1S1a: Models and tools for estimating circularity of alternative food and agricultural systems

Session : Aprill 11th 13.45 u (continued at 15.45)

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The purpose of this session is to explore models and other data analytic tools for estimating tradeoffs and outcomes of alternative options for transforming food and agricultural systems (FAS) into circular systems. The session will be organized to attract both modelers and non-modelers while clearly having a focus on models.

Food and agricultural systems are complex, varying considerably over space and time depending on physical, cultural, economic, political, and environmental conditions. Our existing mostly linear FAS lose considerable quantities of natural resources, degrade the environment, and discard large amounts of products as wastes. Having system performance dependent on multiple decision makers contribute to these outcomes. Continued incremental changes to existing FAS will not lead to systems that can meet future global demands for more food and changing diets, demands for reducing environmental degradation and losses of natural resources, and the critical need to address the climate change crisis.

Transforming FAS into more circular economies has the potential to simultaneously meet increasing food demands, regenerate natural systems, reduce GHG emissions and degradation of water resources, and increase resource use efficiency.

Systems modeling and analytical methods are powerful tools to understand and compare performance and tradeoffs (productivity, economic and environmental benefits, and resource use efficiencies) of envisioned alternative circular FAS. These tools will be necessary for monitoring and evaluating system performance to enable consumer confidence and ensure accountability of outcomes to justify payments for environmental services.

Although there are existing models, data protocols, and analysis tools for some components, most are not designed to study holistic food and agricultural systems, that is, the entire value chain from production through consumption and loss of resources in wastes and discarded products.

Presentations in this session may review existing models, data, and analysis tools or describe new progress in developing and deploying integrated tools for advancing circularity in food and agricultural systems. Examples may include dynamic biophysical, industrial ecology, economic, and behavioral models; life cycle analyses; and performance measures for assessing food systems.

Other topics may include integrated system model analyses for different types of FAS; studies at different scales of analysis; data requirements for verification of system performance; data standards; tradeoff analyses at local and broader scales; feed/food competition; agent-based models that address interactions among decision makers across FAS value chains; and others. These presentations may address any one or multiple themes of the conferences. Presentations focusing on technical modeling aspects should also aim at communicating the context and core messages in a non-technical form for non-modelers.