
The Challenges of the Water-Energy-Food Nexus for Integrated Modeling

Understanding The Water-Energy-Food Nexus And Its Implications For Governance

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The WEF Nexus is about Expanding Boundaries

“There is no single, legitimate boundary to draw around a system. We have to invent boundaries for clarity and sanity; and boundaries can produce problems when we forget that we’ve artificially created them.

When you draw boundaries too narrowly, the system surprises you.”²

Models can serve a range of purposes and must be judged in light of their intended purpose

- general understanding
 - policy formulation
- detailed implementation¹

A computer model may be preferable to a mental model

- “It is precise and rigorous instead of ambiguous and unquantified.
- It is explicit and can be examined by critics for inconsistency or error.
- It can contain more information than any single mental model.
- It can proceed from assumptions to conclusions in a logical, error-free manner.
- It can easily be altered to represent different assumptions or alternative policies.”¹

But

“Very few computer modelers can claim that their models actually do exhibit all these advantages. Models can easily become so complex that they are impenetrable, unexaminable, and virtually unalterable. They can also be less complete than mental models, if requirements of mathematics or data inputs prohibit the inclusion of certain kinds of relationships.”¹

Reminders for Modelers and Model Users

- “Everything we think we know about the world is a model.”
- “Our models do have a strong congruence with the world.”
- “Our models fall far short of representing the real world fully. ”
- “Pay Attention to What is Important, Not Just What is Quantifiable”
- “Stay Humble – Stay a Learner”²

References

1. Meadows, Donella H. 1979. "The Unavoidable A Priori," in *Elements of the System Dynamics Method*, ed. J. Randers, MIT Press, Cambridge MA, pp. 161-240.
2. Meadows, Donella H. 2008. *Thinking in Systems: A Primer*. Edited by Diana Wright. White River Junction, VT: Chelsea Green Publishing.