Resilience thinking and the evolution of collaborative environmental governance in the Western Cape

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ABSTRACT

To cope with complex environmental governance realities, new innovative models of collaborative governance or co-management have emerged in South Africa over the last 15 years. Resilience – defined as the capacity of a system to absorb disturbance and still retain its basic function and structure – is dependent on the system's adaptive capacity or its ability to reorganise and renew itself in the face of change. A concept growing in importance for understanding, managing and governing complex socio-ecological systems is that of resilience. Increasingly, collaborative governance is also combined with learning-based approaches such as adaptive management, formulated originally to deal with complexity and uncertainty.

In the Western Cape in the globally threatened biodiversity hotspot of the Cape Floral Kingdom, institutional innovation has also flourished in the environmental governance arena. This article focuses on a selection of these new collaborative governance models and will attempt to analyse and understand their evolution from a resilience perspective. In conclusion, some observations and reflections will be offered on the practical implications of applying resilience thinking to collaborative governance settings and the possible insights we can gain from this.

"The adaptive capacity of a social-ecological system is enhanced when complex issues can be dealt with by a network of loosely connected

stakeholders located at different levels of society. Such a dynamic structure allows for flexible coordination and cross-scale responses to solving problems because there is experimentation combined with networking of knowledge, creates the diversity of experience and ideas for solving new problems. It stimulates innovation and contributes to creating feedback loops at different scales".

Walker and Salt (2006)

INTRODUCTION

The notion of resilience – defined by the Resilience Alliance (2013) as "the capacity of a system to absorb disturbance and still retain its basic function and structure" – is seen as an emerging paradigm for understanding, managing and governing complex socio-ecological systems. Over a period of 15 years collaborative environmental governance or co-management has come to the forefront in South Africa. In the Western Cape in the globally threatened biodiversity hotspot known as fynbos or the Cape Floral Kingdom, (WWF 2013), institutional innovation has also flourished with a proliferation of new collaboratives coming into being since the mid-1990s.

The purpose of this article to explore the possible implications and meaning of resilience thinking in practical governance settings by focussing on the emerging patterns and characteristics of the evolving collaborative environmental governance models in the Western Cape. Firstly as the theoretical point of departure, the emerging paradigm of resilience as a new approach to managing resources and of understanding the world is described. Secondly the shift from government as central actor to the multi-stakeholder governance paradigm is introduced and, thirdly, its impact on approaches to natural resource management is explored focusing specifically on adaptive co-management as a governance approach. In conclusion, the biodiversity hotspot of the Western Cape Province will be used as a case study, and some observations and reflections will be offered on the implications of applying resilience thinking to collaborative governance settings and the possible insights we can gain from this.

THEORETICAL POINTS OF DEPARTURE

Resilience thinking

According to Walker, Anderies, Kinzig and Ryan (2004), C.S. Holling introduced the concept of resilience in 1973. The notion of resilience, according to Folke,

Carpenter, Walker, Scheffer, Elmqvist, Gunderson and Holling (2004:575) has grown as an important concept to understand complex linked systems of people and nature, as well as its implications for management and governance. The emerging paradigm of resilience is seen as a new approach to manage resources and of understanding the world and as alternative to the "business as usual" scenario. This rethink was necessitated by the realisation that communities, ecosystems and landscapes increasingly display a lack of capacity to provide the goods and services necessary for the planet's wellbeing. In contrast to "business as usual" attempts to control natural resources for optimum production and short-term economic gain through greater intensification and higher efficiencies, a resilience approach assumes an uncertain socio-ecological context and aims to achieve sustainable long-term delivery of environmental benefits linked to human wellbeing (Walker and Salt 2006).

The central building block of resilience thinking, according to Resilience Alliance (2010:6), is the concept of a social-ecological system (SES). A SES being a complex adaptive system is able to exist in more than one kind of stable state where ecological, cultural, political, social, economic and technological components interact and change continually through different cycles. The key to sustainability lies not in optimising isolated components of the system, as the outcome of doing that has the effect of increasing the vulnerability of the system to shocks and disturbances. It lies instead in enhancing the resilience of social-ecological systems, where resilience is the capacity of a system to withstand shocks without losing its basic function and structure (Walker and Salt 2006).

