Imagining LCB futures: conceptual maps & scenarios activity

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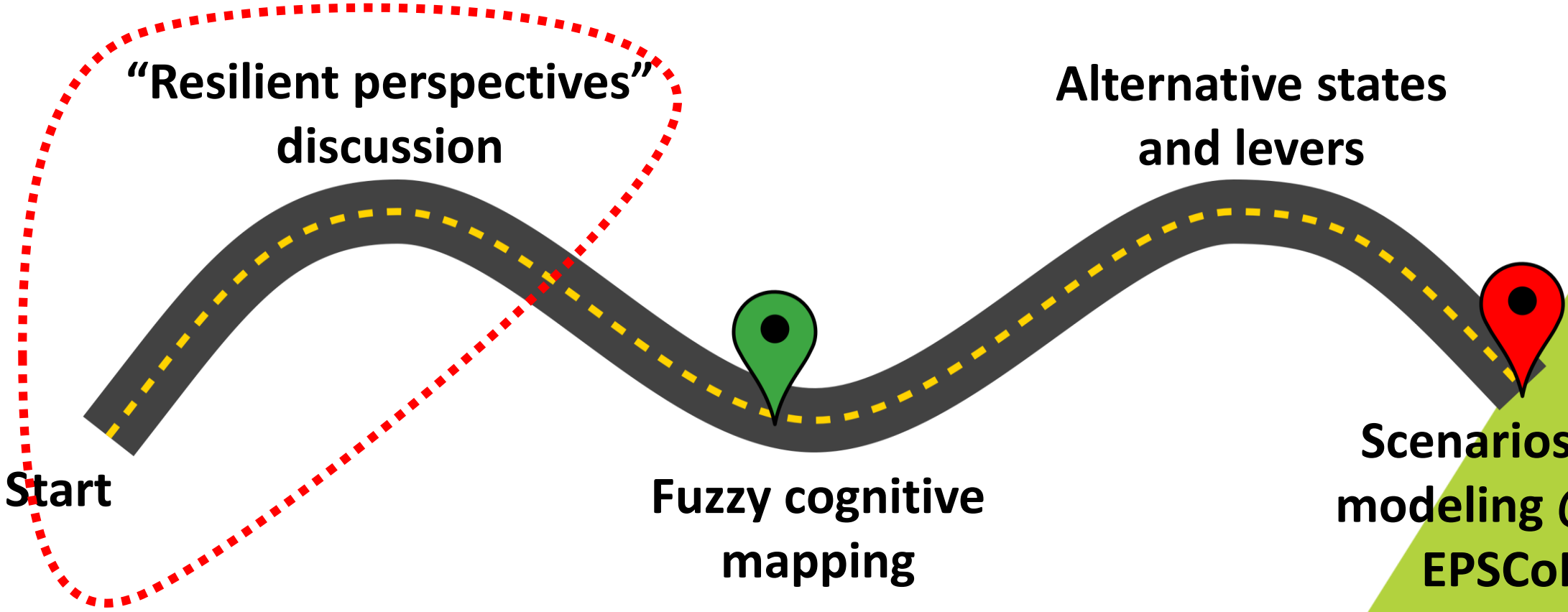
Objectives

1. Develop storylines and scenarios to inform model development and simulation
2. Identify key leverage points and perturbations (disturbances) of interest and concern
3. Explore strengths, weaknesses, and uncertainties in the scenarios, interventions, and their impacts

Activity Roadmap



Previous activity: resilience perspectives

1. What **criteria** would you use to classify the LCB system as resilient or not?
2. What are the extreme events that threaten LCB resilience? What makes the events concerning?
3. In a social-ecological system, some processes move faster (e.g., run-off, crop prices), while others are slower (e.g., regional climate, policy change). What "slow" processes do you view as problematic? Why?
4. What resources are necessary for creating a more resilient LCB? Are they available? Why or why not?
5. Which social actors (governments, institutions, organizations, interest groups) are important for LCB resilience? Are any groups advantaged or disadvantaged by resilience efforts?

Resilience criteria

- Status (or loss) of critical elements
- Amount of time it takes to "bounce back" from an event
- Economic viability
- Land use balance
- In-stream loadings (phosphorus, sediment)
- Landscape storage capacity (water)
- Social justice
- Homeostasis
- Ability to be self-sustaining

PTAC definitions of resilience

"…the Lake Champlain Basin system should maintain critical functions after an event without significant post-event inputs."

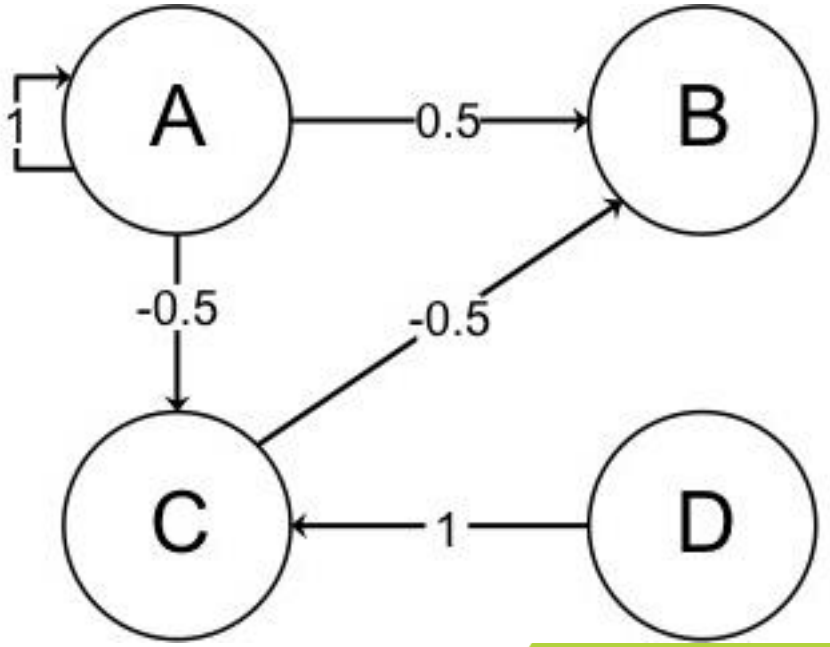
"…ability to provide for public safety and property for as many people as possible affordably."

Today's activity

1. Part 1: this intro (20-30 min)
2. Part 2: **group** work and lunch (1h 45m)
    1. Evaluate and edit a cognitive/conceptual map of the LCB social-ecological system
    2. Consider alternative future scenarios
    3. Write a headline
    4. Return to the cognitive map
3. Group report out (30 min)

What is a cognitive or conceptual map?

