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# Building Capacity to Adapt Development Pathways to Protect Human Well-being in the Face of Shocks: Lessons from scholarship and practice

Alicia G. Harley and William C. Clark
Harvard Kennedy School

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WORKING PAPER*

# Building Capacity to Adapt Development Pathways to Protect Human Well-being in the Face of Shocks: Lessons from scholarship and practice

**Abstract**: Central to the pursuit of sustainability is the ability of actors to navigate disruptive change so that they can survive long enough to transition to more equitable development pathways in the future (Reyers et al. 2018). But the increasing turbulence of the Anthropocene, with its unprecedented risks cascading across sectors and scales, brings with it unprecedented challenges for adaptation (Folke et al. 2016). Meeting these challenges will require building and maintaining a sustainability-focused capacity to adapt, which we take here as the ability to confront potentially disruptive change in ways that keep the system operating in pursuit of inclusive human well-being *within* its current regime and thus on something like its current development pathway. Such a capacity will almost certainly require addressing four separate but interrelated challenges: i) reduce sources of vulnerability particularly among the most vulnerable people and places; ii) mitigate harmful shocks and sources of disruptive change; iii) create more, and more equitable, access to the resources that people and communities need to recover from shocks and navigate future development pathways toward sustainability; and iv) strengthen adaptation-focused governance structures that help actors across levels navigate tradeoffs across both space and time that inevitably crop up in efforts to foster sustainability. This working paper provides a high-level overview of adaptation scholarship in sustainability science as well as insights from the past several decades of practice in the field. The paper is designed as a jumping off point for a seminar series on Capacity for Sustainable Development (C4SD) organized by the Mossavar-Rahmani Center for Business and Government, the Sustainability Science Program, Salata Institute for Climate and Sustainability, Center for International Development, and the Belfer Center for Science and International Affairs at Harvard Kennedy School. For more information about the seminar series see this link: https://www.hks.harvard.edu/centers/mrcbg/programs/sustainability-science-program/c4sd-seminar-series

**Authors**: Alicia G. Harley, Senior Research Fellow, Sustainability Science Program, Harvard Kennedy School; William C. Clark, Harvey Brooks Research Professor of International Science, Public Policy and Human Development, Harvard Kennedy School.
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## 1. Introduction:[1]

What capacities are most needed for the effective pursuit of sustainability in the face of the multiple crises currently facing the Anthropocene system? Taken together these intertwined crises – climate, pandemics, extinction, inequity, and others arising from the increasingly intense interactions between nature and society – are threatening the implicit promise of sustainability which has emerged over the last decades as one of the most widely shared goals in human history: **that each generation should hand on to its successors whatever it takes to allow them to achieve a standard of living at least as good as its own, while simultaneously seeking to alleviate poverty and inequity within its own time** (Solow 1993; WCED 1987). Keeping this promise will ultimately require decisive action on multiple fronts. But in this complex world, what will it take to foster our collective ability to pursue sustainability in the face of deep uncertainty and the inevitability of unexpected change?

In the Capacity Building for Sustainable Development (C4SD) research project,[2] we argue that advocates for sustainable development should pay greater attention to building a set of strategic capacities that empower and enable actors (individuals, communities, organizations etc.) to make strategic decisions, and to take deliberate and collective action in the pursuit of sustainability. By capacity we mean both the intention and the ability to accomplish a task or achieve an outcome or, more bluntly, "the ability to get stuff done". Why? Because failure to build, exercise, and improve capacity for the pursuit of sustainability has too often resulted in a "missing middle"—an inability to connect widespread agreement on the goals of sustainable development with the scientific understanding of the dynamics of intertwined nature-society systems that set the stage on which those goals must be pursued.

Three features of today's world make the need to build such strategic capacities particularly urgent:

1) Crises challenging the goals of sustainable development are multiplying and intensifying (Folke et al. 2021), threatening the remarkable progress in many dimensions of well-being that has been achieved over the last two centuries or more (Deaton 2013; McNeill

[1] This "Introduction" is common to all of the white papers we have written in support of the present seminar series. Readers who have already encountered it in another of those white papers can skip ahead to Section 2 without loss.

[2] The Capacity Building project is an activity of the Sustainability Science Program, hosted by the Mossavar-Rahmani Center at Harvard's Kennedy School of Government.

