

Resilience propositions on trial: Briefings for the mock court

“DEVELOPING RESILIENCE PROPOSITIONS”

- 1) How you go about developing them
- 2) Propositions that are emerging

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Part 1

How to develop propositions

Three propositions about developing
propositions about resilience

In the last few years the word 'resilience' has become almost common parlance

- government and industry circles, NGOs, vision statements, operational plans

But different interpretations

Why has it become so widespread?

- a rising sense of unease; the 'gathering storm'

Could we cope if it hits the fan?

- happening in ecology, psychology, health, disaster/military sectors, the corporate world ---

Part 2

Eleven emerging propositions about problems in applying resilience ideas

based on working with a mix of different groups of practitioners trying to get resilience ideas into practice

(i) You cannot understand or manage a system by focussing on one scale.

need at least 3 scales - the focal scale, one above and one below

(ii) Increasing resilience at one scale (or pursuing efficiency at one scale) can reduce resilience at other scales

- commonly, efforts to increase resilience at farm scales (for example) lead to loss of resilience at higher scales

(iii) SESs are essentially self-organizing systems with thresholds

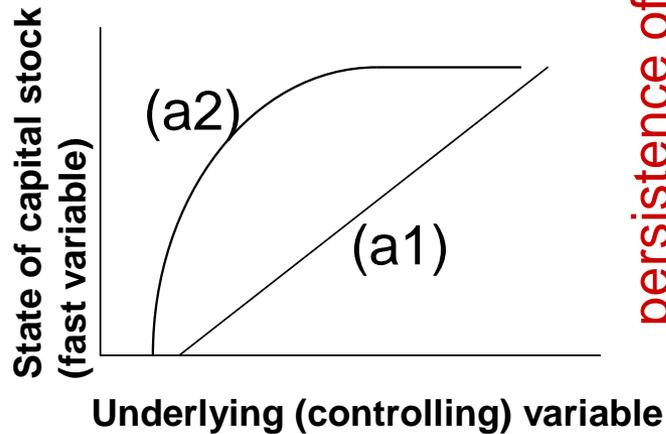
The trajectory the system follows is determined by both bottom-up and top-down effects: How do these effects interact?

Bottom-up -- evolutionary, adaptive, novelty

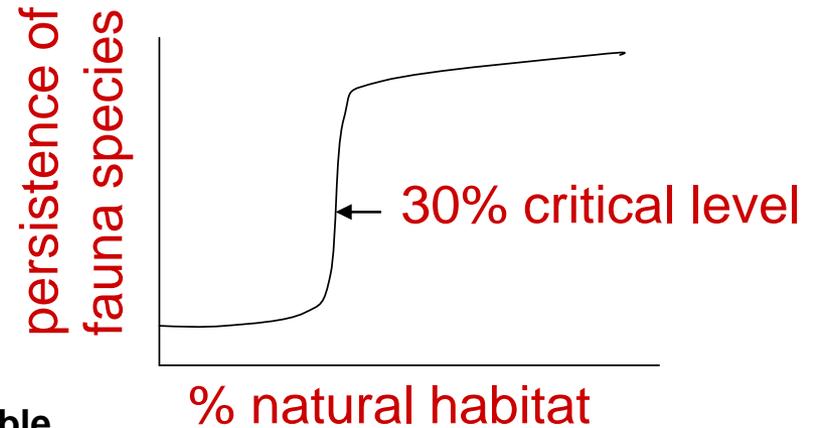
But what about top-down 'influence'? i.e., not only constraints but "directional" influence?
- an area inadequately researched thus far
(cf R. Ulanowicz "The third window")

Kinds of thresholds and "tipping points"