A system which has lost its resilience can be driven by shocks and disturbances across a threshold into a new state or regime, becoming a system with a different identity, whereas a resilient system can withstand disturbance

**Figure 1: Thresholds – The ball-in-a-basin metaphor**
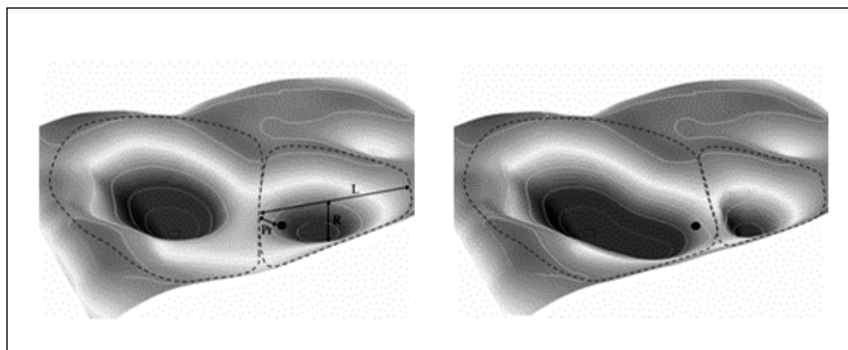
and will not change into a different system regime by crossing the threshold (Resilience Alliance 2013). The metaphor of a ball in a basin is useful illustrating the threshold model (Figure 1).

The shape of the basin is always changing as external conditions change and so is the position of the ball. The ball represents the current state of the system and the basin the set of possible states the system can be in and still retain the same structure and function. Beyond some threshold as represented by the edge of the basin, the system tends towards a different state of equilibrium when the feedbacks that drive the system change and when the ball crosses the edge into a new basin with a different structure and function. In the metaphor resilience is all about the distance between the ball and the edge of the basin, and the size and shape of the basin of attraction. In other words the resilience of the system is its capacity to absorb change and disturbances and still retain its basic structure and function (Walker *et al.* 2006).

The dynamics of SESs can be explored using the various phases of change. The adaptive cycles are characterised by four principal phases, namely (i) growth or exploitation (*r*); (ii) conservation or organisational consolidation (*K*); (iii) release or creative destruction (*omega*); and (iv) renewal or reorganisation (*alpha*) (Resilience Alliance 2013). (see Figure 2).

Figure 2: Adaptive cycles
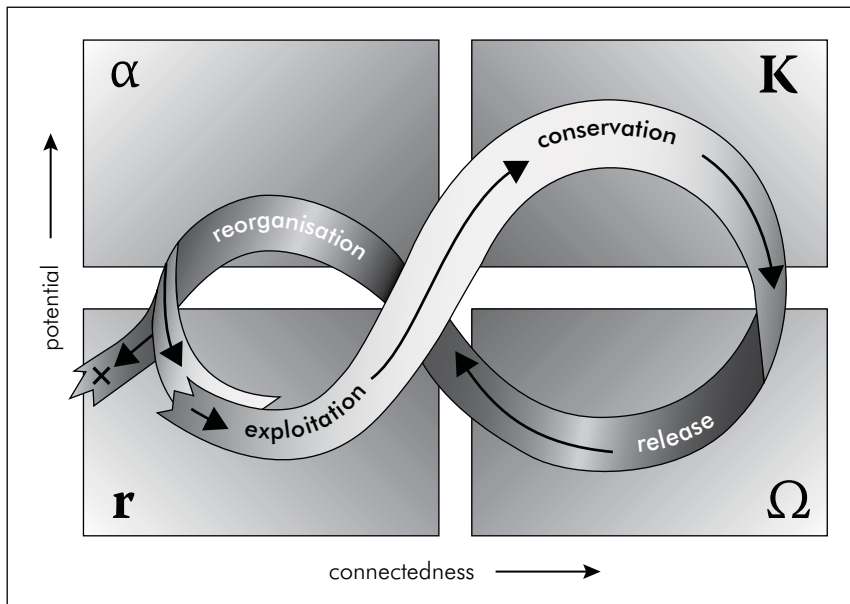
Source: Walker and Salt 2004.

