



Managing the Global Commons:

*Sustainable agriculture and use
of the world's land and water
resources in the 21st Century*

April 2-3, 2020



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GLASS

Global to Local Analysis of Systems Sustainability

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Dominique van der Mensbrughe, Research Professor and Director, Center for Global Trade Analysis (GTAP), Department of Agricultural Economics

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Discovery Park, Purdue University
Burton Morgan Center
1201 W. State St.
West Lafayette, Indiana

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Purpose of the conference: Ensuring the long-term sustainability of our land and water resources, even as we seek to meet the world economy's growing demands, requires informed management of the complex networks of policies, infrastructure and technologies that connect the food and resource nexus. In addressing this challenge, a global perspective is required to determine the boundary conditions facing decision makers as they seek to craft policies to ensure a sustainable economy and planet. The goals of the conference are: (i) *to lead and to learn from other scholars, policymakers, and industry leaders* engaged in analysis of sustainability challenges at global, national and local scales, and (ii) *to identify current challenges* in this space and (iii) *develop a community-driven research agenda* for the next 5 years that tackles those challenges using collaborative, interdisciplinary approaches that are responsive to stakeholder needs.

Motivation: The UN Sustainable Development Goals (SDGs) represent “a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity, now and into the future.” Of the 17 goals, 8 are closely tied to essential food, land and water resources that are already under intense pressure. Can the future demands for food, fuel, clean water, biodiversity, climate change mitigation and poverty reduction be reconciled? What are the tradeoffs of favoring one goal over others? These are challenging questions, given that sustainability in a local context is often driven by global forces, and the pursuit of the SDGs will have global consequences in addition to local and regional impacts.

Our research and engagement efforts in this arena were recognized with a Discovery Park “Big Idea Challenge Award” and applied research consortium: GLASS: Global to Local Analysis of Systems Sustainability (<https://mygeohub.org/groups/glass>). GLASS aims to promote world-changing research by cultivating a global community of practice around open-source analysis of the global-to-local-to-global (GLG) linkages underpinning global sustainability. Our hypothesis is that fine-scale analysis of the SDGs within a global framework will promote responsible public and private investment and sustainable management of critical natural resources.

Conference format: The conference will take place April 2-3, 2020. The event will cover six cross-cutting themes: climate, water, digital agriculture and machine learning, biodiversity and ecosystem services, governance, and computational approaches to sustainability. Led by members of the conference organizing committee, each theme will feature four speakers – two “local” and two outside speakers. These individuals represent a diverse set of backgrounds, including public and private sectors, NGOs as well as academia. The talks will be designed to emphasize the overarching GLG theme.

This will be a working conference aimed at producing set of papers for a special issue of the journal *Environmental Research Letters*, as well as a synthesis that will ultimately be published as a review article in a leading general-interest journal (e.g., *Science*). In preparation for this event, the leaders are developing detailed review outlines to be shared with speakers in advance of the conference. These will give structure to each session, and these outlines will also serve as building blocks for the ensuing review article and special issue papers. Both days will include working lunches. Lunchtime rooms will be pre-assigned to ensure a mix of backgrounds at each table, and will be based on the self-nominated affiliation to each of the six major themes. Each thematic group will report to the entire conference at the end of the lunch. The leaders for each theme will integrate what has been co-created during the discussions into a short summary to be presented in the final session of the conference. The conference will also include an evening reception and dinner on Thursday. When combined with the working lunches, this will provide participants with ample opportunity to network. By gathering together for an exciting conference, featuring cutting-edge, policy-relevant research, we will be in a position to chart the course for future interdisciplinary research on global-to-local-to-global analysis of systems sustainability.



PANELS

Thursday, April 2, 2020

8:30-9 a.m.

Welcome and Introduction

Tom Hertel, Purdue University

Overview and objectives of the conference

9 - 10:30 a.m.

Theme 1: Climate Change

(Dominique van der Mensbrughe, Purdue)

Bob Kopp, Rutgers University

Topic: Climate change risks and coastal impacts

Gokul Iyer, PNNL-Maryland

Topic: Climate mitigation and the SDGs

Matthew Huber, Purdue University

Topic: Heat stress on humans

Laura Bowling, Purdue University

Topic: Climate impacts on agriculture

10:30-11 a.m.

