Unit 3.4 Capacity to Adapt: How can societies mobilize resources to cope with unexpected shocks and changing conditions?

Adaptation has long been an important focus of research and practice in sustainable development. We define it as the ability to keep a system operating within its current regime and thus on something like its current development pathway in the face of potentially disruptive change. This distinguishes adaptation from transformation (see Unit 3.7), which involves shifting a system into a fundamentally different regime. From a systems perspective, adaptation often involves strengthening feedbacks that are "dampening" or "balancing" to maintain stability, while transformation requires "reinforcing" or "amplifying" feedbacks that push toward new states.

Adaptive capacity matters because development pathways in the complex adaptive system of the Anthropocene cannot be fully predicted in advance or managed without encountering surprise and disruption. Pursuing sustainable development therefore requires both "thinking through" the implications of available options as best we can, and "acting out" development as an experiment—implementing promising approaches, observing results, and adapting course as needed. Yet two decades of research reveal that while adaptation is everywhere — actors continuously respond to change through feedback processes — adaptation that genuinely reduces vulnerability rather than merely shifting it elsewhere remains frustratingly rare.

The scholarship on adaptation has produced several robust findings. First, while "richer is safer"—wealthier communities have more resources to cope with disruption—this refers not just to financial wealth but to the full portfolio of natural and anthropogenic resources that societies draw on to create well-being. For successful adaptation, communities benefit not only from plentiful resources but also from the agency to mobilize them effectively. Second, heterogeneity can enhance adaptive capacity by creating options for compensation and learning from others, but only when connections are appropriately managed; too-tight coupling propagates shocks universally while power imbalances shift risks onto vulnerable groups. Third, non-linear dynamics impose fundamental limits on trial-and-error learning through tipping points, path dependencies, and irreversible changes. Fourth, actors systematically prioritize responses to immediate acute shocks over chronic stresses, a "short-termism" that too often leaves communities perpetually reactive. These findings help explain why adaptation efforts so often result in "maladaptation"—interventions that reproduce existing vulnerabilities, redistribute risks to more vulnerable populations, or create new sources of fragility. This unit explores what science and practice have taught us about building adaptive capacity that reduces rather than redistributes vulnerability, empowers rather than marginalizes local actors, and navigates inevitable tradeoffs between immediate needs and long-term sustainability.

Preparation for class: To prepare for this unit, please:

a) **Read**: Harley, A. G., & Clark, W. C. (2025). *Building Capacity to Adapt Development Pathways to Protect Human Well-being in the Face of Shocks: Lessons from scholarship and practice* (Nos. 25–02; Sustainability Science Program Working Paper, p. 20). Harvard Kennedy School of Government. https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/programs/sustsci/files/Adaptation%20Capacity_SSP%20Working%20Paper_FINAL.pdf (Available in Course Library)
   This working paper synthesizes two decades of research and practice on building adaptive capacity, examining both why adaptation is essential for sustainability and why it has proven so difficult to do well.

b) **Read**: Eriksen, S., Schipper, E. L. F., Scoville-Simonds, M., Vincent, K., Adam, H. N., Brooks, N., Harding, B., Khatri, D., Lenaerts, L., Liverman, D., Mills-Novoa, M., Mosberg, M., Movik, S., Muok, B., Nightingale, A., Ojha, H., Sygna, L., Taylor, M., Vogel, C., & West, J. J. (2021). Adaptation interventions and their effect on vulnerability in developing countries: Help, hindrance or irrelevance? *World Development*, *141*, 105383. https://doi.org/10.1016/j.worlddev.2020.105383

This systematic review of adaptation interventions reveals the troubling frequency of maladaptation—cases where adaptation efforts fail to reduce or even increase vulnerability. As you read, consider what factors distinguish successful adaptation from maladaptation. Note that while this paper presents important critiques of current adaptation practice, scholars debate whether such critiques might inadvertently harm vulnerable populations by discouraging adaptation funding (see Schipper & Mukherji in the optional readings for a counterargument).

