

# RESILIENCE

FOSTERING CAPACITY TO  
NAVIGATE SHOCKS, CHANGE  
AND UNCERTAINTY



Image: paolo-nicolello---0RlqBni6g-unsplash

CST POLICY BRIEF 2021 | R Biggs, C Pringle, N Sitas, H Clements, B Dube, M Hamann, W Malherbe, A Manyani, R Preiser, O Selomane, J Waddell

---

# INTRODUCTION

We live in an increasingly interconnected, turbulent, and uncertain world. Africa, in particular, is experiencing a number of very rapid, large-scale changes including urbanization, population growth, technological change, and various forms of environmental degradation.

At the same time, the region and the world are experiencing increasing shocks, including droughts, floods, fires, diseases such as the Covid-19 pandemic, food shocks and economic crises that propagate more rapidly and with greater geographic spread than in the past. These changes are complex and interrelated, and are key features of the Anthropocene - the geological era in which we currently live, where human activities profoundly shape the earth system, and where global systemic risks interact and are amplified.

These changes and shocks highlight the extent to which our economies and human well-being are dependent on and intertwined with the natural environment. Furthermore, it is apparent that the impacts of these changes and crises are disproportionately borne by vulnerable and marginalized groups, aggravating inequality, social tensions, and conflict. It is therefore increasingly clear that we cannot make substantial long-term progress in addressing environmental sustainability or poverty and inequality without accounting for the deep interlinkages between many environmental and social challenges. This calls for a social-ecological systems approach that focuses on understanding the complex interconnections between human activities, human well-being, and nature. It also calls for increased abilities or capacities that enable us to navigate shocks, change, and uncertainty as we work to transform our ways of living towards a more just and sustainable future.

## WHAT IS RESILIENCE?

Use of the term “resilience” has grown rapidly over the past two decades and is currently something of a buzzword.

It is used in a wide range of fields, including environmental and sustainability science, disaster risk management, climate change adaptation, urban planning, international development, engineering, business, and psychology, and in settings that include academia, UN agencies, local governments, NGOs, and international funders (Meerow & Newell 2015; Fraccascia et al. 2018).

As a consequence, a range of definitions of resilience have emerged and evolved over time. These include engineering-based definitions focusing on the ability to bounce back or withstand stress, ecological-based definitions that focus on the amount of disturbance that can be absorbed without fundamentally altering the structure and function of a system, and social-ecological systems definitions that focus on the capacity to navigate uncertainty, shocks, and change in order to contribute to sustaining or improving social-ecological outcomes (Folke et al. 2016; Walker et al. 2020).

As the concept of resilience continues to evolve rapidly and be used in different contexts and for different purposes, it is clear that there are a number of different ways in which resilience is being conceptualized. It is common for multiple conceptualizations of resilience to be used within the same project, which can be confusing as some of these conceptualizations conflict with one another. Three main conceptualizations are currently identified (Moser et al. 2019; Brand & Jax 2007):

1. Resilience as a value-neutral system property or characteristic that describes the ‘stickiness’ of a system, where resilience is neither good nor bad;
2. Resilience as a desired outcome or goal of governance and management, often used by development and government agencies, where it is clearly a normative or ‘good’ outcome;
3. Resilience as a negotiated and contested process of building a pathway towards a more desirable future.

Closely related to this is resilience thinking as a complex systems-based worldview and approach to engaging and studying social-ecological systems and facilitating change towards sustainability.

Despite the plethora of definitions and conceptualizations, there is an emerging convergence toward definitions focusing on resilience as the ability or capacity to respond to a shock or disruption, as well as slower change, in order to facilitate or ensure desired outcomes (Manyena et al. 2019). This shift reflects an increasingly normative focus, as the desired outcomes are often multi-dimensional and value-laden, such as equity, food security, or well-being. It also raises important questions of who defines the desired outcomes and who benefits and losses: “Resilience of what to what, and for whom?” (Helfgott 2018). Resilience is therefore increasingly seen as a political and contested outcome that needs to be negotiated (Harris et al. 2018).