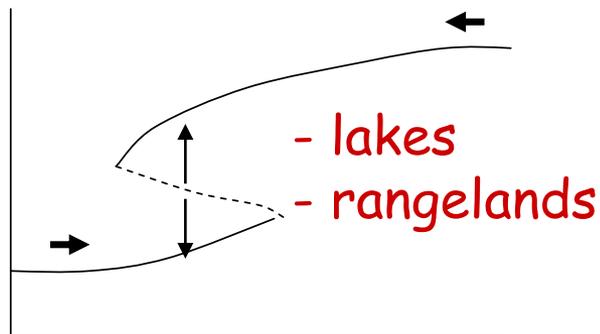
(a) No threshold effect



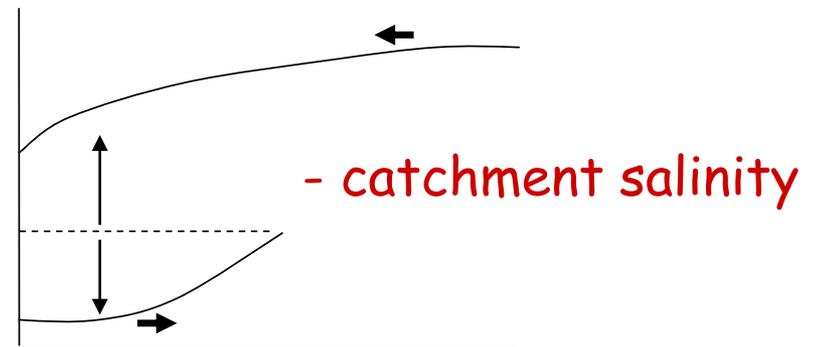
(b) Step change



(c) threshold, alternate stable states



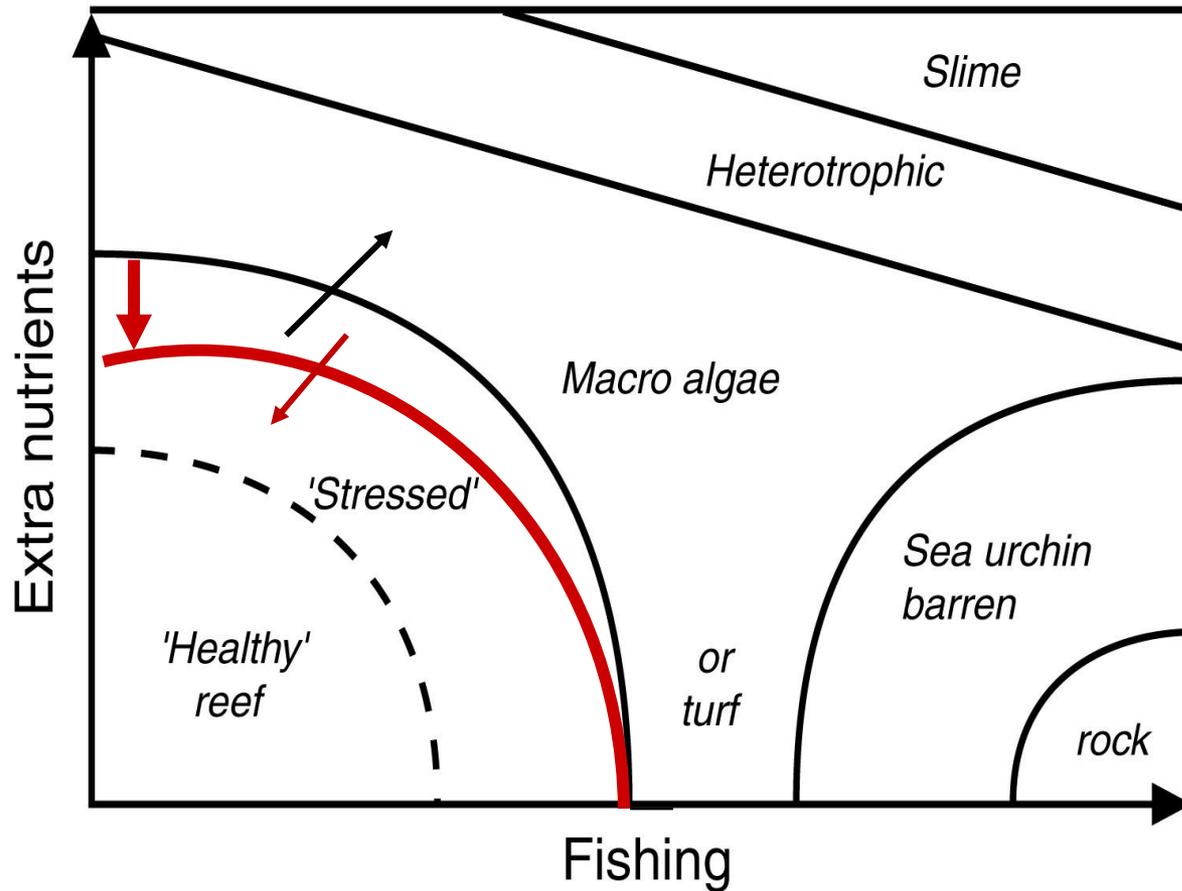
(d) irreversible threshold change



Types (a2) and (b) dynamics -- not strictly within the definition of "resilience" and so not usually considered in resilience studies