2016). More effective action to address the multiple threats to sustainability is increasingly urgent.

2) The threats to sustainability are interconnected, as is the underlying nature-society system from which they emerge (Preiser et al. 2018). Efforts to address them one-by-one at best become a Sisyphean nightmare of whack-a-mole and often end up competing with or undermining one another. All too visible examples are provided by unsatisfactory results of siloed efforts taken in pursuit of one or another of the UN's 17 SDGs. Strategic approaches are needed to support actions likely to be effective across multiple interconnected challenges and where efforts to foster sustainable development require attention to the whole intertwined system rather than just the parts.
3) Better assessments, forecasts, and the scientific models to support them are necessary components of such strategic approaches. But they are not sufficient. The reason is that nature-society interactions constitute complex adaptive systems in which novelty (innovation, evolution), uncertainty and surprise are the norm rather than the exception (Preiser et al. 2018). This complexity virtually guarantees that even the most scientifically informed plans will eventually turn out to be at best incomplete if not altogether wrong. Effective strategies must complement "thinking through" with "acting out" approaches, i.e. with capacities to approach problems and solutions from a systems perspective, to treat interventions as experiments, to learn from those experiments, and to course correct when forecasts eventually, and inevitably, go wrong.

This working paper focuses specifically on the capacity to adapt development pathways to protect human well-being as one of a broader set of six capacities that we argue connect the goals of sustainable development with the scientific understanding of the multiple, interacting, and complex sustainability challenges currently facing the Anthropocene. These six capacities emerged from decades of research across multiple interdisciplinary—but often disparate—research programs focused on what is needed to foster sustainability (Clark and Harley 2020). Taken together the six capacities enable collaborative action for sustainability in the face of uncertainty. As summarized in Fig. 1, they are:

1. **Capacity to measure** progress toward sustainable development
2. **Capacity to adapt** development pathways to protect human well-being in the face of shocks
3. **Capacity to transform** unsustainable development pathways into sustainable ones
4. **Capacity to advance equity** both within and among generations
5. **Capacity to govern,** i.e., to build and maintain collaborative relationships in pursuit of sustainable development
6. **Capacity to link knowledge with action** for sustainability

The remainder of this working paper is organized in three sections: the first section reviews the state of knowledge and scholarship on adaptation and sustainable development; the second section highlights what actors are already doing at the cutting building adaptative capacity in practice; and the third section synthesizes emerging insights from practitioners and scholars collected as part of the Capacity Building for Sustainable Development (C4SD) research project about what is needed to build and maintain and strategic capacity to adapt development pathways to protect human well-being in the face of multiple uncertainties and cascading shocks currently facing the Anthropocene system. We hope that the seminar series for which this background paper has been prepared will further contribute to the C4SD research project, deepening the insights found in this working paper.

## 2. Adaptation and Sustainable Development: A brief overview of the scholarship

For our purposes here, we define adaptive capacity as the ability to confront potentially disruptive change in ways that keep the system operating *within* its current regime and thus on something like its current development pathway.[3] At the most basic level, adaptation is everywhere: actors are continuously responding to change through conscious and unconscious feedback processes (Castro and Sen 2022; H. M. T. Rahman and Hickey 2019). But adaptation

[3] The concepts of adaptation and transformation are clearly related. We find it useful, however, to distinguish them in terms of their respective goals: adaptation seeks to moderate harms or exploit opportunities arising in the current system, while transformation seeks to restructure that system into a fundamentally different one that will generate significantly fewer harms and greater opportunities for inclusive human well-being in the first place. (We pursue transformation in a separate working paper, while focusing here on adaptation).

does not come without costs and the growing demands for adaptation caused by the increasing turbulence of the Anthropocene has led to an unequal distribution of those costs to vulnerable communities and future generations (Environment 2024). Recognition of these trends has made adaptation a focus of multiple disciplines studying risk, hazard, vulnerability, resilience and innovation (Cinner et al. 2018; Elrick-Barr, Plummer, and Smith 2022; Keys et al. 2019; Kousky 2019; Mortreux and Barnett 2017; Orlove 2022). This research has produced several generalizable findings relevant to sustainable development:

