

Seven-mile Creek Local Bioeconomy

Minnesota Rural Energy Board

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University of MN

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About Us

We are a transdisciplinary research collaborative at the University of Minnesota.

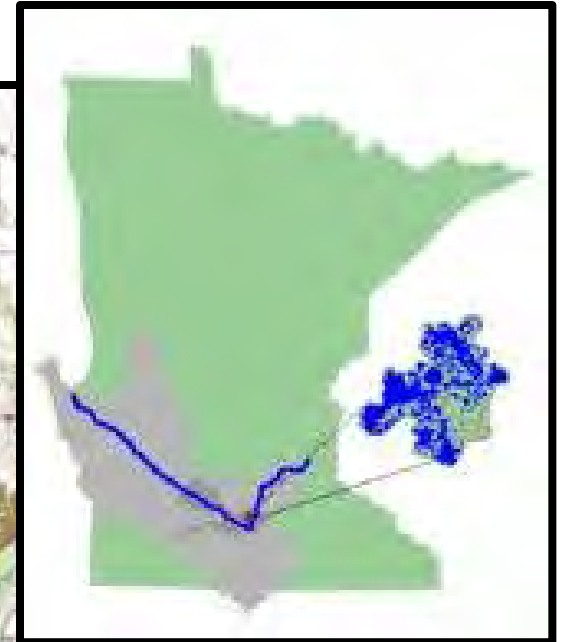
Mission

The collaborative's mission is to help communities with resource-based economies—through participatory processes and decision support tools—apply ongoing research and innovation towards economic growth and development, improved environmental outcomes, and community well-being.

Purpose

With stakeholders in the Seven-mile Creek area we discuss and identify implementable strategies on the agricultural landscape to increase productivity, improve soil health and water quality, and grow the local economy.

Seven-Mile Creek



The Drivers

Policy

Technology



Better
Economics

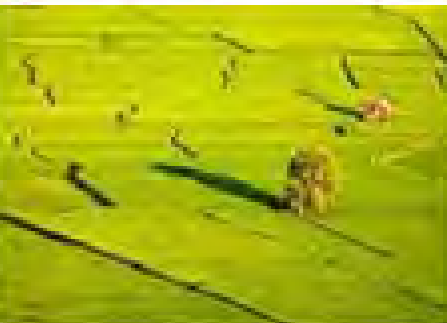
Market/Economics

Policy, Technology, & Market

Policy	Big-Tent Technology	Market/Economics
Fuels, Chemicals, Thermal Production Incentive	Biomass Utilization <ul style="list-style-type: none">• CaOH• AFEX• Ethanol	Volatile Commodity Pricing
Water Quality Politics <ul style="list-style-type: none">• Fishable, Swimmable, Drinkable• Buffer Strips	Genome Editing <ul style="list-style-type: none">• Field Pennycress• Energy Crops• Cover Crops	High Cost Inputs
	Precision Ag <ul style="list-style-type: none">• ROWBOT	Feed Costs

Big-Tent Technology:

