11

The adaptive systemic approach: equitable co-design and partnerships for sustainable multi-use rangelands in Tanzania, Ethiopia, and South Africa

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Key words: complex social-ecological systems; rangeland co-operation; strategic adaptive management.

Abstract

Building effective equitable partnerships and implementing co-designed projects and/or interventions to sustain multi-use rangelands, takes time, sustained commitment, and resources. There are pitfalls. Teams in three African countries used the collaboratively developed Adaptive Systemic Approach (ASA) to navigate these processes. We present a summary of the ASA and findings from its application. Key ASA strengths included: partnership building; enabling co-design; and capacity building through transformative social learning (explicitly respecting and integrating different knowledge forms: academic, practice-based, indigenous). We identify pitfalls: inadequate capacity building across academic disciplines, patchy facilitation skills, process discontinuities (e.g. changing representative participants), inattention to language and translation, power imbalances, and experiences of disrespect. We present adaptations to mitigate pitfalls. In all three contexts we aimed to move towards increased capacity for participatory governance, and an increased likelihood of improved rangeland condition and sustainable livelihoods. 1) The Great Ruaha River catchment (Tanzania), exemplifies challenges related to unequal water resources sharing, and ongoing contestation among competing water users, including communal livestock farmers, crop farmers and other community members. ASA engagements included these marginalised groups, addressed longstanding power imbalances, and set the groundwork for future collaborations. 2) Current vegetation cover in the Upper Blue Nile River basin (Ethiopia) reflects a complex interplay of human activities including grazing, cultivation, and selective fodder cutting; interwoven with the influences of climate, soil, and geology. A long-term restoration initiative in the Aba Gerima and Debre Yaqob catchments focusses on managing vegetation cover and the balance of woody plants and grasses. Using the ASA, communities in the two catchments co-developed strategies for rangeland and livelihood sustainability. 3) In the Tsitsa River catchment (South Africa) the appointment of eco-rangers, and early steps towards agreements for rotational grazing of multi-owned herds, in the degraded free-range communal rangeland, emerged from participatory ASA processes.

Introduction

Across Africa, rangelands are used by people with livestock for cultural, economic and food production purposes (Homewood 2004). As competition for rangeland use increases, contestation emerges (Samuels et al. 2021). It

takes time, sustained commitment, and resources to build effective equitable partnerships and implement co-designed projects and/or interventions that catalyse change towards social justice and ecological sustainability - social-ecological justice (Wolff et al. 2019). There are pitfalls. We consider contexts in three African countries, two where livestock grazing has impacted vegetation cover, rangeland health and livelihoods, and one where livestock owners are scapegoated for water scarcity problems. In each context we applied the Adaptive Systemic Approach (ASA)(Palmer et al. 2023, Palmer and Tanner 2024). We qualitatively evaluated the indicators: partnership building; enabling co-design; effective communication; and developing participatory governance capacity and capabilities through transformative social learning. We discuss the implications of practising the ASA in rangeland management and restoration.

Methods

The Adaptive Systemic Approach (Palmer et al. 2023) (Figure 1) emerged from the literature on Adaptive Management (Allen and Garmestani 2015), the emergence of Strategic Adaptive Management (SAM) (Rogers and Luton 2011), and practice in the Tsitsa River catchment (Cockburn et al, 2018) - that included participatory monitoring, evaluation, reflection, and learning (Rosenberg and Kotschy 2020).

