

Soil as a Social Ecological Feedback: Guiding Principles and Organizational Structure

SESYNC Pursuit Team

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Introduction

This project is motivated by recent research that suggests the firsthand experience of farmers observing and learning from their soil resources can lead to an ethic of conservation that encourages farmers' maintenance, adoption and enhancement of practices that emphasize soil health and conservation. Much research has been conducted on what drives conservation practice adoption, particularly at the individual level; however, no synthesis has been conducted to operationalize this notion of soil acting as a social -ecological feedback - a learning loop wherein soils are key to farmers thinking differently about resource conservation - using social, biophysical, climatic, political, and economic factors at multiple scales. This project will help explain soil health stewardship at a landscape scale, including the identification of "hotspots" of conservation. It will also elucidate important relationships between social and ecological factors that are driving agricultural conservation. In this project, we aim to determine the most important factors related to this soil health feedback, their interrelationships, and how they govern decisions to adopt, maintain and increase the use of soil health conservation practices. We will provide synthesis, analysis, and spatial storytelling resources to achieve actionable science goals, linking our efforts with those stakeholders working at multiple institutional scales, to achieve more soil conservation for long term agroecological resilience.

The goal of our [SESYNC pursuit](#) is to bring together a diverse team of collaborators to examine how soil health can act as a social-ecological feedback at the level of individual farmers, agencies and policy makers' decisions to use or encourage soil enhancing practices through a transdisciplinary integration of biophysical, climatic, and social science data at multiple scales (spatial, temporal and human-institutional).

Research questions:

- What are the most important social, economic, biophysical, climatic and policy-level factors governing the relationship of soil health practices/principles, which ideally achieve the goal of resilient soils? And what are the spatial and temporal relationships between these factors, which have the largest impact?
- How can this soil adaptation feedback loop be leveraged to encourage greater stewardship amongst U.S. farmers, to preserve and enhance soil resources for climate resilience?

Outputs:

- Data synthesis using county, state, and national data on soil health and soil conservation behaviors

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- Data mining and geospatial analysis techniques, integrated into a distributable library in R
- Structural Equation Modeling to test hypotheses regarding the relationships between key social, biophysical, climatic, economic and policy factors that will elucidate the dynamic of soil acting as a social-ecological feedback.
- Story Maps to facilitate spatial storytelling, using multiple data sources to describe where, why and how soil health and soil conservation efforts are being implemented across the landscape.
- Educational resources that highlight results of synthesis, modeling and mapping to inform diverse stakeholders interested in leveraging this work to enhance incentives, resources, and communication strategies aimed at improving soil conservation efforts.

Actionable Science Philosophy

SHEAF's leadership is committed to engaging stakeholders in formal and informal capacity throughout the duration of this project to ensure that our efforts expand awareness and knowledge of factors that influence soil health practice adoption and the maintenance and development of more resilience soils. Our team represents a diversity of lived experiences, academic and scholarly expertise, and a shared desire to advance transdisciplinary social-ecological science. We aim to develop project outputs that are informed by an iterative conversation between diverse stakeholders who have a stake in the findings from this team synthesis work so that our work can lead to advancing goals of actionable science. The SHEAF leadership is committed to sharing the governance of this project with key partners, including SHEAF collaborators and our External Stakeholder group throughout the duration of this project.

Guiding Principles

Core Values

As a group, we will strive to have a transparent, respectful, and collaborative engagement with stakeholders and one another, therefore we commit ourselves to:

- Recognize that we are all responsible for the success of this project
- Create an environment of cooperative learning among all team members
- Promote information sharing and shared-decision making throughout the project
- Approach our collaborative inquiry from a place of respect, transparency, openness and creativity.
- Accountability, show up as much as you can and communicate when and where you can't show up
- Support for early career scholars as they make their way in the professional realm

Communication

Clear, concise and regular communication is necessary for the success of this project, therefore we commit ourselves to:

- Regular communication via working groups and the larger group
- Critique ideas, not people.

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- Be NICE and remember we are all HUMAN
- Practice constructive criticism
- Provide and explain all disciplinary jargon and terminology
- Be open to new ideas and perspectives

Managing Conflict

As a group we commit ourselves to working through conflict in 1 of 2 ways. If you are able to address the issue, one-on-one with an individual and look for resolution, do that. Avoid talking behind people's backs or unnecessarily gossip. If you are unable to address the issue one-on-one then reach out to the PI's or to SESYNC support staff to help mediate a conversation to resolve the conflict.

Decision-Making Processes

- Abide by a collaborative decision-making structure where all relevant teams and team members are consulted prior to big decisions that affect the project are made. Work to build consensus where and when possible.
- For some logistical and programmatic decisions, it may be necessary for the PI's to make decisions to move the project forward in a manner consistent with project goals and principles.

Managing Expectations for Engagement

- Recognize and respect the time investment of team members, state engagements and community our ability to follow-thru on commitments (to this project, vis a vis your other commitments)
- Foster and build flexible communication and engagement strategies with external stakeholders and with one another that is based on achieving project goals around actionable science.
- Invest in team member's skills and abilities, looking for ways to cultivate new skills and leverage existing expertise to ensure our ability to meet our stated goals.

Authorship

Authorship is potentially available to any member of the working group. All working group members should be given opportunity to work on/co-author all products via email communication. Contributions that warrant authorship involve actively participating in the development of the product, defined by involvement in at least two of the following:

- Writing/editing (not just grammar or spell check);
- Contribution of data (gathered from the literature, databases or through primary research);
- Contribution to data analysis;

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- Developing the central ideas.

Order of authorship is agreed upon by all parties involved in the paper.

Organizational Structure

PI team

Gabrielle Roesch-McNally, Andrea Basche and Erich Seamon are the Principle Investigators for this project. They will lead the logistical and programmatic management of the project to ensure that we meet the goals of the SESYNC pursuit in a timely and coherent fashion.

Project Teams (leads in bold)

Working Group 1: Soil Health Practices/Processes/Principles (**Andrea**)

- Jen Moore Kucera, Kate Tully, Stefan Gailens, Dave Huggins, Laura Lengnick, Tabitha Brown

Working Group 2: Socio-Economics (**Gabrielle**)

- Rachel Schattman, J. Arbuckle, Maria Bowman

Working Group 3: Biophysical and Climatic Factors (**Erich**)

- Nora Alvarez-Berrios, Julian Reyes

Story Maps (Gabrielle)

- J. Arbuckle, Tabitha Brown, Jen Moore Kucera, others....

Modeling (Erich)

- Julian Reyes, Gabrielle Roesch-McNally, Andrea Basche, others...

Education/Policy Outreach (TBD)

- This group is evolving and can be fleshed out at Meeting 2

External Stakeholder Team (Andrea)

- Currently the external stakeholder team is small, but may grow. The group includes: Teresa Matteson from Benton Soil and Water Conservation District; Steve Rosenzweig from General Mills; Tom Driscoll from National Farmers Union; Marcia DeLonge from Union of Concerned Scientists

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