

Grand Challenge VI

**We must Heighten Environmental Stewardship
Through the Development of Sustainable
Management Practices**

Committee Composition

Regional ED & Coordinator - Eric Young

Science Leaders

Nancy Creamer – Director Center for Environmental
Farming Systems – NCSU

Laurie Drinkwater – Dept. Horticulture – Cornell

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Steve Meredith – Lincoln University

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Framing the Issue

Agriculture and the Environment

Agriculture transforms ecosystems and can undermine and degrade the integrity of environmental systems, with ensuing negative consequences for human health and well-being

- Resource Consumption
- Agricultural Emissions

General Research Approach

- Research must be systems-based – tools such as life-cycle analysis
- Must include long-term studies
- Must include processes occurring at larger than farm scale (watersheds)
- Measure Yields in terms of other resource use
 - i.e. yields relative to inputs and emissions

Research Needs and Priorities

1. Reduce the use of nonrenewable inputs in agricultural production
 - Agricultural Water Conservation
 - Protection of Water Quality by Reducing Soil, Chemical, Microbial, and Nutrient Runoff
 - Energy-Efficient Agriculture Systems, Including Food Distribution Networks and Bioenergy from Animal Manure and Crop Residues
 - Reduced Air Emission in Agriculture

Research Needs and Priorities

2. Assess the capacity of agriculture and other managed systems to provide market-based ecosystem services (OEM)
3. Enhance internal ecosystem service (e.g., nutrient cycling, pest control, and pollination) that support production outcomes so that chemical inputs can be reduced

Research Needs and Priorities

4. Assess food animal production in relation to ecosystem services
5. Develop innovative waste management technologies
6. Pursue systems-oriented and science-based policy and regulation for agricultural and other managed systems