- Semiquantitative and dynamic method to structure expert knowledge (Kosko 1986)
- Graphical representations of a system that visually illustrate the **relationships** or **edges** between key concepts, or **nodes**, of the system, including **feedback** relationships
- In resilience studies, used to find basins of attraction (Gray et al. 2015)



Gray, S. A., S. Gray, J. L. De Kok, A. E. R. Helfgott, B. O'Dwyer, R. Jordan, and A. Nyaki. 2015. Using fuzzy cognitive mapping as a participatory approach to analyze change, preferred states, and perceived resilience of social-ecological systems. *Ecology and Society* **20**(2): 11. http://dx.doi.org/10.5751/ES-07396-200211

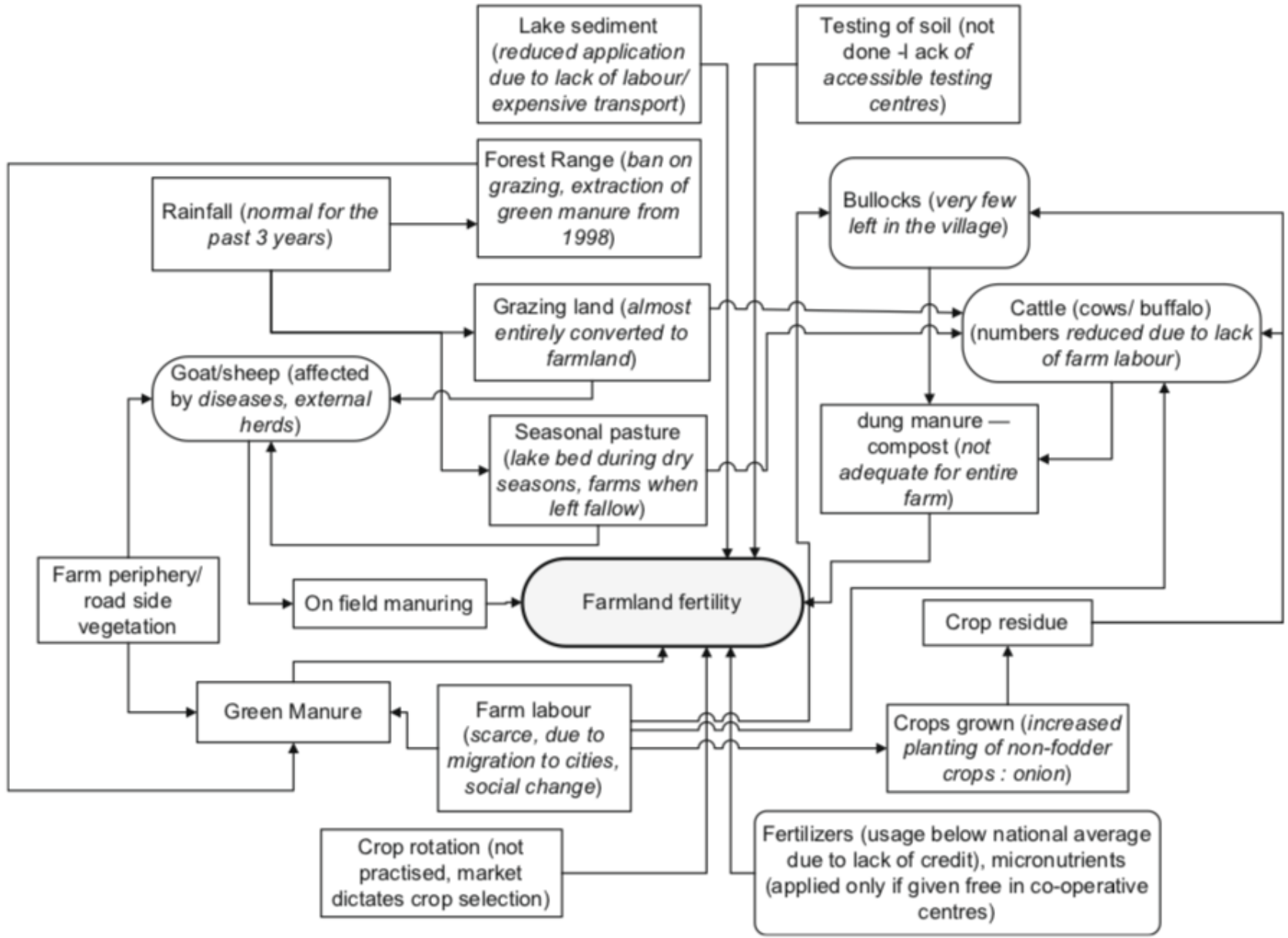
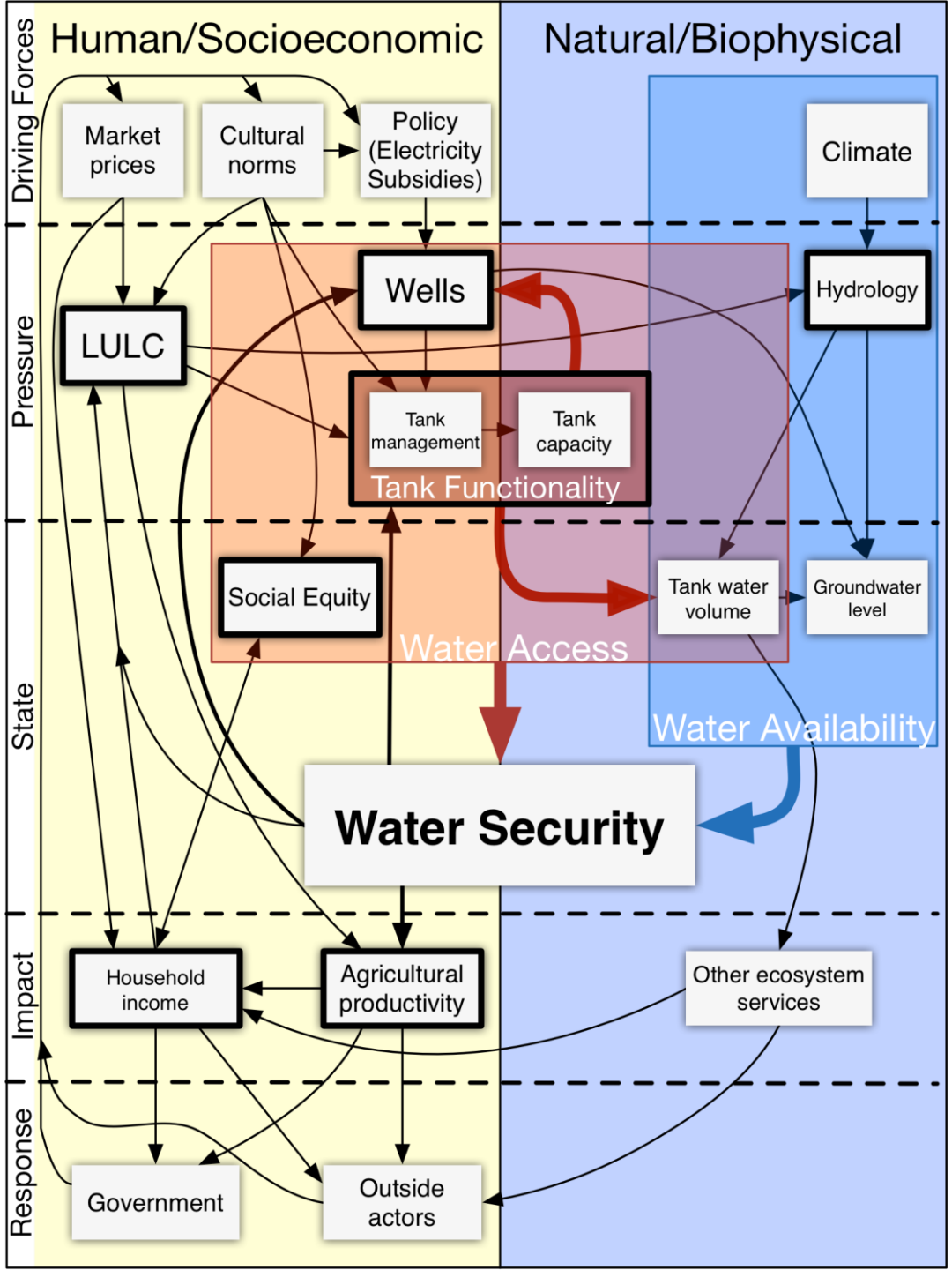
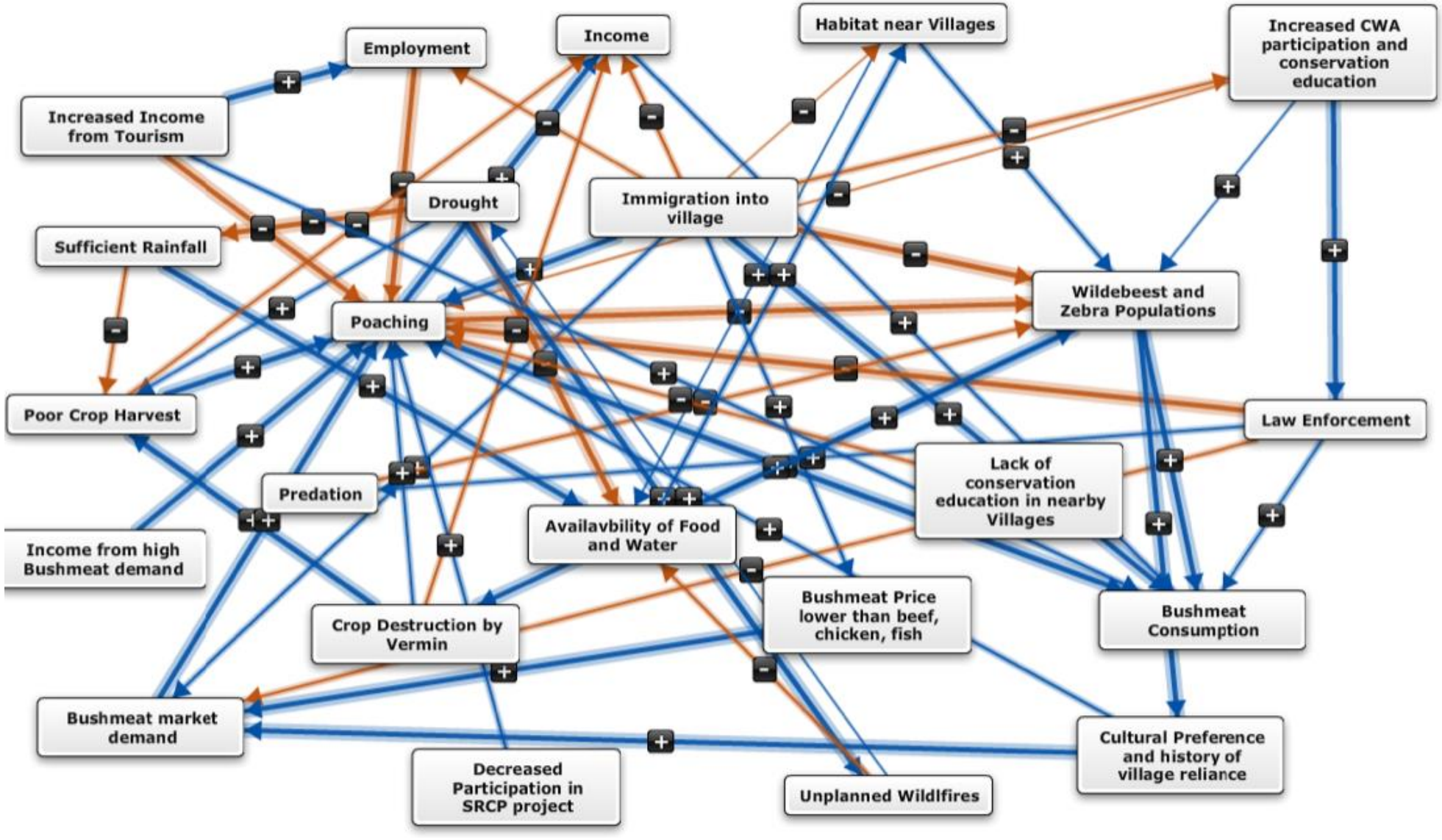