c) **Explore**: *Adaptation at Altitude: Solutions Portal*. (n.d.). Adaptation At Altitude. Retrieved October 12, 2025, from https://adaptationataltitude.org/solutionsportal/

Review 2-3 case studies of mountain communities adapting to climate change, selecting those with more comprehensive information (these will typically have longer descriptions, multiple sections covering implementation details, outcomes, and lessons learned). As you explore these cases, note what specific resources were mobilized, who led implementation versus who benefited, what barriers were encountered, and whether the interventions built long-term adaptive capacity or provided temporary relief.

d) Review: Return to the London teaching case from Unit 1.4, i.e. Matson, P., Clark, W. C., & Andersson, K. (2016). *Pursuing Sustainability: A Guide to the Science and Practice*. Princeton University Press. “London: The struggle for sustainable development in an urban environment” (pp. 143-165).

<u>Study Questions to help you get the most out of the readings</u>:

I. **Adaptation and Vulnerability in London:** Reading ‘a’ emphasizes that adaptation often shifts risks from one group to another rather than reducing overall vulnerability. The London case from Unit 1.4 describes how the city responded to increasing stench and health concerns they associated with backyard cesspits by eventually requiring all households to connect to sewers that discharged into the Thames, effectively creating "a common cesspool for all of London." This shifted indoor pollution to outdoors and concentrated waste downstream. Using the four lessons from reading ‘a’ — addressing vulnerability drivers, empowering local actors, embedding across scales, and acknowledging tradeoffs—analyze how this "solution" exemplifies the problem of risk redistribution in adaptation. What would a more sustainability-oriented adaptive response have looked like?

II. **Evaluate real-world adaptation efforts:** Select two adaptation interventions from the Adaptation at Altitude Solutions Portal (reading ‘c’) that provide enough information to analyze their approach and outcomes. Analyze what these cases reveal about building adaptive capacity in practice. Consider both what the interventions achieved and what challenges they faced. How do these real-world efforts align with, diverge from, or extend beyond what the academic readings suggest about effective adaptation? What do these cases teach us that the scholarship might be missing? Where do they fall short, and what explains those shortcomings?

III. **Your case:** Design an adaptation strategy for a specific shock facing your case community (drought, flooding, heat waves, economic volatility, etc.). Create a brief assessment framework (3-4 key questions) to evaluate whether your intervention would genuinely build adaptive capacity or risk maladaptation. Focus particularly on: how to address root causes of vulnerability rather than just symptoms, and how to ensure local communities have real agency in the adaptation process.

<u>Digging deeper (optional materials for further exploring frontiers in the pursuit of sustainability):</u>

e) **Explore**: *State and Trends in Adaptation: Report 2022*. (2022). Global Center on Adaptation. https://gca.org/reports/sta22/

Provides a comprehensive global assessment of current adaptation practices, financing gaps, and emerging trends, with particular focus on what's working and what's failing in vulnerable regions.

f) **Read:** Schipper, L., & Mukherji, A. (2024). Misguided negative adaptation narratives are hurting the poor. Science, 386(6722), 624–626. https://doi.org/10.1126/science.adq7821

This provocative commentary argues that academic findings about maladaptation are being weaponized to justify reducing adaptation funding, ultimately harming vulnerable populations. It offers an important counterpoint to the maladaptation literature, challenging readers to consider how critical research can be misused in policy contexts.

g) **Read**: Nelson, D. R., Adger, W. N., & Brown, K. (2007). Adaptation to environmental change: Contributions of a resilience framework. *Annual Review of Environment and Resources*, *32*(1), 395–419. https://doi.org/10.1146/annurev.energy.32.051807.090348

This comprehensive review synthesizes a large literature on how social-ecological systems respond to environmental change and remains foundational to contemporary adaptation scholarship.

h) **Read:** Kousky, C. (2019). The role of natural disaster insurance in recovery and risk reduction. *Annual Review of Resource Economics*, *11*(1), 399–418. https://doi.org/10.1146/annurev-resource-100518-094028

Examines how insurance mechanisms can both enable and constrain adaptation, exploring the tensions between using insurance for recovery versus risk reduction, and the challenges of making insurance work for vulnerable populations.