

LAND CORE

Advancing soil health policies & programs
that create value for farmers, businesses,
and communities.

SOIL HEALTH & RISK MITIGATION PREDICTIVE MODEL | PROJECT ABSTRACT

Updated October 28, 2021

ABOUT LAND CORE:

[Land Core](#) is an independent 501(c)3 organization with a mission to advance soil health policies and programs that create value for farmers, businesses and communities. The organization is building the missing infrastructure and market-based incentives that will make the rapid adoption and scalability of soil health possible. Land Core is known for its efficacy in US federal policy and its ability to build broad coalitions of support for soil health.

PROJECT ABSTRACT:

Land Core has convened a collaborative, cross-sector working group to build an actuarially-sound, predictive model of the risk reduction associated with soil health. Although it's generally understood that certain soil health practices can mitigate risk in agriculture, primarily by increasing resilience to flooding and drought, the institutions that price risk, such as lenders and insurers, do not incorporate these benefits into their risk pricing today.

The Land Core Risk Model is quantifying the economic risk-mitigation value of specific soil health practices by examining the correlation between the implementation of these practices over time, recovery time after a stress event, and ultimately their impact on yield. Starting with corn and soybeans, the dominant crops in the US, we are focusing on yield as farmers' economic output.

The model draws on existing soil health practice data from spatial observations, combined with data from in-field experiments, publicly-available climate, weather, soil and geological data, as well as estimated yield data, to inform a statistical model capable of predicting the likelihood of reduced financial risk. This will pave the way for lenders and insurers to develop incentives such as lower-rate loans and discounted insurance to incentivize regenerative practice adoption. The MVP is being developed and piloted in partnership with Compeer Financial.

IMPACT:

1. Gives lenders and insurers the tool they need to quantify the risk-mitigation impacts of specific soil health practices and develop pricing that reflects the positive impact on their bottom lines
2. Creates a pragmatic, economic rationale for stakeholders to incentivize the adoption of de-risking, soil health practices
3. Informs private and public-sector policy development and broadens the needed coalition of support for regenerative agriculture

PROJECT TEAM:

Land Core has convened the following working group made up of world-class professionals across a range of sectors and industries to build this model.

- [Tim Bowles, Ph.D.](#), Assistant Professor of Agroecology and Sustainable Agricultural Systems, University of California Berkeley
 - **Expertise:** Agroecology, soil-health and soil biogeochemistry, agricultural resilience, climate change adaptation, social-ecological systems
 - **Role:** Model development supervisor and resilience analysis lead, integration of available data with statistical modeling approach
- [Frederi Viens, Ph.D.](#), Professor, Department of Statistics and Probability; Director, Actuarial Science Program; Adjunct Director, Center for Statistical Training and Consulting, Michigan State University; Chinook's Acres farm
 - **Expertise:** Probability theory and applied probability, applied Bayesian statistics, mathematical statistics, actuarial science, quantitative risk analytics, quantitative finance, agronomy, food security, farming
 - **Role:** Statistics lead and Bayesian analysis; academic support and faculty supervision
- [Bill Salas, Ph.D.](#), Interim CEO, CSO; Applied GeoSolutions, LLC; President, Dagan, Inc
 - **Expertise:** Modeling and remote sensing (geospatial tools and earth systems models), data analysis; conservation agriculture, bringing tools to market
 - **Role:** Modeling and remote sensing advisor; data provider
- [Shefali Mehta, Ph.D.](#), Founder & Principal, Open Rivers Consulting Associates
 - **Expertise:** Environmental economics, agriculture; statistics, dynamic and probabilistic modeling, data analytics, strategy and implementation
 - **Role:** Strategy and facilitation
- [Jenette Ashtekar, Ph.D.](#), VP of Sustainability and Regeneration, CiBO Technologies, Inc
 - **Expertise:** Modeling, machine learning and big data analysis, product development, soil science and agronomy
 - **Role:** Advisor, modeling, remote sensing and product development; data provider and technology consulting
- [Jessica Chiartas, Ph.D. candidate](#), Soils & Biogeochemistry, University of California, Davis; Soil Life Services, LLC
 - **Expertise:** Soils, in-field testing, teaching, cross-sector collaborations, media
 - **Role:** Soil science and soil health assessment advisor
- [David Krevitt](#), Independent Data and Risk Analyst; Technologist
 - **Expertise:** Investment management, including interest rates, credit risk, mortgages (formerly Blackrock Financial); market valuation; data and risk analytics; cost modeling; web development
 - **Role:** Finance advisor; data management, data analyst
- [Aria McLauchlan](#), Co-Founder & Executive Director, Land Core
 - **Expertise:** Soil health, federal policy, communications, business development, project management, non-profit leadership
 - **Role:** Project Director, incl. project management, fundraising and communications

- [Harley Cross](#), Co-Founder & Director of Strategy, Land Core
 - **Expertise:** Strategy, communications, business, soil health policy
 - **Role:** Project development, strategy, partnerships and implementation
- [Yvonne Socolar, Ph.D. candidate](#), Agroecology, Department of Environmental Science, Policy and Management, UC Berkeley
 - **Expertise:** Agroecology, soil health, agricultural resilience, climate change adaptation, crop rotational complexity quantification, spatial statistics
 - **Role:** Spatial analysis, model development and analysis support

PROJECT ADVISORS:

These outstanding leaders in the field are generously advising the project:

- [Keith Paustian, Ph.D.](#), University Distinguished Professor, Department of Soil and Crop Sciences, and Senior Research Scientist at the Natural Resource Ecology Laboratory, Colorado State University
- [David Lobell, Ph.D.](#), Professor at Stanford University in the Department of Earth System Science, Stanford Earth; Senior Fellow, Stanford Woods Institute for the Environment; Senior Fellow, Stanford Institute for Economic Policy Research (SIEPR), Stanford University

FLAGSHIP PARTNER:

Our partnership with Compeer brings decades of industry experience and deep ties to rural America.

- [Compeer Financial](#) is a member-owned Farm Credit cooperative providing credit, insurance and financial services throughout 144 counties in Illinois, Minnesota and Wisconsin. With over \$25 billion under management, Compeer is the third largest cooperative in the Farm Credit System.

TIMELINE:

Phase One Jan 2020 - Jul 2020	Phase Two Oct 2020 - Feb 2022	Phase Three Mar 2022 - Sept 2022
Convene working group Project kickoff Project scoping & MVP design Fundraising & grant applications Initiate partnerships	Onboard project staff Scrub data Launch MVP development Regional-scale pilot Model iteration, incl. Soil biophysical interactions Model expansion by region	Develop end-user tool User calibration UX/UI design Web portal development Launch & adoption

PARTICIPATE:

1. Recommend advisors representing lending, investment, insurance and conservation finance to provide feedback and inform model development.
2. Suggest additional field-level data sources across different regions and crops/livestock.
3. Land Core invites funders and partners to contribute cash and/or in-kind contributions to help build and pilot the MVP. Please contact aria@landcore.org for more information and budget.