The first two phases (*r* and *K*) form a familiar, slow and fairly predictable pattern of development called the "forward loop", while the *omega* and *alpha* phases constitute a less familiar, unpredictable and more rapid "back loop" of reorganisation (Holling 2004). The disturbances that periodically punctuate the adaptive cycle break down stability and predictability, but this releases resources for innovation and reorganisation (Resilience Alliance 2013). The system behaves in a different manner responding to changes in the strength of the internal connections, flexibility and resilience as its move from one phase to the next (Walker *et al.* 2006).

Walker *et al.* (2006) also point out that the different cycles operate at different scales and that linkages across scales are very important since what happens on one scale can influence or drive events at other scales. A system is embedded in a hierarchy of linked adaptive cycles (referred to as panarchy) operating at different scales in both time and space. The system's structure and dynamics at each scale are driven by a small set of key processes. This linked set of hierarchies governs the behaviour of the whole system (Holling 2001:390).

A resilient system is dependent on its diversity: the diversity of different functional groups of actors or *functional diversity*, – actors that do different things in the SES – contributes to a system's performance. On the other hand, a variety of actors within a functional group but with different ranges of responses to disturbances contribute to the system's *response diversity*, because redundancy increases the resilience of its performance (Walker and Salt 2006). According to the authors, a distinction should also be made between general and specified resilience. The latter occurs when the focus is on specific key slow variables which might or have already exhibit threshold effects such as the effect of fires on vegetation. But optimising for one form of resilience can reduce other forms of resilience. It is also important to maintain the general capacities or general resilience, of a social-ecological system to allow it to absorb unforeseen disturbances, such as those disturbances you have not even thought of.

According to Walker and Salt (2006), several factors play an important role in maintaining resilience:

- *diversity* in all forms should be promoted and sustained as a source of future options;
- *acknowledging slow variables* and the thresholds that lie along them could facilitate the possibility of increasing the space of the desirable regime to enable the system to absorb more disturbances;
- building *social capital* to increase the adaptability of people to respond together and effectively to disturbances;
- *innovation:* embracing change, experimentation, learning and locally developed rules;

- *overlap in governance* by including "redundancy" in the governance structures of institutions, and a mix of common and private property with overlapping access rights;
- *diversity*: the more variations available to respond to shocks, the greater the ability to absorb them, whereas a lack of diversity limits options and reduces capacity to respond to disturbances;
- *modularity*: refers to the degree to which the components of a system are linked as shocks travel rapidly through these highly connected systems, whereas loosely linked modules allows individual modules to keep functioning when other modules fail and the system as a whole has a chance to self-organise. A degree of modularity therefore increases the system's resilience;
- *tightness of feedbacks:* refers to the time and strength with which the consequences of a change in one part of the system are felt in other parts and responded to – centralised governance delays and therefore weakens feedbacks, the chance of crossing a threshold is increased without detecting it in a timely fashion, whereas the opposite case of decentralised governance with local social networks improves resilience because of the increased tightness of feedbacks and the shortening of feedback times.

These factors serve as pointers to describe the characteristics of a SES which contribute to the resilience of the system. The implications for actors to manage the resilience in a system are summarised in Table 1.

The notion of adaptability is used to capacity of the actors to manage resilience which, according to Walker and Salt (2007), might entail (i) moving thresholds; (ii) moving the current state of the system away from a threshold; or (iii) making a threshold more difficult to reach. The pointers summarised in Table 1 provide a framework which can be utilised to assess the resilience of a socio-ecological system as actors have to develop an understanding of the system before management interventions or governance model can be designed or adopted.

In the next section some of the important trends and concepts applicable to collaborative environmental governance will be described and defined.

The changing role of government – from regulation to collaboration

The emergence of collaborative environmental governance models could best be understood against the context of how the role of government has changed in three decades in the face of factors such as the tension between centralising and decentralising forces, the dynamic nature of the modern world with its endemic uncertainty, and the 'fragmentation' in policy and institutional terms of our society's

Table 1: Summary of the implications of resilience thinking for understanding and governing socio-ecological systems