Fig. 7. Cognitive map for farmland fertility.



Bitterman, P., E. Tate, K. J. Van Meter, and N. B. Basu. 2016. Water security and rainwater harvesting: A conceptual framework and candidate indicators. *Applied Geography* 76:75–84.



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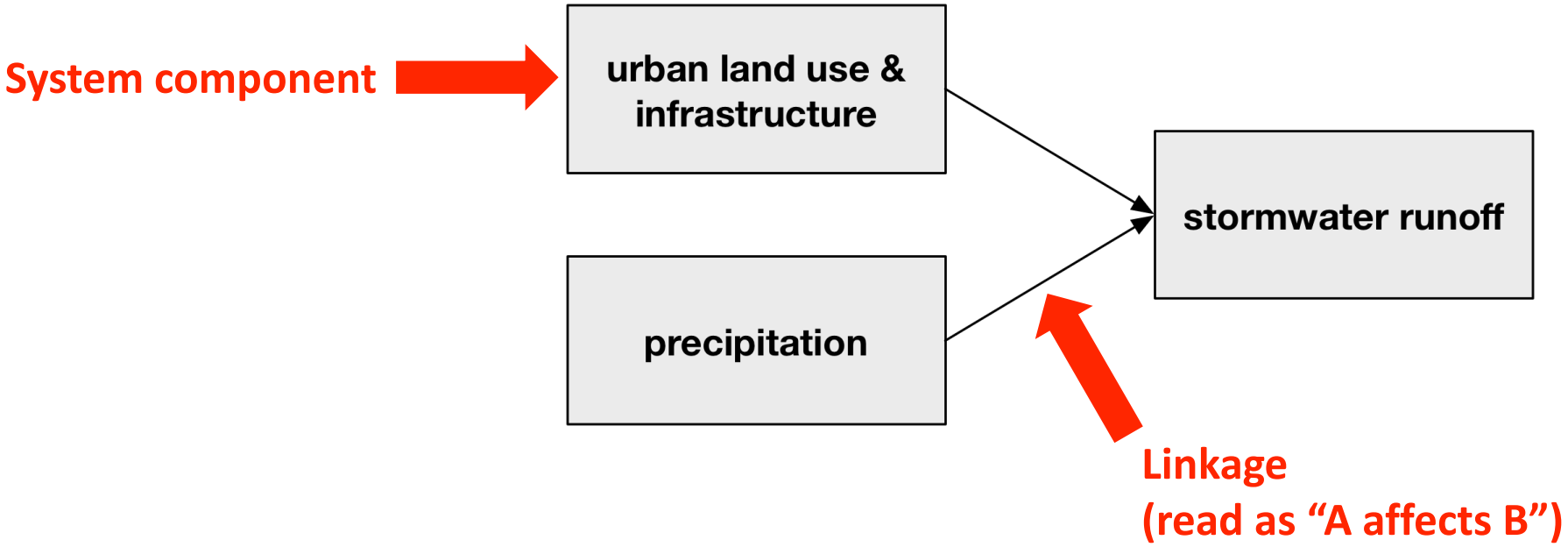
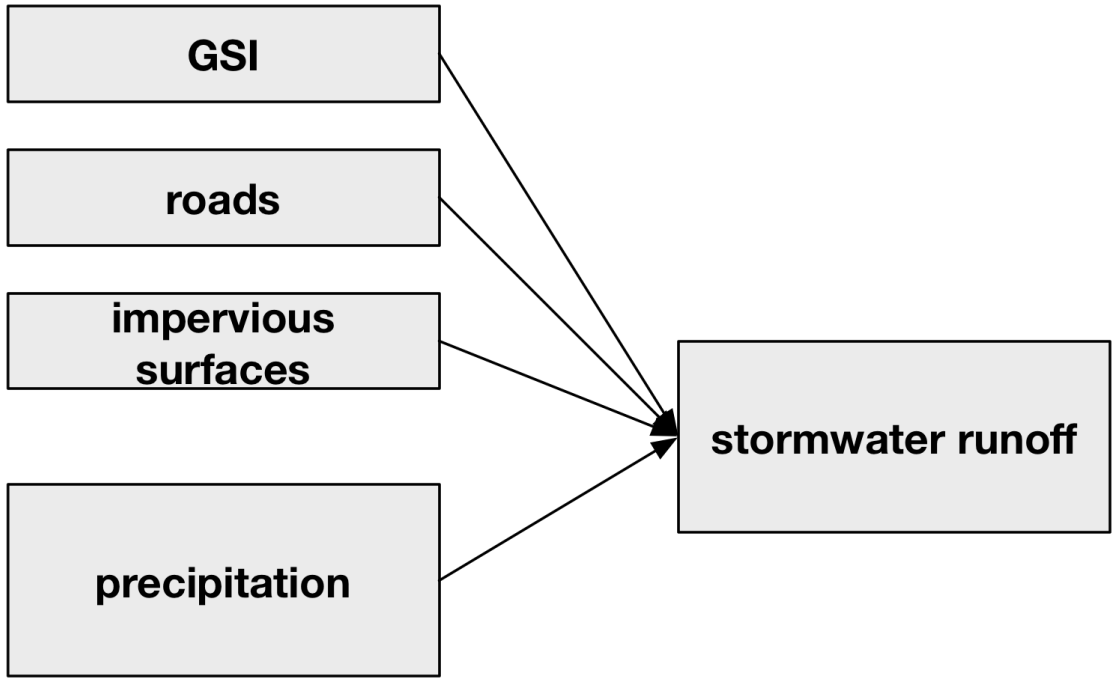
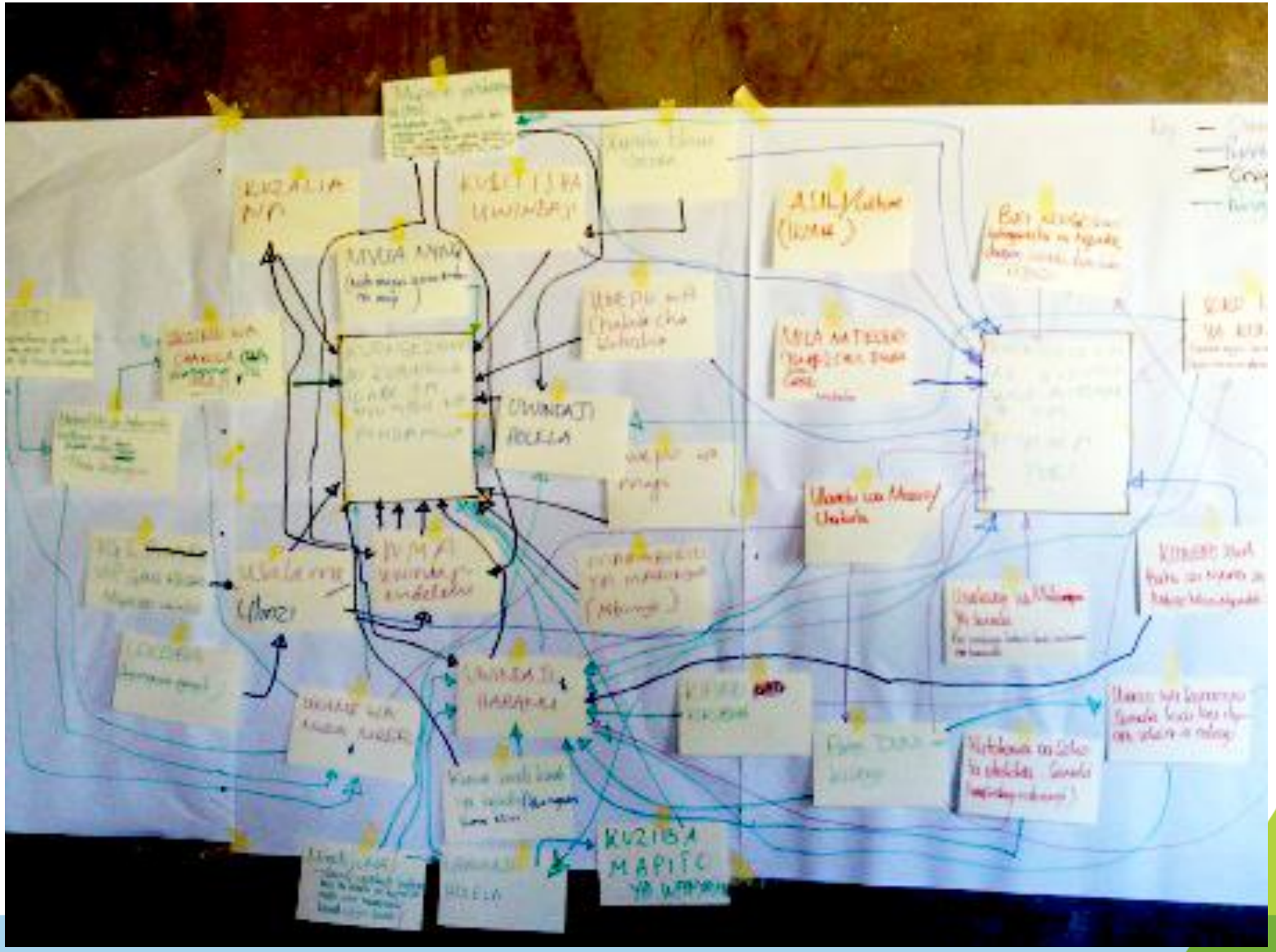
Components and linkages



A more complicated version





