Considering the Suitability of Engaging Stakeholders in Forest-Based Socio-Ecological Systems Modeling

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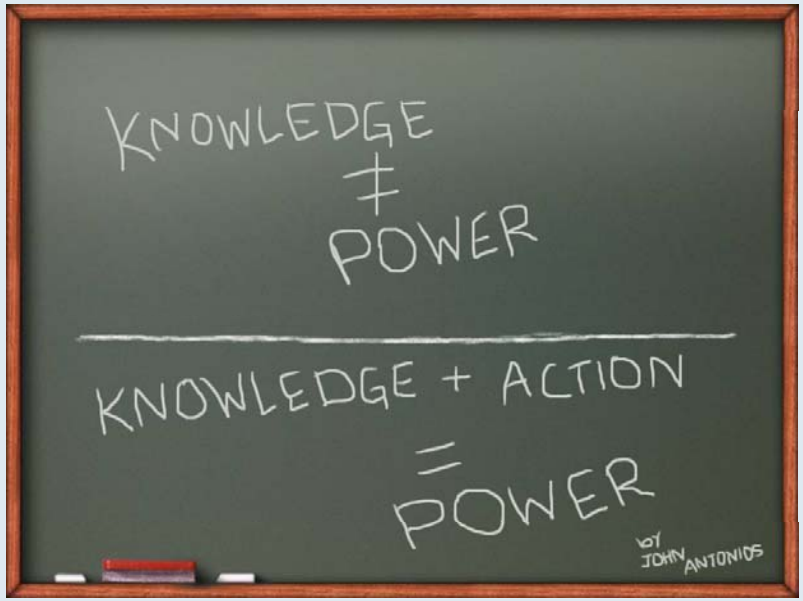
Overview

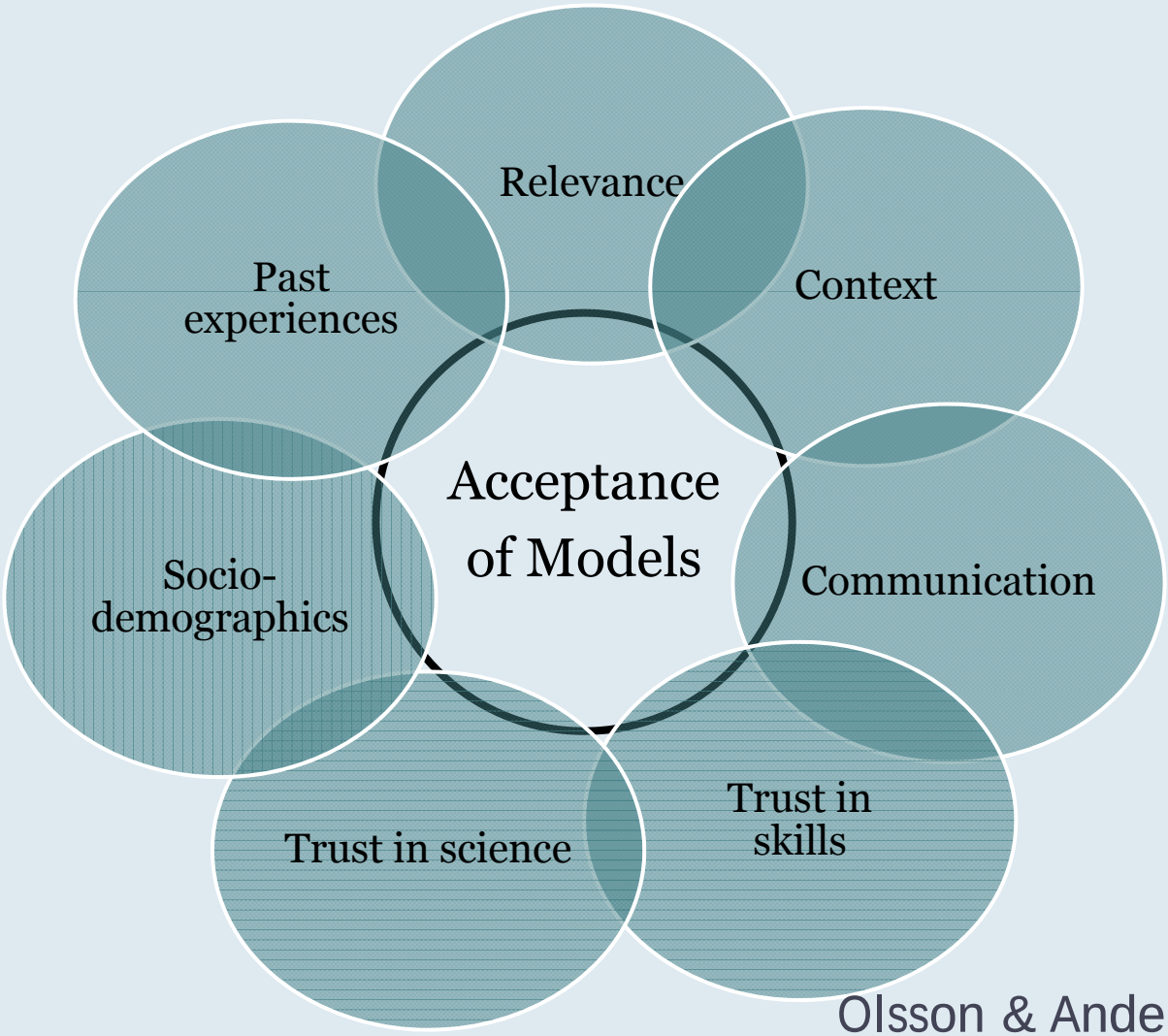
- Knowledge to action in social-ecological systems
- Stakeholder engagement
- Model acceptance
- Case study: Building a Family Forest Agent-Based Model with Stakeholders
- Implications for SES Modelers



