

# Exploring a Dynamic Soil Information System: A Workshop

► MARCH 2-4, 2021

The National Academies of  
SCIENCES • ENGINEERING • MEDICINE

Board on Agriculture and Natural Resources  
Board on International Scientific Organizations  
Board on Earth Sciences and Resources

## VIRTUAL WORKSHOP

A dynamic soil information system for the United States would overlay important chemical, physical, and biological information about soil samples taken across a wide range of geographies with information on influences on soils, such as land use and land management, soil moisture, weather, and other variables. This workshop will examine the level of detail needed by potential users of this combined information and envision how data on soils and other parameters can be most effectively collected, combined, and curated over time.

### AGENDA

**Tuesday, March 2**

(All times in Eastern Time, U.S. & Canada)

11:00 **Welcome**

*Bruno Basso, Michigan State University*

11:15 **Keynote Talks**

**Innovative Technology for Managing Soils**

*Joe Cornelius, Gates Ag One*

**Soil in Agricultural Systems**

*Jerry Hatfield, USDA Agricultural Research Service (retired)*

**The Importance of Data Archiving and Data Integration**

*Alison Hoyt, Max Planck Institute for Biogeochemistry*

12:15 **Q&A with Drs. Cornelius, Hatfield, and Hoyt**

12:45 **Break**

1:05 **Panel Discussion: Why do we need a dynamic soil information system?**

*David Babson, DOE Advanced Research Projects Agency–Energy*

*Jim Dobrowolski, USDA National Institute of Food and Agriculture*

*Matt Kane, National Science Foundation*

*David Lindbo, USDA Natural Resources Conservation Service*

*John Mesko, National Corn Growers Association*

*Stephen Wood, The Nature Conservancy*

*Moderated by Bruno Basso, Michigan State University*

2:15 **Lessons Learned from Listening Sessions**

*Alison Marklein, University of California, Riverside*

2:45 **Break**

2:55 **Panel Discussion: What soil information systems do we have now?**

*Mark Farrell, CSIRO (prerecorded)*

*Drew Kinney, USDA Natural Resources Conservation Service*

*Luca Montanarella, European Commission Joint Research Centre*

*Rik van den Bosch, ISRIC—World Soil Information*

*Samantha Weintraub, National Ecological Observatory Network*

*Skye Wills, USDA Natural Resources Conservation Service*

*Moderated by Charles Rice, Kansas State University*

3:55 **Preview of Second Day**

4:00 **Adjourn**

---

**Wednesday, March 3**

(All times in Eastern Time, U.S. & Canada)

11:00 **Fireside Chat with Industry Representatives**

*Teddy Bekele, Land O'Lakes Inc.*

*Adrian Percy, UPL Ltd.*

*Karsten Temme, Pivot Bio*

*Moderated by Ranveer Chandra, Microsoft Azure Global*

11:45 **Breakout Session 1**

*Topic A: Measurements and Sampling and Archiving*

- What should be measured? Where and when should it be measured?
- What protocols or standardizations would be useful?
- What other parameters need to be collected routinely (for example, temperature, rainfall, land management practices)?
- Collection and preservation of physical samples
- Linking physical samples to digital data

*Topic B: Collection and Curation (including cyber infrastructure)*

- Harmonization of data and methodology
- Semantic and ontology structures
- Data models
- Avoiding the proliferation of standards
- Internet of Things
- Cloud infrastructure for data storage and data processing
- Data repository federations
- Security/privacy issues
- Machine learning tools in databases
- Data platforms

*Topic C: Data Analysis and Models*

- Machine learning algorithms for gap filling and spatial inference
- Process modeling
- Decision support tools
- Meta-analyses

1:00 **Break**

1:15 **Breakout Session 2**

*Topics A, B, and C repeated*

2:30 **Adjourn**

---

**Thursday, March 4**

(All times in Eastern Time, U.S. & Canada)

11:00 **Welcome**

*Bruno Basso, Michigan State University*

11:10 **Reports from Breakout Groups**

1:00 **Break**

1:30 **Continuing Engagement Opportunities**

*Kathe Todd-Brown, University of Florida*

1:40 **Synthesis Session**

2:15 **Concluding Remarks**

2:30 **Adjourn**