Value-added Processing for Biomass from Continuous Living Cover Crops



AFEX Process



- Biorefinery sugar feedstock
- Releases 75+% of sugars for fuels and chemicals



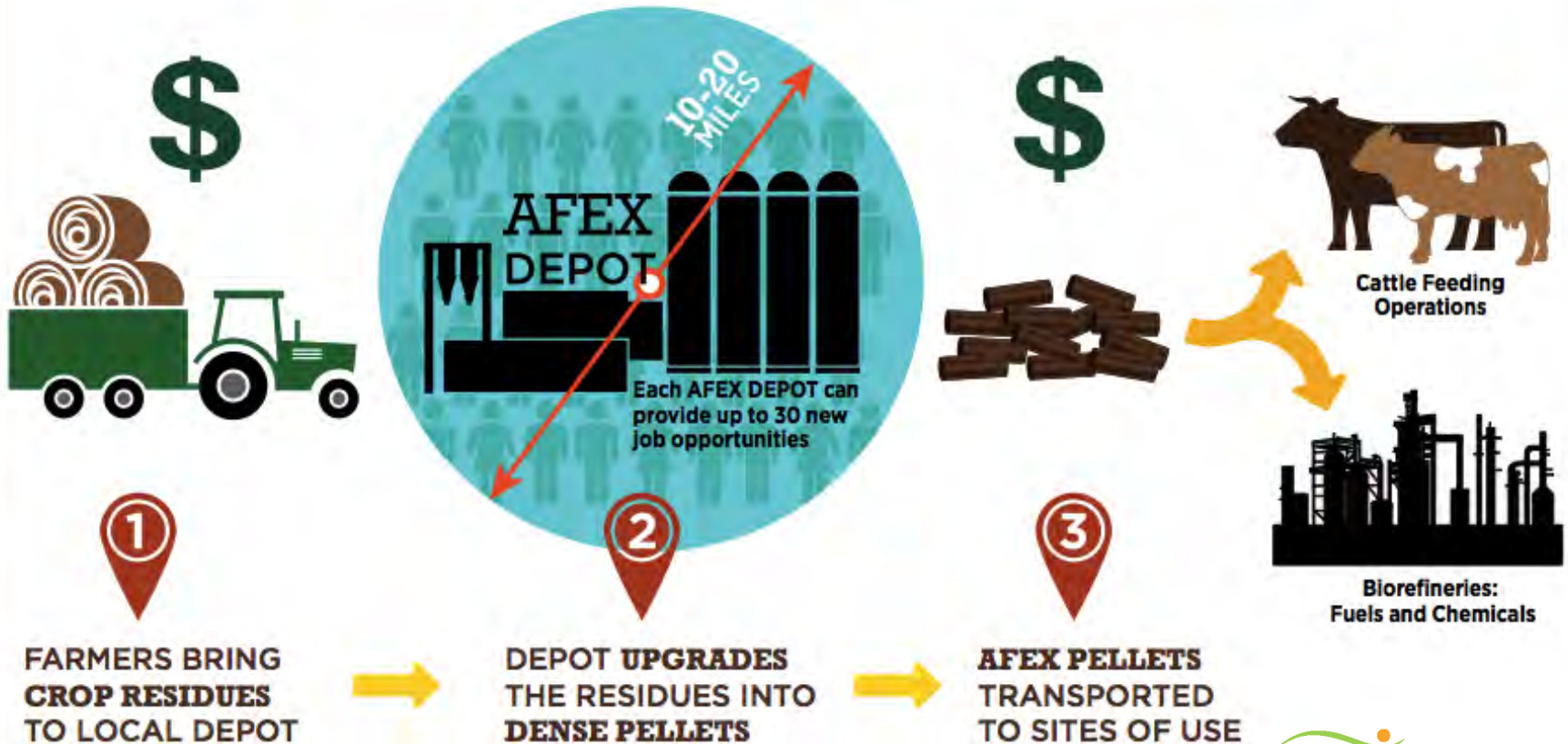
- Ruminant animal feed for beef and dairy cattle
- Potential to displace corn grain



De-Risking and Scale-Up
of Bio-Based Technologies

Social value from locally-owned processing

COMMUNITY BASED PRODUCTION SYSTEM



Big-tent Technology: Genome Editing



Contents lists available at [ScienceDirect](#)

Plant Science

journal homepage: www.elsevier.com/locate/plantsci

Review

New approaches to facilitate rapid domestication of a wild plant to an oilseed crop: Example pennycress (*Thlaspi arvense* L.)