Bringing Knowledge to Action

- Social-ecological systems as a “wicked problem”
- Limited evidence of agent-based modeling use by natural resource managers
  (Gebetsroither, Kaufmann, Gigler, Resetarits, 2006; Matthews, Gilbert, Roach, Polhill, & Gotts, 2007; Pahl-Wostl, 2002; Parker, Manson, Janssen, Hoffmann, Deadman 2003)
- How do stakeholders view models?

Model Acceptance



Olsson & Andersson, 2007

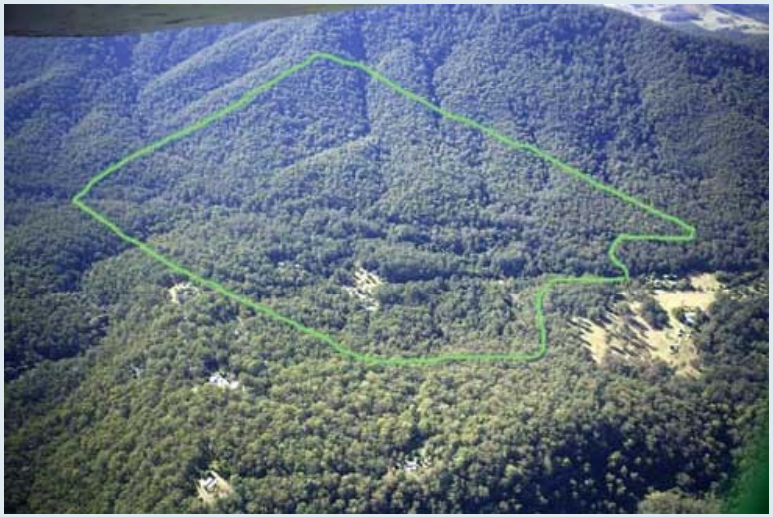
Stakeholder Engagement

- Variety of methods:
  - Stakeholder participation (Reed et al. 2008)
  - Mediated modeling (Van den Belt, 2004)
  - Social learning (Maarleveld & Danbegnon, 1999)

- Potential benefits:
  - Identifying future research areas
  - Increase saliency, legitimacy, and credibility
  - Model acceptance

