

Session Partnerships: April 13th 11.00 hrs

4s2b: Food system transitions in deltas under pressure

Understanding tradeoffs in circular grain production systems

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Grain production systems in the United States need to be transformed into more circular and sustainable systems to address the simultaneous challenges of resource depletion, environmental degradation, and increasing demand for food under the threat of climate change. Grain production in the U.S. is geographically dispersed and distant from large centers of national and global consumption (e.g., animal feeding operations, food processors, cities) with limited recycling of nutrients and energy, and a major source of non-point source pollution of air and water. In this talk I show that transformation of U.S. grain production systems into circular systems can be achieved using currently feasible digital, mechanical, and genetic technologies that close loops of nutrient and energy flows within the farm, through the optimization of land use choices and crop management. But widespread adoption of these circular systems by the large-scale commercial farms that produce most of the grain crops in the U.S. will depend critically on their profitability relative to the current linear system.

Keywords: