WATER RESEARCH COMMISSION

POLICY BRIEF

Towards building resilient landscapes

A recently completed Water Research Commission (WRC) project is promoting social-ecological transformation towards a more sustainable future.

Background

Ecological infrastructure refers to naturally functioning ecosystems that deliver valuable services to people, such as healthy mountain catchments, rivers, and wetlands. Human activities are causing substantial changes to ecological infrastructure, and these changes are affecting the resilience of social-ecological systems and their ability to absorb, adapt and recover from disturbance.

In turn, this exposes society to a wide variety of increasing risks. Protecting and restoring ecological infrastructure is a shared responsibility between government, the private sector and society, and should include both formal and informal mechanisms of working towards a shared response at a landscape level.

Scientific information on where to, how to and why to invest in ecological infrastructure must be linked to social networks to ensure implementation of suitable strategies for protection and rehabilitation of this infrastructure.

This WRC project has focused on integrated and systemic ways of approaching risk by linking the concept of social capacity for governance and social and natural capital to ecological infrastructure in order to build resilient landscapes.

This means changing the way in which decision-makers and land managers think, value and make decisions about ecological infrastructure and social governance capacity. The ultimate desire is to develop an inclusive system of governance and decision-making, founded in learning, reflection and adaptation.

The study focused on the Eden district, in the southern Cape, which is prone to floods and drought, and which is considered vulnerable to the impacts of climate change.

How was this done?

This project engaged in traditional ecological and hydrological assessment methods as well as social engagement and the co-generation of knowledge. These included invitations and observations, sustainability dialogues, participatory mapping, writing popular articles for print media, interactive presentations, interviews, risk survey analysis, water quality assessments, land-cover change assessment, modelling sediment and nutrient flows, and modelling invasive alien plant impacts on water flows.

Main results

Using a systems-based approach, a number of key risks were identified in Eden (drought, fire, flood, storm waves and in the Wilderness catchment (water quality and quantity, invasive alien species and sediment erosion).

The concept of risk was found to play a facilitating role, enabling the boundary work required to co-produce knowledge for enhancing ecosystem management activities in Eden. The incorporation of environmental information into decision-making processes can be enhanced through engaging with issues related to ecosystem-based risk reduction activities for disaster management.

Poor communication and inappropriate language has the potential to disrupt knowledge production and exchange. If not addressed in the early phases of engagement, this can lead to narrow entrenched disciplinary thinking. Using a knowledge co-production approach based on social-ecological systems research greatly assisted with the development of shared knowledge on the contribution of ecological infrastructure for reducing disaster risk.

At a finer scale, the Wilderness catchment is made up of a diverse set of stakeholders with varying levels of social connectedness, information, knowledge awareness and capacity to use and manage a common resource base. They also have different interpretations of the value of natural ecosystems.

The lack of an overall shared meta-identity translated into the overall lack of a common vision for the catchment. These finding highlight the importance of using a variety of stakeholder engagement techniques, and how vital it is to develop a detailed understanding to prior knowledge of stakeholder groups using this as a departure point for engagements.

This allows for establishing a baseline collective understanding among stakeholder groups. Facilitation is vital in working towards a shared collective vision for a catchment or region among stakeholders.

The identified risks with stakeholders were investigated at a finer scale in the Wilderness catchment. Here the project team developed creditable, scientific information on issues directed by stakeholders, relating to water quality and quantity, sediment erosion and invasive alien plants.

The intensification of land-use in the last 50 years within Eden and, more specifically, the Wilderness catchment, has impacted the ecological infrastructure of the catchment. studies in the catchment highlighted key sources of pollutants, the location and quantification of key nutrient and sediment retention areas and their retention volumes, and the likely impact that the lack of a coherent invasive alien management plan will have on water supply in the catchment.

Developing the knowledge and responding to the impacts associated with risk and extreme events requires the determination of societal sensitivity to these issues and events, an understanding of ecological infrastructure and ecosystem services within social-ecological systems, and how we enhance governance capacity in matching this understanding.

The study highlights the importance of participatory approaches and the co-production of the required knowledge. It also emphasises the importance of both short- and long-term interventions in shifting a catchment into a more adaptive and transformative state.

The findings of the study have been synthesised into the creation of two frameworks and approaches for assessing the risk and social governance. The first is focused on identifying environmental risks and developing resources to these. Here a four-step resilience analysis approach is outlined.

The second framework is focused on transdisciplinary learning as a means for enhancing social governance. This frameworks is focused on understanding who communities should learn with, what they should learn about, and how different people in communities should go about learning together.

Conclusions and recommendations

The learning on this project highlighted the fact that building resilient landscapes requires understanding important social processes and histories, multi-stakeholder engagements and the well facilitated co-production and exchange of knowledge.

The concepts of risk and ecological infrastructure were useful boundary objects around which we could build these social processes. Through this project clear steps have been taken towards reducing risk and vulnerability in this area by initiating processes for enhanced social governance.

The following recommendations emanated from the project:
- Employ a variety of techniques in engaging stakeholders in co-learning at all phases of projects.
- Ensure that the project team contains skilful facilitators or bridging agents who are able to generate interaction and promote social connectedness and knowledge sharing through enhanced communication and concept translation between stakeholder groups.
- Identify and use boundary objects (objects of mutual

interest and relevance) in establishing shared understanding across different knowledge domains and stakeholder groups.

- Engage in network weaving. Focus on establishing, coordinating and enriching connections between groups and individuals so as to ensure healthy networks
- Work towards creating or establishing a common vision or stakeholder identity as this will facilitate collective action and cooperation in place of self-interested action. Furthermore, such a vision will promote strategic (forward looking) decision-making with both short- and long-term considerations.
- Use available social media in establishing communication forums
- Support established initiatives that are focused on sharing information.
- Explore mechanisms and participatory activities that can enhance social governance capacity that can effectively implement these shared responses.
- Ensure that building resilience in one catchment doesn't result in the creation of vulnerabilities in other areas.
- Develop a systemic understanding of risk. This will highlight cross-scale issues and will allow for ensuring that appropriate partnerships are made with those that can act across scales, thereby ensuring system appropriate planning.

Further reading:

To order the reports, *Towards building resilient landscapes by understanding and linking social networks and social capital to ecological infrastructure* (**Report No. 2267/1/15**), contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.