Case Study: Building a Family Forest Agent-Based Model with Stakeholders

- Purpose: create a learning tool to better understand family forest landowner harvesting behavior
- Structure:
  - Landscape
    - Parcels, FIA data, FVS
  - Agents
    - Landowners
    - Goal structure and beliefs
    - Interact via communication
    - Decisions and actions



Family Forests in Maine

- Family forests as coupled SES
  - What are they?
  - Why are they important?
- Family forests face a variety of decisions:
  - Timber Harvest
  - Subdivision
  - Estate Transfer
  - Public Access

Case Study Objectives

1. What gains come from involving stakeholders in the modeling process?
2. How does stakeholder knowledge change?
3. How do stakeholder attitudes change during social learning modeling activities?
4. What are the key barriers to model adoption among stakeholders?

A Mixed-Methods Approach

- A series of 3 focus groups w/survey
  - Beginning of ABM creation
  - Midway through modeling process
  - Fine-tuning the model details

- Technical details
  - Scripted questions, presentations on modeling progress, group activities
  - Audio recorded, transcribed, and to be analyzed with NVivo

Family Forest Stakeholder Participants

- Legislators
- GrowSmart Maine
- Small Woodland Owner Association of Maine
- American Tree Farm System
- Maine Forest Service
- State planning office
- Maine Inland Fisheries & Wildlife
- Natural Resource Conservation Service
- Private forest management company

1. What gains come from involving stakeholders in the modeling process?

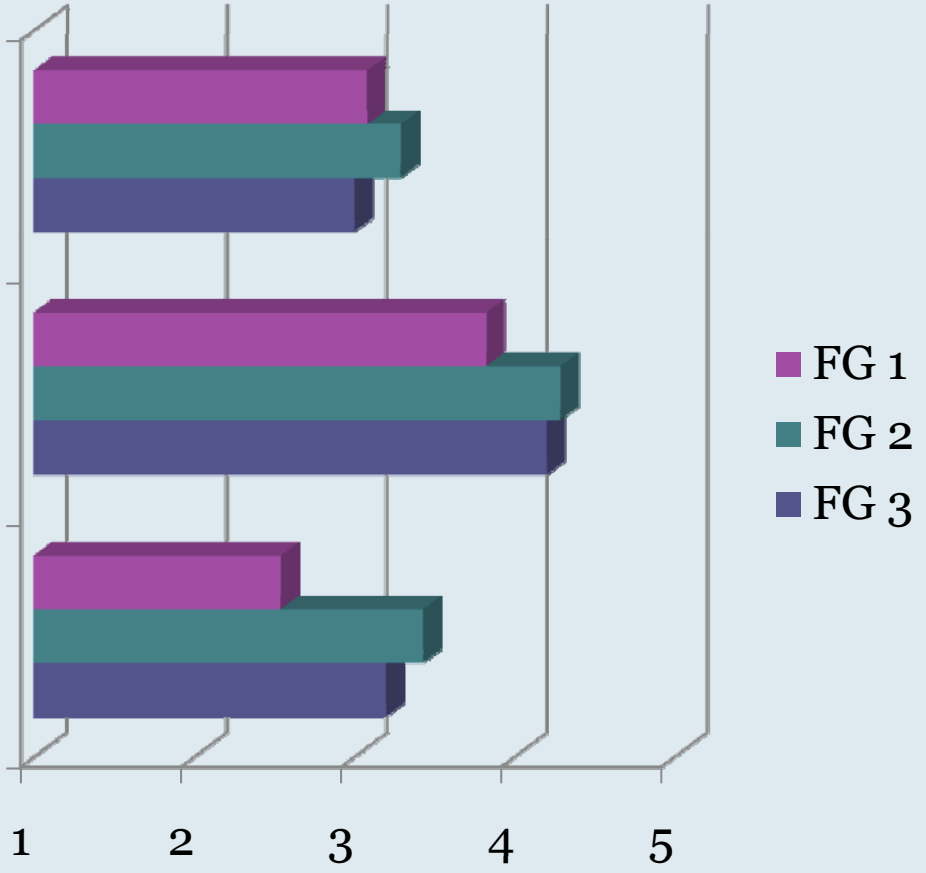
- Model improvements
  - FIA data sampling
  - Agent goal structure
  - Actions
  - Agent communication
- Understanding of stakeholder needs
  - Relevance
  - Context
  - Communication

2. How does stakeholder knowledge change?

I understand the agent-based models that are in use today.