John C. Sedbrook^{a,*}, Winthrop B. Phippen^b, M. David Marks^c

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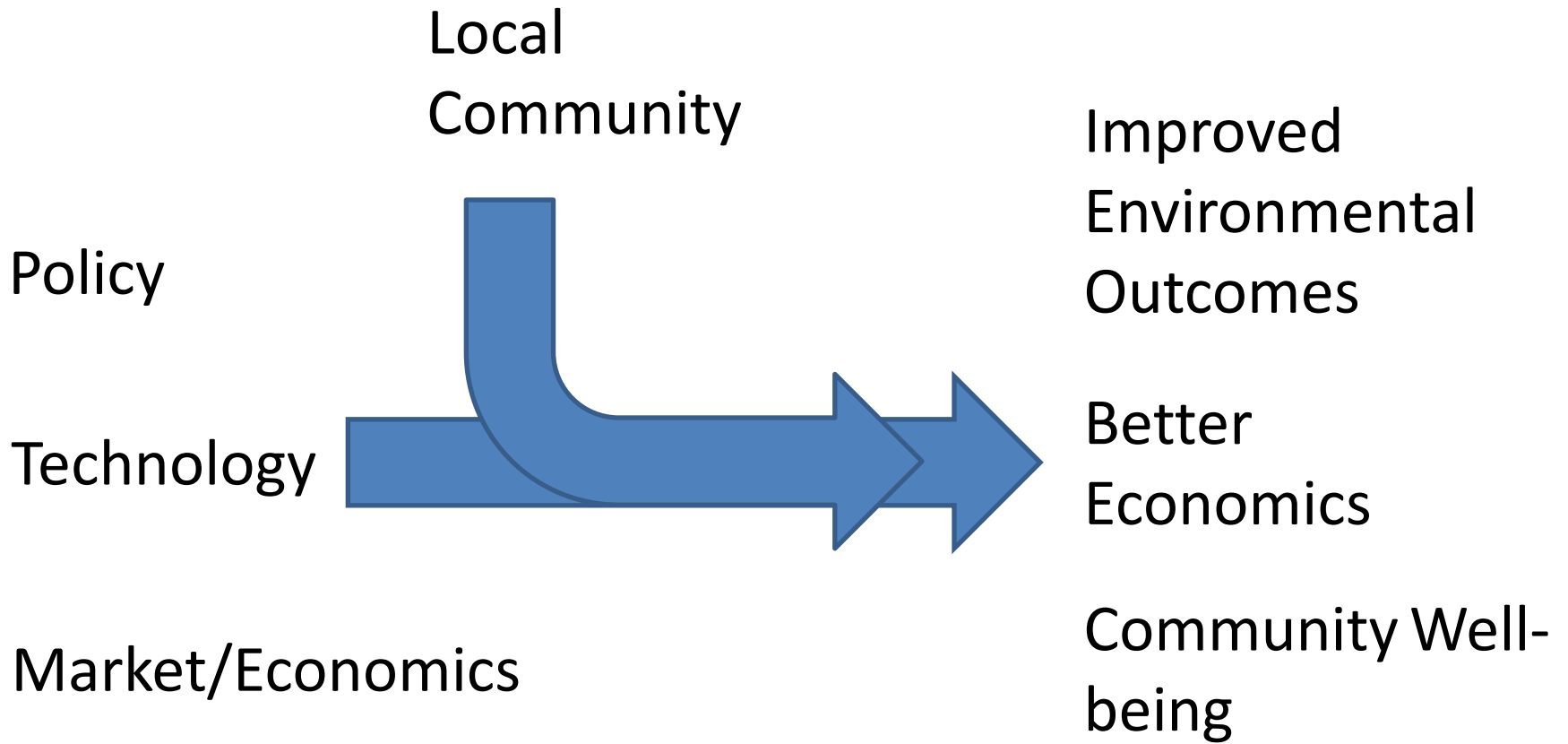
^c Department of Plant Biology, University of Minnesota, 1445 Gortner Avenue, 250 Biological Sciences Center, Saint Paul, MN 55108, USA



KSU Extension

**Field
Pennycress**

- + After soybeans
- + Benefits soil, bees
- + Shades weeds
- + Yields oil + feed
- + \$300 profit/acre
- Some production challenges