1) **Richer is safer:** One generalizable (if unsurprising) finding of this scholarship is simply that 'richer is safer,' or conversely that poorer households and communities are more vulnerable to disruptive change because they have fewer resources—natural and anthropogenic—to cope with it (Adger et al. 2003; De Silva and Kawasaki 2018; Meierrieks 2021). This is not just a matter of material assets, but also of power. Access and agency (self-efficacy, self-esteem) are essential elements of adaptive capacity, since only resources that particular individuals and communities can – and believe they can – mobilize allow them to actively shape their futures in the face of unexpected change (Bohle, Etzold, and Keck 2009; Brown and Westaway 2011; Liu et al. 2022).
2) **Heterogeneity can help:** A second generalizable finding is that society's potential for adaptation is enhanced to the extent that neither its assets nor shocks to them are distributed evenly across space and time. This works in two ways. First, if a shock impacts one place or time but not others, various forms of compensation are possible that would not be in a homogenous world (or models of it). Second, diversity among places for example in their livelihood strategies or supply chains or past experience —can enhance the menu of options available for particular places facing new shocks (Biggs et al. 2012). That said, the potential contributions of heterogeneity to adaptation can be realized only to the extent that connections among different places and times are appropriately understood and managed. For example, when systems are so tightly and globally connected that shocks anywhere in the system impact everyone equally, the prospects for adaptation via compensation are diminished unless "circuit breakers" can be put in place (Nyström et al. 2019). Connections among diverse places can also shift risks from one group or place to another. This can

be a good thing, as when insurance spreads risks to make disasters less damaging to those who happen to be exposed (Kousky 2019). But is can also be problematic, as when upstream levies accentuate downstream floods, or tall "smoke" stacks expose people far away to pollution they did nothing to create, or displaced migrants overwhelm the ability of neighbors to take them in (Nelson, Adger, and Brown 2007).

3) **Limits to trial and error:** Third, while trial-and-error learning is clearly a central mechanism for adaptation, it also has limitations. These derive from the non-linear character of nature-society interactions that give rise to thresholds, tipping points, path-dependence, and the possibility of irreversible change (Anderies et al. 2013). All of these phenomena can make it difficult or even impossible to adapt by simply "returning to go" and trying something different (Steffen et al. 2018). Researchers have responded with efforts to build both better forecasting models for exploring such discontinuities and better metrics for providing early warning when development pathways approach them (Bury et al. 2021; Nijp et al. 2019). Results have been encouraging, but remain controversial and incomplete (Hillebrand et al. 2020; Martin, Schlüter, and Blenckner 2020).
4) **Short-termism:** Finally, research reveals a tendency of actors to prioritize adaptations that reduce immediate damages associated with acute shocks rather than ones addressing chronic conditions or long-term trends. This "short-termism" gives short shrift to proactive adaptations designed to address stresses that are foreseen but have not yet occurred (Biggs et al. 2012). Researchers are exploring ways to overcome this behavioral bias using scenario development and foresight analysis to build adaptive capacity over longer time horizons (Vervoort et al. 2014; Wiebe et al. 2018).

Together these findings indicate that adaptation is both urgent and difficult particularly for the poorest and most vulnerable communities. Scholarship suggests that efforts to build adaptive capacity must ensure that poor and vulnerable communities have the necessary resources and connections to adapt to distributive change while navigating the limits to trial-and-error learning and short-termism that make adaptation challenging.

## 3. Building Adaptive Capacity: A brief review of practice

In the realm of practice, much recent work on adaptation has been focused on the impacts of climate change. For this reason, climate politics has had an outsized influence on efforts to build adaptive capacity. In the 1980s and 1990s, many in the climate community were reluctant to discuss adaptation both out of concern that support for adaptation might come at the expense of mitigation (efforts to reduce the greenhouse gas emissions that cause climate change to begin with). Others were concerned that financial support for adaptation would constitute implicit acceptance of responsibility by countries responsible for the majority of historical greenhouse gas emissions (E. Lisa F. Schipper 2006).