- but both are ecologically and socially important and need to be included in practical management programs

Hysteresis effect on threshold position for reversing a phase shift

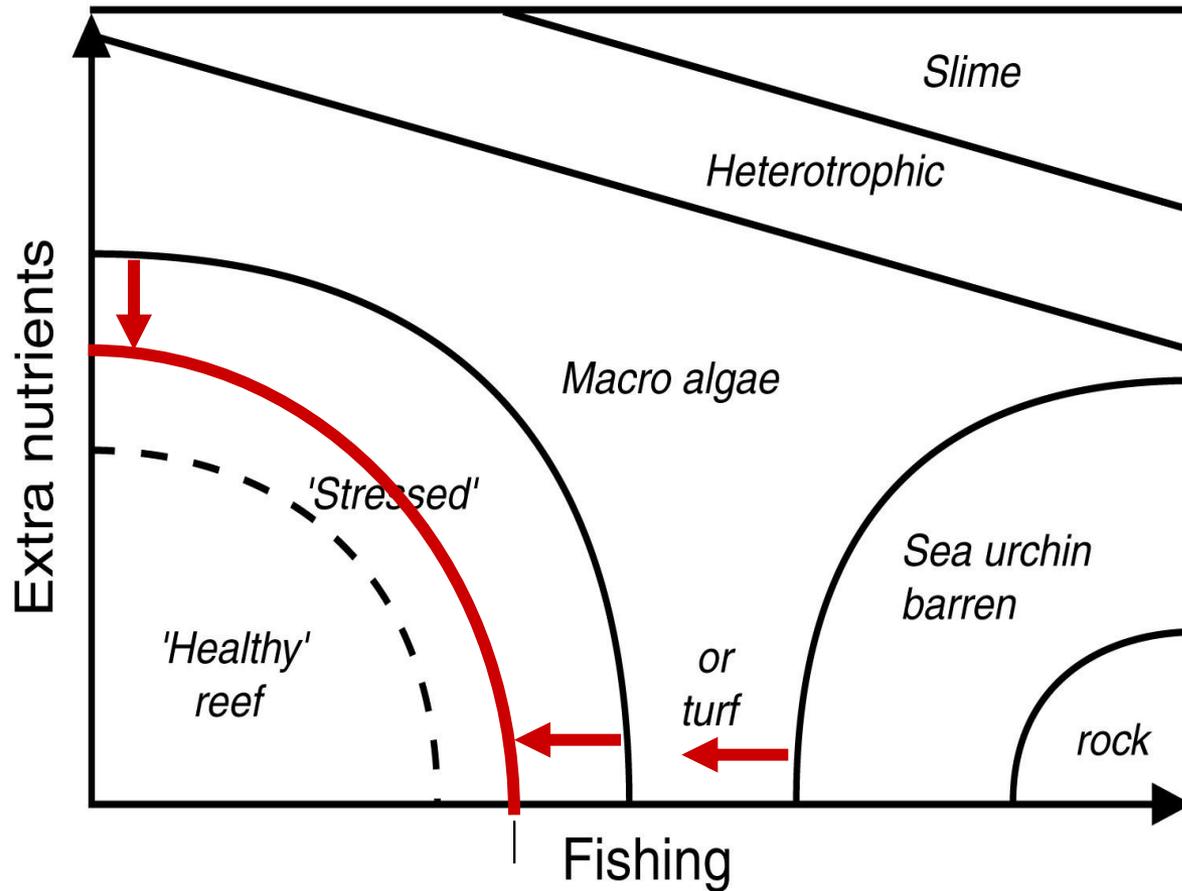


(adapted from the work of T. Hughes and colleagues)

(iv) Thresholds can move

Phase-shifts on coral reefs

multiple controlling variables, multiple "states"