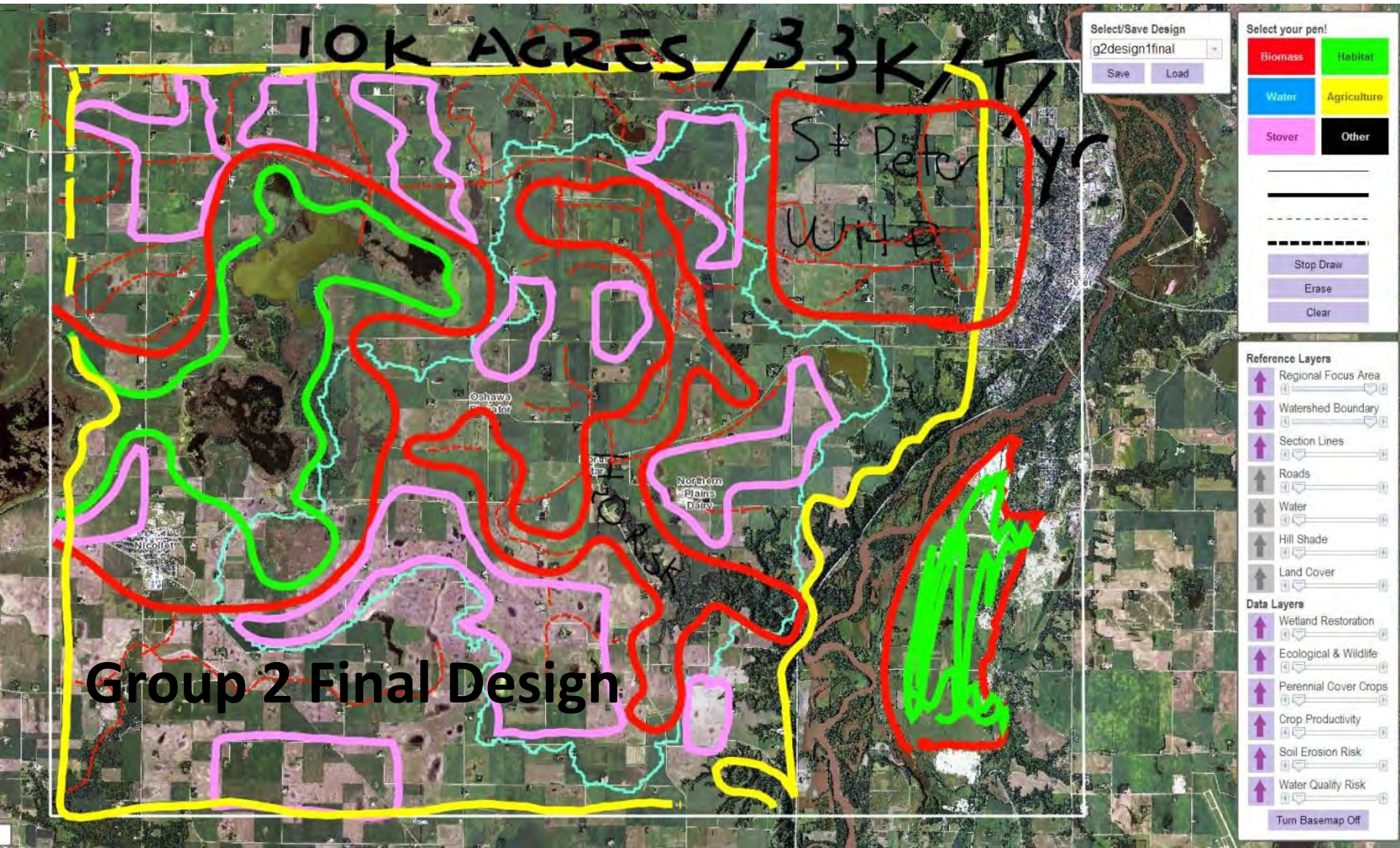
Engagement Tools

- Facilitated Engagement
- Support from University – Action Oriented Research
- Creating Community Capacity and Connections
- Decision Support Tools

Designing for biomass with Collaborative Geodesign



Collaborative Geodesign task: 10,000 acres of biomass in 75,000 acre region



Continuous Living Cover

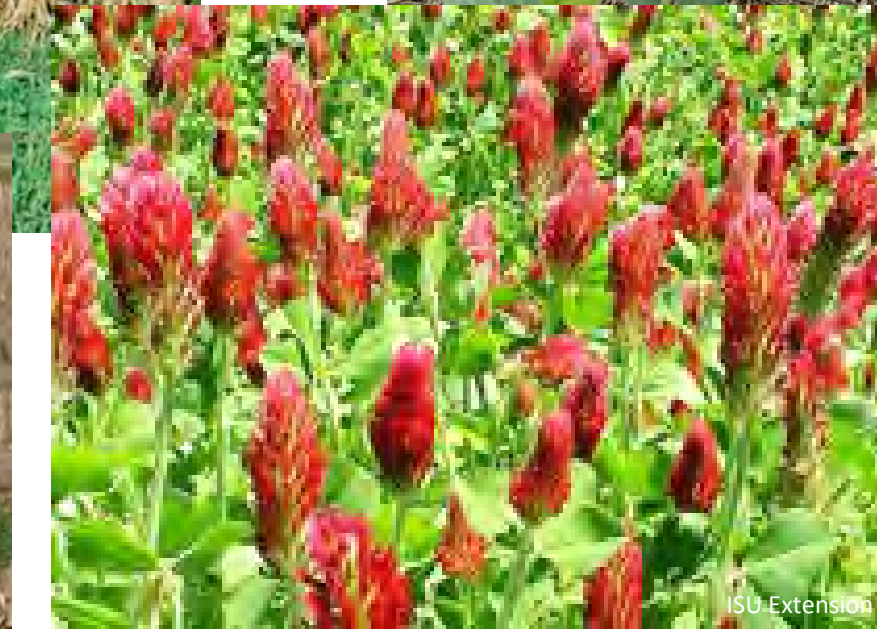
Winter annuals/double-cropping

Grains, legumes, oilseeds...



