Key principles for applying
a metacoupling framework

Systems thinking- understand social and ecological connections

- Identify the social-ecological systems boundary of interest
- Understand the interconnections between social and ecological dimensions
- Zoom in and out: consider multiple scales 'below' and 'above' your scale of interest

Foreground social justice and equity

- Identify different dimensions of equity in the SES
- Explore vulnerability contexts using an intersectional lens to understand where power mediates SES connections

Ensure more participatory decision-making and collaborative implementation

- Encourage diverse actors to work together across boundaries
- Disrupt inequitable power dynamics and co-develop holistic solutions that consider the interconnectedness of challenges and opportunities
- Collaboratively implement responses across sectors and scales
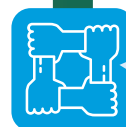
Identify leverage points

- Understand that small shifts in the right place can result in big changes
- Embrace and try to map out the complexity
- Accept that solutions might lie outside your system of interest

Foster adaptive planning and management

- Embed a continuous monitoring, reflection and learning culture in project activities
- Adopt participatory planning methods that involve diverse actors in the co-creation of management plans
- Establish learning networks for sharing knowledge and experiences

Systems thinking – understand social and ecological connections

■ **Identify the social-ecological systems boundary of interest**
There are many tools to help choose boundaries, but not all of the can operate at various (often distant) scales. Metacoupling helps to effectively define system boundaries by asking the questions about the social dimensions/processes and ecological dimensions/processes involved.

■ **Understand the interconnections between social and ecological dimensions**
It is important to understand not only the individual social and ecological aspects of a system, but also the interactions between them. For example, agricultural productivity depends on both social and natural inputs, and the interplay between these inputs can produce sustainable or unsustainable outcomes (e.g. over fertilisation leading to poor soils, or desertification leading to poor productivity). Metacoupling helps to determine the manifestation of a flow (material or nonmaterial) connecting social and ecological dimensions.

■ **Zoom in and out: consider multiple scales 'below' and 'above' your scale of interest**
The influence of faraway actors on the local system (e.g. through demand for goods facilitated by trade) could be better considered inside/as part of, rather than external to the system (from exogenous to endogenous). This consideration is important for making decisions about the impacts of the connectivity, and the potential actors to involve in resolving the challenges manifesting on the ground. For example, people and nature in an adjacent system might be directly impacted by activities in the intrasystem, but not necessarily directly by those in a telecoupled system.

Foreground social justice and equity

Our understanding of equity and justice has evolved from a predominant focus on the distribution of benefits, to also considering representation and participation as well as the broader context enabling or hindering equity.

■ **Identify different dimensions of equity in the SES**
A metacoupling lens can be helpful in identifying 'inequity opportunities' (i.e. places to look for inequity within and beyond a single system), by explicitly naming the different linked systems for consideration. With these identified, questions can be asked about the actors in each of the systems and how they link to one another. For example, equity in a telecoupled system (distant coupling) might be driven by global dynamics (e.g. global retailers setting prices and farmers in a sending

system being price takers). Or, in a pericoupled system (adjacent coupling), it might be driven by the natural flow of a river (e.g. those upstream are advantaged while downstreamers are inevitably disadvantaged and at the mercy of the upstream use, unless effective regulations are in place). The explicit naming of linked systems is also helpful to identify how inequities between Systems A and B, might increase inequities between Systems B and C (System A demands more product from System B through trade; System B uses more water to grow products for System A, and making water less available for System C). Identifying the different dimensions of how equity plays out in these processes can assist with understanding key leverage points/ places to intervene.

■ **Explore vulnerability contexts using an intersectional lens to understand where power mediates SES connections**
Exploring vulnerability contexts demands an intersectional lens, delving into the interconnections of social, economic, and environmental factors. By understanding the interplay between various dimensions such as gender, ethnicity, and socioeconomic status, one can unveil how power dynamics mediate these connections. This approach recognises that vulnerabilities are not isolated but shaped by intersecting identities. Examining where power influences SES connections can unveil disparities, inform equitable interventions, and enhance resilience. This approach acknowledges that vulnerability is nuanced, requiring comprehensive analyses to address the multifaceted challenges faced by marginalised communities within the broader context of value chains operating across scales.

Ensure more participatory decision-making and collaborative implementation

Inclusive governance can be strengthened by approaches that acknowledge the interconnectedness of challenges but also opportunities and that every actor in the system has a role and responsibility to foster more just and sustainable systems.

■ **Encourage diverse actors to work together across boundaries**
By fostering transdisciplinary and cross-sectoral partnerships, actors and organisations can harness a range of perspectives, expertise, experiences and resources that can be pooled for collaborative implementation of activities. Participatory engagement can also assist with disrupting inequitable power dynamics and help to co-develop holistic solutions that consider the interconnectedness of challenges and opportunities.

- **Adopt participatory planning methods that involve diverse actors in the co-creation of management and/or engagement plans**
Involving diverse actors in the co-creation of management/or engagement plans fosters inclusivity and considers varied perspectives. This collaborative approach enhances the relevance and success of initiatives, ensuring that any strategy/ activity aligns with the needs, values and aspirations of the communities they impact.

