

Building a Better Food System to Advance Justice and Sustainability

Subsidies, Land Grant Universities, and Farmer- Scientist Matching Programs

May 18, 2021

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Acknowledgements

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- Doug A. Kysar, CAFE Lab Professor, Yale Law School
- Gene Baur, President and Cofounder, Farm Sanctuary
- Jason Davidson, Senior Food and Agriculture Campaigner, Friends of Earth
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Introduction

The current food system is unsustainable in every sense of the word. It is failing to support the long-term ability for eaters, farmers, workers, and the planet to thrive. Climate change, after all, is a symptom of larger socio-economic systems built on values that do not support healthy and equitable living conditions for all. Transforming the food system is a critical part of creating a better and healthier future. Transitioning away from agricultural practices that deplete the natural resources of the planet and perpetuate a system of inequity will be indispensable to addressing the climate crisis. Our intervention focuses on a question that focuses on a miniscule section of this vast area of study: *how can we harness federal subsidies and the power of institutional research to empower communities who strive to better understand and implement sustainable agricultural practices?*

In designing our project, we centered on the needs of farmers and honed in on strategies that would help eliminate economic, social, and environmental barriers that they often face in the process of transitioning to a sustainable farm. Our goal is to chart a preliminary pathway of a program that matches small farmers with researchers, scientists, and/or environmental managers (hereafter referred to as a farmer-scientist matching program) to encourage the adoption of Whole Farm Systems.

This project will use NRCS-EQIP subsidies to fund farmer-scientist matching programs through Land Grant Universities. These programs will be focused on empowering, researching, and legitimizing Whole Farm System farmers with the ultimate goal of a structural shift towards sustainable and equitable food systems. Our intervention will help build capacity through the farmer-scientist matching program to research, legitimize, accelerate, and support sustainable agriculture.

What are Whole Farm Systems?

Whole Farm Systems is a framework of farm planning and management that integrates three key priority areas for family farms. The first is quality of life and work-life balance. The second is sustainability and environmental natural resource management. The third key priority area is economic viability and financial profitability. Big Agriculture depletes the earth's resources, costs farmer's their livelihoods and lifestyles, and isolates crops in the name of efficiency.

Whole Farm Systems create opportunities for farmers to control their quality of life and profitability. Some Whole Farm practices include soil remediation, crop diversification, and additional resource integration. In addition to providing benefits to farmers, Whole Farm Systems bolster the local and regional agriculture systems and provide new opportunities for community development and sustainability education.

There are several potential practices that employ whole farm systems, many of which are included in the following categories:

Cropland	Water Quality	Forestry	Wildlife Habitat	Inclusion
Soil Health/Quality Prevent Erosion Fertilizer Runoff Crop Rotations	Waste Structures Riparian Buffers Cover Crops Filter Strips	Plant Health Timber Stewardship Species Diversity Agroforestry	Fragmentation Migratory Bird Habitat At-Risk & ESA Species	Higher payments & priority for historically underserved groups

Whole farm system planning is different from other farm planning approaches because it employs a systems thinking framework and is more farmer-centered, allowing for the inclusion of a long-term vision within the planning process.¹ This framework emerged as a way to counteract single issue farm planning that silos problems of natural resource management from each other and the larger ecosystem impacts.² For example, a small to midsize farm may have separate management plans for erodible soils, enhancement of wetlands, or grazing management. Oftentimes, management plans solve one issue at the expense of the other, the plans are created in a cookie cutter format by agency personnel, and don't incorporate feedback from the farmers themselves.³ Least cost solutions, avoidance of looking for underlying problems, capacity issues within administrative agencies, lack of knowledge about sustainable practices, and lacking coordination among multiple farms within the same region all render traditional farm planning unable to meet the future challenges of climate change. A thorough analysis of whole farm planning is outside the scope of this report. However the Oregon State University Extension Program has detailed resources regarding the multiple-steps involved in this type of planning, and ways to get started.⁴

Theory of Change

A whole-ecosystem approach aims to responsibly manage human and natural capital. Our approach is *farmer centered and scientist driven*. For our intervention, whole farm planning is an appropriate strategy to employ because adaptation to climate change and transitioning to sustainable agriculture will require both systems thinking and foresight. This system allows farmers to maintain profitability while enhancing sustainability. Implementation and the decision framework for suitable agricultural practices in different geographies requires both scientific and environmental management expertise, hence the Farmer-Scientist Matching Program.