Paradigm	• view socio-ecological systems as complex adaptive systems which are constantly changing and adapting to a changing world.
Context	• understand the history of the system.
Drivers	• appreciating what's driving and configuring the system of interest; • identify the key slow variables driving the system; • identify where the system is heading.
Thresholds	• envision a system in relation to its thresholds; • identify the forces which are driving the system towards the threshold; • identify the system's important feedbacks which under certain conditions are likely to change; • identify whether approaching a threshold beyond which it will be in a new regime; • ask which management interventions can influence either the shape of the basin or the position of the system within the basin.
Adaptive Cycles	• envision the system as a set of linked adaptive cycles; • identify the phase of the adaptive cycle the system is currently moving through.
Panarchy	• place the system in the adaptive cycle at the scale you are most interested in; • investigate what is happening at the other scales (above and below) the scale of interest; • identify the linkages between these scales.
Governance	• design or modify existing governance systems so that key intervention points can be addressed at the appropriate scales and times; • acknowledge that there is a cost to maintaining resilience in terms of trade-offs between short-terms gains versus long-term persistence and reduced costs from crisis management; • recognise when a system has already moved into an undesirable regime and that transformation is the only option to minimise transaction costs and increase the likelihood of success; • be aware that simplifying the system for increase in efficiency reduces the system's diversity and possible responses to disturbances, and that the system becomes more vulnerable to stresses and shocks; • devise incentives for change rather than maintaining the status quo when systems are in trouble; • ask how one can build resilience and adaptive capacity generally to increase the ability of the system to cope with external shocks.

Source: Synthesised from Walker and Salt (2006).

increasing complexity and uncertainty. This is aptly described by the notion that we have reached the 'limits to governance' (Carley and Cristie 2000:141).

The rapid changes which are threatening to overwhelm bureaucracy with its command and control attributes as we know it were predicted by Bennis

(1967:238-242) over 40 years ago in his well-known essay "Organisations of the Future". He predicted the decline of the bureaucracy, which would gradually be replaced by new organisational forms that will be formed and shaped to cope with the core problems of integration, distribution of power, collaboration, adaptation and revitalisation.

The shift that has taken place in how we try to cope with public problems is signified by using 'governance' instead of 'government'. As the knowledge and information required to solve public problems is not available to any single public or private actor, no actor can dominate a particular governing model unilaterally. The role of government has therefore changed to facilitating the formation of appropriate arrangements such as partnerships for taking co-responsibility between different groups of actors for dealing with management problems. The new reality of public problem solving therefore lies in its collaborative nature in pursuing public purposes and with government relying more and more on a variety of third parties to address public problems (Salamon 2002:8).

Trends and approaches in natural resource management

The general shift to the governance paradigm also impacted on the natural resources sector. It could be argued that the environment, being a prime example of a complex or "wicked" public problem, led to the pioneering of some novel and innovative approaches. There are two prominent ideas or approaches that stood out in this regard, namely the notion of adaptive management and the focus on collaboration.

Adaptive management
According to Allen, Fontaine, Pope and Garmestani (2010:1340), C.S Holling first introduced the concept of "adaptive management" in 1978. If one considers ecosystems as complex systems, then adaptive management of natural resources is a "learning by doing" approach that emphasises learning through management. The philosophical point of departure is that managers and policy makers must act despite the uncertainty of incomplete knowledge or that knowledge we think we have could actually be wrong. Adaptive management first focussed on ecosystems but has increasingly embraced the importance of the human dimension with its necessity of cooperation among a range of stakeholders and institutions (Pahl-Wostl, Craps, Dewulf, Mostert, Tabara and Taillieu 2007).

Collaboration
The terminology used in the literature to describe the collaborative nature of new approaches to natural resource management is confusing. Multi-party

natural resource management projects, programmes or decision-making processes using participatory approaches are described and defined by a variety of concepts. However, the two dominant narratives are those of *collaborative natural resources management* and *co-management.*

Using the collaborative natural resource management narrative, Magerum (2008:487) notes that several common characteristics are highlighted in the literature on collaboration. Firstly, a wide range of stakeholders is involved. Secondly, the participants are engaged in a creative and intensive process of consensus building. Thirdly, it strives towards reaching consensus on problems, goal and proposed actions. Finally, a sustained commitment to problem solving is required. Similarly, Heikkila and Gerlak (2005:583) define collaborative resource management as the process when diverse stakeholders representing both government agencies and resource users work together to resolve shared problems.

Carlsson and Berkes (2005:70) argue that co-management systems should be understood as governance structures. These structures may be composed of a whole range of other public and private actors (including government, NGOs, commercial interests as well as local resource users) coupled to one another by a significant number of relations.