---

## Social-Ecological Resilience

The capacity to anticipate, respond, adapt, or transform in response to shocks, uncertainty, and change, especially novel systemic changes, in order to facilitate desired outcomes.

---



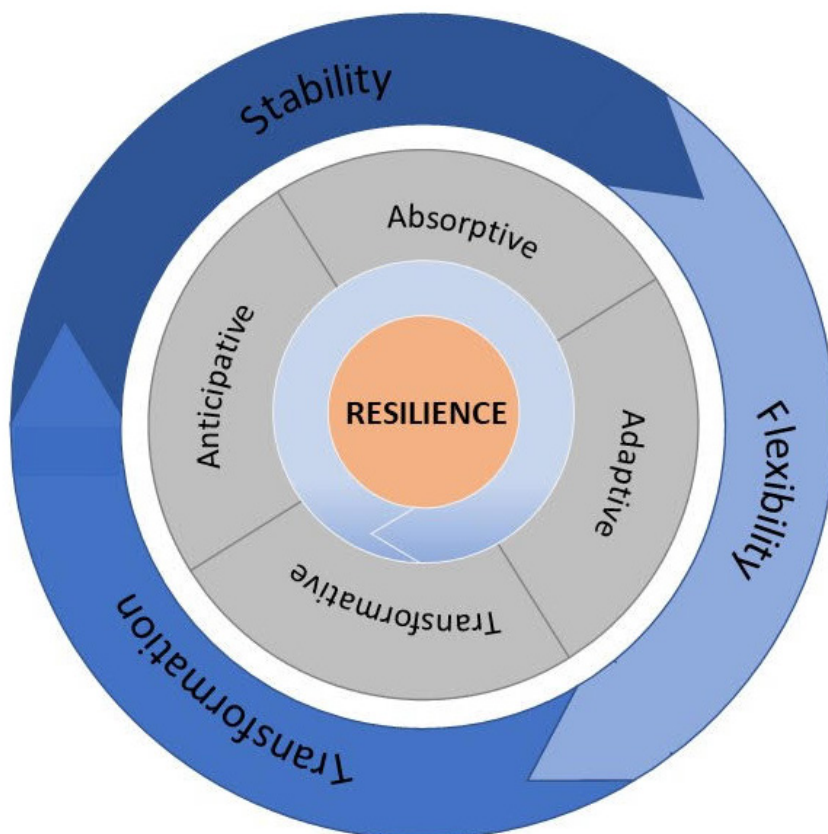
Image: melvin-ankran-WVBY6GntAGw-unsplash

# STRATEGIES FOR FOSTERING RESILIENCE

Four key capacities that underlie resilience include absorptive, adaptive, transformative, and anticipatory capacities.

Strategies that aim to enhance resilience typically do so by fostering one or more of these underlying capacities or abilities (Béné et al. 2014; Jeans 2017):

1. **ABSORPTIVE CAPACITY:** the capacity to recover from, moderate, or buffer the negative effects of a disturbance or change, or to 'bounce back' in order to ensure stability and persistence. Strategies that focus on fostering absorptive capacity usually focus on reducing exposure, minimising impact, or shortening the recovery time after a shock. For example, through systems that protect natural and physical capital, the expansion of social networks, or legal and policy frameworks that enable effective disaster risk reduction.
2. **ADAPTIVE CAPACITY:** the capacity to adapt and change in response to a disruption or adjust to ongoing change. Strategies that focus on building adaptive capacity tend to focus on incremental adjustments. For example, the use of different cultivars to mitigate the potential effects of crop diseases or investment in more efficient technologies.
3. **TRANSFORMATIVE CAPACITY:** the capacity to fundamentally change the interlinked ecological, economic, or social processes and structures that lead to undesirable outcomes, often requiring deep changes in structures and power imbalances that are rooted in culture and expressed through policies, management, and social practices. Strategies that build transformative capacity focus on addressing systemic challenges or creating better access to opportunities. For example, long-term engagements to reduce poverty reduction.
4. **ANTICIPATORY CAPACITY:** capacity to anticipate change to known and unknown shocks and disturbances, acknowledging the uncertainty inherent in complex evolving systems. Strategies that focus on building anticipatory capacity allow actors to prepare for and respond to shocks and changes. Anticipatory capacity can facilitate absorptive, adaptive, and transformative responses through better understanding and anticipation of potential known, unknown, and entirely novel changes. For example, scenario planning approaches or early warning systems.



