

# Agriculture Innovation Thesis

Accelerating Crop Diversification  
in the Upper Mississippi River Foodscape



**Innovation has been at the heart of the world's agricultural production since humankind first learned to cultivate the soil. And today, with global food systems contributing one-third of global greenhouse gas emissions and farmland expansion acting as the leading cause of habitat loss around the world, innovation is needed once again to transition these systems toward regenerative practices. In the Upper Mississippi River Foodscape, we are focused on accelerating innovative practices, such as crop diversification, at scale to address the dual challenges of climate change and biodiversity loss.**



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## The Challenge

In the last 100 years, the demand for food, feed, fuel and fiber has been on a steep and steady incline, spurring the expansion of agricultural lands and new methods of farming. But these advances have come at a cost to people, climate and nature, increasing the contribution of greenhouse gases into the atmosphere, while simultaneously reducing the very ecosystems that can help sequester them. These impacts are felt deeply by the producers and families who operate more than 2 million farms in the United States and are enduring chronic droughts, flooding, record-high temperatures and frequent storm events that threaten their livelihoods and the agricultural supplies the world depends on. Agriculture is also a significant source of nutrient runoff into freshwater systems utilized by both rural and urban areas, which means that this growing demand has a reverberating effect on millions of people across the country.

Agricultural communities, businesses, consumers and scientists recognize these threats and are calling for a change in our production systems, including a shift in production practices toward systems that are regenerative, climate resilient and productive. Science tells us that farming practices such as agroforestry, cover crops, no-till and crop diversification can deliver the changes we need to increase soil health, biodiversity and water retention, while also increasing profits, decreasing costs on chemical inputs and improving resiliency against climate, financial and political shocks. But adoption of these practices isn't happening fast enough or reaching far enough to outpace the detrimental impacts of the current agricultural system. To make significant progress, we need to challenge the status quo by identifying solutions that circumvent or disrupt roadblocks to large-scale change. In other words, business as usual won't work.

# Our Focal Region

For the purpose of this strategic project, we focused on the challenge of increasing crop diversification in the [Upper Mississippi River Foodscape](#), part of the larger 31-state Mississippi River system where environmental and economic impacts not only affect waters and critical habitat throughout the Midwest, but further downstream to the Gulf.

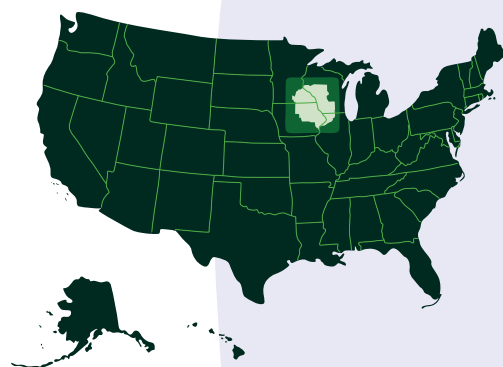
Monoculture, or growing one single crop in a given area year over year, is a significant issue, as cropland in this foodscape is dominated by corn and soybeans, which occupy 72.5% of cropland acres. The prevalence of these two crops negatively impacts the foodscape’s ability to sequester carbon, support biodiversity, enhance water quality, control flooding and improve soil health. Also, farm operations specializing in so few commodities are less resilient to extreme weather events, pests and disease, making their livelihoods and quality of life vulnerable.

Crop diversification produces a mix of crops such as corn, soybeans, oats, rye, barley, winter oilseeds like winter camelina and pennycress, and agroforestry crops. This approach can enhance biodiversity, improve soil health, reduce erosion and nutrient runoff into waters, reduce carbon emissions, improve pest resistance and nutrient cycling, and reduce dependency on a single crop. These outcomes are critical for rebuilding climate resilience in the Upper Mississippi River Foodscape for farms and the communities around them.

## Our Thesis

There are many factors that influence farm operations and their crop rotation decisions. We believe that the most effective way to accelerate progress on crop diversification in the Upper Mississippi River Foodscape is to identify the specific challenges and roadblocks producers face and leverage those critical insights to inform decisions on the technologies and innovative solutions that will be best suited to circumvent, mitigate or disrupt those challenges.