I understand the purpose of using agent-based models.

Prior to today, how would you rate your awareness of agent-based models?

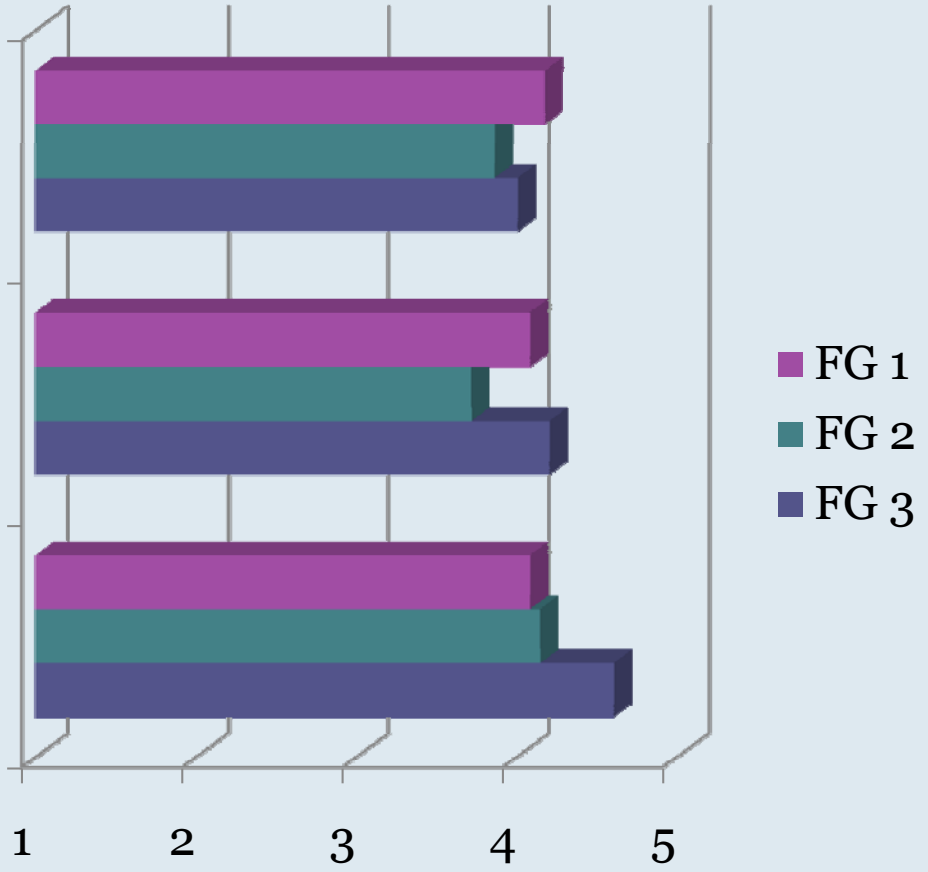


3. How do stakeholder attitudes change during social learning modeling activities?

I believe agent-based models are a useful learning tool.

How interested are you in learning more about forest-related agent-based models?

How interested are you in learning more about forest resource models, in general?