The goal is to utilize the scientific research process as a tool for equity among small to mid-sized farmers. An analogous example to the scientist role as envisioned by our intervention is a family

¹ [Minnesota Institute for Sustainable Agriculture \(2017\), Whole Farm Planning](#)
² [Great Lakes Basin Farm Planning Network \(1996\), Successful Whole Farm Planning Essential Elements](#)
³ Ibid
⁴ [OSU Extension Program, Designing a Whole Farm System](#)

doctor, tax accountant, financial advisor, or even favorite mechanic who can give personalized advice based on professional expertise in the setting of a long-term relationship based on trust and mutual respect. Our research shows that for small and mid-size farmers who are already thinking about switching to sustainable management practices, or who have a similar vision of what they want their future on the farm to be, there is a scarcity of professional resources and an abundance of structural barriers. The application processes alone can be a burdensome undertaking and specific management plans for farm resources are highly dependent on the geography.

To build a better food system and realize our vision of sustainability and justice for communities, we identified 4 main parts to advance this theory of change:



To achieve Whole Farm Systems, we need:

- A funding mechanism that goes through State Level Subsidies and explicitly granting funds to break implementation barriers for whole farm systems
- Programmatic and technical support through Land-Grant University Extension Programs
- Farmer centered scientific and management expertise through the farmer-scientist matching program
- Scaling up results through knowledge sharing practices in the Community

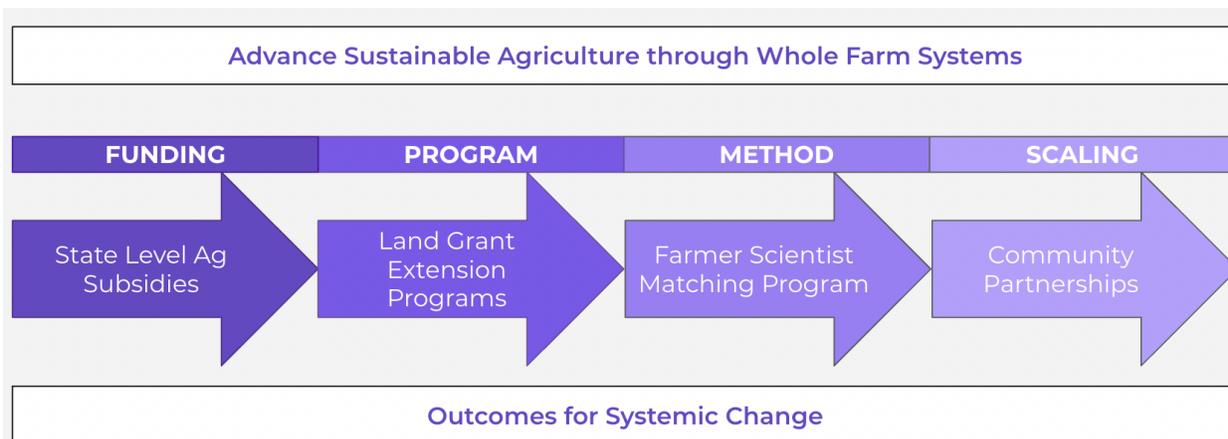


Figure 1: Theory of Change to create sustainable and equitable food systems

As a way to discuss our intervention within geographic bounds, we selected New York State as our case study. Since subsidies, land grant extension programs, and community relationships are highly dependent on place based factors we felt it was important to have a geographic focus in order to center our discussion. The remainder of this paper will provide examples and more specific analysis of each lever of change in our intervention. However, before further discussing the implementation mechanisms, it is important to understand Whole Farm Systems and why we picked them as the central theme of this work. The following sections provide details on the funding, programmatic, and community partnership aspects of our intervention.