Within this document, specific challenges and roadblocks will be outlined, and corresponding technology and innovative solution themes will be identified. Our goal is to provide a better understanding of why “business as usual” is not going to achieve the scale of change needed, and with that insight, inform those investing philanthropic funding and other forms of capital where their resources might be the most catalytic.







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# Current State of the Foodscape

# Crop Distribution

Current State of the Foodscape

There are approximately 34 million acres in the Upper Mississippi River Foodscape: 22.5 million acres are cropland, comprising 65% of total land and representing approximately 6.5% of total U.S. agricultural acres. According to the 2022 USDA National Agriculture Statistics Service Cropland Data Layer, cropland in this foodscape is dominated by corn and soybeans, which occupy 72.5% of cropland acres. Hay and pasture take up another 4.6 million acres, or 20.7% of agricultural lands. Other legumes and grain make up less than 2.5 million acres, or 6.5% cropland. Fruits and vegetables make up 0.3% of cropland. Tree crops comprise less than 1% of cropland.<sup>1</sup>



**72.5%**

Corn & Soy



**20.7%**

Hay & Pasture



**6.5%**

Legumes & Grain



**0.3%**

Fruits & Vegetables



**<1%**

Trees



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## Current Market Drivers

The significant share of acres under corn and soybean production is a result of a complex set of economic, environmental, public policy (including subsidies, price support programs and federal crop insurance programs supporting a select group of crops, including corn and soybean production) and global market pressures.<sup>2,3</sup> Farm operations have shifted acreage to corn and soybeans because they are typically in high demand, are more competitive in global markets, and can deliver greater returns per acre compared to barley and wheat.<sup>4</sup>

The pressures outlined above support the fact that there is not a pull to diversify production coming from either farm operations or their buyers, the producers of food and feed. The biofuel market and, more specifically, sustainable aviation fuel, are a potential exception. (The demand pull depends on U.S. government fiscal support, which has not been confirmed as of the writing of this thesis.) The focus of this thesis and The Nature Conservancy's (TNC) work in agriculture is not on crops grown for biofuels, but rather feed and food.



## Market Tailwind

Although there is not currently a strong pull from farm operations or their buyers to diversify crop production, there is a significant tailwind that supports the fact that business as usual—continued corn and soybean rotations—is not sustainable for farm operations.

The primary tailwind is cropland health: Lower long-term resilience of Midwest croplands is the result of continuous corn-soybean rotation. This two-year rotation is associated with a buildup of pests and diseases over time and provides diminishing returns for breaking pest cycles. The reliance on similar weed control tools in both corn and soybean (e.g., 2,4-D or dicamba) is resulting in increased herbicide resistance. Adding a small grain, like wheat, oats or hybrid rye, back into the rotation with corn and soybean can help mitigate these challenges while simultaneously building soil health and helping to optimize nutrient cycles.<sup>5,6</sup> Should the degrading resilience of the croplands start to impact consistency of supply, there is the potential for market forces to drive demand for increased rotations.<sup>7</sup>

This tailwind is the impetus for TNC's work to determine where challenges and roadblocks exist in the current system. There is an opportunity to identify and test solutions that will circumvent those roadblocks, so that the market can support future demand for increased crop diversity from farm operations and/or their buyers—the producers of food, feed and fuel.



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# Innovation Research & Strategy



## Research Team

This thesis and the methodology behind it were developed by TNC's Agriculture Innovation Team. Established in 2020, the Team worked to support—with a lens on technology and innovative solutions—the Conservancy's audacious goal for U.S. agricultural production: 50% of croplands utilizing regenerative agricultural practices and systems by 2030 to achieve economic and environmental benefits.

The **Agriculture Innovation Strategy**, the synthesis of the team's goals, research and learnings, included direct investment in eight agriculture technology companies. In some cases, the Agriculture Innovation Team supported pilots that tested select technologies for the intended positive environmental impacts and farm and ranch operation profitability outcomes. The challenges and roadblocks the Team worked to address were those preventing the adoption of regenerative agriculture production practices, including acres under cover crops, increased crop diversity,

input optimization, no till/minimal till and the adoption of grazing land management plans. The portfolio of companies continues to be a great signal for investors regarding the types of critical technologies and innovation solutions needed to accelerate the profitable adoption of regenerative practices.

