

Challenges in developing TPCs for natural resource use

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Historical background

- Social & ecological systems have co-evolved over many centuries
 - Traditional hunter-gatherer societies;
 - relied heavily on natural resources;
 - incorporated nature into their worldviews, metaphors, folklore & belief systems;
 - natured sources of ecosystem renewal by creating small scale disturbances; practiced biodiversity conservation (taboos); many practices embodied sustainability principles (Toledo et al 2003)
 - practices passed down from generation to generation by cultural transmission (included succession management in forests, managing for landscape patchiness) (Berkes et al 2000)

Historical background

- Colonisation, settlement & commercialization (mid-17th century – 1900s)
 - Intensified use of natural resources to support rapid economic development
 - Commercialization
 - Focus was on the maintenance of sustainable yields
 - Maintenance of long-term forest productivity
 - Simple cause & effect models

Historical background

- Preservationist attitude towards natural resource use (early 1900s)
- Southern Africa became aware that natural resources would be depleted if measures were not taken to manage them better
- Establishment of national parks & private conservancies
- Strict focus on biodiversity conservation
- No consumptive use

Historical background

- Poor, which lacked political clout, were excluded from the process
- Forcibly removed from their homes, and relocated to new areas that were more densely populated, less productive and poorer in biodiversity than the land from which they had come
- Social networks & relationships were undermined
- Negative attitudes towards conservation
- Illegal harvesting

Historical background

- New, people-centred approach to conservation
- Fuelled by pressure from the international conservation community
 - Recognise the importance of human-nature relationships
 - People's dependence on natural resources
 - National parks to contribute to human well-being in addition to biodiversity conservation

Management challenge

- Social & ecological systems have co-evolved over many centuries.
- These systems have been characterized by people's adaptations to changes, & often crises, in their surrounding environment.
- Social & ecological changes have played an important role in shaping the different ways in which people view landscapes & natural resources, as well as how they are used & managed.
- Ultimately, the way in which people adapt to these changes & the decisions they make, affects the well-being of current & future generations.
- An understanding of the thought processes behind how local people come to arrive at their resource use decisions is critical to managing these systems & knowing how to buffer them against radical, and often irreversible, changes.

KNP Mission

(proposed revision: Sept 2003)

In keeping with the SANParks mission, to maintain biodiversity in all its natural¹ facets and fluxes, to provide human benefits and **build a strong constituency** and to preserve as far as possible² the wilderness qualities and **cultural resources** associated with the Park

*New words in red; 1997 footnotes accepted but ¹add the notion "indigenous" to natural; ²"detract as little as possible from" wording (as in 1997) possibly better.

Biodiversity Objective

To maintain biodiversity in all its natural facets and fluxes.

Ecosystem Objective

To understand and manage the KNP as part of the lowveld savanna and its river catchment areas in such a manner as to conserve and restore its varied natural structure, function and composition over time and space, and its wilderness qualities, through an approach integrating the different scales and types of objectives.

Atmospheric Effects

To understand the major effects of climate (esp. rainfall) in influencing biodiversity, and therefore if, when and how to take management decisions (including the no-action decision) with this clearer context.

Water in the Landscape

To develop an integrated understanding of non-terrestrial ecosystem diversity and dynamics (including sub-surface water) and its links with terrestrial systems, and to maintain the intrinsic biodiversity as an integral component of the landscape and maintain or where necessary restore or simulate natural structure, function, composition and processes.

Terrestrial Ecosystem

To develop an integrated understanding of ecosystem diversity and dynamics, and where necessary intervene with appropriate strategies, in order to conserve and restore terrestrial biodiversity and natural processes.

Alien Impact

To anticipate, prevent entry and where possible control invasive alien species, in an effort to minimise the impact on, and maintain the integrity of indigenous biodiversity.

Threatened Biota

To prevent extinction within the Kruger Park of any species on the IUCN's global critically endangered or endangered lists, and to work with other conservation initiatives to secure and strengthen the future of such species over their historic distribution ranges. To put in place appropriate monitoring and conservation efforts of other threatened species or lower taxonomic division, including considering recommendations of experts of invertebrate taxa for which no formal red-listing has been done, according to a realistic framework. Except in crucial instances for the survival of globally critically endangered species, management for system integrity and biodiversity must take precedence over species management.