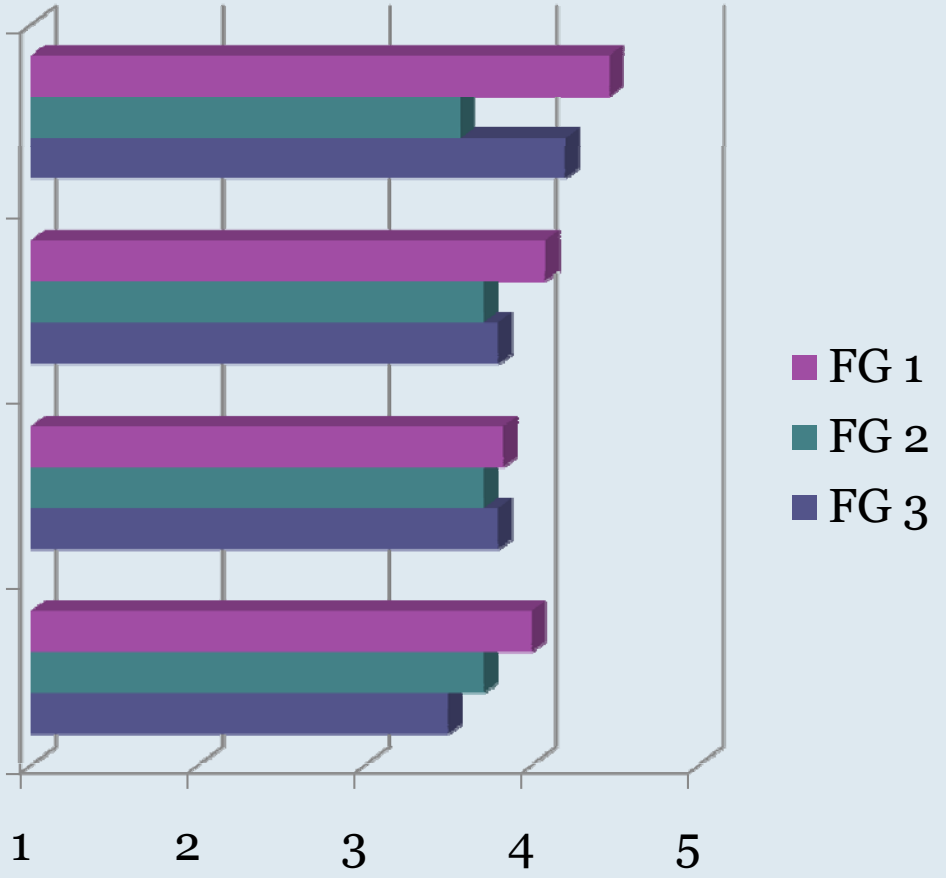
3. How do stakeholder attitudes change during social learning modeling activities?

It is possible to understand large issues by examining small components.

It is important to examine human behavior through agent-based models.

It is important to examine policy impacts through agent-based models.

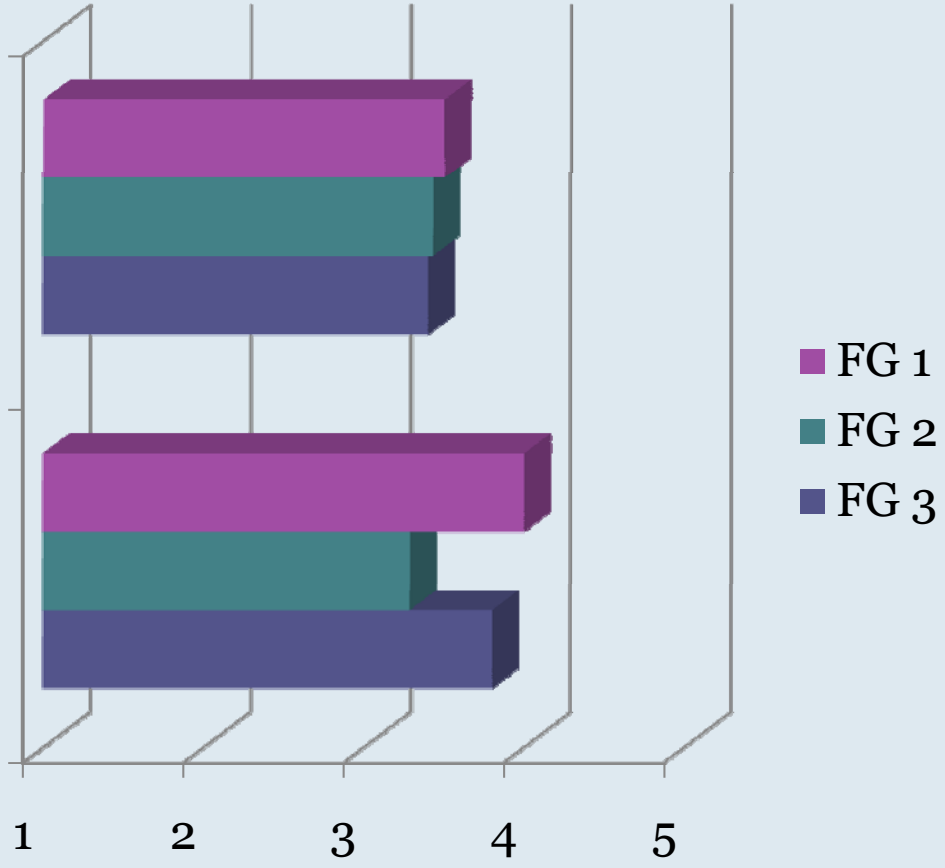
It is important to examine environmental changes through agent-based models.



