THE ENVIRONMENTAL HEALTH MATTERS INITIATIVE

REDUCING THE HEALTH IMPACTS OF THE NITROGEN PROBLEM

A VIRUTAL WORKSHOP OF THE ENVIRONMENTAL HEALTH MATTERS INITIATIVE

Nitrogen is a widely-used, essential input to crop production. In many regions of the United States, nitrogen from farms has leaked into drinking water and caused adverse health impacts. These health impacts include methemoglobinemia, a condition that inhibits the blood's ability to carry oxygen around the body. This workshop hosted by the Environmental Health Matters Initiative (EHMI) will explore what actions can be taken on several levels to address the nitrogen contamination problem.

Workshop sessions will take place every Thursday from 2:30–5:30 p.m. Eastern, starting January 28 through February 25, 2021.

THURSDAY, JANUARY 28

WHAT IS THE NITROGEN PROBLEM?

2:30 **Welcome**
Catherine Kling, Cornell University

2:35 **Overview of the Environmental Health Matters Initiative**
Thomas Burke, Johns Hopkins Bloomberg School of Public Health

2:45 **Overview of Workshop Statement of Task and Agenda**
Catherine Kling, Cornell University

3:00 **Health Effects of Nitrogen in Drinking Water**
Mary Ward, National Cancer Institute

3:25 **Where is Drinking Water Contaminated by Nitrogen from Agricultural Sources?**
Craig Cox, Environmental Working Group

3:55 **The Role of Nitrogen in U.S. Agricultural Systems and the Need for Robust Metrics to Quantify It**
Kenneth Cassman, University of Nebraska–Lincoln

4:15 **The Geographical Scale of the Nitrogen Challenge in the United States**
Matthew Helmers, Iowa State University

4:45 **The Leaky Nitrogen Cycle Across Scales, from Farms to Food Systems to Ecosystems**
Eric Davidson and Xin Zhang, University of Maryland Center for Environmental Science

5:05 **Q&A with Speakers**
Moderated by Jim Galloway, University of Virginia

5:25 **Preview of Next Session**

5:30 **Adjourn**

THURSDAY, FEBRUARY 4

WHAT FARM-LEVEL ACTIONS COULD BE TAKEN TO ADDRESS THE NITROGEN PROBLEM?

2:30 **Welcome and Review of Previous Week**
Catherine Kling, Cornell University

2:40 **Drivers of Farmer and Agricultural Stakeholder Decision Making and Actions**
Linda Prokopy, Purdue University

3:05 **Flash Talks: Farm-level Actions and Opportunities**

Digital Agriculture to Reduce Nitrogen Losses across the U.S. Corn Belt
Bruno Basso, Michigan State University

Cover Crops by Region: The Good, the Bad, and the Ugly in the Midwest
Alejandro Plastina, Iowa State University

Strategically Integrating Prairie to Restore Ecosystem Health and Functioning Within Annual Crop Fields
Lisa Schulte Moore, Iowa State University

Successful In-field Water Management in Nebraska
Jim Schepers, University of Nebraska–Lincoln

Management of Nitrogen in Tile Drainage Systems
Jane Frankenberger, Purdue University

The 4Rs of Nutrient Management
Carrie Vollmer-Sanders, The Nature Conservancy

Technology to Monitor Nitrogen Loss in Farm Fields
David Lee, Booz Allen Hamilton

Floridan Aquifer Collaborative Engagement for Sustainability (FACETS) Project: An Integrated Assessment of Economic and Environmental Impacts of Best Management Practice Adoption
Wendy Graham, University of Florida

4:05 **Review of Input on Farm-Level Actions and Opportunities**

4:20 **Discussion**
Moderated by Jerry Hatfield, USDA Agricultural Research Service (retired)

5:25 **Preview of Next Session**

5:30 **Adjourn**

THURSDAY, FEBRUARY 11

WHAT LANDSCAPE-LEVEL ACTIONS AND INNOVATIVE TECHNOLOGIES COULD BE USED TO ADDRESS THE NITROGEN PROBLEM?