Reform Federal and State Subsidies to Promote Whole Farm Systems

Our recommendation is to explicitly include whole farm system priorities within state funding allocation for NRCS-EQIP Program in addition to the program's existing priority areas.

Every year, the United States provides billions of dollars in farm subsidies, in 2019 this number was \$22 billion, the highest in over a decade.⁵ Within the vast world of farm subsidies, we focused on the U.S Department of Agriculture's Natural Resources Conservation Service (NRCS). The 2018 Farm Bill provided expanded funding to the various NRCS Conservation programs that focus on various aspects of farm health including soils, water, air quality, land use, energy inputs, community well-being and climate change. The NRCS programs offer financial and technical assistance through grants and activities that help agricultural producers make improvements on their land.⁶ NRCS offers half a dozen programs with aspects of sustainable agriculture and whole farm systems incorporated within their program goals, although none are as comprehensive as our intervention suggests. Among the NRCS programs we researched for our intervention are:

- **The Environmental Quality Incentives Program (EQIP)** provides financial and technical assistance to agricultural producers to improve the management of water, preserve air quality, increase soil health, reduce sedimentation, improve wildlife habitat, and implement climate change mitigation/adaptation measures.⁷
- **The Conservation Stewardship Program (CSP)** helps farmers improve their existing conservation systems and provides them resources for additional conservation activities. Many of the priority resource concerns for CSP match the priorities of the EQIP program. CSP is a performance based program and payments increase with more conservation practices implemented.⁸
- **The Agricultural Management Assistance (AMA)** is a program aimed at helping farmers become more financially secure through implementing crop diversification, and marketing their conservation practices that may have been implemented under the previous two programs. This program is a partnership between NRCS, the Agricultural Marketing Service, and the Risk Management Agency.⁹
- **The Agricultural Conservation Easement Program (ACEP)** facilitates partnerships among landowners, land trusts and other land conservation entities to permanently protect, restore, and enhance wetlands, grasslands, working farms etc through conservation easements.¹⁰

⁵ [Charles, Dan. NPR \(2019\). Farmers Got Billions From Taxpayers In 2019, And Hardly Anyone Objected](#)

⁶ [USDA, NRCS. Farm Bill](#)

⁷ [USDA, NRCS. Environmental Quality Incentives Program \(EQIP\)](#)

⁸ [USDA, NRCS. Conservation Stewardship Program \(EQIP\)](#)

⁹ [USDA, NRCS. Agricultural Management Assistance \(AMA\)](#)

¹⁰ [USDA, NRCS. Agricultural Conservation Easement Program \(ACEP\)](#)

- **The Healthy Forests Reserve Program (HFRP)** specifically focuses on helping landowners restore, and protect forested lands on private property as well as tribal lands through easements and grants. HFRP goals also promote the recovery of endangered and at-risk species, increase local biodiversity, and enhance carbon sequestration in lands.¹¹
- **The Regional Conservation Partnership Program (RCPP)** is aimed at improving collaboration among NRCS and its partner agencies for delivering conservation assistance to producers and landowners.

Within the NRCS Programs introduced above there are many components of whole farm systems that our intervention aims to promote. The three central tenets of whole farm systems are i) quality of life & work-life balance, ii) sustainability & environmental natural resource management, and iii) economic viability & financial profitability. Although the NRCS programs with their current priorities help farmers improve natural resources management, they are lacking in their comprehensiveness for addressing social, environmental, and economic issues holistically. For example, EQIP funding provides technical assistance for implementing conservation practices, and CSP is a performance-based program with higher payments for better conservation results, but neither of these include priorities to help farmers plan for a long term future on their farm. Climate change adaptation and mitigation goals are also included, but again not to the extent that would bring about a transformational change in food systems to help us prepare for a significantly warmer world.