Conceptual mapping can be hard

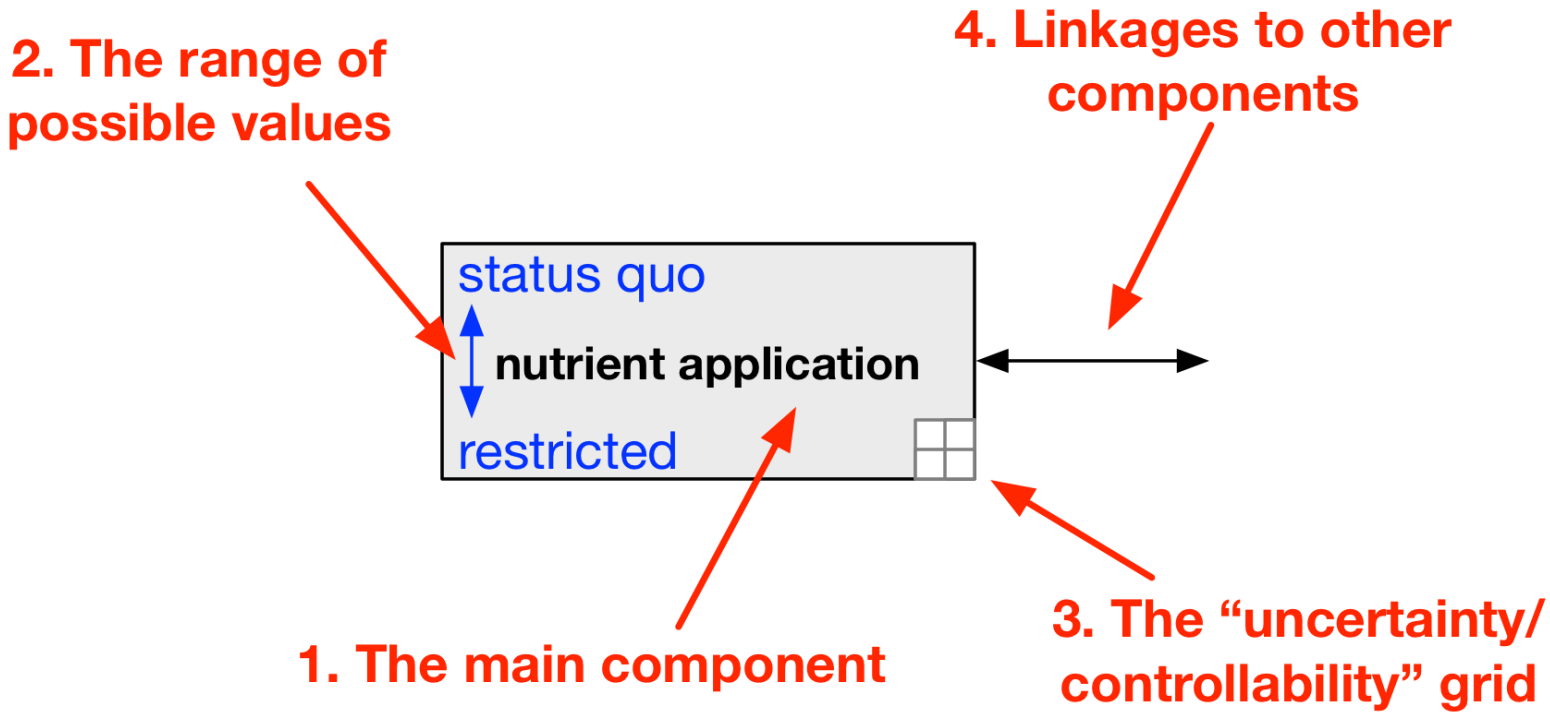
- Scale (always) matters
    - How long is the coastline of Lake Champlain?
    - Does "bounce back from an event" refer to an individual? A group? An institution?
- The level of complexity matters
    - What could a "hydrology" box mean? A "wellbeing" box?
    - The concept and the measurement can be mismatched or misaligned
- **Requires stakeholder knowledge and an acknowledgement of uncertainty**