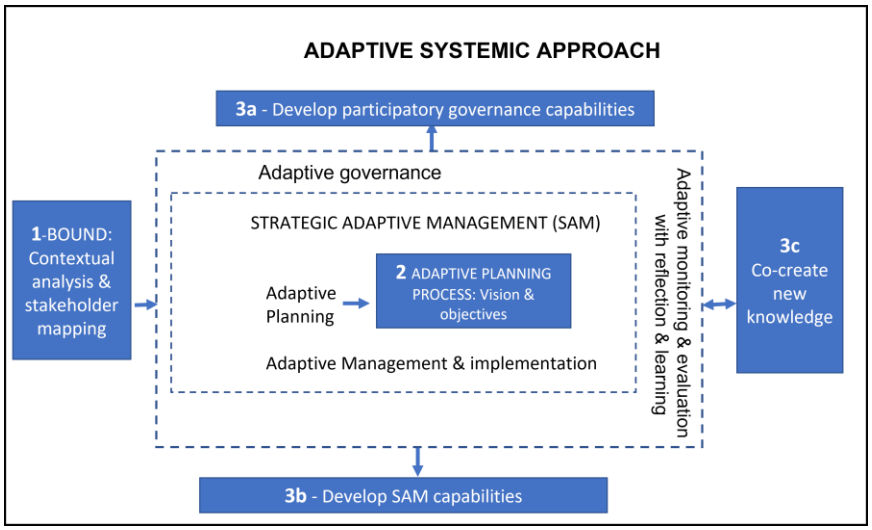

Figure 1. The Adaptive Systemic Approach (ASA) (1-3) begins with a contextual analysis termed "Bound" because systems have porous boundaries, influencing and being influenced by neighbouring systems. The Bound phase **(1)** includes early stakeholder mapping and engagement. Strategic Adaptive Management (SAM) was built on the tradition of adaptive management, with strategy conferred by an Adaptive Planning Process (APP) **(2)**. When the ASA was developed, SAM did not include governance, or monitoring and evaluation with reflection and learning. The first participatory ASA event is a facilitated SAM Adaptive Planning Process (APP) workshop **(2)**, where stakeholders experience participation, and begin a journey of participatory governance capability development **(3a)**. The APP gives rise to an objectives hierarchy – the blueprint for strategically and adaptively managing a system. SAM can be used to manage a problem being faced collectively by stakeholders, and also in the management of their home institutions. The ASA initiates the development of SAM capabilities **(3b)**. Concurrently, additional research into the collective problem may be undertaken, and in all participatory engagement stakeholders learn from each other (transformative social learning) – fostering the ongoing co-creation of new knowledge **(3c)**. Adaptive monitoring and evaluation, with reflection and learning is applied in each of the ASA activities, including facilitation planning and debriefing.

The full ASA was applied in Tanzania and Ethiopia. In South Africa, it was applied in the earlier Tsitsa River catchment forum (Cockburn et al. 2018). Detailed engagement data are curated at the Institute for Water Research, Rhodes University, South Africa. Here, we qualitatively assessed the key features of ASA practice claimed by Palmer et al. (2023): *Partnership building, Developing participatory governance capacity and capabilities, Transformative social learning and Enabling co-design;* in the three country-based case studies. Outcome achievement was judged as 1) minimal, 2) moderate, or 3) substantive.

Results

Tanzania: Ruaha River catchment in the Rufiji River basin

The Ruaha River catchment, Tanzania, is characterised by inequitable water sharing, and ongoing conflict among competing water users that include expanding towns, large- and small-scale farmers in the Usangu plains; pastoralists and fisherfolk in seasonal wetlands and in the Ihefu permanent swamps; and the wildlife ecosystems of the Ruaha National Park. The Ruaha River also sustains electricity production at the Mtera and Kidatu hydropower plants, with new hydropower development planned. Among these, small-holder irrigation and mobile pastoralists were blamed for reduced streamflow.

Partnership building, Developing participatory governance capacity and capabilities, and Transformative social learning were moderate among the wide spectrum of participating stakeholders. Analysis of participant reflections indicated intractable power differences despite evident co-learning and knowledge exchange among stakeholders. Continued application of the ASA would aim for slow trust-building, and data sharing to demonstrate the level of inequity, and the low level of threat from smaller resource users, in comparison to large-scale agriculture and hydropower. In the Ruaha, water-use conflict is more intense than rangeland-use conflict for livestock owners, and delinking grazing impact from water use would be helpful. *Enabling co-design* was minimal in the timeframe of the research engagement.

Ethiopia: Aba Gerima and Debre Yacob sub-catchments in the Upper Nile River basin

Landscape restoration activities, with restricted grazing and delivery of rangeland forage by "cut and carry" enabled livestock production and rangeland recovery (Feoli et al. 2002). Restoration practices were more rigorously maintained in Aba Gerima. The ASA Adaptive Planning Process workshop enabled the two catchment communities to meet, collaborate and learn from each other. They co-developed a vision and objectives that included a renewed commitment to cut and carry, to support livestock and rangeland improvement in both sub-catchments.

Partnership building, Developing participatory governance capacity and capabilities, Transformative social learning and Enabling co-design were all substantive at the scale of communities in the two sub-catchments interacting with each other and with researchers. These indicators were progressed in the preparation for, and facilitation of the Adaptive Planning Process workshop. Clear objectives for community livestock and landscape restoration and sustainable management were agreed. Progress in all these indicators was minimal at the scale of community-government engagement. The most immediate reason was the civil conflict in the region. However, researcher-government engagement was slow, and deepening research-government relationships, and extending these to include communities, would have required more extensive trust-building and communities travelling to the capital, Addis Ababa, for a "learning words" process prior to government engagement (Palmer et al. 2022, Palmer and Tanner 2024).