The first decades of the 21st century saw a slow but steady increase in efforts to promote adaptation and build adaptive capacity, with growing consensuses in the global community that wealthy and developed nations bear responsibility to help vulnerable populations adapt to the changing Anthropocene. This shift made adaptation and adaption financing a central topic in international climate negotiations (IPCC 2022). 2015 was a watershed year for the global adaptation agenda, which saw the adaption of the 2030 Sustainable Development Goals (SDGs), the Paris Climate Agreement and the Sendai Framework for Disaster Risk Reduction, all of which enshrined adaptation as central to ongoing efforts to build a more just and sustainable future (United Nations 2015c, 2015a, 2015b).

Goals and strategies for adaptation have been adopted by actors from city governments to multi-national corporations (Araos et al. 2016; Uniited Nations Global Compact and UN Environment Programme 2012) and experiments in turning plans into action are now being regularly assembled from around the world and analyzed by organizations including the Global Center on Adaptation through its *State and Trends in Adaptation Reports* (https://gca.org/report-category/flagship-reports/), the UN Environment Program through its *Adaptation Gap Reports* (https://www.unep.org/resources/adaptation-gap-report ) and the UN's Global Platform for Disaster Risk Reduction through the organizing and reporting on its periodic *Sessions* (https://globalplatform.undrr.org/ ). Financial support needed for building adaptive capacity is also growing, but substantial gaps remain between the need for adaptation financing and available funding (UN Environment Programme 2022). Current geopolitical disruptions are also of course raising questions about the future of adaption financing (DeConcini, Rennicks, and Hyman 2024).

Yet designing and implementing adaptive interventions that effectively promote sustainable development goals—rather than merely perpetuating the status quo or worse yet deepening vulnerabilities—has proven difficult (Eriksen et al. 2021). A systematic review of more than 48,000 published case studies on past efforts to foster adaptation found fragmented results with little evidence of systemic risk reduction (Berrang-Ford et al. 2021). Scholars and practitioners of adaptation have coined the phrase 'maladaptation' to signal their growing concern that many efforts to build adaptive capacity have counterproductively increased vulnerability (Barnett and O'Neill 2010; E. Lisa F. Schipper 2020). And yet narratives of maladaptation have also led to a growing hesitance from donors to fund adaptation efforts that are clearly essential to helping the poorest and most vulnerable prepare for and respond to the increasing turbulence of the Anthropocene (E. L. F. Schipper and Mukherji 2024). Finding a pathway forward that integrates lessons from past missteps while continuing to link global support for adaptation with local needs is the challenge facing the adaptation practitioners moving forward.

## 4. Emerging Lessons from Practice and Scholarship

Efforts to build adaptative capacity have grown in number and scale over the past two decades, yet expert consensuses suggests that adaptative interventions regularly come up short—failing to achieve substantial reductions in risk and vulnerability, or worse yet exacerbating, reinforcing and redistributing risks to more vulnerable people and places (Berrang-Ford et al. 2021; Eriksen et al. 2021). As part of the C4SD research project, we are conducting interviews with practitioners and scholars to begin to distill and synthesize the lessons coming out of their work to date and point to directions forward for efforts to build and strengthen adaptive capacity. What we have learned is that building a sustainability-focused capacity to adapt will require substantial investments in local capacity to prepare ex-anti and respond ex-post to the growing turbulence of the Anthropocene. This local capacity however must be paired with multi-level support systems that invest in the physical infrastructure and nature-based solutions that can help reduce the impacts of shocks and disasters as well as the financial and organizational systems to support individuals and communities impacted by disasters. This multi-level approach must both mobilize financing while also ensuring that local efforts to adapt do not simply redistribute risk to other (often more vulnerable) people and places. Here are just four of the specific lessons

that have emerged from this research so that we believe are important for building capacity to adapt development pathways so that they better protect human well-being in the face of shocks.