*Resilience is underpinned by four interconnected capacities: absorptive, adaptive, transformation, and anticipatory capacities. These capacities confer a mixture of stability, flexibility, and transformation that enable a system to navigate shocks, change and uncertainty.*

Some strategies focus on specified resilience, while others aim to build general resilience. Specified resilience refers to resilience to particular shocks (e.g., droughts, floods), while general resilience refers to the capacity to deal with multiple different shocks and changes, including novel and unknown changes. In the Anthropocene context, there is increasing emphasis on general resilience and on taking a broad systems approach that considers both human well-being and environmental outcomes (i.e., building social-ecological resilience).

Social-ecological resilience can be fostered at multiple levels, ranging from the individual to the community, to regional, national, and global levels. The strategies applied at these different levels can range from actions by individuals, to municipal or community initiatives, to national or regional actions coordinated across different government departments and the non-governmental sector, to international strategies and agreements that aim to support responses across the interconnected social, economic, and environmental domains. The strategies employed by actors, ranging from individuals to international coalitions, will depend on the resources to which they have access, and on the magnitude, duration, and intensity of a shock or change (Béné et al. 2016).

## Lessons in building resilience from Oxfam projects

A recent analysis of Oxfam projects indicate that they have been effective in building multiple resilience capacities, but overall show most improvement in building absorptive capacity.

Interventions that enhance absorptive capacity include 'quick wins' such as the establishment of early warning systems, but also include more difficult medium-term interventions, such as access to savings and contingency resources. Furthermore, Disaster Risk Reduction (DDR) can be an entry point for building multiple capacities. For example, the establishment of a flood early warning system and community disaster risk management groups can be integrated into development planning that ultimately also enhances absorptive and transformative capacities.

The analyses further indicate that absorptive and adaptive resilience capacities can be built simultaneously. Transformative capacity is slightly trickier, as the conditions for transformational change must be included within the design of the project to be most effective. Creating the conditions for bringing excluded groups into decision-making is key to promoting empowerment and to tackling the social, political and institutional barriers that transformative capacity aims to challenge.

However, this is not a fast process, and interventions need to recognise and promote changes that need to continue even after the project has ended.

It may also be that transformation cannot occur without a certain threshold of wellbeing, as people are less likely to attempt to engage in innovations or get involved in higher level politics if they cannot meet their basic needs.

Source: Bahadur et al. 2016.



Image: annie-spratt-wtk4VH8EU20-unsplash

# PRINCIPLES FOR FOSTERING RESILIENCE

Looking across a wide variety of strategies that have been implemented to foster resilience in social and environmental systems, a number of commonalities or general principles for fostering resilience in social-ecological systems emerge.

These principles draw on theoretical understanding of the complex nature and behaviour of social-ecological systems and can be applied with respect to all the capacities highlighted above. Biggs et al. (2012, 2015) identified **7 key principles or system attributes** that can be managed to build resilience in intertwined social-ecological systems. A number of recent papers identify additional factors including inclusivity, reflectiveness, flexibility, leadership, and trust (Walker 2020; Moser et al. 2019; Cinner & Barnes 2019). There is also increasing work on how participatory processes contribute to building resilience, recognizing that building resilience is a process of negotiation that requires iterative engagement with diverse actors and interests across multiple scales (Harris et al. 2018).

## Fostering resilience of Protected Areas

Protected Areas (PAs) are the major global strategy for conserving biodiversity and provide a range of ecosystem services that are important for human well-being. PAs are created by people for people, and are embedded in political, social and economic contexts. They are therefore social-ecological systems, and the fates of the ecosystems they are intended to protect are intricately connected to the needs and values of people. PAs are exposed to changes that could erode their resilience. These include local changes such as the transformation of land around PAs, poaching, introduction of alien invasive species and spread of disease; as well as broader-scale influences such as climate change, volatile tourism markets and political unrest. To build their resilience it is therefore imperative to understand what influences their capacity to achieve their objectives in a changing world.