Coffee break

11-12:30 p.m.

Theme 2: Digital Agriculture (Keith Cherkauer, Purdue)

Vipin Kumar, University of Minnesota

Topic: Artificial intelligence as a tool for global sustainability

Daniel Padrao, Solinftec

Topic: Digital agriculture in Brazil

Melba Crawford, Purdue University

Topic: Frontiers of remote sensing and sustainability

Ankita Raturi, Purdue University

Topic: Design for Sustainable Agriculture Systems

12:30-2 p.m.

Working lunch

- 2-3:30 p.m. **Theme 3: Water Resources (Laura Bowling, Purdue)**
Brian Richter, Sustainable Waters
Topic: The role of private investors in the creation of sustainable water use
Tara Troy, University of Victoria
Topic: Infrastructure for sustainable water use
Jane Frankenberger, Purdue University
Topic: Water quality challenges at the interface with agriculture
Jeff Frey, US Geological Survey
Topic: Nutrient transport in the Midwest
- 3:30-4 p.m. Coffee break
- 4-5:30 p.m. **Theme 4: Computing Sustainability (Carol Song, Purdue)**
Amy Walton, NSF Office of Cyberinfrastructure
Topic: Future directions for cyberinfrastructure
Shaowen Wang, University of Illinois
Topic: Spatial temporal modeling in a supercomputer environment
Michael Witt, Purdue University
Topic: Distributed data curation for interdisciplinary research
Venkatesh Merwade, Purdue University
Topic: Engaging the user community with shared computing platforms
- 5:30-7 p.m. **Poster session and reception - (Mann Hall)**
- 7-8:30 p.m. **Dinner - (Mann Hall)**
*Mann Hall, 203 S. Martin Jischke Drive
West Lafayette, Indiana*



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PANELS

Friday, April 3, 2020

8:30-10 a.m. ***Theme 5: Ecosystems and Biodiversity (Jeff Dukes, Purdue)***

Taylor Ricketts, University of Vermont

Topic: Biodiversity and agriculture

Rebecca Shaw, World Wildlife Fund

Topic: Providing ecosystem services for the future

Jeff Dukes, Purdue University

Topic: Ecosystems in the face of climate change

Sylvie Brouder, Purdue University

Topic: Ecosystem and biodiversity stresses from agriculture

10-10:30 a.m. Coffee break

10:30-noon ***Theme 6: Governance for Sustainability (David Johnson, Purdue)***

Jonathan Wiener, Duke University

Topic: Governance, Fragmentation, Scale, Tails and Adaptive Policy

Stephen Polasky, University of Minnesota

Topic: International to local initiatives to preserve biodiversity

Leigh Raymond, Purdue University

Topic: Political Science Perspectives on Sustainability

Linda Prokopy, Purdue University

Topic: Engaging farmers in sustainability initiatives

Noon-1:15 p.m. Working lunch

1:15-2:15 p.m. ***Demonstration and Discussion of GLASS products and vision (GLASS team)***

GLASS team

2:15-3:15 p.m. *Thematic teams meet to finalize syntheses*

2:15-3:15 p.m. Coffee break

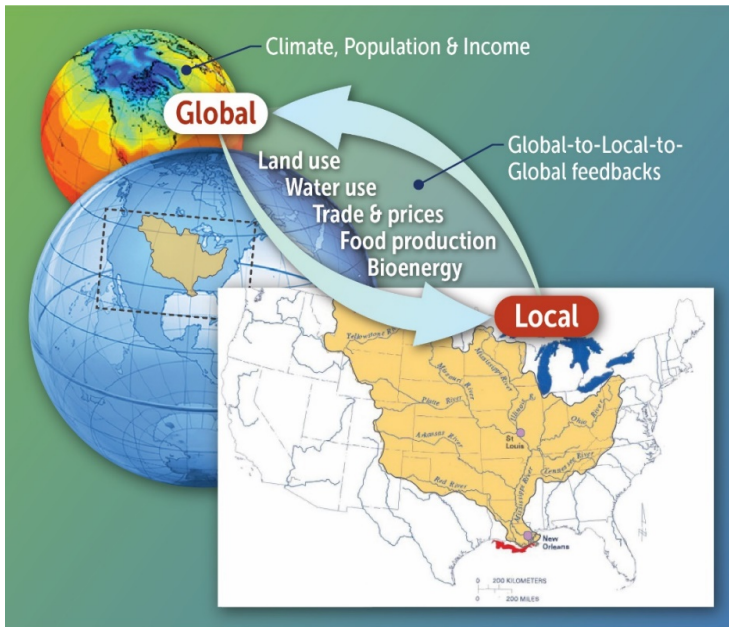
3:15-4:45 p.m. *Developing a Research Agenda (Tom Hertel, Purdue)*