However, the practice that proved the most challenging from an investment and pilot perspective was increasing crop diversity. The roadblocks and challenges impacting farm and end-user decisions around new crops or expanding the use of existing crops are wide-ranging. The Agriculture Innovation Team had the opportunity—generously supported by Builders Initiative—to dive deep to gain understanding around the unique challenges and roadblocks that are preventing the accelerated adoption of more diverse crops. This practice is of specific interest to TNC's team and partners leading our efforts within the Upper Mississippi River Foodscape.

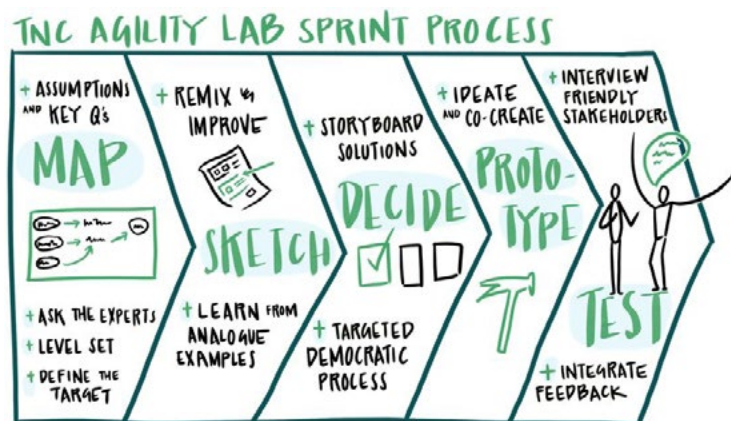
## Research Methodology

The Agriculture Innovation Team, empowered by four years spent addressing agricultural challenges and roadblocks and executing successful pilots to test technologies and innovative solutions, took a disciplined approach to building this specific innovation thesis for accelerating crop diversification. They reviewed the research and analysis the Upper Mississippi Foodscape Team had collected and commissioned and then conducted one-on-one interviews with 10 agriculture experts from within the Conservancy and partner organizations. These experts are actively working as nonprofit stakeholders to accelerate crop diversification. Based on the learnings from these interviews, the Team collaborated with a professional facilitator to develop a design sprint (see next page). The participants in this design

sprint were private sector actors in the agriculture supply chain, critical stakeholders who could provide necessary insight and clarification on challenges and roadblocks. They included representatives from a major commodity trader, processor and distributor; a consumer packaged goods (CPG) company; a farm input company; and an agriculture retailer. Further insight was gathered through interviews conducted during the workshop (a feature of the design sprint). The stakeholders represented in the interviews included a milling company, an independent agronomist, a supply chain tech/MRV provider, a row crop farm owner/operator, community millers and an agriculture lender.

## Design Sprint Process

This process took place in a virtual three-day meeting using an interactive workshop based on the “design sprint” concept, which was originally developed by Google Ventures and refined by TNC’s **Agility Lab**. The format and relatively short timeframe of the workshop are based on an “agile” way of approaching problems. This approach has been successfully implemented across technology and business sectors to de-risk projects and build better solutions with fewer resources in less time. TNC’s Agility Lab has been refining the process for TNC’s work since 2020. The workshop was structured to help explore new ideas, quickly make informed decisions and get real-time feedback from additional expert perspectives.



## Innovation Thesis Criteria

The focus of this innovation thesis are those challenges and roadblocks to scaling crop diversification that might be addressed through market-based solutions. There are many other critical levers of influence beyond markets including policy and culture. Those are beyond the scope of this work.

## Vision

Our goal is to support the development of technologies and solutions that will eliminate the current cost premium to crop diversification that acts as a roadblock for the majority of producers.