The seven principles can be used to consider what elements of a network of PAs (e.g., a network of national parks) are important for building their resilience. Ecological **diversity** (in genes, species, ecosystems) is important because it contributes diversity in how species and ecosystems will respond to change. Similarly, diversity in management and revenue-generating strategies promotes diversity in responses to change, and thus the likelihood that some responses are effective. Recognizing the importance of ecological **connectivity**, PAs are increasingly being planned and managed to function as networks that facilitate the movement of species, enabling them to function as “stepping stones” to facilitate

the migration, dispersal and genetic exchange of species, and movement in response to changing climates. Socio-economic connectivity also matters; establishing management collaborations between PAs can provide opportunities for learning, sharing knowledge and equipment. It is also imperative that PA managers identify and monitor important **slow-changing variables** (e.g., vegetation composition, groundwater flow or political support) that are often overlooked in PA monitoring and management but are ultimately critical for maintaining PA resilience.

PA management based on an **understanding that humans and ecosystems interact in complex and dynamic ways** can have increased capacity to cope with change. Such an understanding necessitates **learning and experimentation and broad participation** in decision-making. The need for broad participation in PA management and decision-making (particularly historically excluded stakeholders) is gaining increasing prominence. Multiple institutions involved in PA governance at different scales (local, regional, national) can facilitate knowledge-sharing, learning and collective action in response to change. This **polycentric governance** can enable local governance to step in when broader institutions fail and vice versa, and can improve alignment of governance, management and ecological scales. Ultimately, building resilience in PAs and the services they provide depends on building resilience in individual PAs, regional and national PA networks, as well as the institutions that manage and govern these systems.

# Seven principles for building resilience in social ecological systems



**1. Maintain diversity and redundancy:** Systems with many different components (e.g., species, actors, or sources of knowledge) are generally more resilient than systems with few components. Redundancy provides 'insurance' within a system by allowing some components to compensate for the loss or failure of others. For example, planting a diversity of crops can ensure that livelihoods are sustained if a particular crop is affected by disease.



**2. Manage connectivity:** Well-connected systems can overcome and recover from disturbances more quickly, but overly connected systems may lead to the rapid spread of disturbances across the entire system so that all components of the system are impacted. For example, connecting patches of remaining natural habitat through vegetation corridors can increase population viability, especially for larger mammals.



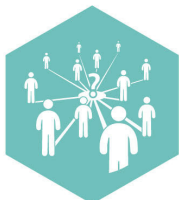
**3. Manage slow variables and feedbacks:** Managing slow variables and feedbacks is important for avoiding unwanted tipping points that can be extremely difficult to reverse. For example, regulations that limit fishing can help prevent sudden fisheries collapse triggered by overfishing.



**4. Foster an understanding of complex adaptive systems:** A complex systems understanding may enhance resilience by emphasizing the need for more integrated approaches, the importance of continual learning, and awareness of the pervasiveness of uncertainty. For example, participatory dialogues that engage multiple perspectives to understand a particular system or issue can help foster such understanding.



**5. Encourage learning and experimentation:** Learning about social-ecological dynamics through experimentation and monitoring is essential for enabling adaptation in response to system changes. Importantly, however, learning requires trust and appropriate relationships and institutions to flourish.



**6. Broaden participation:** Participation builds trust and relationships and facilitates the learning and collective action needed to respond to change and disturbance. However, a nuanced understanding is needed of who participates, under which conditions participation is appropriate, and how participation takes place.



**7. Promote polycentric governance systems:** Collaboration across institutions and scales improves connectivity and learning, and helps enable swift responses to change and disturbance. Polycentricity provides a governance structure that enables the other principles, especially learning and experimentation, participation, and providing redundancy. However, coordination among governance units, social capital, and trust are essential for effective polycentric arrangements.

Source: Biggs et al. 2012, 2015



Image: murad-swaleh-7tDidSXbgD8-unsplash

# TOOLS AND RESOURCES

There are a wealth of tools and resources available to support resilience practice.