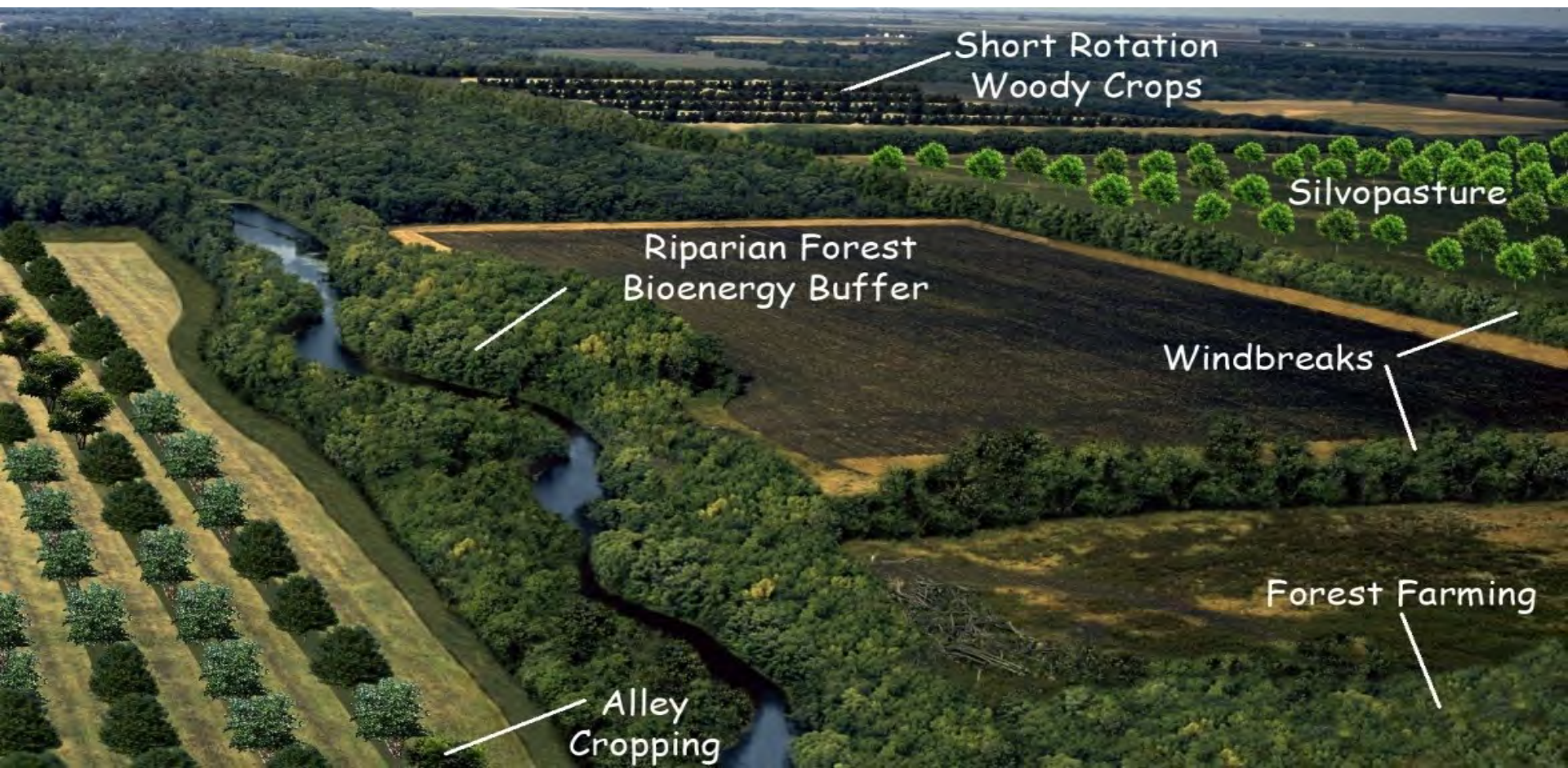
Continuous Living Cover

Cover cropping & green manures



Continuous Living Cover

Agroforestry: integrating woody & non-woody crops



Continuous Living Cover

Herbaceous crops & polycultures

Conclusion

- Identify those that are interested and can contribute
- Get the word out about the project
- Build a service orientated relationship with the local community