That's where you come in

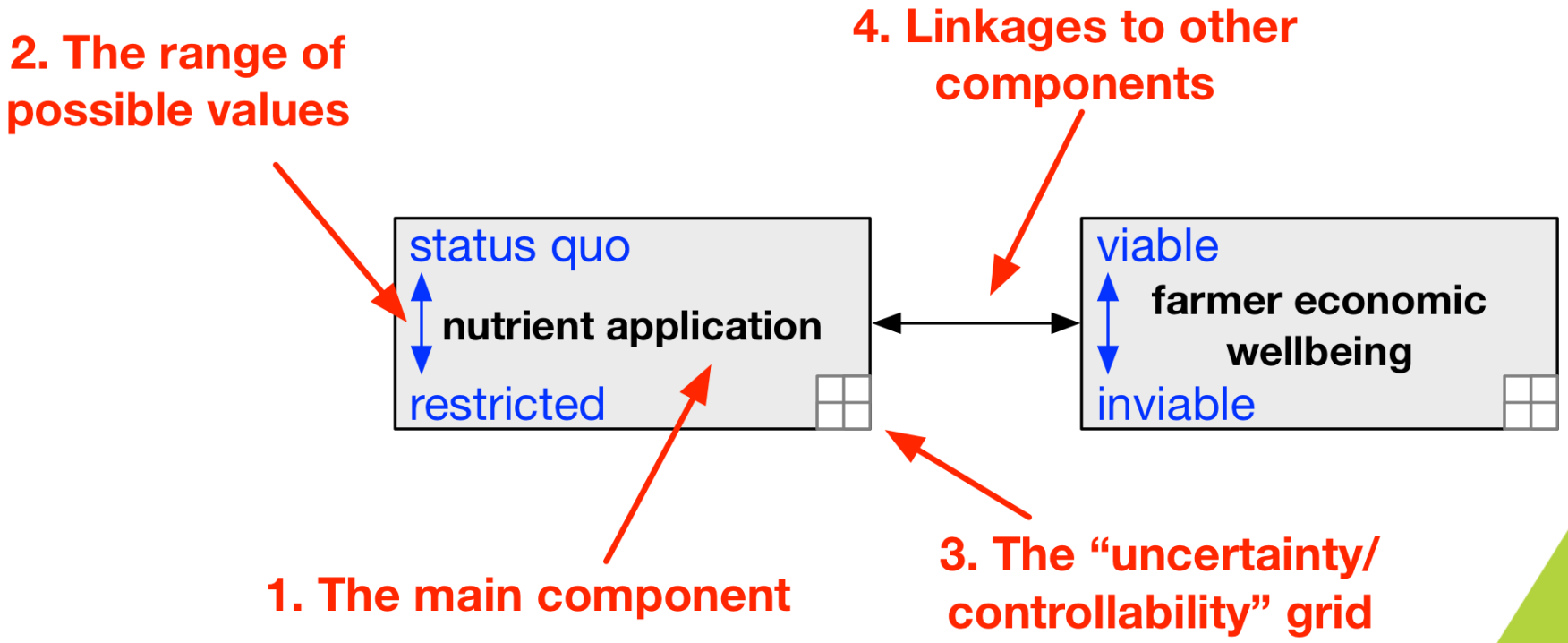
1. Evaluate and edit a cognitive/conceptual map of the LCB social-ecological system
    - It is a purposeful simplification of the system and IAM – just key aspects
    - What is missing?
    - What is wrong?
    - What is important? Unimportant?
2. Consider & develop alternative future scenarios
3. Write a headline & short storyline
4. Return to the cognitive map