Most resilience building approaches are highly participatory and entail a shared process of sense-making and learning with key actors in a system (e.g., Wayfinder process). A compilation of case studies and tools particularly relevant for the southern African context can be accessed at the Southern African Resilience Hub (<https://reshubafrika.org/>)



**Wayfinder** is a process guide for resilience assessment, planning, and action in social-ecological systems, which consists of five phases (Enfors-Kautsky et al. 2021). Starting by building a coalition for change that can lead the process, you move on to create a shared understanding of the identity of your system, explore system dynamics, develop strategies for change, and implement these through a learning-by-doing approach that enables you to collectively 'learn your way forward' towards a more sustainable future.

## FURTHER READING

Bahadur A, Lovell E, Pichon F. 2016. Effectiveness in Building Resilience. Oxfam Research Report.

Béné C, Wood RG, Newsham A, Davies M. 2012. Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes. *IDS Working Papers* 405: 1-61.

Béné C, Newsham A, Davies M, Ulrichs M, Godfrey-Wood R. 2014. Resilience, poverty and development. *Journal of International Development* 26: 598–623.

Béné C, Headey D, Haddad L, von Grebmer K. 2016. Is resilience a useful concept in the context of food security and nutrition programmes? Some conceptual and practical considerations. *Food Security* 8, 123–138.

Biggs R et al. 2012. Towards principles for enhancing the resilience of ecosystem services. *Annual Review of Environment and Resources* 37: 421-448.

Biggs R, Schlüter M, Schoon ML (eds). 2015. *Principles for building resilience: sustaining ecosystem services in social-ecological systems*. Cambridge University Press.

Brand FS, K Jax. 2007. Focusing the meaning(s) of resilience: resilience as a descriptive concept and a boundary object. *Ecology and Society* 12(1): 23.

Brown K. 2016. *Resilience, development and global change*. Routledge, London, UK.

Carpenter S et al. 2012. General resilience to cope with extreme events. *Sustainability* 4: 3248 – 3259.

Cinner JE & Barnes ML. 2019. Social Dimensions of Resilience in Social-Ecological Systems. *One Earth* 1(1): 51–56.

Enfors-Kautsky E, Järnberg L, Quinlan A, Ryan P. 2021. Wayfinder: a new generation of resilience practice. *Ecology and Society* 26(2):39.

Folke C. 2016. Resilience (Republished). *Ecology and Society* 21(4):44.

Folke C, Biggs R, Norström AV, Reyers B, Rockström J. 2016. Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society* 21(3): 41.

Fraccascia L, Giannoccaro I, Albino V. 2018. Resilience of complex systems: State of the art and directions for future research. *Complexity* 2018: 3421529

Harris LM et al. 2018. Negotiated resilience. *Resilience* 6(3): 196-214.

Helfgott A. 2018. Operationalising systemic resilience. *European Journal of Operational Research* 268(3): 852-864.

Jeans H, Castillo GE, Thomas S. 2017. *The Future is a Choice: Absorb, adapt, transform Resilience Capacities*. Oxfam Working Paper.

Manyena B, Machingura F, O'Keefe P. 2019. Disaster Resilience Integrated Framework for Transformation: A new approach to theorising and operationalising resilience. *World Development* 123: 104587

Meerow S, Newell JP. 2015. Resilience and Complexity: A Bibliometric Review and Prospects for Industrial Ecology. *Journal of Industrial Ecology* 19(2): 236–251.

Moser S, Meerow S, Arnott J, Jack-Scott E. 2019. The turbulent world of resilience: interpretations and themes for transdisciplinary dialogue. *Climatic Change* 153: 21-40.

Walker B. 2020. Resilience: What it is and is not. *Ecology and Society* 25(2): 11.

FOR FURTHER INFORMATION PLEASE CONTACT: CENTRE FOR SUSTAINABILITY TRANSITIONS

Stellenbosch University, Private Bag X1, The Stables at 19 Jonkershoek Road, Stellenbosch, South Africa

Tel: +27 21 808 9607 | Website: [www0.sun.ac.za/cst/](http://www0.sun.ac.za/cst/)