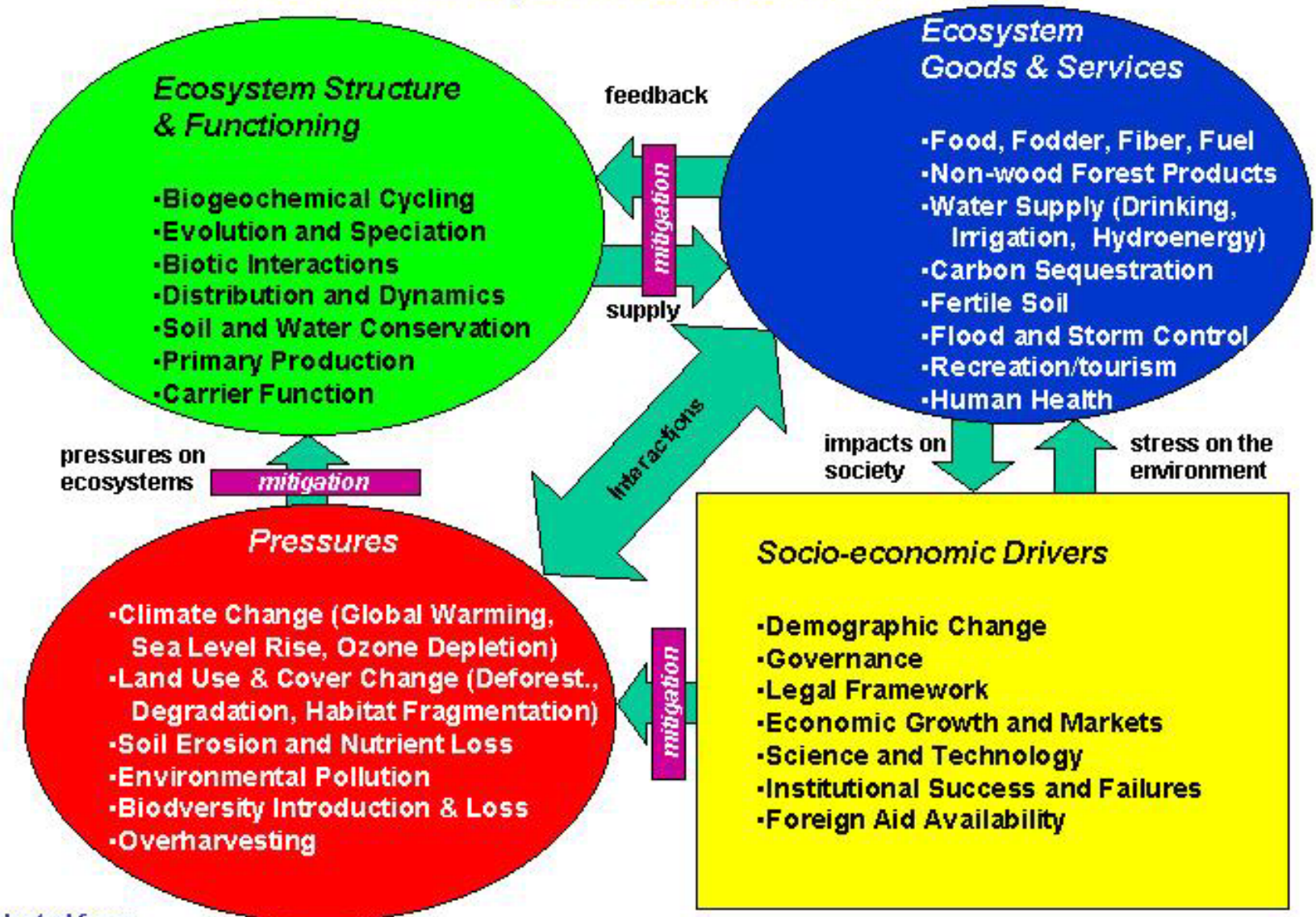
Legal and Statutory Objective

To have a thorough working understanding of the legal and statutory framework influencing biodiversity in and around KNP, and to influence the framework's further development and content to the benefit of KNP objectives. KNP may often need to take a pro-active stance in many wider or generic legal and statutory issues, rather than await developments passively.