effect of climate change on threshold positions

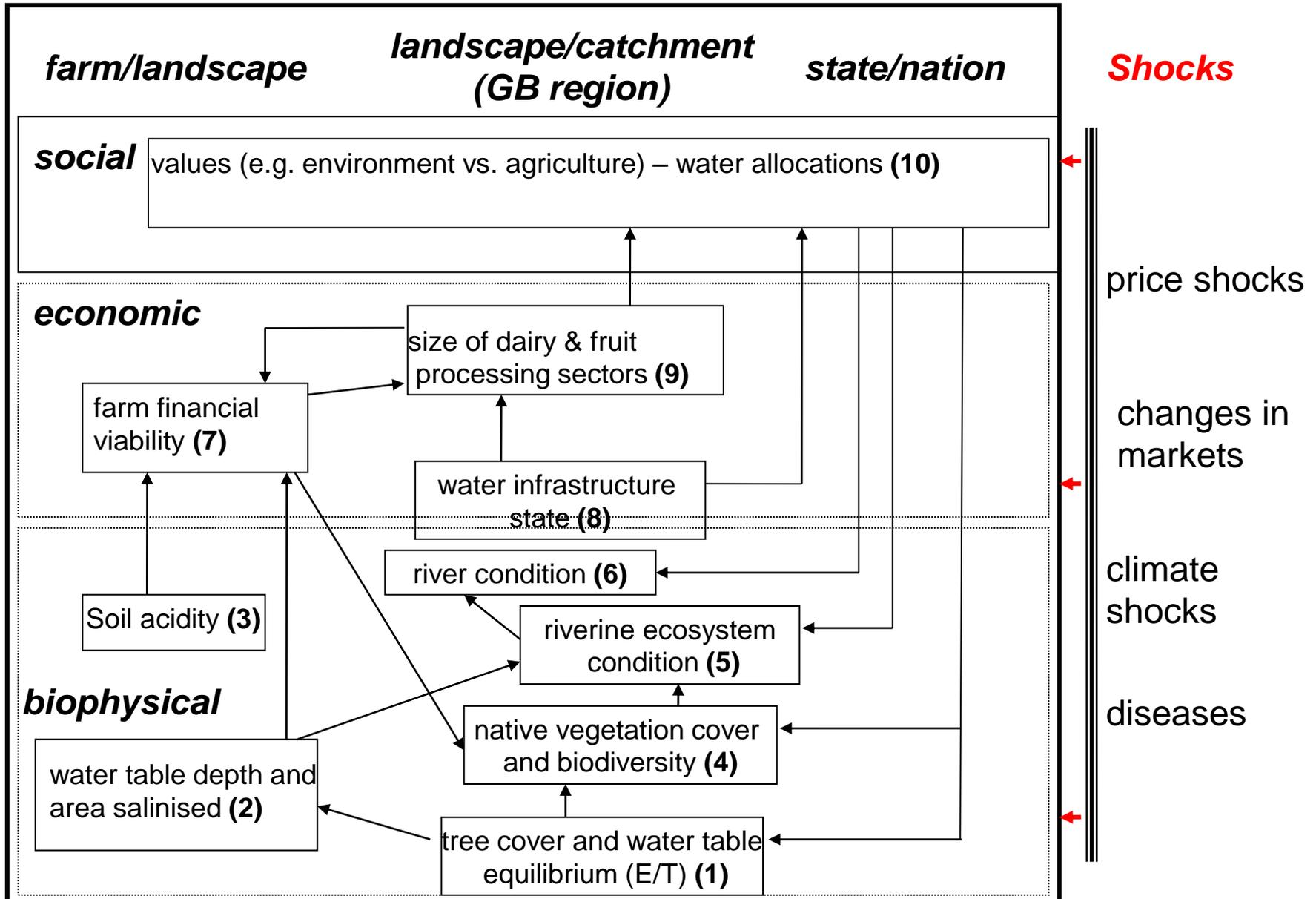
How do you identify thresholds?

- known thresholds in related systems
- thresholds of potential concern (TPCs) (suspected, or in related systems)
- conceptual models of change
 - e.g. develop state-and-transition models; which transitions have thresholds on them?
- probabilistic (Bayesian updating) models (e.g. for risk of a state transition - T. Lefroy group)
- analytical models of leading indicators
 - e.g., rising variance and autocorrelation (time and space) (Carpenter and Brock, Scheffer, Dakos) ;
 - BUT ---

What do you do about thresholds?

develop policies for their management
- for avoiding them, moving them,
and (if necessary) crossing them

A specified resilience perspective of the Goulburn-Broken catchment



With 10 or more identified TPCs, 2 issues arise:

1. "requisite simplicity", and "the rule of hand"

so: (v) there is a hierarchy of thresholds, with some embedded within others

Adopt something like the "Strategic Adaptive Management" framework for implementing thresholds in management

Kingsford, R.T., et al. Strategic Adaptive Management in freshwater protected areas and their rivers. *Biol. Conserv.* (2010), doi:10.1016/j.biocon.2010.09.022

2. there's a danger of getting all attention focused on the identified thresholds

(vi) Trying to make the system very resilient in one way can lead to loss of resilience in others

SO -> general resilience

general resilience - what determines it?