Detailing our cognitive map

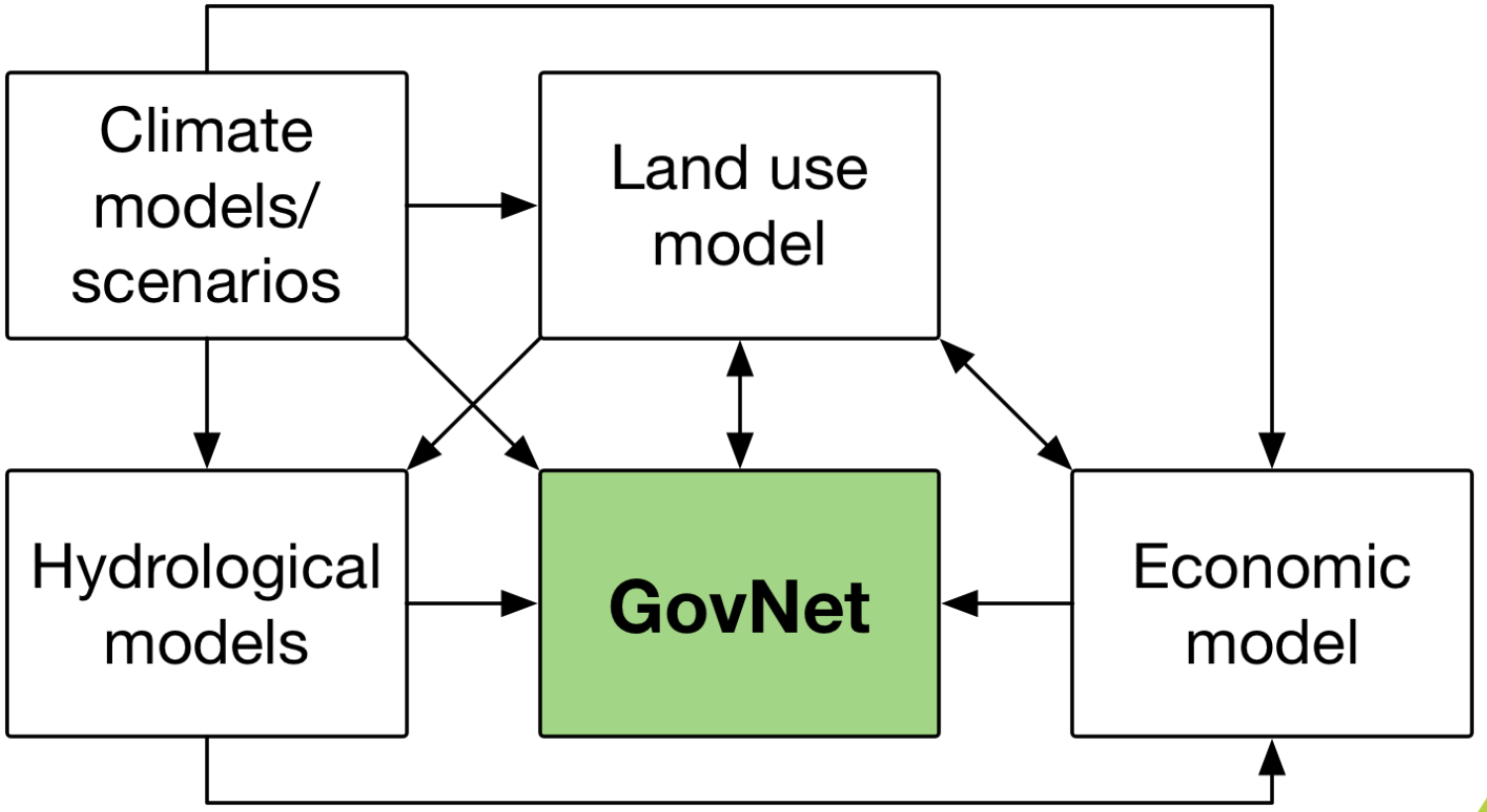
Our concept boxes

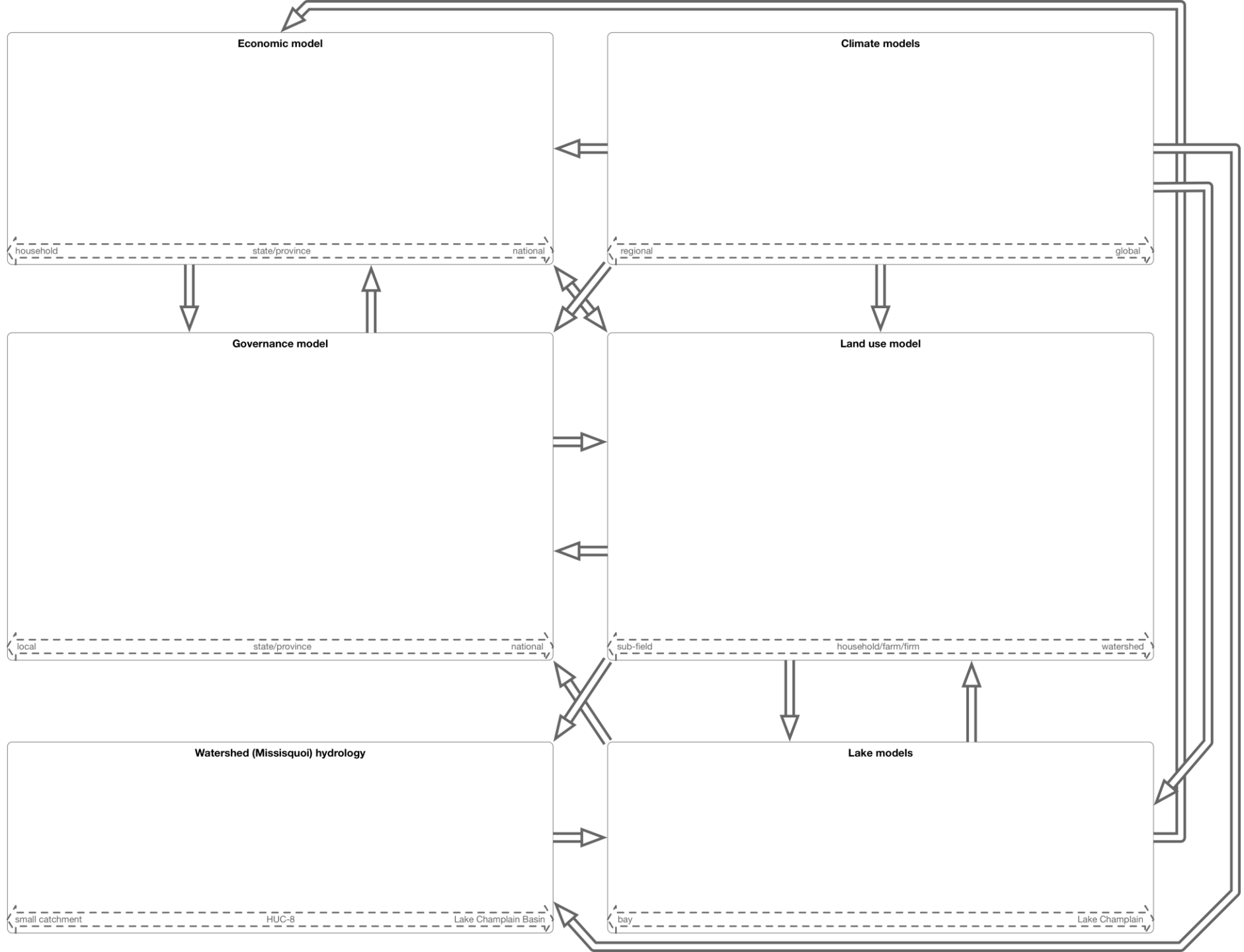


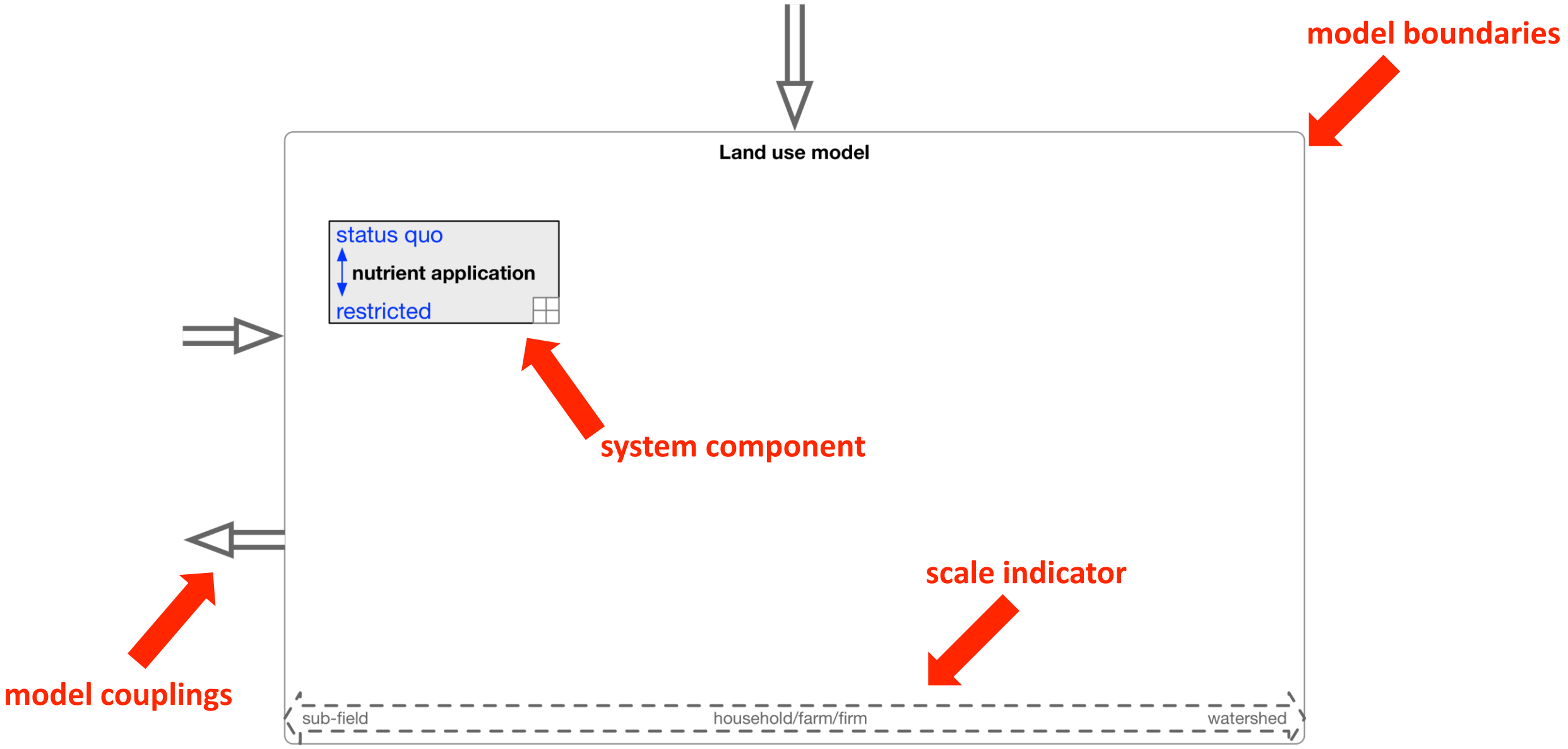
Our concept boxes

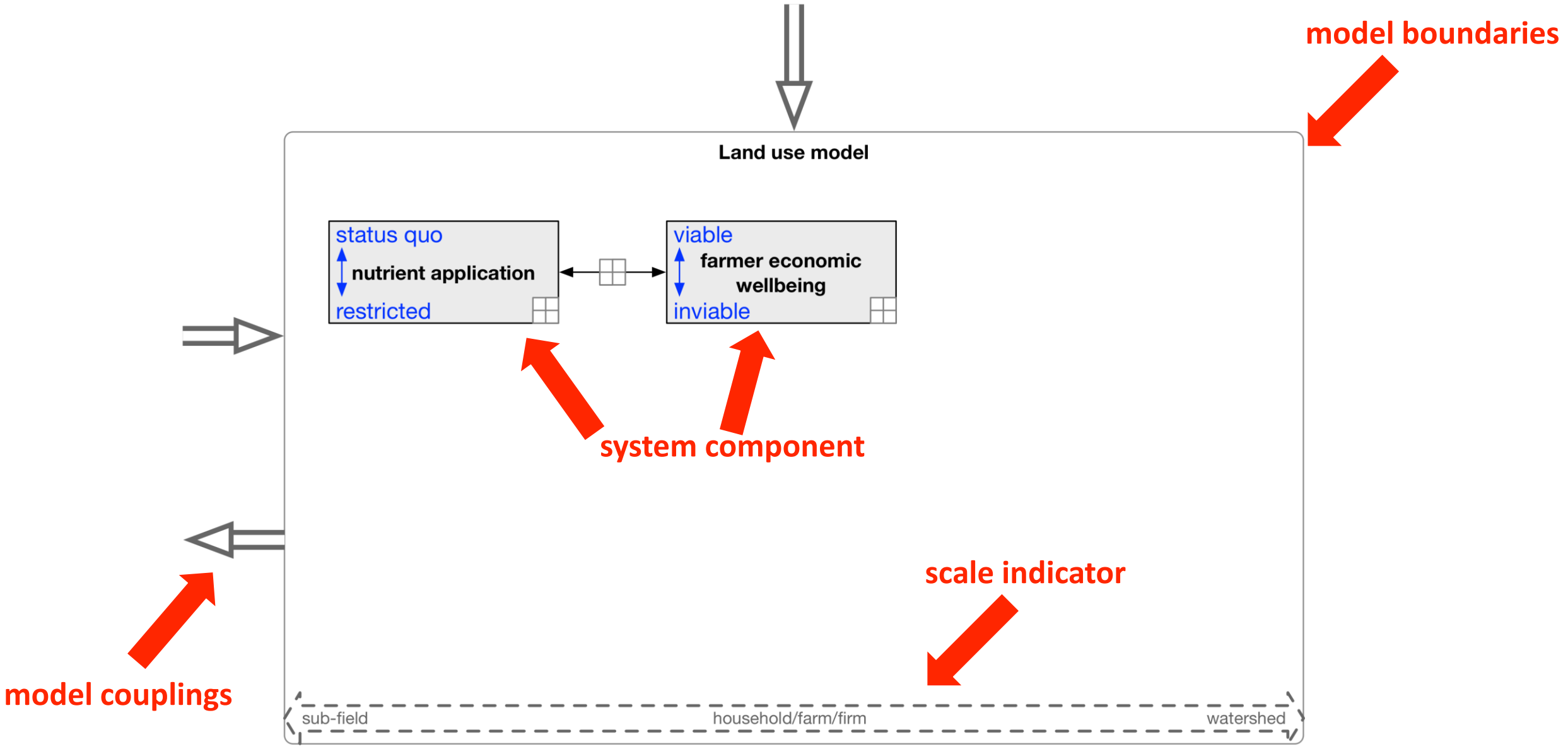


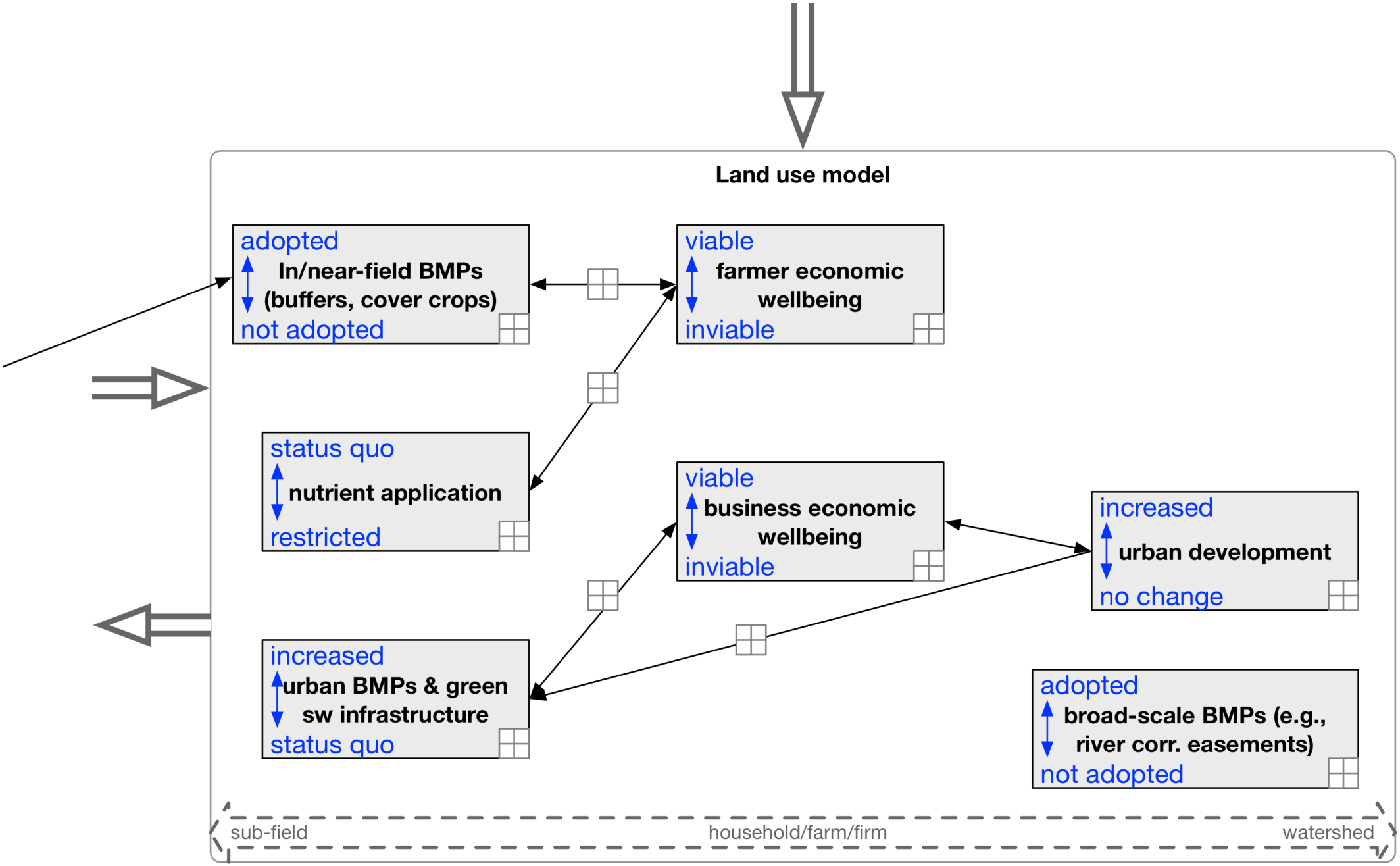
One view of the IAM

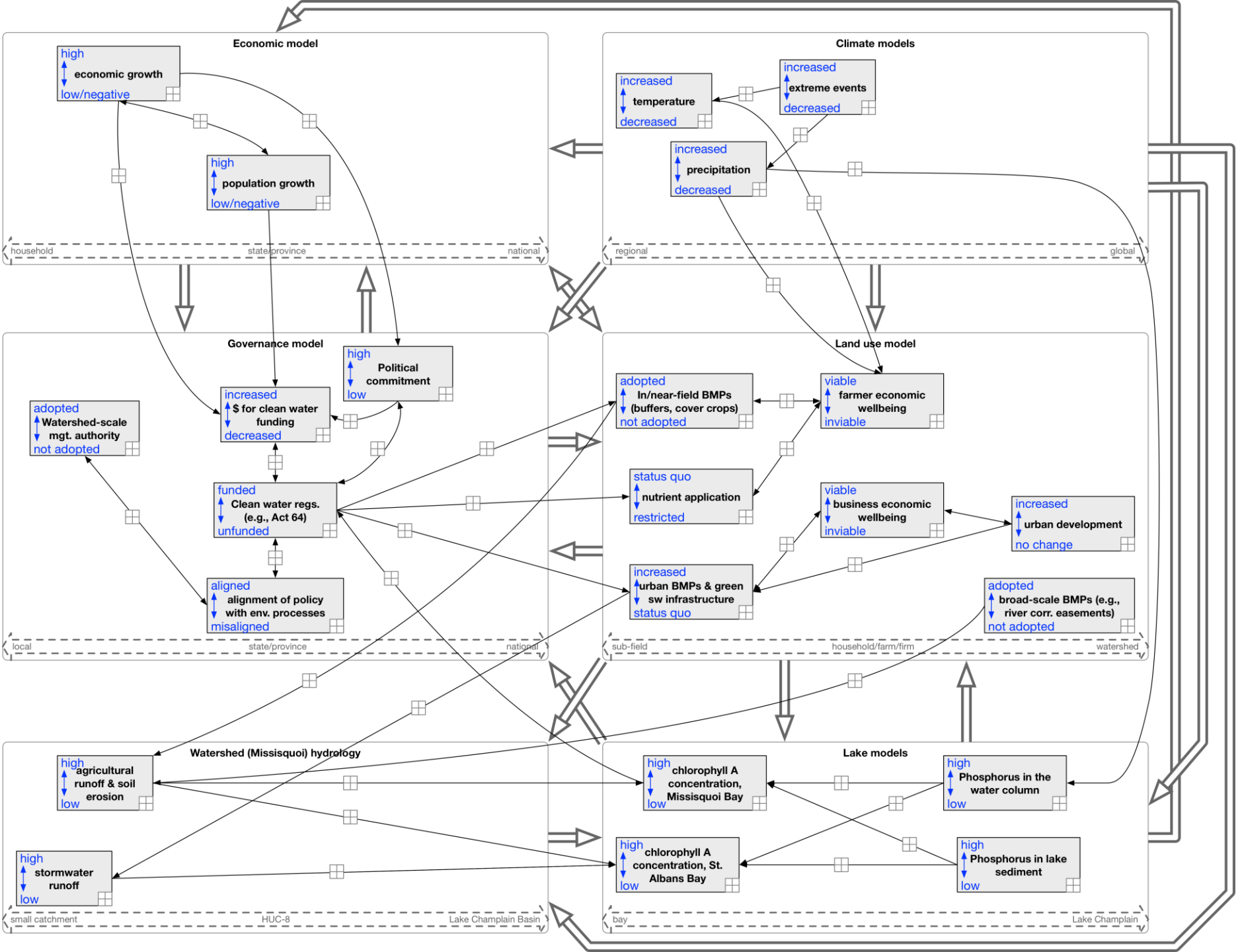



Economic model
household
state/province
national
Climate models
regional
global
Governance model
local
state/province
national
Land use model
sub-field
household/farm/firm
watershed
Watershed (Missisquoi) hydrology
small catchment
HUC-8
Lake Champlain Basin
Lake models
bay
Lake Champlain


model boundaries
Land use model
status quo
nutrient application
restricted
system component
scale indicator
model couplings
sub-field
household/farm/firm
watershed


model boundaries
Land use model
status quo
nutrient application
restricted
viable
farmer economic wellbeing
inviable
system component
scale indicator
model couplings
sub-field
household/farm/firm
watershed


Land use model
adopted
In/near-field BMPs
(buffers, cover crops)
not adopted
viable
farmer economic
wellbeing