The Farm Bill subsidies allocated to NRCS flow down to individual states, where the state then has oversight over setting its own funding goals that meet federal program priorities, and can often go beyond in the implementation of sustainable agricultural practices. We focused our intervention on modifying state level priorities, and in this instance New York State is our case study. New York State has identified the following 7 priority areas for its allocation of NRCS-EQIP funds:¹²

¹¹ [USDA, NRCS. Healthy Forests Reserve Program \(HFRP\)](#)

¹² [USDA, NRCS. NY State Program. Financial Assistance](#)

1. **Livestock Management:** Use funds to address concerns for storage, treatment, and management of animal waste, manage flow of nutrients and pathogens into water resources
2. **Cropland:** Help farmers improve soil health, soil quality and manage erosion
3. **Water Quality:** Installation of conservation practices including Waste Storage Structures, Heavy Use Area Protection, Riparian Buffers, Cover Crops, Filter strips and Waterways to restore and enhance water quality
4. **Forestry:** Improve plant health, forest management, and habitat management for wildlife
5. **Wildlife Habitat Enhancement:** Manage and increase practices that help target species recover, including migratory birds, endangered and at-risk species, enhance habitat for other species with similar needs.
6. **Grazing:** Assist farmers with getting an approved grazing plan that addresses natural resource concerns, with special focus on soil health, limiting erosion, and preserving water quality
7. **Equity:** New York has committed to reaching out to historically underserved individuals. Black and minority farmers can receive higher payments in addition to being considered in high priority funding pools

In line with our recommendation, creating specific funding pathways through existing subsidy platforms is necessary to propel Whole Farm Systems. This new priority area would combine the natural resource management and equity considerations already in place within the NY State EQIP program, and would equip farmers with implementation tools and personalized assistance. We are creating a mechanism of indirect federal subsidies, flowing to the states, with the states creating funding pathways for land-grant institutions to receive subsidies specific to the implementation of whole farm system practices. The farmer-scientist matching program would be run out of the university, and would help break capacity barriers that farmers face in long term planning for their farms. Small to mid-size farmers are in need of technical and financial assistance for transforming their land into a sustainably managed resource. This cannot be done without personalized help and creation of policies that support holistic farm planning; economic well-being and work-life balance should not be sacrificed for the achievement of environmental goals. By modifying existing systems of funding we hope to advance all three of these tenets.

Provide Programmatic Support through State Land Grant Universities

Our program to create new extension programs at Land Grant Universities that are focused on working with farmers who are willing to engage in Whole Farm Systems practices and sharing this research.

Land Grant Universities are those institutions that receive funds from Congress in accordance with the Morrill Acts to “teach agriculture, military tactics, and the mechanic arts as well as

classical studies so members of the working classes could obtain a liberal, practical education.”¹³ Additionally, the Hatch Act of 1887 established a process by which land-grant universities would receive federal funding (matched by the state) for agricultural experiment stations.¹⁴

With their missions for agricultural research and extension, land-grant universities seem to be well-positioned to be leaders in research surrounding sustainable agricultural practices including Whole Farm Systems. However, they have developed a reputation for being heavily influenced by “Big Ag.” Because of this, there are few comprehensive efforts by the faculty at these universities to truly convert farmers to more sustainable farming practices.

A potential solution to this is the creation of new programs with goals explicitly in line with the goals of sustainable farming. Knowledge sharing is another critical aspect of expanding sustainable agriculture practices to other geographies. While developing our intervention, we looked at several existing extension programs that accomplish some of the goals we plan to implement, taking away several key learnings from their successes.