A question arises whether this whole block does not belong under "Balancing". At this stage, given the strong biodiversity influence in forthcoming legislation, it seems best here, with additional (often smaller) legal & statutory blocks elsewhere in the tree as necessary.

'Driving factors' are poorly understood

Millennium Ecosystem Assessment Framework



Adapted from:

1) Watson et al. 2001. Human Needs and Climate Change. IPCC. Synthesis Report; 2) Gitay, H., S. Brown, W. Easterling & B. Jallow. 2001. Ecosystems and Their Goods in Services. In: J.J. McCarthy, O.F. Canzini, N.A. Leary, D.J. Dokken & K.S. White, eds. Climate Change 2001: Impacts, Adaptation, and Vulnerability. IPCC.

Policies don't exist or are still being drafted!

- **Guidelines for Resource Use in SANParks**
- **Draft 2, June 2006**
- **Purpose**
- SANParks' guiding principles for resource utilization in National Parks highlight the Organization's fundamental approach to resource use in the organization. They provide the basis from which individual Parks could develop more detailed resource use policies, in compliance with the National Environmental Management: Protected Areas Act (2003) and other relevant legislation.
- These guidelines are aimed at providing:
- **Clarity and direction** regarding SANParks' position on resource use in protected areas, including roles and responsibilities, acceptable and unacceptable activities, its obligations under the relevant Conventions and Acts (Appendix 1) and the process for decision making.
- **Guidance on technical and operational issues** such as how to differentiate between different categories of resources; how to differentiate between the rights and responsibilities of different stakeholder groups; how to make decisions about some of the 'intangible' cultural resources forming part of the national estate; and how to integrate intangible, indirect use and direct use values into decision making.
- **Safeguards** to protect the interests of various stakeholders, including the interests of SANParks and those of marginalized and less powerful role players.

No baseline data!

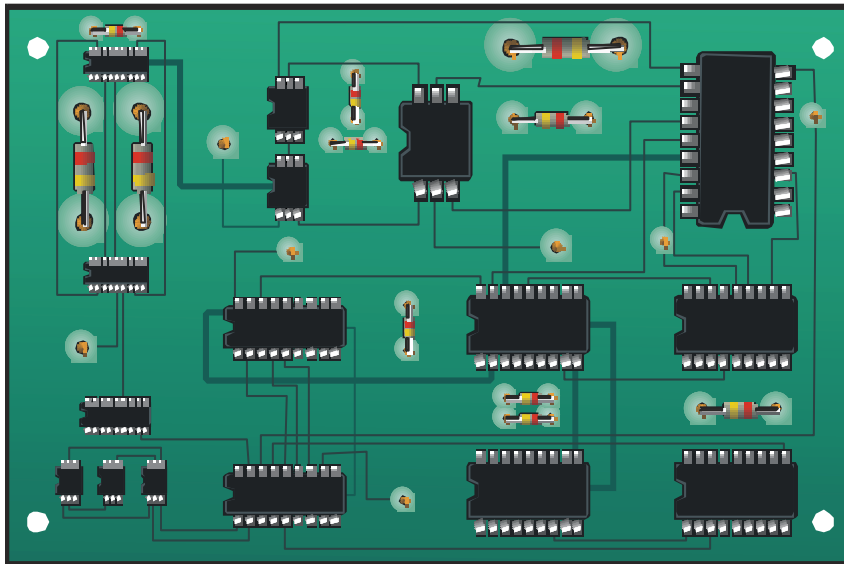
Annual, gross direct-use values (S.A. Rand) per household of timber use by rural households from various sites