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# Challenges & Roadblocks



**CHALLENGE:****Technical Assistance for Production**

Technical assistance and experience at most trusted agriculture retail partners is centered on corn and soybean production, which means there is a lack of support for farm operations to plan and produce new crops. Sales agronomists (who are employed by agriculture retailers) are generally at capacity and unlikely to have the bandwidth to expand their expertise to include new crop production.

**Implications**

Without trusted guidance, the risks and costs are too high for farm operations (beyond early adopters) to experiment or adopt new crops.

**Investment Theme**

There are solutions that support independent agronomists, who are more likely to have the bandwidth and business incentive to support the introduction of a new crop, to reduce their per-acre costs. If independent agronomists can profitably scale their businesses, they are able to serve a range of customers, including those looking to introduce a new crop into their rotation.

**Example companies**

**EarthOptics<sup>a</sup>** is building solutions to provide farm operations and their trusted partners (i.e. agronomists) with predictive agriculture insights. These predictive data and insights could support farm operations as they plan the introduction of a new crop and assess potential profitability outcomes.

**AgWorld** provides a farm management system designed for agronomists and farm businesses to support crop planning and recommendations. This system can be used to develop multi-year, multi-crop strategies delivering some of the necessary technical knowledge needed to implement plans that include additional crop rotations.

**Canopy Farm Management** offers tree planting and management services to support farm owners who want to reintroduce a tree crop on their land.

**GreenCover** is a cover crop seed company that provides technical assistance to support their customers' successful planting and help them achieve intended soil health outcomes.

The incumbent companies in agriculture inputs (e.g., Syngenta, CropwiseAI and Bayer, proprietary GenAI LLM) are developing generative artificial intelligence (GenAI) models to augment their agronomic advice. Much of the focus is on corn and soybeans. Should these models deliver as expected, perhaps they can be quickly trained to support crops beyond corn and soybeans and be used by independent agronomists.

<sup>a</sup> The Nature Conservancy made an equity investment in PatternAg which subsequently merged with EarthOptics as part of its Agriculture Innovation strategy. The inclusion of EarthOptics here is not intended to be an investment endorsement.

The challenges and roadblocks to increasing crop diversity are listed on the following pages. Each challenge includes a reflection, or "investment theme," from the Agriculture Innovation Team that examines how an investor lens could be applied to mitigate, disrupt or circumvent these roadblocks. In some cases, the investment themes include the names of specific companies that could help confront these challenges. These are intended to be examples and are not to be considered investment advice.

This list is not comprehensive and known gaps are outlined in the subsequent section (see "Thesis Gaps"). It was developed by experts from throughout the agriculture supply chain, all of whom are working from their educated assumptions about how the system functions. The intention is for this list to be thought-provoking and informative for those looking to make investments that could accelerate change.



**CHALLENGE:**

## Technical Assistance for Post-Harvest Storage and Processing

There is also a gap in available technical assistance at the post-harvest storage stage. Farm operations need technical assistance to support storing, minimal processing (which retains value) and marketing a new crop. Grain traders need to understand the necessary specifications to store, process and sell a new crop.

### Implications

Processors and millers (beyond boutique companies and cooperatives) do not have the technical assistance needed to support new crops efficiently and this creates friction in necessary market development. At the farm gate, the lack of post-harvest technical assistance also creates friction in necessary market development.

### Investment Theme

There are solutions that aggregate the demand for new crops with grain traders and build the business case for investment in the necessary technical assistance to manage a new crop.

#### Example companies

**Bushel** supports farm operations' ability to market their grain by providing real-time access to cash bids, digital grain offers and mobile tools for managing contracts, scale tickets and settlements. It also streamlines payments through Bushel Wallet and integrates with farm management systems to support profitability tracking and informed decision-making.

**The Ryzosphere** is an intelligent platform that discovers, qualifies, matches and maps farm production to buyers, with a goal to reduce transaction risk and cycle time.



# Post-Harvest Infrastructure

In addition to a gap in technical assistance and support, the physical hardware needed to store alternative crops after harvest is less common. Separate bins and potentially unique processing equipment are needed, which means challenges for getting product to market.

## Implications

Without post-harvest infrastructure, producers face logistical and financial barriers to storing, processing and marketing new crops. This discourages diversification and limits market access.

