Understanding dynamic environmental and socio-economic interactions in food systems to support decision-making towards a sustainable and resilient agriculture

Award Year:
2018

Principal Investigator:
Xin Zhang, University of Maryland Center for Environmental Science
Kimberly Pfeifer, Oxfam America
Eric Davidson, University of Maryland Center for Environmental Science

Associated Program:
Propose a Pursuit [1]

Where and how to increase agricultural production to meet growing food demand is critical for the sustainability and resilience of food systems and society. The resources required to produce each calorie or gram of protein varies largely across crop types and regions, which, in turn, affect nutrition, farmer welfare, and the resilience of food supply. Based on the indicator system and associated database developed by the Sustainable Agricultural Matrix Workshop (supported by SESYNC, August 2017), the team developed a SAM-CMT (Crop Mixes and Trade) model to assess the impacts of crop mixes on domestic production, international trade, and sustainability. Building on the SAM Workshop output and this new model, the team proposes to coordinate a highly interdisciplinary and cross-sectoral team to study the complex dynamic interactions of environmental, economic, and social dimensions of sustainability. Project products will include: 1) new research into environmental and socioeconomic tradeoffs related to sustainable agriculture; and 2) an integrated decision-support tool for designing agricultural development strategies towards sustainable and resilient food system goals, such as dietary changes, increasing resource inputs, shifting cropmixes, and altering international trade networks. In addition to identifying linkages and trade-offs to guide further interdisciplinary research, the team envisions that this tool will also be used to assist policy making from national to global scales and provide educational opportunities for students and the general public regarding the socioeconomic, human health, and environmental consequences of their dietary choices. Policy papers and educational documents will be produced to assist the application of the tool.

Participants:
Carole Dalin, University College London
David Kanter, New York University
Paolo d'Ordorico, University of California, Berkeley
Mark Musumba, University of Florida Institute of Sustainable Food Systems
Guido Schmidt-Traub , United Nations Sustainable Development Solutions Network
Tan Zou, University of Maryland Center for Environmental Science
Thayer Patterson, Princeton University
Weifeng Zhang, China Agricultural University
Adam Komarek, IFPRI
Kris Johnson, The Nature Conservancy
Jing Zhao, University of Maryland Center for Environmental Science

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