions for enabling transformation. Thus, this paper synthesized capacity building best practices and lessons learned for doing so from across five fields of practice and identified their implications for the field of climate change. These implications include the importance of enabling agency while navigating power dynamics between different capacity building stakeholders, integrating local cultures and knowledge into capacity building interventions, building mechanisms for learning, collaboration and systems thinking across every stage of capacity building, and going beyond technical, managerial, and technological framings of capacity building to also build capacities envisioning, creating, mobilizing, learning and inculcating desirable attitudes, behaviors and values. Moreover, gaps in capacity building research and practice in areas such as how to sustain capacity building gains and outcomes, overcome power dynamics, and identify linkages between capacity building interventions and specific kinds of transformation need further consideration from all stakeholders. Ultimately, by building on these insights and paying attention to existing strengths and gaps in knowledge and implementation, capacity building practitioners, researchers and donors can contribute towards unlocking emancipatory and plural pathways of transformative climate action.

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