1) **Address drivers of vulnerability:** An important part of adaptive capacity consists of work that preemptively addresses the drivers of vulnerability. Adaptive interventions whether arising locally or driven by international donors often reproduce existing vulnerabilities, redistribute vulnerabilities elsewhere, or introduce new and unexpected sources of vulnerability (Antwi-Agyei et al. 2018; Eriksen et al. 2021; Thomas and Warner 2019). The non-trivial number of maladaptive outcomes resulting from adaptive interventions stems at least in part from a tendency of adaptation projects to focus too narrowly on immediate consequences of disruptive change (by hardening infrastructure and developing technological solutions) while failing to address the underlying inequities that make certain communities particularly vulnerable to disruptive change in the first place (Bertana et al. 2022; E. Lisa F. Schipper 2022). Strategies to enhance adaptive capacity by reducing vulnerabilities can be as simple[4] as getting out of harm's way, e.g. through relocating key transportation infrastructure out of flood plains or "managed retreat" away from coastal zones subject to sea-level rise together with institutional reforms to regulate future use of such predictably vulnerable spaces. But strategies focused on reducing vulnerability can also be much more fundamental. A good example is provided by Bangladesh which has been at the forefront of efforts integrate adaptive capacity as part of the country's larger development and poverty-reduction strategy. This effort is articulated in their National Action Plan for adaptation which prioritizes vulnerable areas and aims to integrate adaptation planning into the country's broader development strategy (Ministry of Environment, Forest and Climate Change, Government of the People's Republic of Bangladesh 2022).

2) **Empower local actors:** Planned or top down interventions for building adaptive capacity have too often exacerbated power imbalances, reinforced existing inequities and led to the neglect of 'everyday' or 'autonomous' adaptations that local communities are already

[4] "Simple" to imagine, though certainly not to implement. The multiple components of adaptive capacity needed to implement such simple visions – components ranging from political savvy to technical expertise – are so complex and difficult to organize that we felt it important to develop a teaching case to explore how it was actually done in one county in the Pacific Northwest regions of the USA (Garcia-Rios, Varley, and Donahue 2009)

making to accommodate the shifting environments in which they work and live (Castro and Sen 2022; Islam et al. 2018). Failure to integrate everyday adaptations emerging at the local level into the design of top-down adaptation interventions, means that large-scale adaptation projects too often work at cross-purposes to existing community efforts to adapt to disruptive change (Zickgraf 2019). The failure to integrate top-down adaptation interventions with the priorities and work already being done by local communities to adapt has led to the overwhelming consensus that in order for the global adaptation agenda to avoid the mistakes of the past, it must be grounded locally with individuals and communities setting their own goals, exercising their own agency, and negotiating tradeoffs in ways that accommodate local constraints and support local visions for the future. In the Netherlands, the Room for the River project which was carried out between 2013 and 2018 aimed to create a safer river delta by giving the river more space to flood while also improving the quality of life for people in the area. But the program came with tradeoffs for local farmers who were losing land that the program aimed to 'give back to the river'. By involving local stakeholders from the start, local interest groups developed the innovative idea of building houses on small mounds of reclaimed land that would allow farmers to continue to live and keep their cattle on the land while ensuring it was still available as a flood plain when necessary. But ensuring that adaptation is locally led is easier said than done and requires institutional structures and financial systems that prioritize the agency and decision-making of local actors. The Global Commission on Adaptation has developed a set of principles for locally led adaptation, which have been endorsed by over 100 countries and organizations. These principles include, among others, devolving decision making to the lowest appropriate level, addressing structural inequities, and investing in local capabilities (Coger et al. 2022). Yet despite strong interest in locally led adaptation, most adaptation efforts still fail to structurally engage local communities in meaningful ways (M. F. Rahman et al. 2023).

3) **Embed across multiple scales:** While adaptation action must be grounded locally, adaptive capacity it must be embedded across multiple scales. This is essential both to mobilize the necessary resources to support adaptation in affected areas and to ensure that local efforts to adapt do not redistribute risks to others elsewhere. Growing experience bringing the tools of insurance to help vulnerable communities adapt to shocks has shown that building multi-

scale capacity requires developing metrics that are both locally appropriate and globally comparable. One good example is provided by the Kenya Livestock Insurance Program (KLIP), an index-based insurance program which aims to cushion pastoralists against the adverse effects of forage scarcity due to severe drought. Key to the success of KLIP was the development data sets aimed at identifying homogenous areas over key variables necessary for index-based insurance. This process drew on both globally comparable satellite data on forage availability as well as local information gathered through participatory mapping exercises on rainfall patterns, agroecology, migration patterns and social boundaries. Combining these two sources of data allowed KLIP to create more accurate geographic units to support payouts when drought over a given unit reaches pre-specificized thresholds, while still offering the private sector insurance companies the certainty they need to sell insurance products (Pelvin and Jones 2023).