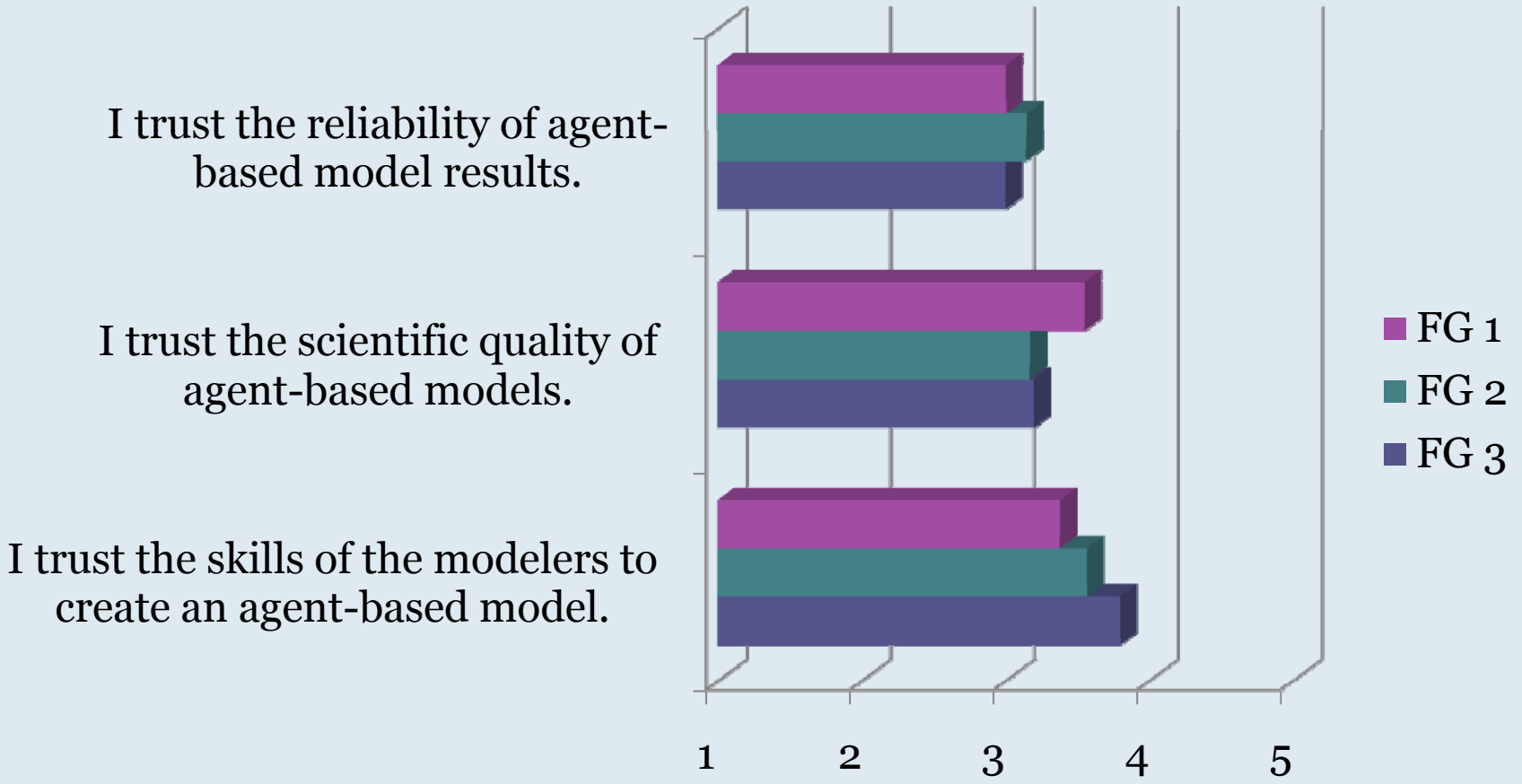
3. How do stakeholder attitudes change during social learning modeling activities?