In engaged, transdisciplinary sustainability research, time frames are crucial (Palmer and Tanner 2024). Aba Gerima and Debre Yacob catchment had been the focus of Ethiopian research engagement over decades, and the success of landscape restoration was already evident (Feoli et al. 2002). The three-year ASA project came in as a

facilitated intervention to encourage and renew sustainable pastoral grazing when cut and carry efforts had flagged in one of the catchments. It effectively catalysed renewed sustainability practice.

South Africa: Tsitsa River catchment in the Mzimvubu River basin

The Tsitsa River catchment is a strategic water resource in South Africa. However, historical land-use practice has resulted in extensive erosion and vegetation cover loss which threaten the effectiveness of any dam development (Powell et al. 2018). Water resource development needs motivated investment in landscape restoration. The seven-year Tsitsa Project (Cockburn et al. 2018) constellated many of the ASA elements and the Tsitsa River catchment was a learning catchment for the Tanzanian and Ethiopian cases.

Partnership building, Developing participatory governance capacity and capabilities (Palmer et al 2022), Transformative social learning (Weaver et al. 2023) and Enabling co-design (Fry et al 2024) were substantive. The research had time to facilitate the development of community livelihoods, with a focus establishing nurseries to grow the plants used in landscape restoration, and the employment of eco-rangers to control free-range livestock movement. This is an alternative to the "cut and carry" methods used in Ethiopia. The timeframe of the Tsitsa catchment intervention was not long enough to measure vegetation cover increases, so the appointment of the eco-rangers was the measurable impact on the rangeland of the engaged research.

Discussion

The ASA provides natural and social scientists with the conceptual and practice tools to effectively engage with natural resource users (like pastoralists) and managers, civil society, powerful private enterprise, and government agencies, with the purpose of moving rangelands towards social-ecological justice and sustainability. However, the reality of engaged transdisciplinary work is hard (Palmer and Tanner 2024). As we advocate for rangeland researchers, managers, and governments to use the ASA, we highlight one lesson from all our experience: the fundamental importance of epistemic justice – fairness in relation to knowing. The two core aspects of epistemic justice in transdisciplinary participatory engagements are, that all participants i) experience being equally and well respected, and ii) have sufficient understanding and vocabulary to both understand and contribute to participatory knowledge exchange. Engagement planning and facilitation style are key in achieving this. Early engagement in the Tsitsa River catchment revealed that while facilitation skills such as eliciting input from participants randomly (rather than preferencing those with higher perceived status or power) and writing participant input on sheets that everyone could see, in exactly the words used, resulted in experiences of being respected. It was harder to build equitable knowledge and vocabulary, and respect for a range of knowledge forms. Knowledge was unevenly held and respected. In the Ruaha and Tsitsa River catchments formally educated participants were impatient, and discounted the value of local knowledge, while local communities needed time, were sensitive to disrespect and could be easily silenced. It was hard to overcome entrenched gender and racial prejudice. The development of the Learning Words processes in the Tsitsa project (Palmer et al. 2022) was crucial: stakeholder participants who are residents in the landscape meet with researchers the day before a general stakeholder workshop. Their local knowledge is elicited, and they are exposed to how deep their knowledge is, and that other stakeholders know far less. They are encouraged to share their knowledge in the engagement to come. Researchers then introduce any specialist vocabulary likely to be used the following day. Very often residents understand the concept – but may have a different set of words – for example not all languages have a direct word for "catchment" or "landscape. Learning Words workshops need to be routinely incorporated into the ASA process. In all our case studies engagement with local communities was undertaken in their local language, with translation for participants who only spoke English. (A sound colonialism push-back.) Adaptation to the pitfalls of practising the ASA included working to expose both specialist natural and social scientists to foundational ASA concepts such as complex social-ecological systems, transdisciplinarity and transformative social learning. We exposed the depth of gap between the social and natural sciences and the need for work on conceptual similarities with different vocabulary, methodological differences, and engendering sufficient respect for researchers to take the time collaborate effectively. We exposed the need for training in epistemic justice-sensitive facilitation.

Inclusion of epistemic justice, the methods of Learning Words, and the wider framework of the ASA can contribute to several *IYRP themes*: The ASA provides a purposeful mechanism for *connectivity* and building social-ecological *resilience.* The ASA focuses on building a shared fair, sustainable future and supports *biodiversity* retention of the *ecosystem services* related to *soils, water and land-use*. Learning Words workshops forefront *indigenous and local knowledge,* and ASA facilitation methods enable fair inclusion of *women and youth*. It is vital to understand that sustainable rangeland restoration and management involves respectful engagement. Above all, to recognise that engagement processes take time, and that respect and trust building are the foundational levels of transformation.

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