According to Carlsson and Berkes (2005:67), some common underpinnings characterise the definitions and conceptualisations of co-management in the literature. Firstly, the concept of co-management is explicitly associated with natural resources management. Secondly, co-management is regarded as a partnership between private and public actors. Thirdly, co-management is seen as a process that takes place along a continuum and not a fixed state. Similarly, Borrini- Borrini-Feyerabend, Pimbert, Farvar, Kothari and Renard (2004:69) describe co-management of natural resources as "a partnership by which two or more relevant social actors collectively negotiate, agree upon, guarantee and implement a fair share of management functions, benefits and responsibilities for a particular territory, area or set of natural resources".

For all practical purposes these two narratives may be considered to be synonymous and are used interchangeably to refer to multi-party environmental governance systems working together towards shared problem solving. But some authors such as Heikkila and Gerlak (2005:583) argue that co-management defined as the sharing of power and responsibility between the state and local resource users might be too simplistic as collaborative natural resource management are in most instances more complex and sophisticated than might be concluded from the mainstream image. On the other hand, as pointed out by Carlsson and Berkes (2005:67), co-management is explicitly associated with natural resources management, which makes the qualification of "natural resources" when using the collaborative natural resource management narrative, unnecessary.

From adaptive management to adaptive co-management or
adaptive collaborative natural resources management

An interdisciplinary response that blends the two narratives of adaptive management and collaborative management emerged in the form of *adaptive co-management*. Cundill and Fabricius (2010) argue that combining the strengths of the two narratives through a focus on adaptive learning and the linkages between actors and organisations operating at multiple levels, adaptive co-management evolved in a governance-based approach to the management of complex adaptive systems. Alternatively, taking Heikkila and Gerlak (2005:583) view one can argue that collaboration is implied in the definition of "governance". Therefore adaptive natural resource (or environmental) governance could suffice according to Allen *et al.* (2011:1343) as "a form of governance that incorporates formal institutions, informal groups/networks and individuals at multiple scales for purposes of collaborative environmental management" which operates through power sharing and taking co-responsibilities while a collaborative participatory process is promoted.

The implications of resilience thinking and the adaptive co-management approach will be explored in the next section using examples of practical collaborative governance settings by way of a case study.

CASE STUDY FROM THE WESTERN CAPE

In this section the focus will fall on the emergence of collaborative environmental governance models in the Western Cape. As a point of departure the governance models will be contextualised in terms of the significance of the natural resources against the background of a changing institutional landscape.

Biodiversity in the Western Cape Province

South Africa is world renowned for its diverse natural landscapes and richness in biodiversity. The smallest of the world's six floral kingdoms is the fynbos or Cape Floristic Region (CFR). Fynbos occurs predominantly within the Western Cape Province and is the only floral kingdom confined within a single country. This region houses more than 9 000 plant species, nearly half of South Africa's total biodiversity (Younge and Fowkes 2003:15). With more than 1 700 species considered threatened or endangered, fynbos is considered to be one of the world's most threatened biodiversity hotspots (WWF 2013). Most (80%) of the priority areas fall outside of existing statutorily protected areas and are mostly on privately owned land (CWCBR 2013). The traditional governmental response of acquiring land by buying or expropriating it, and then conserving and managing

it as nature reserves is thus no longer a feasible policy option and alternative approaches are being sought.

Context

The restructuring of the public sector and the transformation of the institutional landscape in South Africa after the establishment of constitutional democracy in 1994 was also characterised by the increasing use of the term 'governance'. A key trend in natural resource management in South Africa over the past two decades has been the emergence of collaborative partnerships and other novel governance forms incorporating different stakeholders. This trend was facilitated by the lack of capacity at the local level, and limited state capacity and resources to implement environmental management policies effectively. It was also encouraged by an openness and willingness after 1994 to experiment with new ideas, coupled with international support and sharing of "best practice" models.

The emergence of new environmental governance models

To illustrate some of the South African experiences and experimentation with novel environmental governance models, a selection of examples of organisational innovation based on differences in process and form have been selected from the variety of collaboratives which have emerged from 1995 in the Western Cape Province.