inviable
status quo
nutrient application
restricted
viable
business economic
wellbeing
inviable
increased
urban development
no change
increased
urban BMPs & green
sw infrastructure
status quo
adopted
broad-scale BMPs (e.g.,
river corr. easements)
not adopted
sub-field
household/farm/firm
watershed



Evaluate and edit

- What is missing? (add it)
- What is wrong? (change it)
- What is important? (mark it)

Storylines and headlines

- The year is 2040
- You are the environmental beat reporter for *The Champlain Seven-Digger-Times Independent Daily Free Press.net*
- You've been assigned a story: *a 25 year retrospective on Act 64 and its effects in the LCB*
- What story do you write? What's your headline?
- Your packet has additional details **AND** a place to write
- Finally, there are 4 questions to address (under the headline)

In review

1. Part 1: this intro (almost done)
2. Part 2: group work and lunch (1h 45m)
    1. Evaluate and edit a cognitive/conceptual map of the LCB social-ecological system
        - What is missing?
        - What is wrong?
        - What is important? Unimportant?
    2. Consider alternative future scenarios
    3. Write a headline
    4. Return to the cognitive map
3. Part 3: group report out (30 min)

Group activity

- Break up into smaller groups
- Identify group members for 2 roles:
    1. **Reporter**: group's spokesperson
    2. **Recorder (BREE person)**: take notes summarizing important discussions and decisions
- You have until 2:15 pm
- Alternative viewpoints are welcome (and expected) – you do not need to come to a consensus

- What we're asking is confusing
- Everyone has a packet that includes explanations of tasks, additional descriptions, space to write, and examples
- Flag down a BREE person

Go!

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Group report out

- Headlines
- Did the conceptual mapping process work? What parts?
- Does the conceptual map below need to change to fit your storyline? If so, how?
- What are the primary factors that led to your storyline?
- What possible new risks might be created in your storyline?
- In your storyline, what don't we know enough about? Where do we need to increase our knowledge?

Thank you!