## Investment Themes

- 1 Low-cost storage solutions can be deployed seasonally and easily support a variety of crop types.

### Example companies

**GrainPro<sup>b</sup>** offers a range of solutions to preserve and protect dry agriculture commodities.

**Wiagro** offers lot-enabled grain storage solutions to preserve and protect dry agriculture commodities.

- 2 Infrastructure funded through public-private partnerships can support storage and processing.

### Example companies (leveraging public-private partnerships)

**4P Foods** is a U.S.-based food distribution and logistics company focused on local and sustainable food systems. Its infrastructure includes cold storage and logistics hubs that support the aggregation, short-term storage and distribution of fresh, locally sourced food.

**Happy Dirt** is an organic produce distributor that connects local farms with retailers, institutions and food businesses across the southeastern United States. Similar to 4P Foods, its infrastructure enables the storage, fulfillment and delivery of fresh, locally sourced food.

- 3 Mobile processing solutions exist as an alternative to larger, commercialized processing operations. These options are built with the flexibility and scalability producers would need when testing out a new crop.

### Example companies

**Craft Cannery** is a manufacturing company that specializes in small-batch production of sauces, dressings, marinades, soups and other specialty foods. They work with chefs, restaurants and food entrepreneurs to scale up recipes for retail and foodservice distribution, offering both co-packing and private label services.

**Friesla** develops modular meat processing systems designed for use by farms, ranches and small-scale meat producers. Their offerings include mobile and stationary units for slaughter, processing and cold storage. The company aims to support more localized and flexible meat processing infrastructure.

<sup>b</sup> Renée Vassilos, Agriculture Innovation Team member, serves on the board of GrainPro as of June 2025.



## CHALLENGE:

# Market Availability, Stability and Risk Mitigation

Markets for new crops are underdeveloped, opaque or volatile. Farm operations are hesitant to grow what they cannot obtain crop insurance or other risk mitigation products for and reliably sell within a known price range. Additionally, CPG companies and feed companies are reluctant to build product offerings without a guaranteed volume of supply.

## Implications

Without stable demand and supply or consistent price range, producers and buyers alike face high risk. This stifles food and feed innovation and production of new crops.

## Investment Theme

- 1 There is opportunity to explore private insurance solutions modeled after the Minnesota grain indemnity to de-risk production for farm operations. These options, such as off-take agreements and forward contracts, could be offered to CPG and feed companies to de-risk their experimentation with new crops.

### Example company

**Munich Re AgRisk Partners** offers tailored agricultural risk management solutions (parametric insurance) to farm operations, agribusinesses and food producers.

- 2 There are opportunities to support solutions that de-risk new crop adoption on farms.

### Example company

**Growers Edge**<sup>c</sup> is a fintech company that provides warranty solutions to de-risk the adoption of new technologies and production practices (e.g., cover crops) for farm businesses.

**NatureX RMS** is developing a parametric Insurtech<sup>d</sup> platform to enable (re)insurers to underwrite products for the nature-based solutions market, including regenerative agriculture transition risk (which could include increased crop diversity).<sup>8</sup>

## Challenges & Roadblocks

## CHALLENGE:

# Livestock Nutritionists

Collaboration with livestock nutritionists has the potential to impact the largest share of acres under production in the Upper Mississippi River Foodscape because approximately 40% of U.S. corn and over 70% of U.S. soybeans are used for animal feed.<sup>9,10</sup> Livestock nutritionists are conservative in trying new products in feed formulation due to the need for consistency during an animal's lifecycle and volume of product to support significant demand. Even proven alternatives like hybrid rye face resistance.<sup>11</sup>

## Implications

Livestock feed represents a major share of crop demand. Without buy-in from nutritionists, new feed crops struggle to scale.

## Investment Theme

There is opportunity to invest in solutions that build a more diversified feed market, which will allow lower crop production volumes to be cost effectively included in a feed formulation. Diverse crops (like oats) could be incorporated into feed rations or pet food if they are priced appropriately and there's a steady supply.