Province	Site	Fuelwood	Housing timber	Fence/kraal timber	Total
Eastern Cape	Pikoli	1 596	156	132	1 884
	Kat River	1 145	1	22	1 168
KwaZulu-Natal	KwaJobe	726	54	154	934
	Hlabisa	212	6	15	233
Limpopo Province	Mogano	1 736	0	5	1 741
	Mametja	706	3	17	726
	Hagondo	1 569	2	106	1 677
	Bushbuckridge	465	62	156	683
MEAN		R 1 019	R 36	R 76	R 1 131

Sources: Magasela et al. (2001), Motinyane (2001), Shackleton et al. (1999; 2002), Shackleton & Shackleton (2000), Twine et al. (2001)

Dealing with a complex system:

Diversity, interactions (especially local), & a selection process (like natural selection) producing ongoing change



To gain more insight, it is very helpful to consider the difference between COMPLICATED (like a jet aircraft or an electronic circuit board; = 'knowable' of Snowden) and COMPLEX (like an ecosystem)

Integrate social & ecological systems

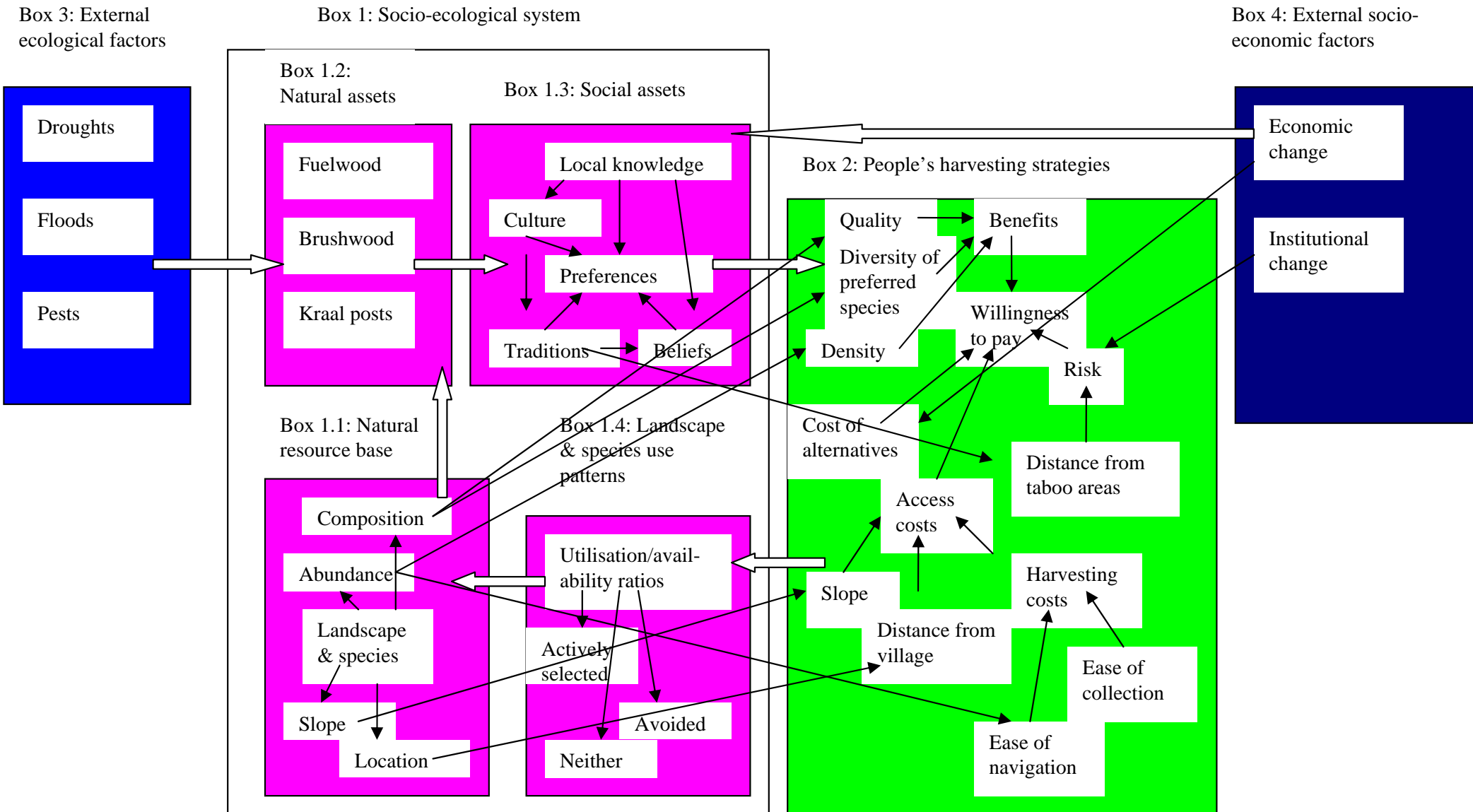
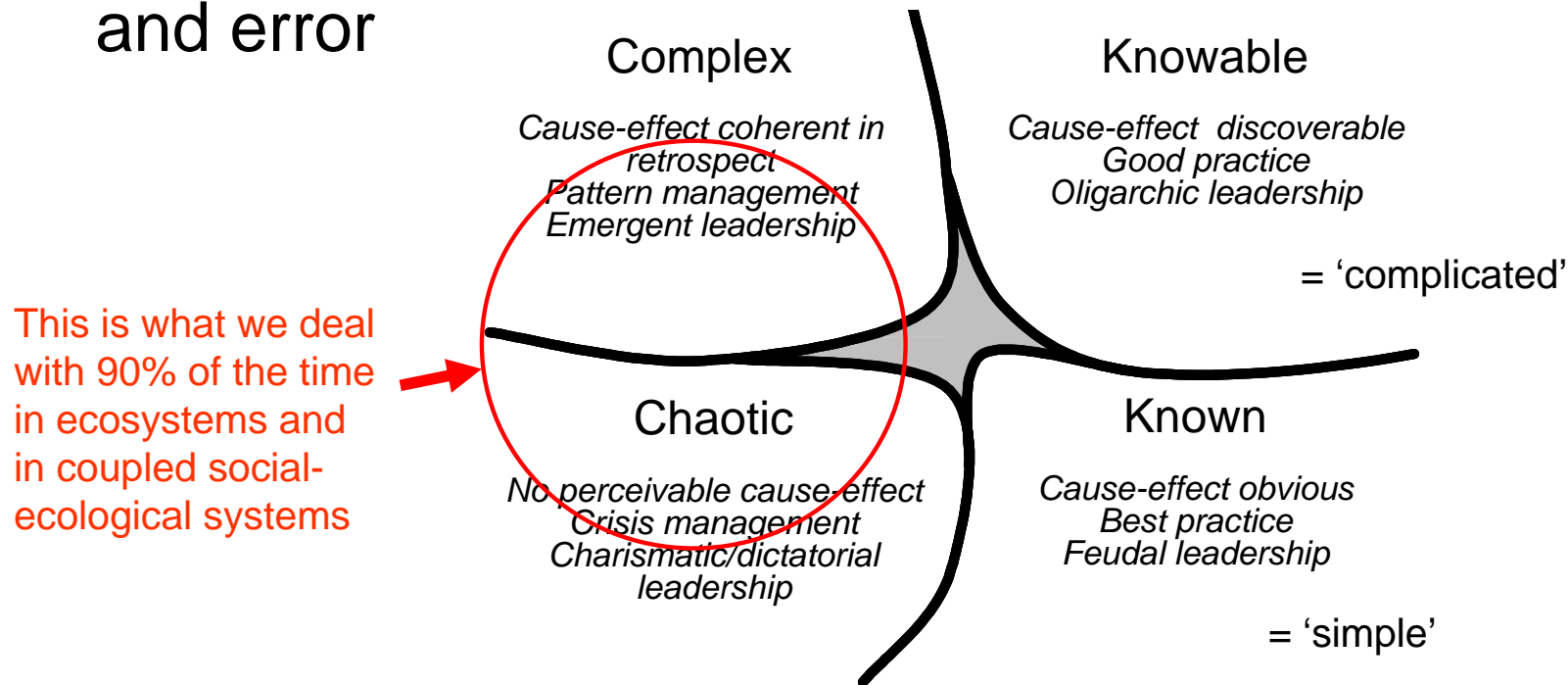