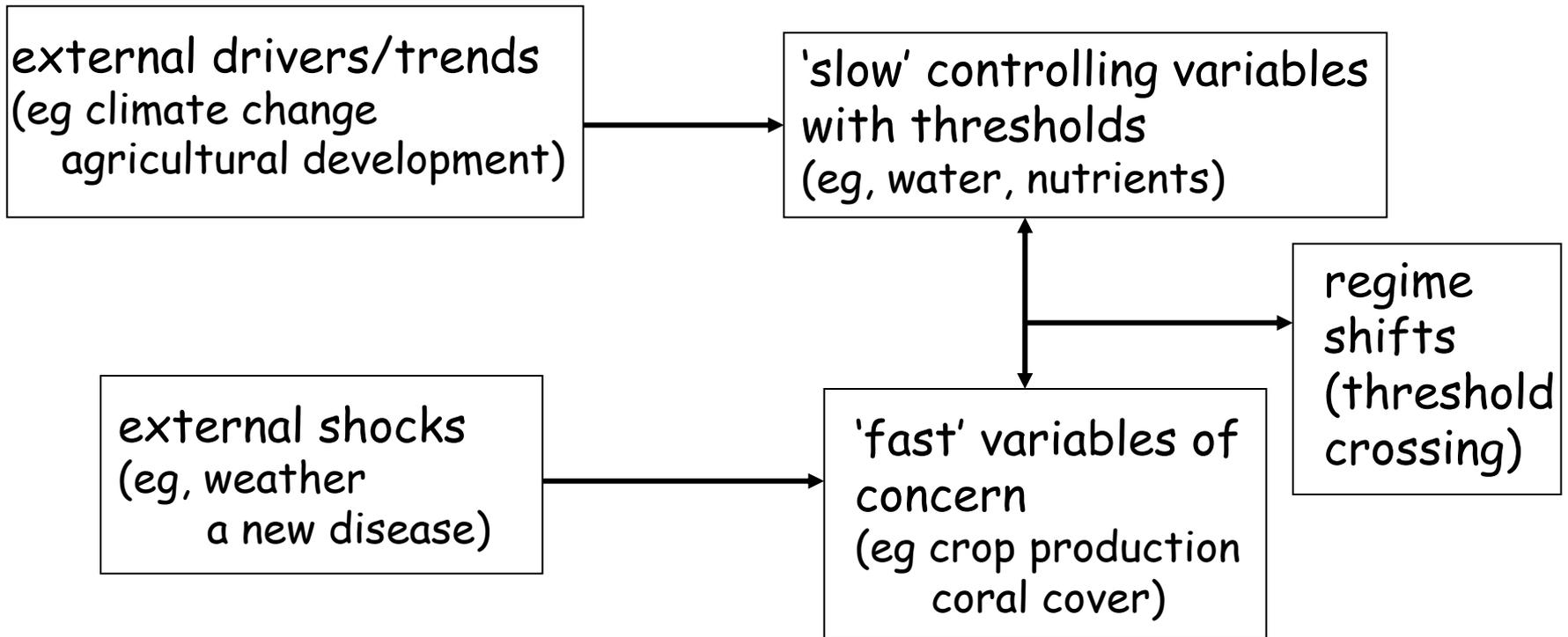
- diversity
- modularity (connectedness, network structures)
- tightness of feedbacks
- openness - immigration, inflows, outflows
- reserves and other reservoirs (seedbanks, nutrient pools, memory)
- overlapping institutions, polycentric governance
- adaptive governance

(vii) general resilience theory lacks rigour, needs research

(viii) Specified resilience and general resilience are both important and interact

- this occurs through the interaction of exogenous and endogenous changes

Exogenously driven changes (threshold focus)