The *Breede-Overberg Catchment Management Agency* (BOCMA) is only the second catchment management agency (CMA) to be established in South Africa (and the first in the Western Cape) as a new breed of primary water-resource management, catchment-based institutions to be established in the different water management areas (WMAs) (Müller 2007:54-55). The CMA is a legal entity mandated by law, headed by a governing board, which must be representative of all the relevant stakeholders in its particular WMA, such as local authorities, water user associations and conservation groups. It must facilitate decentralised decision-making based on a participatory approach to water-resource management through the involvement of stakeholders. A CMA can choose the organisational model ranging from various hybrids of decentralised/networking/outsourced at the one end of the continuum to centralised in-house arrangements most appropriate to its area at the opposite end (Müller 2007:54–55; BOCMA 2013).

While BOCMA is an example of a government-led collaborative, the three *biosphere reserves* in the Western Cape – out of seven in South Africa – were championed by civil society. They are *Kogelberg* (KBR), the *Cape West Coast* (CWCBR) and *Cape Winelands Biosphere* (CWBR) Reserves. The KBR

is the first of South Africa's biosphere reserves, which was established as a biodiversity hotspot in 1998 when international conservation status was awarded by UNESCO. The biosphere reserves are managed by a not-for-profit company steered by a member-elected board of directors (public and corporate). The directors have individually allocated portfolios and are advised by a standing technical committee. The boards are supported by full-time staff – where the reserves have been successful in obtaining funding–and they facilitate liaison between stakeholders. The implementation of strategic and business management plans takes place mostly through other implementing agencies and partnerships (Müller 2007:50–51; KBR 2013; CWCBR 2013; CWBR 2013).

Arguably the most significant, successful and internationally acclaimed conservation programme in South Africa's history is the *Working for Water (WfW)* programme, which was launched in 1995. The name of the programme captures its focus on job creation by protecting water resources threatened by invasive alien plants. The multi-departmental governmental initiative is governed by a WFW Board through an Executive Committee representative of seven national departments on behalf of a Management Committee representing the key partners. The programme is executed through partnerships with implementing agencies which are funded through a budget of R4 billion to implement more than 300 WfW projects countrywide on a contractual basis, utilising emerging contractors while providing training and employment opportunities for upwards of 20 000 people (Müller 2007:49–50; DWA 2013).

An example of a network model is *Cape Action for People and the Environment (CAPE)* formally established and institutionalised through a memorandum of understanding signed between 21 governmental, scientific and civil society stakeholders in 2001 to implement a strategic plan developed in response to the threat to the Cape Floristic Region. Its governance structure consists of the CAPE Co-ordination Committee, supported by a co-ordination mechanism, the CAPE Co-ordination Unit hosted by the South African National Biodiversity Institute. The financial resources to implement the plan are solicited from various international funding agencies and other donors, and executed by implementing agencies on a project-by-project basis (CAPE 2013).

A public-private partnership (PPP) between the government and the commercial forestry sector was established in 2003 under the name of *Working on Fire (WoF)* to create an efficient and effective nationally co-ordinated fire-fighting network by pooling and sharing resources. WoF operates as a Section 21 not-for-profit company in partnerships with other fire-fighting agencies, including conservation agencies, district and local municipalities, and the forestry industry through a nationwide system of fire bases where fire-fighting crew are stationed, and with operations coordinated by dispatch and co-

ordinating centres in each of the eight fire-prone regions of the country reporting to a National Co-ordinator linked to the National Disaster Management Centre. WoF is funded on a 'user pays' basis, except where the fire has spread and the property and lives of the general public are threatened, in which case it is funded by public money through the National Disaster Management Fund (Müller 2007:52–53; WoF 2013).

A more informal example of collaboration is the *Upper Breede Collaborative Extension Group* (UBCEG), which was established in 2006 in the Winelands District of the Western Cape Province of South Africa to resolve a variety of problems around land management in the Breede Valley. UBCEG was initiated by Cape Nature, the provincial nature conservation agency and the provincial Department of Agriculture's Landcare programme. UBCEG members include government departments and agencies, local governments, NGOs and private sector interests. UBCEG provides a forum where the different organisations can discuss agricultural applications in the context of pressures on biodiversity conservation, socio-economic gains and agricultural production, before authorisation by the relevant authorities (Rumble 2012:26–30).