Figure 7.6: Conceptual model (version II), showing how social and ecological factors interact to influence people's harvesting strategies and natural resource use patterns in terms of the landscapes and species they use for fuelwood, brushwood and kraal posts

Simple, cause & effect models – holistic, systems approach

Recipes/blueprints/best practice – learning by doing, trial and error



Snowden's diagram as modified by Roux

Is complexity everything? We already said not. But it's a big deal

Know your problem and use the appropriate methods to understand and manage it. We are even started examining inter-relationships /swaps between these operating styles. And there are more styles ...

<u>Strategy</u>	<u>For use in</u>
Command-and-control	For predictable systems; or to panel-beat them into predictability; externalities often carried at next scale up
Optimisation (esp because of our “agricultural” history)	Maximises production, with trade-offs against resilience
Strategic adaptive management	Complex systems; maximises heterogeneity and resilience

Need to develop the techniques & methodologies

- Iterative modelling
- Scenario analysis
- Pilot studies (multiple resources)
- GIS modelling/land-use or management zonation
- Adaptive management; with resource use embedded in monitoring & research programmes

Tapping into local knowledge



Preference ranking

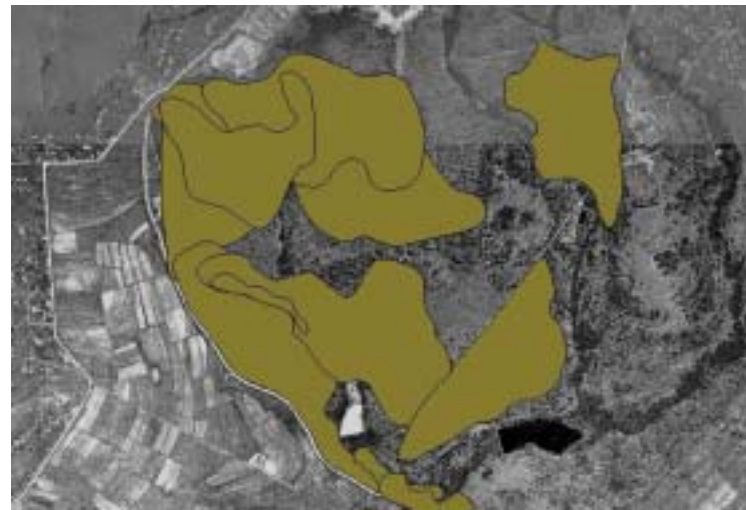
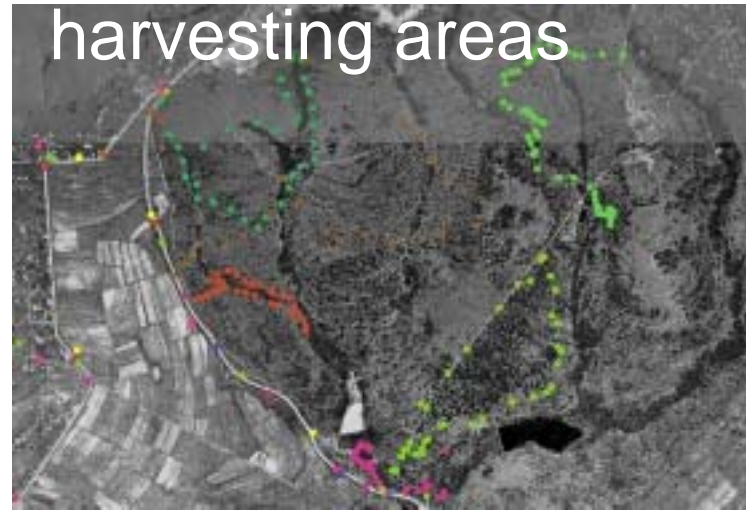