4) **Acknowledge tradeoffs:** There are no one-size-fits-all solutions for building adaptive capacity (Cinner et al. 2018). Tradeoffs crop up between individual components of adaptative capacity: increasing investments in one livelihood strategy can decrease willingness and ability to diversify in the face of change; connections across sub-systems can facilitate adaptation, but they can also propagate disruptions such as disease epidemics or economic panics; strong social bonds within a community can be a source of adaptive capacity, but they can also lock groups into particular ways of thinking that prevent adaptation etc. These tradeoffs mean that the components of adaptive capacity must be balanced "Goldilocks-like" to make useful contributions in a given context. The need for balancing suggests that effective adaptive capacity requires close integration with other capacities we explore in this seminar series. These most immediately include the capacity to link knowledge with action (so as to illuminate likely trade-offs among possible adaptations) and the capacity to govern (so as to deliberative democratic choices among them). But other capacities surely matter as well, which is why this seminar series is seeking to foster an integrated perspective on capacity building for sustainable development (see Fig. 1).

Our intention is that the seminar series for which this working paper provides a foundation will provide further opportunity to refine (or refute) these lessons as well as to add new lessons we have not yet included.

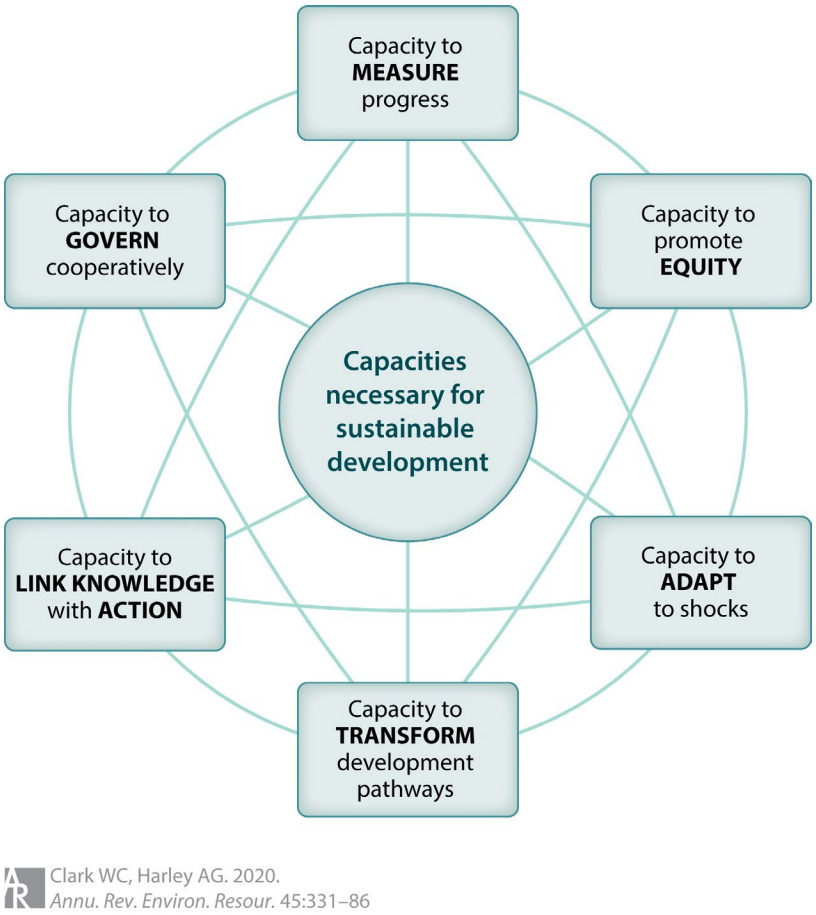


Figure 1: An integrated perspective on capacities for sustainable development. Six interdependent capacities are necessary for the successful pursuit of sustainability: (a) capacity to measure progress toward sustainable development, (b) capacity to promote equity within and between generations, (c) capacity to adapt to shocks and surprises, (d ) capacity to transform the system onto more sustainable development pathways, (e) capacity to link knowledge with action for sustainability, and ( f ) capacity to devise governance arrangements that allow people to work together in exercising the other capacities. Source: (Clark and Harley 2020)

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