### Example company

**Agriiness** is a technology that manages sows via farm management software that is intelligent and adaptive. For operations using this type of management solution, there is the potential to leverage the software to support the testing and eventual scaling of new feed ingredients.

<sup>c</sup> The Nature Conservancy made an equity investment in Growers Edge as part of its [Agriculture Innovation Strategy](#). The inclusion of Growers Edge here is not intended to be an investment endorsement.

<sup>d</sup> Parametric insurance offers rapid, flexible payouts based on pre-defined triggers such as rainfall or wind speed, bolstering transparency and resilience in vulnerable communities<sup>9</sup>.

**CHALLENGE:**

## Food Companies Incorporating Diverse Crops

There is a gap between small-scale local production and large multi-national production of food products. CPG procurement teams and processors prefer to buy familiar product from known and trusted partners, rather than trying someone new. Regulatory hurdles also exist to setting up new and expanding existing facilities.

### Implications

Without scalable demand, many farm operations cannot take on the risk of growing new crops. CPG brands are constrained by scale of production requirements related to their infrastructure. One exception is regional grocery retailers and their private label brands (e.g. Giant Eagle, High-V). Regional grocery stores have private label brands that could absorb a non-extreme initial quantity.

### Investment Themes

- 1 Private label and other food manufacturers can map and matchmake supply and demand beyond the hyper local to medium-scale producers.
- 2 Supporting third party product Research and Development can demonstrate ingredient performance and fungibility with other ingredients (e.g., replacing wheat with Kernza®) and support the development of innovative product blending to match diversified operations.

#### Example company

**Patagonia Provisions** is the food division of Patagonia, the outdoor apparel company. They work to include a more diverse set of ingredients in their products, including Kernza®.

- 3 Cost-effective processing approaches for more than one commodity can be an alternative to setting up a new facility, such as swapping out parts between production runs rather than requiring different equipment.



**CHALLENGE:**

## Internalization of Externalities

While some farm operations have diversified their yields, the push for crop diversification has primarily come from environmental organizations and the federal government. Additionally, the messaging around why crop diversification is necessary has been conservation. This messaging has not led to a shift from a pull to a push from stakeholders around increasing crop diversity. The positive potential externalities that landscape-level change will bring have not been internalized by the local and regional agriculture businesses that serve farm operations.

### Implications

With the current messaging not yielding intended results, there is an opportunity to shift toward outcomes valued by aligned stakeholders. Examples of these values include minimizing soil erosion, improving soil health and local water quality and minimizing the impact from extreme climate events. A feature of the agriculture supply chain is that many of the farm operation owners and managers, agriculture retailers, agriculture equipment dealerships, agriculture lenders, and some traders, processors and millers are local or at least regional businesses. There is an opportunity to build alignment on improving outcomes at the landscape scale. The businesses have a vested interest in the community (minimizing business cost related to extreme environmental events such as floods, tornadoes, etc.) and could build shared values around the potential positive environmental outcomes from their contribution to supporting change.

### Investment Themes

- 1 There are solutions that can accurately map potential outcomes over five- to 10-year periods with various levels of commitment to crop diversification across a region. These positive visions of the future can galvanize various aligned stakeholders to buy in and support crop diversification.
- 2 Additionally, there are available solutions that can track progress toward collective ecological goals at the landscape scale. The goal is to have and share information on what is possible and how it might positively impact not only the farm operations in the community, but also minimize losses for the businesses that serve those farms. In other words, they can help show how regenerative practices build resilience beyond the farms.

#### Example companies

**Planet Labs** provides high-resolution, high-frequency satellite imagery. These data can be used to model land-use scenarios, forecast ecosystem outcomes based on proposed goals (e.g., minimized soil erosion, water quality improvements) and provide visual storytelling to support the internalization of externalities.

**HowGood** is a data platform that supports food brands, food suppliers, grocery retailers and restaurants to estimate the environmental and social impact of their supply chain. This then allows for strategic decisions that incorporate knowledge of externalities and, where feasible, action to drive change within a given foodscape.