[Lincoln University: Innovative Small Farmer's Outreach Program \(ISFOP\)](#). Lincoln University is a land grant university that was established by the Morrill Act of 1890 along with many other HBCUs that were mandated if the original land grant universities excluded black students. These universities tend to be more open to innovative approaches to agriculture.¹⁵ The ISFOP program is a partnership with University of Missouri Extension (UME), other USDA and state agencies, and nongovernmental organizations that aims to help small farmers and ranchers, especially socially disadvantaged and underserved, to raise the level of efficiency on their farms while taking good care of the soil, water and the environment.¹⁶

The program provides research-based information on various farm topics to help farmers: lower input costs, improve farming skills, increase yields/productions, improve record keeping systems, try new enterprises, find niche markets and improve marketing skills, and add value to the harvest/products. It is particularly focused on urban food production in order to help limited resource minority residents, especially the elderly, get access to fresh, nutritious produce. From this project, we would like to *focus on underserved farmers*, find ways to build *connections to urban agriculture*, and create *opportunities to offer these farmers subsidy money directly* (which the ISFOP program does not necessarily do).

[Michigan State University: Community Food Systems](#). The MSU Community Food Systems Program is a partnership with MSU Center for Regional Food Systems, MI Food and Farming Systems, and MSU’s Student Organic Farm that aims to support the development of community food systems by developing farm-to-institutional purchasing, food hubs and farmers markets. It

¹³ <https://www.aplu.org/about-us/history-of-aplu/what-is-a-land-grant-university/>

¹⁴ *ibid*

¹⁵ Based on a conversation with Joe Maxwell, Co-founder, Family Farm Action Alliance

¹⁶ <https://www.lincolnu.edu/web/programs-and-projects/innovative-small-farmers-outreach-program>

further provides knowledge about organic production practices and methods to help farmers transition to organic.

We are excited about MSU's goal of seeking new approaches to institutional food purchasing and capacity to serve local food. The program works by connecting institutional food service directors/buyers, farmers, food vendors/suppliers, advocates, supporters and researchers through a centralized network that creates opportunities for business relationships as well as mutualistically beneficial learning activities and social events across the state.¹⁷ Our program will likewise highlight the importance of offering small farmers opportunities to connect with *institutional off-takers*.

[North Carolina State University: Center for Environmental Farming Systems \(CEFS\)](#). The CEFS program at NCSU is the best model we have studied that aims to meet many of the goals we hope to accomplish in our intervention. A partnership with NC Agricultural and Technical State University and the NC Department of Agriculture and Consumer Services, the CEFS Small Farmer Unit is a 30 acre research farm with a wide range of soil types, equipment, buildings and educational focal points to model a systems-based approach within a whole farm context. The farm produces up to 100 varieties of twenty different kinds of small fruits and vegetables and includes a certified organic area and a model GAP (Good Agricultural Practices)-certified postharvest handling area.¹⁸

The goals of the program are to “develop just and equitable food and farming systems that conserve natural resources, strengthen communities, improve health outcomes, and provide economic opportunities in North Carolina.”¹⁹ They have been able to conduct research on the farm related to enterprise budget studies, greenhouse and high tunnel monitoring, organic transplant production, organic systems work, and entomology projects as well as provide community add innovations such as donating the farm produce to local food kitchens and offering hands-on tours, demonstrations, and workshops. This project highlights for us the *importance of partnerships* and that it is possible to *release significant research directly from small working farms*. We aim to recreate this type of program on existing farms, to allow farmers direct benefits from the research and subsidies.

Cornell University Extension Program

Using our learnings, we recommend a Cornell University Extension Program. We chose Cornell for several reasons including:

- One in five people in New York State are **food insecure**
- Evidence of support for **climate and DEI initiatives**, especially from Cornell faculty
- Existing **Small Farms program**

¹⁷https://www.canr.msu.edu/michigan_farm_to_institution_network

¹⁸ <https://cefs.ncsu.edu/field-research/small-farm-unit/>

¹⁹ *ibid*

- Extensive **network of local chapters** suggests an ability to tap into existing food hubs
- Cornell's program is well-regarded and can act as a **model for other states**. Note that we considered using an 1890 land grant university due to the likelihood of them adopting this type of program more readily, but opted for Cornell due to this opportunity to be a model.
- New York is a **leading fruit and vegetable producer** in the eastern part of the country. Crops include apples, grapes, cabbages, cucumbers, green peas, onions, snap beans, squash, sweet corn and tomatoes.