Panel summaries 10 minutes per group

Next steps 30 minutes

5:00 p.m. *Bus departs for Indianapolis Airport*

Departures from Indianapolis Airport starting at 7 p.m.





List of Speakers and Panel Chairs

Ankita Raturi, *Assistant Professor of Agricultural and Biological Engineering, Purdue University*

Laura Bowling, *Professor of Agronomy and Co-Director, Natural Resources and Environmental Sciences Program, Purdue University*

Sylvie Brouder, *Professor of Agronomy, Purdue University*

Keith Cherkauer, *Professor of Agricultural and Biological Engineering, Purdue University*

Melba Crawford, *Associate Dean of Engineering for Research, Professor of Agronomy, Civil Engineering and Electrical and Computer Engineering, Purdue University*

Jeff Dukes, *Belcher Chair for Environmental Sustainability, Professor of Forestry and Natural Resources, Biology and Director, Purdue Climate Change Research Center, Purdue University*

Jane Frankenberger, *Professor of Agricultural and Biological Engineering, Purdue University*

Jeff Frey, *Deputy Director, Indiana Water Science Center, USGS*

Thomas Hertel, *Distinguished Professor and Executive Director, Center for Global Trade Analysis, Purdue University*

Matthew Huber, *Professor of Earth and Atmospheric Sciences, Purdue University*

Gokul Iyer, *Scientist, Joint Global Change Research Institute, PNNL*

David Johnson, *Assistant Professor of Industrial Engineering and Political Science*

Robert Kopp, *Professor and Director of the Institute of Earth, Ocean and Atmospheric Sciences, Rutgers University*

Vipin Kumar, *Regents Professor and William Norris Chair in Computer Science and Engineering, University of Minnesota*

Venkatesh Merwade, *Professor of Civil Engineering, Purdue University*

Daniel Padrao, *Chief Operating Officer, Solinftec Corp.*

Stephen Polasky, *Regents Professor and Fesler-Lampert Professor of Ecological/Environmental Economics, University of Minnesota*

Linda Prokopy, *Professor of Natural Resources Social Science and Co-Director, Natural Resources and Environmental Sciences Program, Purdue University*

Leigh Raymond, *Professor of Political Science, Purdue University*

Brian Richter, *President, Sustainable Waters*

Taylor Ricketts, *Gund Professor and Director of the Gund Institute for Environment, University of Vermont*

Rebecca Shaw, *Chief Scientist and Senior Vice President, World Wildlife Fund*

Carol Song, *Senior Scientist and Director of Scientific Solutions, ITaP Research Computing, Purdue University*

Tara Troy, *Assistant Professor of Civil Engineering, University of Victoria*

Dominique van der Mensbrugghe, *Research Professor and Director, Center for Global Trade Analysis, Purdue University*

Amy Walton, *Program Director, CISE/Office of Cyberinfrastructure, NSF*

Shaowen Wang, *Professor and Head of the Department of Geography and Geographic Information Science, Founding Director, CyberGIS Center for Advanced Digital and Spatial Studies, University of Illinois at Urbana-Champaign*

Jonathan Wiener, *William R. and Thomas L. Perkins Professor of Law, Professor of Environmental Policy and Public Policy, Duke University*

Michael Witt, *Associate Professor & Interim Associate Dean for Research, Libraries and School of Information Studies, Purdue University*



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