A model being promoted as potentially a national pilot for furthering integrated environmental sustainability is a public-private-community partnership between SANParks, private landowners represented by Nuwejaars Wetland Landowners Association (LOA) and the neighbouring missionary community of Elim. It is known as the Nuwejaars Wetland Special Management Area (NWSMA). A not-for profit company – SMA Company – was established to facilitate the implementation, funding and future management of the area. The Nuwejaars Wetland is "formally recognised" as a Special Management Area, which is a mechanism designed by the Provincial Government of the Western Cape for implementing bioregional planning at the local level (Van Breda 2012: 80–83; NWSMA 2013).

OBSERVATIONS AND REFLECTIONS FROM A RESILIENCE PERSPECTIVE

The question that needs asking is what, if anything, is the significance of the emergence and proliferation of collaborative environmental governance models in the Western Cape Province of South Africa from a resilience perspective? In this section some observations and reflections drawing primarily on the authors' research into various governance aspects of natural resource management over the last 6 years, will be offered utilising resilience thinking and its application in approaches such as adaptive co-management or adaptive environmental governance.

- As a point of departure it can be argued that from a resilience perspective the proliferation of collaboratives as an alternative response to managing resources was necessitated by the realisation that cracks are increasingly appearing in governments' capacity to manage complex public issues, and that we have reached the so-called 'limits to governance'. The 'business as usual', scenario where government agencies could protect ecosystems and biodiversity by establishing nature reserves was no longer feasible in the globally threatened biodiversity hotspot of the Western Cape. The remaining priority areas (80% +) are small and fragmented, and not only do they fall outside of existing statutorily protected areas, but are mostly on privately owned land; hence alternative approaches were sought.
- The new decentralised collaborative approaches and forms which emerged also signalled a paradigm shift in conservation thinking away from, firstly, a government-centred approach towards collaborative multi-stakeholder approaches; and secondly, away from a biocentric to an approach where the aim is to achieve sustainable long-term delivery of environmental benefits linked to human well-being by embracing the concept of social-ecological systems.
- The functional diversity of collaboratives in terms of the different functional groups of actors with a variety of organisational forms and roles – ranging from government-led statutorily-based institutions such as Catchment Management Agencies (CMAs), biosphere reserves championed by civil society, public-private and public-private-community partnerships, and networks to informal forums such as Upper Breede Collaborative Extension Group (UBCEG) – contributes to a system's resilience, as the actors do different things in the socio-ecological system and thereby contribute to a system's performance.
- The overlap in governance which can occur where, for example, a CMA, biosphere reserve, PPP and informal local forums all operate in a particular area, should not necessarily be seen as problematic from a resilience perspective. This is because a variety of actors within a functional group – but with different ranges of responses to disturbances – contribute to the systems' response diversity, because redundancy increases the resilience of its performance. For both functional and response diversity, the more variations available to respond to shocks, the greater the ability of the system to absorb them, whereas a lack of diversity limits options and reduces capacity to respond to disturbances.
- The collaboratives in the Western Cape are characterised by a fairly high degree of modularity, where everything is not necessary connected to everything else. This allows individual modules such as a particular biosphere reserve to keep functioning when one of the other loosely linked modules

fail (for example another biosphere reserve). The system as a whole therefore has a chance to self-organise and consequently has more resilience, which will contribute towards damping the effect of disturbances.

- However, within the small collaboratives (in terms of staff, with the largest biosphere employing 14 people), the decentralised governance approach with local social networks improves resilience, because of the increased tightness of feedbacks and shortening of feedback times.

- As the collaboratives are a fairly recent phenomenon in the Western Cape, it seems reasonable to argue from a resilience thinking perspective that, in terms of adaptive cycles, most of them would be in the growth or exploitation phase (r phase). An exception might be the rapid evolution of the West Coast Biosphere Reserve. In its 12 years of existence different phases can be identified: during the pre-2000 establishment phase problems were analysed and partners were identified and encouraged to commit themselves. The second stage from 2000 until 2006 can be characterised as the stage of information gathering and stakeholder engagement with the formulation of strategic and business plans with the appointment of the first CEO. The implementation phase followed from 2006 when agreements were put in place and programmes and projects implemented (Müller 2013:74-75). Finally the structuring and regularisation of the on-going interactions among stakeholders during the institutionalisation phase followed in 2010. The trails and tourism project got off the ground after 2010 resulting in a rapid expansion of staff. This might indicate that it has already evolved to the conservation or organisational consolidation phase (K phase) in the adaptive cycle.