Endogenously driven changes

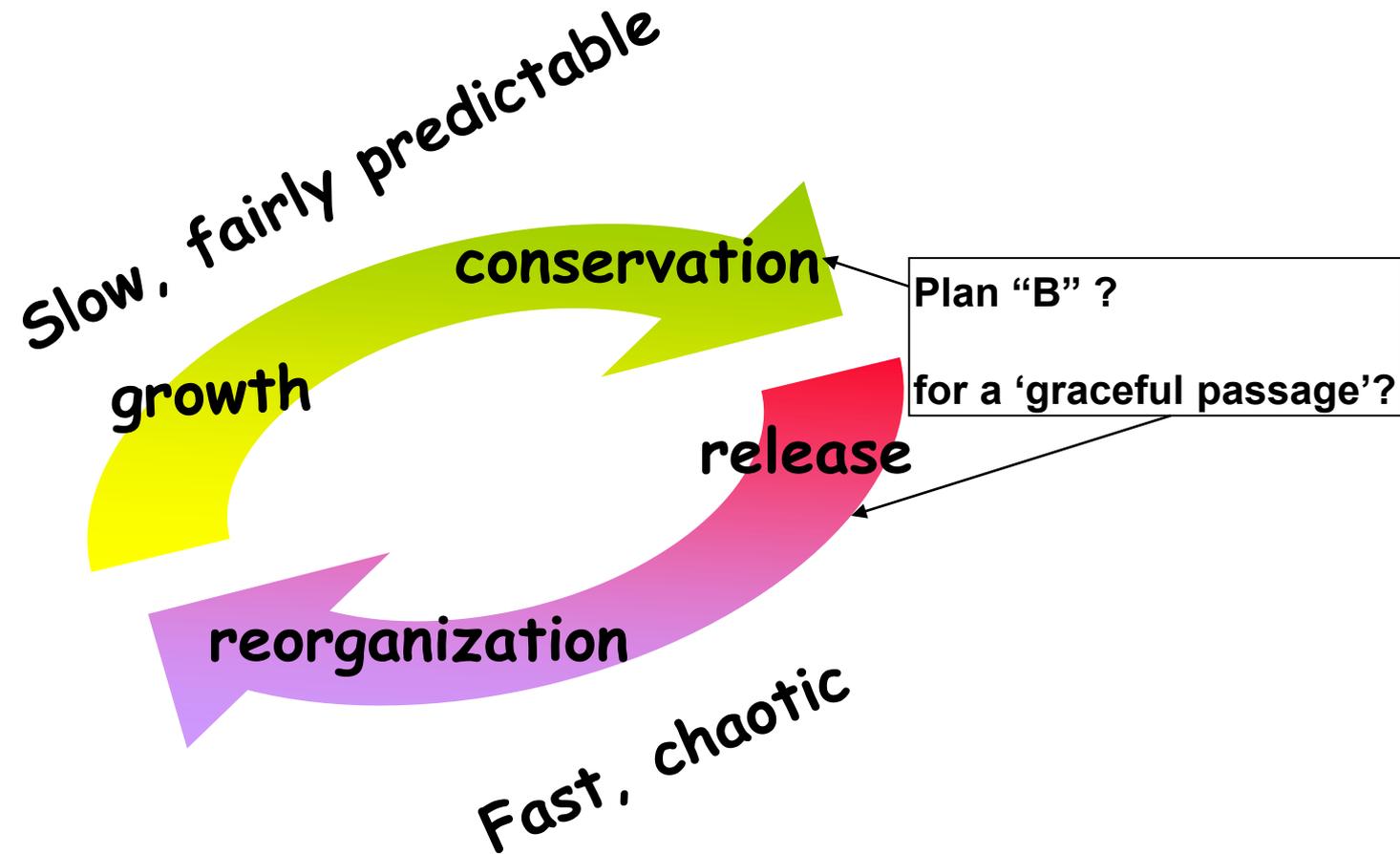
e.g.

