

Questions for short writing assignments for land-use modeling, revised Oct. 8, 2007

(Complete for one of the weekly readings. If you are presenting a paper, you may do your short writing assignment on the same article. You have to write up the answers as always. Also include your answers in your talk).

Questions:

- 1) What is the specific research question or hypothesis addressed by the author(s)?
- 2) What factors are endogenous and exogenous in the model? (*Note: what is endogenous and exogenous depends to an extent on the type of model we are looking at. Very simply, exogenous elements are input data and/or assumptions -- what you know before you run the model. Endogenous elements are the output of the model -- the new information that you have after the model is run. Endogenous outputs depend on the exogenous inputs. Some elements can start as exogenous (through initial conditions) but change exogenously as the model runs, for example, land uses at particular points in space.*)
- 3) At what spatial (resolution and extent) and temporal (time scale and duration) scales does the model operate? Does the model operate over multiple spatial and/or temporal scales? If so, are any cross-scale linkages and/or feedbacks present?
- 4) What types of agents make decisions over land use in the model application (in the real world)? Are these agents represented explicitly in the model? What is the relationship between the spatial and temporal scale of agent decision making in the real world and the spatial and temporal scale of the model? (*Note: Per Agarwal et al., "Agent refers to the human actor or actors in the model who are making decisions."*)
- 5) What real-world factors affect agent decision making in the model application? (You can go back to the literature that we reviewed on "drivers of land-use change" to remind yourself of these factors.) Which of these are also included explicitly in the model?
- 6) In what ways (per Goodchild's defs) is the model explicitly spatial? (*Note: I've reordered these from low to high hurdles.*)

- The *representation* test: SEM include representation of location in their implementations. Rephrasing, this means that absolute locations are represented by a coordinate system, such as in a shape file.
- The *formulation* test: concepts such as location or distance appear directly in the model, in algebraic expressions or behavioral rules. For example, the model passes if it includes transportation costs (dependent on distance) or neighborhood effects (dependent on contiguity and topology).
- The *invariance* test: spatially explicit models (SEM) are not invariant under relocation

of the objects of study. Rephrasing, if you change the locations of the elements used to initialize the model (for example, initial land uses, locations of agents, transportation networks), the outcome of the model will change.

- The *outcome* test: spatial structures of inputs and outputs are different; it modifies the landscape on which it operates.

7) Are any ecological/biophysical processes accounted for?

8) What strategies have been used for verification and validation?

9) Describe or diagram the system described by the model, paying particular attention to the scales at which different processes/drivers operate. (Focus on the causal links and feedbacks, if they are there.) This is similar to what we did on the board with your case studies.

10) What, if any, are the policy implications of the model's results?

11) Give some general commentary regarding the paper, including such questions as:

- How effectively did the author(s) identify and include key spatial, temporal, and human drivers of land-use change?
- Do you think that the modeling technique employed was effective for modeling the particular case/research question described in the paper?
- Can you suggest possible extensions, or other areas of application, for the model?
- What did you see as the strongest and weakest aspects of the paper?

(You don't have to answer all four questions; a good answer to one is sufficient.)