- The case of the Kogelberg Biosphere Reserve also provides an interesting example which could be interpreted in the adaptive cycle framework. The leadership of the Kogelberg Biosphere Reserve failed to build effective partnerships between stakeholders, which opened up the space for interest groups such as KOBIO to 'capture' or assume leadership roles. By 2004 this Section 21 company was, for all practical purposes, considered to be an operational failure and had to be revived at the end of 2004 by the establishment of a technical advisory committee to support the board (Müller 2008:13). In adaptive cycle terminology, this could be depicted as illustrating the release (omega phase) and the renewal or reorganisation phases (alpha phase).

- The importance of innovation in a collaborative setting embracing change, experimentation, learning and locally developed rules, is an important factor in maintaining resilience. The uncertain nature of short-term project funding necessitated that most collaboratives follow a 'learning by doing' approach. For example a conservation manager was appointed in the West Coast

Biosphere Reserve to implement the conservation stewardship programme. An NGO (the biosphere is legally a not-for-profit company) was given in effect a government mandate (CapeNature, the provincial conservation agency) to implement. As this was the first example of its kind the manager had to learn by doing by first engaging stakeholders to develop trust and relationships, before negotiating with developers about contractual reserves and biodiversity land offsets (Müller 2013:76).

- The emergence of collaboratives following adaptive co-management approaches has strengthened the linkages between actors and organisations operating at multiple levels. For example, national and provincial conservation agencies such as SANParks and Cape Nature are linked into the collaboratives as partners or stakeholders on different levels and scales.

- The multi-stakeholder or consultation processes which preceded the establishment of most collaboratives, with participation through forums and reference groups, and the building of consensus on (1) the real nature and extent of the problems at hand, and (2) commitment to the means of resolution, contributed to the formation of social capital (for example, the establishment of CMAs) (Müller and Enright 2009:125–129). From a resilience perspective social capital increases the adaptability of the people to respond together and effectively to disturbances. This could be a possible explanation for why particular collaboratives in the Western Cape (for example, the West Coast Biosphere Reserve) are in terms of achieving desirable outcomes more successful than others (such as the Kogelberg Biosphere) in comparable contexts.

SUMMARY AND CONCLUSION

From a resilience perspective, the emergence of self-organising collaborative governance forms could be interpreted as a response to the realisation that we have reached the limits to governance as far as the 'business as usual' government response to environmental challenges is concerned. From an environmental management perspective, the adoption of an adaptive co-management approach also signalled a paradigm shift away from biocentric ecosystem protection towards embracing the concept of social-ecological systems as complex adaptive systems. The aim here is to achieve sustainable long-term delivery of environmental benefits linked to human wellbeing in the context that are constantly changing and adapting to a changing world.

On reflection, and considering the evolution of collaborative environmental governance in the biodiversity hotspot of the Western Cape, the resilience

approach offers counter-intuitive insights. For example, the proliferation of collaboratives could be seen as contributing to fragmentation, incoherence and complexity thus making an already bad problem worse. However, with resilience thinking applied, the greater the diversity the more variations available to respond to shocks, therefore the greater the ability to absorb disturbances or more adaptive capacity. Another resilience thinking insight is that the overlap in governance that can occur when different collaboratives all operate in the same space should not automatically be seen as waste, since different ranges of responses from various actors to disturbances contribute to the system's response diversity because redundancy increases the resilience. The willingness of stakeholders to accept a diversity of institutions, engage each other in collaborative decision-making and learning from mistakes is an early indication of the presence of some adaptive capacity.

Just as important to building resilience as the outcome of a process of collaborative governance is the beginning of an on-going debate and discussion involving and engaging local stakeholders. Through sharing and building social networks that span different areas and scales of operation, the community is in essence building trust and social capital that is basic to enhancing adaptability and resilience. There are many pathways into the future for specific bioregions: the pathways that foster experimentation and innovation maintain the kinds of diversity that build resilience and enhance social networks. These pathways have the greatest chance of achieving long-term wellbeing, as such approaches create space and keep options and responses open.

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