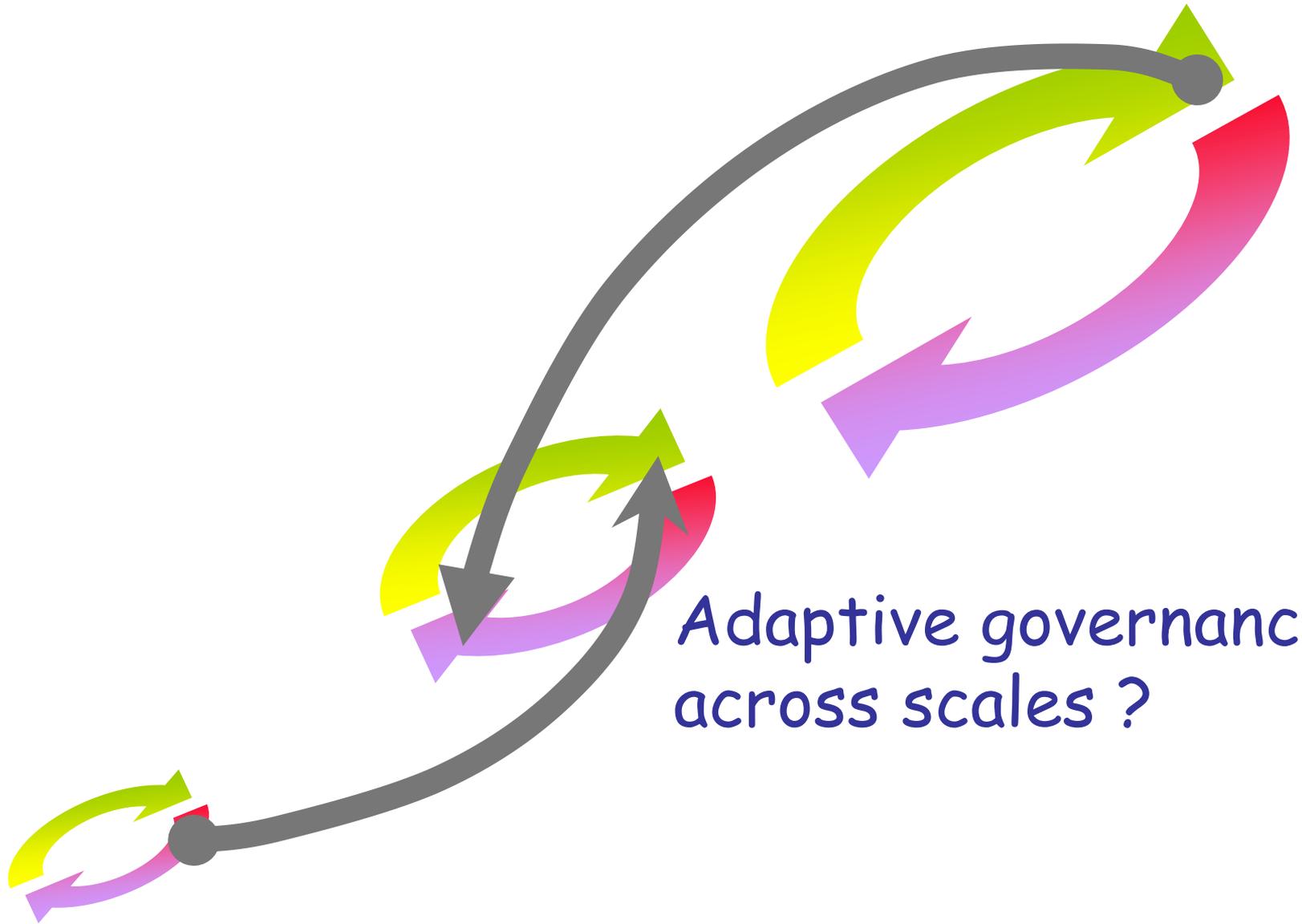
- ecological succession in ecosystems
- demographic change (ageing) in social systems
- social inequity
- increasing connectivity and complexity

general resilience focus

endogenously driven changes through time

- the phases of an 'adaptive cycle'





Adaptive governance
across scales ?

Panarchy - hierarchies of linked adaptive cycles

(ix) The proposition of **panarchy** has become popular and widely used, as a concept, but lacks rigour in application. It needs empirical testing, rather than *post-hoc* justification

Resilience *per se* is neither 'good' nor 'bad'

Undesirable states of systems can be very resilient
(dictatorships, saline landscapes)

A system state that once was considered to be a
'desired' state can become 'undesirable' through
changes in external conditions (context)

Does further adaptation to foster resilience simply amount to digging the hole deeper? (the first rule of holes!)