2:30 **Welcome and Review of Previous Weeks**
Catherine Kling, Cornell University

2:40 **Federal Programs Related to Conservation and Nitrogen Management and Use**
Steven Wallander, USDA Economic Research Service

3:05 **Flash Talks: Innovative Technologies**

Precision Application of Nitrogen
Kit Franklin, Harper Adams University

Microbial Haber-Bosch
Daniel Nocera, Harvard University

Biodegradable Sensors in Soil
Ana Arias, University of California, Berkeley

Potential for Perennial Grains
Steve Culman, The Ohio State University

3:35 **Short Q&A**

3:45 **Flash Talks: Governance and Outreach Opportunities at the Landscape Level**

Building Coalitions to Development and Implement Solutions
Roger Wolf, Iowa Soybean Association

Irrigated Lands Regulatory Program in California
Mark Lubell, University of California, Davis

Engaging Farmers in Nitrogen Management Decision Making
Greg LaBarge, The Ohio State University

4:10 **Short Q&A**

4:20 **Review of Input on Innovative Technologies and Landscape-Level Actions and Opportunities**

4:25 **Discussion**
Moderated by Raj Khosla, Kansas State University

5:25 **Preview of Next Session**

5:30 **Adjourn**

THURSDAY, FEBRUARY 18

WHAT POLICIES AND MARKETS COULD BE CREATED TO ADDRESS THE NITROGEN PROBLEM?

2:30 **Welcome and Review of Previous Weeks**
Catherine Kling, Cornell University

2:40 **Potential Market Opportunities**

Designing Cost-Effective Voluntary Programs that Pay for Agri-Environmental Performance
Leah Palm-Forster, University of Delaware

Water Quality Trading
Kurt Stephenson, Virginia Polytechnic Institute and State University

Certification and Supply Chain Standards
Kurt Waldman, Indiana University

Developing the Market Value of Manure
Leif Fixen and Ben Wickerham, the Nature Conservancy

3:40 **Review of Input on New Policy and Market Opportunities**

3:50 **Panel: Reactions to Proposed Opportunities**
Rod Weimer, Fagerberg Farms
Rochelle Krusemark, Krusemark Farms
Richard Wilkins, Delaware Farm Bureau
Jenny Ahlen, Environmental Defense Fund

5:00 **Discussion**
Moderated by Robyn Wilson, Ohio State Unviersity

5:25 **Preview of Next Session**

5:30 **Adjourn**

THURSDAY, FEBRUARY 25

WORKSHOP SYNTHESIS

2:30 **Welcome**
Catherine Kling, Cornell University

2:35 **Review of Health and Exposure Impacts and Knowledge Gaps of Nitrogen**
Elena Austin, University of Washington

2:45 **Review of Solution Pathways Identified in Workshop Sessions**
Jennifer McPartland, Environmental Defense Fund

3:05 **Discussion of Solution Pathways**
Moderated by Jennifer McPartland, Environmental Defense Fund

Technical Tools

Possibilities:
- More precise N application
- Mimicking natural landscapes
- Restoring natural landscapes
- Edge of field practices to better manage water

Discussants:
Steve Hoffman, InDepth Agronomy
Karl Rockne, National Science Foundation

Behavioral Tools

Possibilities:
- Better targeting of funds to the right practices in the right geographies and cropping systems
- Farmer collaboration models
- Leveraging supply chain to create incentives for improved nitrogen management
- Compliance and performance metrics for land management practices
- Changes to water quality trading market
- Conservation auction markets
- Shifting conservation funding from farm-scale to watershed-scale

Discussants:
Thomas Hertel, Purdue University

Knowledge Gaps

Including:
- Quantifying the social cost of reactive nitrogen
- Quantifying the critical values of nitrogen for soil or plant sap during a given crop's growing season
- Monitoring reactive nitrogen releases from fields and presence in waterways and drinking water

Discussants:
Bonnie Keeler, University of Minnesota
Kenneth Cassman, University of Nebraska–Lincoln

5:20 **Concluding Remarks**
Catherine Kling, Cornell University

5:30 **Adjourn**