

## We Need to Motivate a Significant Proportion of US Agricultural Scientists to Conduct Systems Analyses

### Conditions

- "Food systems are a unique form of coupled social-ecological systems in that they depend upon ecological variables for their most basic function, yet they are largely driven by social processes and policies" (Ericksen 2008)
- "Adaptive responses to macro changes will be manageable only if more diverse, flexible, and resilient institutions and infrastructure structures can be created/re-created" (Dahlberg 2006)
- "Far more research papers claim to offer a systems analysis than do " (Lockeretz and Boehncke 2000)
- "Funding, institutional, cultural, and policy barriers keep most environmental research in agriculture at a disciplinary, reactive, and local level" (Robertson et al. 2004)

### Trends

- There is a significant body of research on agricultural ecosystems but little of it is linked to social and economic conditions in the US.
- Movement in land grant universities to encourage, support, and lift up systems analysis is very slow. Many reasons for this have been identified, but this knowledge has not led to significant change.
- More systems research has been reported in the last several years.

### Needs

- A systems level understanding that routinely permeates all agricultural research
- People who will think long and hard about all the research that has utilized systems approaches and synthesize it
- Proactive, anticipatory research, and greater foresight to prevent future problems
- Long-term, multidisciplinary research to provide the best foundation for management and policy decisions
- Case studies of successful, multidisciplinary, systems research projects conducted by agricultural scientists
- Experiments that provide incentives, training, and support for agriculture and food systems research, and evaluation of their effectiveness

### A few tools for carrying out systems research

- adaptive management
- cognitive science/reframing
- contextual analysis
- "episystemics"
- socio-natural systems
- soft systems

### Some examples

- Food 21 -- 1997 to 2004. Swedish University of Agricultural Sciences.
- Systems Analysis and Modeling in Food and Agriculture 2008 EOLSS.
- 21st Century Systems Agriculture: An Update of the 1989 NRC report "Alternative Agriculture". Forthcoming
- ARS and cooperating institutions. 2008. Eastern Seaboard Food Security Project.

### Some references

Lockeretz, W. and Boehncke, E. 2000. Agricultural systems research. In Proceedings of the Second NAHOWA Workshop. Cordoba Spain. UK: University of Reading.

Dahlberg, K. 2006. Regenerative food systems.

Robertson et al. 2004. Rethinking the vision for environmental research in US agriculture. *BioScience* 54:61-65.

Robertson et al. 2008. Long-term agricultural research: a research, education, and extension imperative. *BioScience* 58 (7): 1-6.

Wilson, K. and Morren, G. 1990. *Systems Approaches for Improvement in Agriculture and Resource Management*. Macmillan Publishing Company. New York.

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