I believe agent-based models can be used to create forest management policies or laws.

I believe agent-based models can be used to make forest management decisions.



4. What are the key barriers to model adoption among stakeholders?

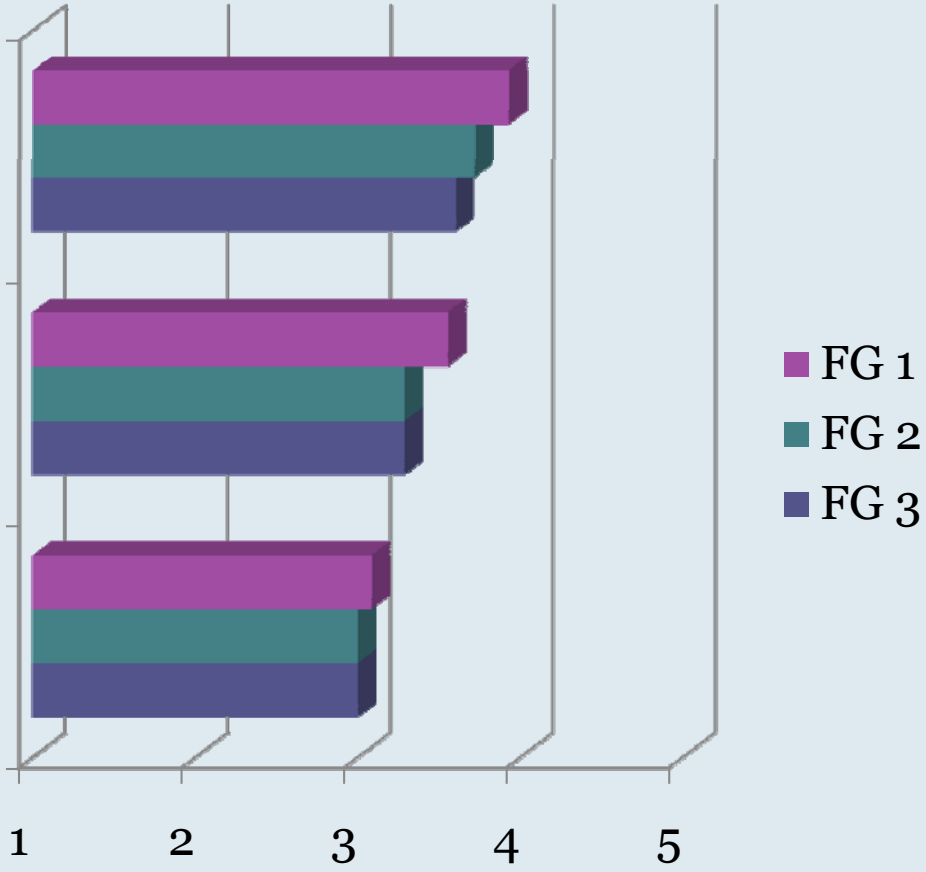


4. What are the key barriers to model adoption among stakeholders?

Based on how well we incorporate your feedback today, do you think you will use agent-based models in your work in the future?

Agent-based models rely on too many assumptions.

There is too much uncertainly in agent-based models.