Interviews with local resource users



Use of scientific knowledge

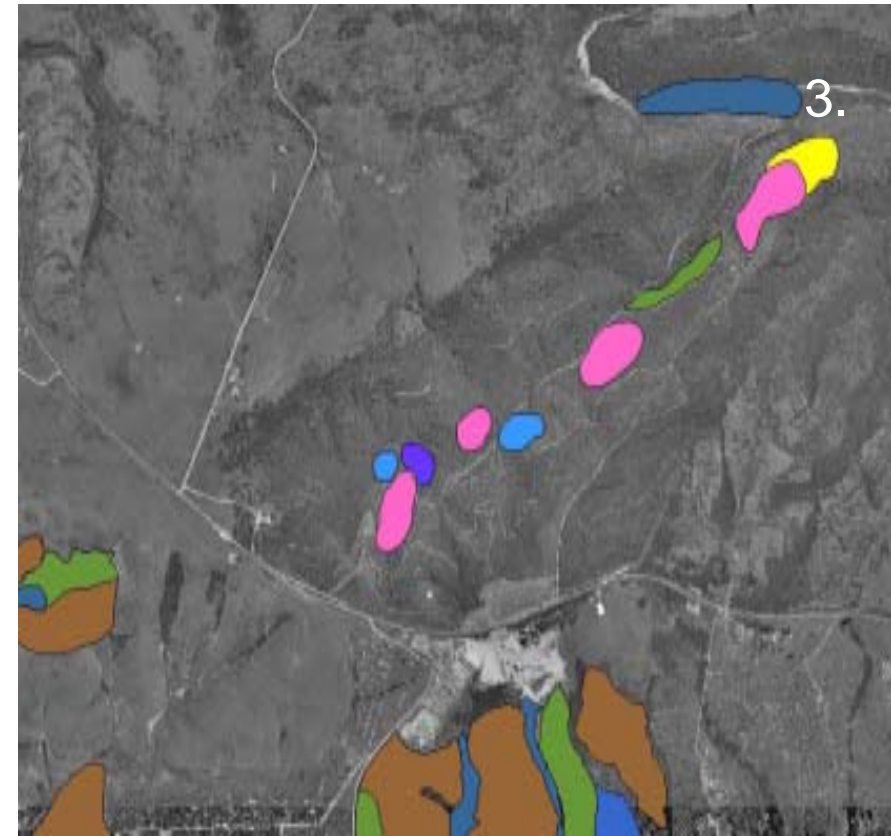
GPS tracking of resource users movements & harvesting areas



Accompanying resource users on collection trips & conducting vegetation surveys

Using GPS data & GIS to compile digital maps

Use of different technologies



Converting hand-drawn, participatory maps to digital GIS maps for modelling purposes

Borrow principles & paradigms from other fields of study

- Resilience (the amount of disturbance a system can absorb without flipping)
- Commonly used in ecological & social systems
- Ecological system: Vegetation composition and structure of rangelands can flip from grass-dominated to shrub-dominated (Walker et al 1993; Ludwig et al 1997; Scheffer and Carpenter 2003), or savannas, from fire-dominated to grazing-dominated or shrub-dominated vegetative states (Anderies et al 2002)
- Social systems: Nomadic people to sedentary people (Madzwamuse & Fabricius 2004); community which practices sustainability principles to community which promotes ecosystem degradation (Tabuti et al 2003)

Cost benefit analysis

- Benefits
- People's preferences for respective resources
- Dependency: are alternatives available; &
- Resource quality
- Resource availability
- Diversity of resources



Costs

- Resource accessibility
- Ease of harvesting
- Risks
 - Illegal harvesting
- Can inform zonation!

What are the constraints for different types of resource use?

Biodiversity Conservation

A

B

C

Tourism

Wildlife

Extractive Resource Use

Hunting / Fishing
Live sales (culling)

Medicinal plants
Timber
Cut flowers / grass

	A	B	C
Compatibility	High	Intermediate	Low
Sustainability	High	Uncomplicated	Complex
Economics *	Good	Good	Poor
Capacity	Low	Intermediate	High

Scenarios

A	No use
B	Non-intensive use of a wide variety of resources
C	Intensive use of 2-3 of the most preferred resources
D	Maximum sustainable yield of all resources