**CHALLENGE:**

## Current Agriculture Ecosystem

Actors throughout the agriculture production supply chain rely on corn and soybean production for their revenue and profitability, including agriculture equipment companies, input companies, agriculture retailers, grain traders, feed companies, meat companies, CPGs, grocery retailers and so on. These include publicly traded companies, meaning their investors also rely on corn and soybean production. The challenges to support additional crops to scale up within this current system are tremendous.

## Implications

Within the current system, there is an opportunity to support the profitable diversification of corn and soybean crops. Through the development of those profitable markets, there would be investment in infrastructure and technical assistance capabilities that could ultimately support markets for a wider variety of crops. This is not an immediate solution to scale crop diversification but it is a way to address one of the most challenging roadblocks: the existing system that was built to support corn and soybean production.

## Investment Themes

- 1 Feed companies have the infrastructure and test crops for their required specifications. There is an opportunity to invest in solutions that facilitate the development of the supply chain to deliver corn produced with regenerative practices that deliver on specifications to livestock operations that are willing to pay a premium.

**Example company**

**Edacious** is building a technology platform for differentiating food quality.

- 2 Premium and identity-preserved soybean varieties exist and market demand for them is growing. There is an opportunity to invest in solutions that continue to support feed and food companies to identify and build additional global markets for soybean varieties.

**Example company**

**Puris** is a vertically integrated food company that develops and manufactures a wide range of plant-based ingredients, including pea protein, starches, fibers and sweeteners, from crops like peas, soy, lentils and corn.





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## Thesis Gaps

This identification of challenges and roadblocks is not complete. Known gaps are outlined here. Reader feedback on others is welcome.

- Labor is a challenge for agriculture production. Specific labor related challenges regarding the increase of crop diversity were not identified.
- The focus of this thesis and TNC's work in agriculture is not on crops grown for biofuels (but rather feed and food). Should the U.S. government implement additional fiscal support for biofuels, including sustainable aviation fuel, it would create an opportunity to replicate this work in collaboration with biofuel experts. This would help identify unique challenges and roadblocks and thereby investment themes to support the production of sustainable crops for growing biofuel demand.
- Crop insurance plays a role in farm operations and their planting decisions. Crop insurance covers most of the gap if there are losses from weather or other emergencies. Most farms require an operating loan from a bank to buy inputs, and most banks will not provide a loan for crops that don't have crop insurance. This thesis focused on the market side of the challenge and did not address the roadblock that is the current federally subsidized crop insurance market and what it does insure (corn and soybeans most robustly) and does not insure (most other crops).
- A significant share of agricultural land is rented. This limits farm operations' ability to make crop production choices. Multiple factors can be at play; for example, risk is greater with rented acres, or landlords limit production to corn and soybeans.
- Federal policy and investment significantly influence U.S. farm production. The Team did not address this challenge and the implications for shifts in federal policy and investment.