4. What are the key barriers to model adoption among stakeholders?

- "It's sounding like you have to make a bunch of assumptions."
- "How do you test the validity of these [models]?"
- "I think [human behavior] one of those things, that are probably pretty hard to predict, models or no models"
- "I think the whole thing is a very unstable thing to try to pin down. It's a tough show, in my opinion."
- "Do you *have* to go with a mathematical model? You kind of lost me on that… [laughter]"

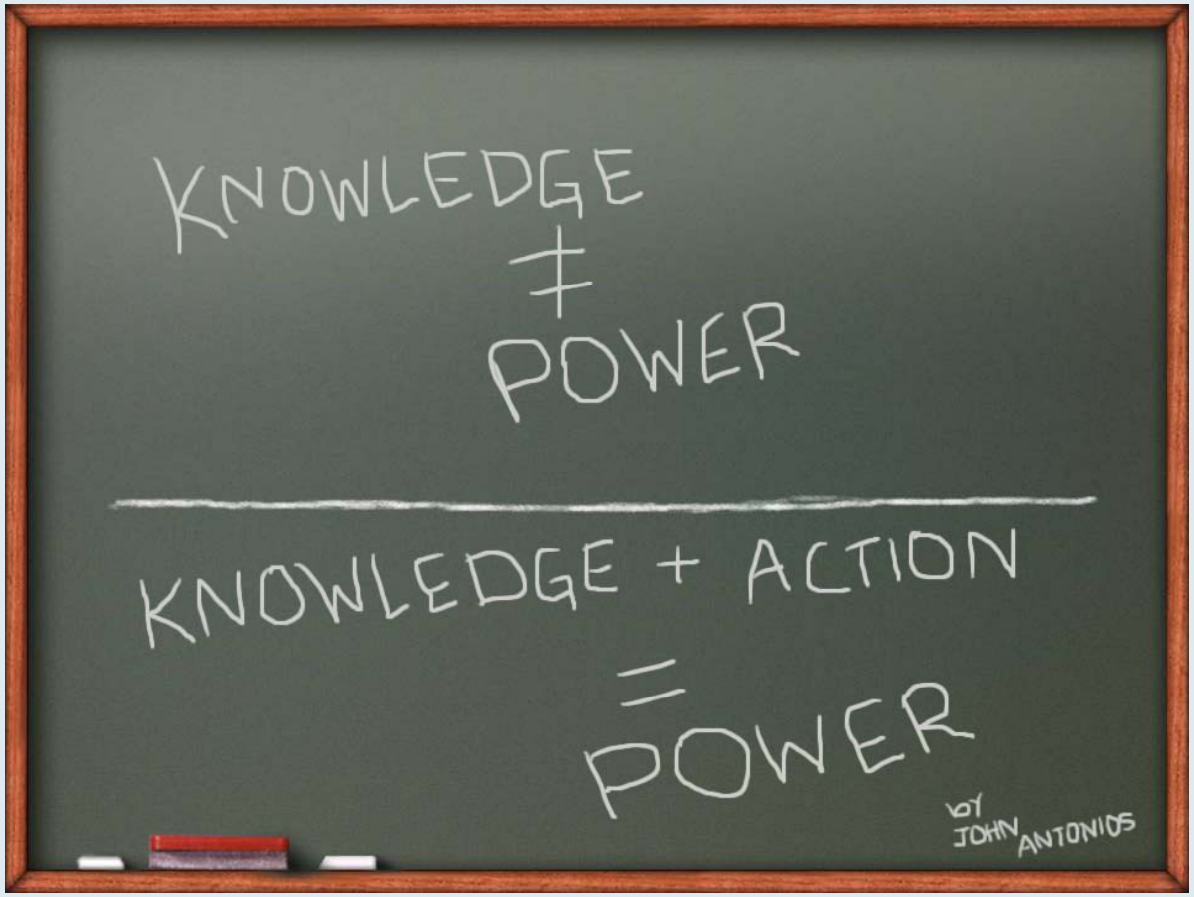
Implications for SES Modelers

- Improved modeling by engaging stakeholders
- Increased stakeholder use
- More sophisticated model users
- Knowledge to action!

Implications for SES Modelers

"… the way I see the model working…this is trying to model behavior – what's likely to happen given these sets of circumstances… what's the likely outcome or trend… based upon the best information available. It informs. It should inform the discussion. As long as people don't say the 'And the results are going to be THAT,' because it isn't going to be THAT."

Questions?



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