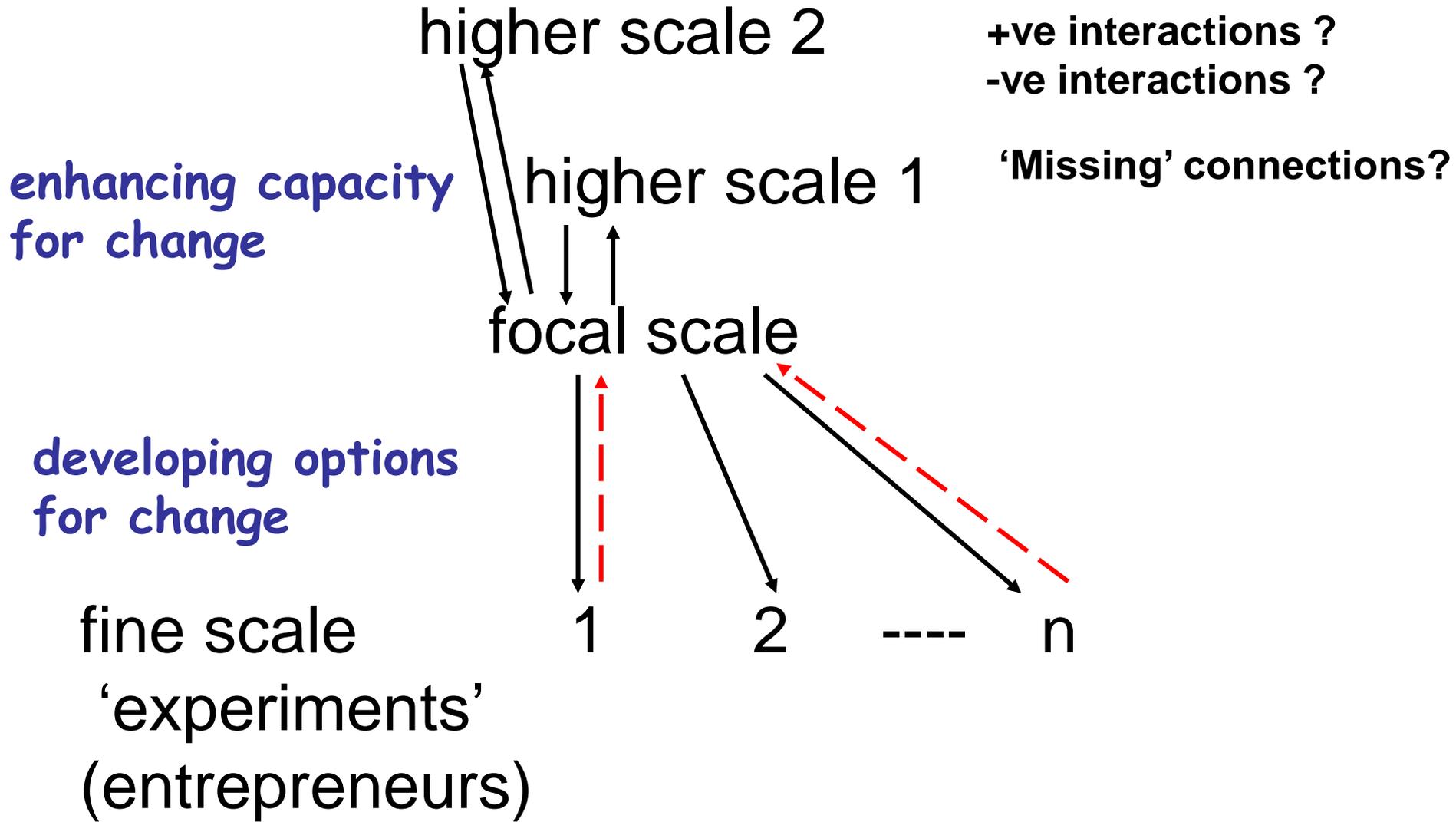
if so, the only option is *transformation*

Maintaining *resilience* at a regional scale can require *transformational* changes at local scales

(x) - resilience and transformability are not "opposites" ; they are compatible aspects of a complex adaptive system that functions at multiple scales

determinants of transformability

- preparedness to change
(getting beyond the state of denial)
- options for change
(new 'trajectories' - emerge from support for experiments, novelty, continual learning)
- capacity to change
(levels of capitals, 'social capital', higher-scale support - the panarchy structure)



In which parts of the region do you need to build resilience, and which parts need transformational change?

(xi) Navigating the combined influences of exogenous shocks and endogenous changes calls for adaptive governance

- how to "do" adaptive governance?

polycentric governance
distributive governance
overlapping functions and scales of
governance

(another area calling for more rigour in applied research; currently more arm-waving than substance)

Some concluding observations from trying to put resilience into practice:

1. a strength

- practitioners mostly love it - "cuts through the dross and gets to what really matters"

2. Things people get wrong, don't understand, etc.

- scales; tendency to limit attention to the 'focal' scale

- confusion about adaptive cycles and specified resilience : Are they connected, and if so, how?

Yes:

where, when and how to intervene to manage resilience depends on the phases of the adaptive cycles (at the important scales)

- it determines what will work, and what won't.

3. Weaknesses, in general

- social domain is OK in terms of 'general resilience', but little rigour in regard to social system thresholds - what to do about this? (nothing? are 'tipping points' important?)

- identifying thresholds. In practical terms, it's a problem .

Time and expertise needed to analyse (model) and quantify thresholds >> what's available