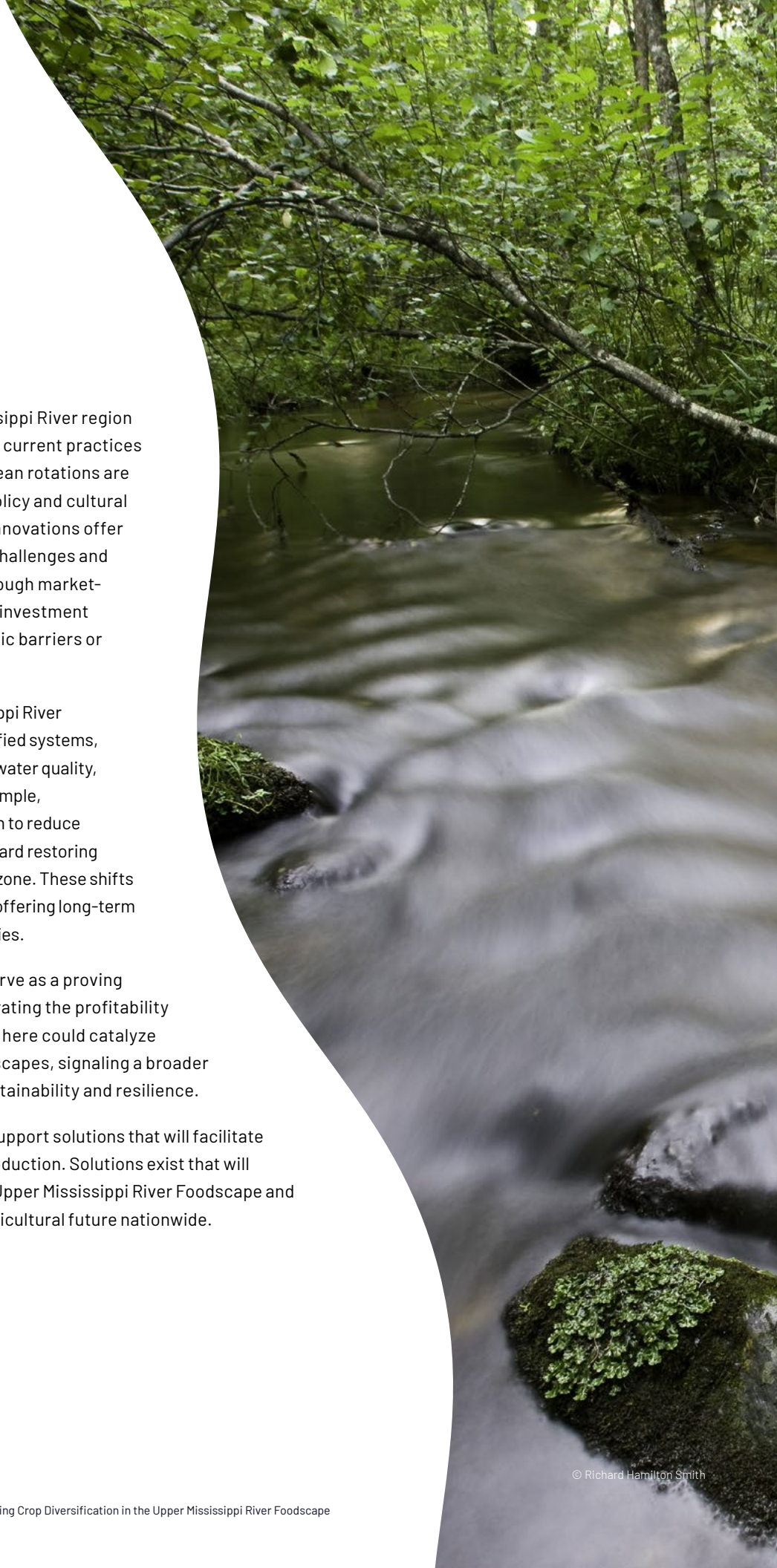
## Conclusion

The resilience of farmland in the Upper Mississippi River region is declining, and the environmental impacts of current practices are becoming harder to ignore. Corn and soybean rotations are no longer a viable long-term strategy. While policy and cultural shifts are slow to materialize, market-based innovations offer a path forward. This thesis identifies a set of challenges and roadblocks to change that could be solved through market-based innovations. These innovations require investment and development to be ready when the systemic barriers or headwinds are removed or mitigated.

If 50% of agricultural lands in the Upper Mississippi River Foodscape transitioned to regenerative, diversified systems, the region could see dramatic improvements in water quality, carbon sequestration and biodiversity.<sup>12</sup> For example, conservation practices have already been shown to reduce nitrogen runoff by up to 34%<sup>13</sup>, a critical step toward restoring freshwater systems and reducing the Gulf dead zone. These shifts also enhance soil health and climate resilience, offering long-term economic benefits to farms and local communities.

The Upper Mississippi River Foodscape can serve as a proving ground for scalable transformation. Demonstrating the profitability and ecological benefits of diversified systems here could catalyze adoption across other major agricultural landscapes, signaling a broader shift in the U.S. agriculture system toward sustainability and resilience.

For those looking to invest, the time is now to support solutions that will facilitate the profitable shift toward more diversified production. Solutions exist that will benefit farms and the local ecosystems in the Upper Mississippi River Foodscape and lay the groundwork for a more regenerative agricultural future nationwide.





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