- **Collaboratively implement responses across sectors and scales**
Addressing complex problems often requires interventions at multiple scales and within diverse sectors which include responses from private, public and civil sectors of society that integrate a range of socio-political response options that can facilitate with breaking down siloed implementation e.g. addressing both on-farm activities by understanding agricultural, hydrological, ecological and social features involved in farming export fruit and how foreign retailers can support more socially and environmentally just practices.

Identify leverage points

Leverage points, or places to intervene in a system, are defined as places within a complex system (a business, a value chain, a community, a city, or an ecosystem) in which a small shift can result in big changes in significant areas of interest in a system.

- **Understand that small shifts in the right place can result in big changes**
Using a systems approach for understanding where change needs to happen can unlock opportunities where a small shift in a system e.g. the introduction of a new policy or incentive mechanism can have cascading impacts for people and nature. Here futures thinking and scenario work can assist with understanding the ripples of change and whether additional measures are needed to minimise future and unanticipated tradeoffs that could enhance or entrench inequities. Futures thinking coupled with a metacoupling approach can assist with ensuring any anticipatory work considers important feedbacks and flows across scales.

- **Embrace and try to map out the complexity**
Because the systems we work with are complex (involve social and ecological process as well as the interactions within and between them), it can be difficult to discern the most effective areas to intervene. There are many systems mapping tools

which describe and quantify interactions, which have been used in many disciplines but these do not always include actors. The explicit focus of metacoupling on actors means that the leverages we identify are linked to the people responsible for addressing or implementing them (e.g., "key stone actors" who might not be directly visible but control large scale processes so that getting them to change will likely change the entire system). In some cases, it is about targeting individual behaviour, and in other cases, about changing a regulation that then unlocks previously unavailable opportunities.

- **Accept that solutions might lie outside your system of interest**
By understanding where change needs to happen can result in finding out that interventions to create change might lie outside the initial boundaries of the system you might initially be working in e.g. intervening in value chains may require understanding and engaging in European Union policies. Fostering new strategic collaborations through civil society or solidarity networks e.g. unions or non-governmental organisations can assist with amplifying and scaling solutions.

Foster adaptive learning and reflection

Fostering adaptive planning and management in the governance of metacoupled SES is crucial for addressing the dynamic and complex challenges associated with ensuring just, accountable and sustainable value chains.

- **Embed a continuous monitoring, reflection and learning culture in project activities**
Regularly assessing progress, reflecting on outcomes, and fostering a culture of adaptability ensures responsiveness to challenges as they arise. This iterative approach enhances project effectiveness, identifies areas for improvement, and promotes dynamic, learning-driven co-management of shared resources

- **Establish learning networks for sharing knowledge and experiences**
Co-developing learning networks is vital for knowledge exchange and co-production and collaboration. These networks facilitate the sharing of insights and experiences among diverse stakeholders. By creating a platform for collective learning, organisations can enhance their adaptive capacities, promote innovation, and address complex challenges based on diverse evidence and learning.

SARA's work towards building equitable resilience in Southern Africa

Since 2022, the Southern African Resilience Academy (SARA) has supported collaborative working groups to pursue inter- or transdisciplinary synthesis research under the guiding theme of "**Building equitable resilience in Southern Africa**".

This is in line with SARA's role as a convening and support space for researchers and practitioners working across Southern Africa to engage around pressing resilience and development challenges in the region.

SARA is an initiative of the Global Resilience Partnership (GRP), with support from the Swedish International Development Cooperation Agency (Sida). The academy's goals are to strengthen existing expert networks, expand collaboration, and facilitate the co-production of policy and practice-relevant knowledge.

Through its links with other regional networks, SARA aims to contribute directly and meaningfully to regional and global policy discussions around resilience and development, and elevate the Southern African voice in international fora.

SARA is coordinated by the Centre for Sustainability Transitions (CST) at Stellenbosch University in South Africa. It is co-funded by the South African Research Chair in Social-Ecological Systems and Resilience.

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WORKING GROUP:
Enhancing equity and resilience in an interconnected world

Getting a good grasp of how resources are allocated in place for example, may seem to be entirely dependent on laws, norms and governance decisions of the place in question. But outside factors can sometimes play an outsized role in these decisions. For example, growing decisions in a farming community might be driven by demand in faraway and seemingly unconnected places. Equity and resilience are generally viewed through a place-based lens, which offers important context-specific insights. However, the awareness that external factors also play a crucial role in shaping local dynamics and equity outcomes is challenging the completeness of this narrative. The concept of "metacoupling" addresses the interconnections and interdependencies of social-ecological systems at multiple scales which span the local, neighbouring, and global. Applying a metacoupling framework can help to deepen our understanding of the complex relationships between systems and the flow of resources, benefits, and impacts across scales. It can also be used to spotlight the multiple sources of power and associated dynamics that constrain access to resources and opportunities thereby creating or perpetuating inequities.

This working group, comprising of researchers and practitioners, uses a metacoupling framework to explore the multiple dimensions of (in)equity in three southern African case studies linked to export horticultural value chains and transboundary fisheries. Our approach draws attention to the power dynamics and disparities present in the value chains of the agricultural commodities and fisheries that are traded between local and global systems. In so doing, we aim to demonstrate how a greater focus on cross-scale connections can be used to identify key leverage points for fostering resilience and equity and how to empower local actors in an increasingly globally connected world.

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