

Land Use and Biophysical Carbon Cycling

**Workshop on Climate Change Impacts and Integrated Assessment
(CCI/IA), Snowmass, CO**

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July 24, 2012

Does it matter? Modelling Approach

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- Depends on the research question
- Data availability
- Time constraints
- Research team expertise
- Target audience
- Blah blah blah...

Does it matter? Data availability

- **Fine resolution models**

- can be much more data intensive than coarse res.
- when detailed decision making and preferences
 - experience with targeted models (UM) and general model development across range of study sites (EDIN)
 - data is sparse
 - preference and behaviour seem to be rarely predicted by characteristic information available (e.g., census)
 - can get around this by leveraging the model via SA or scenarios (e.g., Arun et al. in revision)

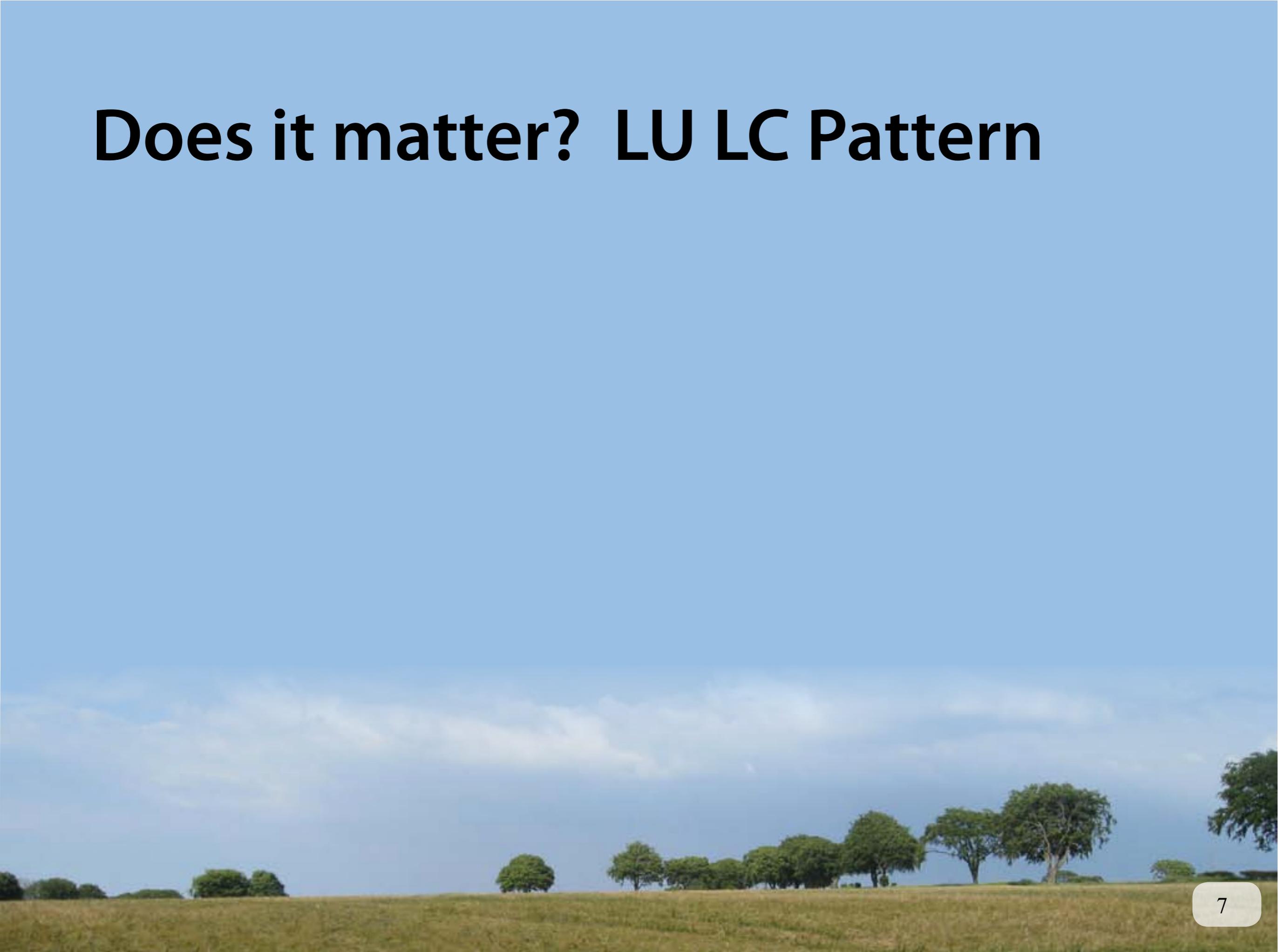
Does it matter? Heterogeneity



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- Detailed representation of actors and their decisions
 - decision making structures
 - capacity to change the land
 - demographics and changing preference structures
 - landscape constraints
- leads to understanding of how processes arise
- enables different types of interaction (i.e., not random mixing)

Does it matter? LU LC Pattern



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- O'Neill's question to Jain
 - Location
 - for biophysical outputs (e.g., crop yields) - YES
 - for land-use change (e.g., urban growth) - YES
 - Pattern (e.g., #patches, patch size, etc...)
 - for biophysical outputs (e.g., carbon storage) - YES
 - however, edge effects are rarely taken into account

Does it matter? Private vs. Public Goods



Does it matter? Private vs. Public Goods

- many goods are not visible to the public
 - e.g., carbon storage, ground water, etc..
 - until a threshold is crossed
- Role of governance
 - monitor
 - constrain, sanction, regulate
 - enable, promote or incentivise, propagate

Completing the loop in CNHS

- In many cases we are very selective in the feedbacks from the environment back to the human system
 - space constraints, crop yield or land prices,
 - many are missing that create positive feedbacks
 - e.g., culture, lifestyle, aesthetics, open space, recreation, and other rural amenities (e.g., reason why aspen exists!)
 - or repelling feedbacks (e.g., keeping people out of a region)
- To what degree does avoiding these issues in our models affect our results?

Does it matter?

- Yes, but when does it matter?
- There is likely to always be a circumstance when the aforementioned factors do matter, but can we
 - better identify which questions require a specific approach or data is critical, or
 - what questions can not be properly addressed without bridging top-down and bottom-up modelling approaches could be very useful