The goal of the program is to deliver research that demonstrates the value of Whole Farm Systems production, while providing subsidies, off-taking agreements, and business strategy to the farmers chosen for the program.

A matching program would match farmers with scientists based on shared goals, capacity for research, common values, and logistical criteria. Once matched, the farmers and researchers would collaborate on a project to satisfy both parties' goals and values, as well as the Whole Farm System goals of the program. This partnership would result in data, analysis, and publication for the researchers as well as new strategies and beneficial practices for the farmers. Research opportunities would be similar in scope to the examples of extension programs discussed above; all with a focus on whole farm systems. We also expect to create educational and community partnerships, leading to the food hubs that offer farmers institutional off-takers, opportunities to donate excess crops to local food kitchens, and hands-on experiences and tours, demonstrations, and workshops for the greater community.

In order to implement this initiative, the next step would be to work with a Cornell faculty member interested in promoting Whole Farm Initiatives to develop a program work team dedicated to bringing in external groups and stakeholders to bring this program to life.²⁰ While Cornell currently has a variety of professors and researchers looking at climate farming and regional best practices, this would be the first opportunity to create such a holistic program dedicated to advancing sustainable agriculture practices.

Farmer-Scientist Partnership

While all parts of this intervention are important, the foundation upon which the rest of the program stands is the farmer-scientist partnership. This relationship, which is formed through the program but ideally lasts much longer than the formal appointment, begs the question: who is the farmer? Who is the scientist? The answer is that there are several different types of farmers and scientists who can participate in the program.

The farmer categories consist of farmers who are already operating Whole Farm Systems, farmers who are hoping to transition to Whole Farm Systems, farmers with small to mid-sized farms who

²⁰ From a conversation with Andrew Fagan, Executive Director Cornell Cooperative Extension (Chemung County)

are looking for support and are open to using sustainable practices, and specifically BIPOC farmers looking for support and who are open to implementing sustainable practices. Through our interviews, it was clear that BIPOC farmers are typically overlooked by policymakers unless they are specifically identified.²¹ Although this intervention is not operating at a government policy level, we thought it would be good practice to call them out here as well to ensure that there are funds allocated to BIPOC farmers. The categories of farmers identified as potential participants are intentionally inclusive of farmers at any point in transition from traditional farming to Whole Farm Systems: whether they have fully transitioned or are just open to the idea, all farmers looking to progress in sustainable farming are welcome.

As for the scientist end of the partnership, scientists can include “hard science” researchers, social science or agricultural economics researchers, or environmental managers. While related, these three categories serve distinctly different purposes for the farmers and the research that they conduct. Hard scientists would study the ecological, biological, nutritional, etc. potential of Whole Farm Systems for the farm, food, and surrounding ecosystem. They would probably be focused on data collection and experimentation in their different fields. Social scientists or economists, however, would be far more focused on the farmer, rather than the farm. They would be directly studying the socio-economic barriers that many farmers face when trying to transition. The goal here would be to try and study the barriers so as to break them down or learn how to work around them. Environmental managers, while similar to hard scientists, would be more focused on the management of natural resources, the operations of the farm, and a holistic view of how the farm fits into the greater environmental and economic systems. These different types of scientists could work individually or in teams on projects with specific farms. Regardless of the team structure, the emphasis would always be on fostering collaboration between farmers and scientists. This is an equal partnership with each party contributing something that the other does not have — with all contributing towards shared goals.

While they have shared goals, the outputs for each party may be different. The main goal for farmers would be a successful farm, while the main deliverable for researchers would be publication or shareable research results. However, these two outcomes are inherently intertwined and can only be achieved through collaboration and recognition of the overarching mission of the program: to research, legitimize, and accelerate Whole Farm Systems and create a supportive network of like-minded farmers and scientists.

Community Partnerships

A major aim of our intervention is to create a network of non-industrial farms organized around a program developed by a land grant university that incorporates NRCS-EQIP Goals. Ideally the program would evolve to go beyond EQIP goals. Our intervention will devote resources from EQIP through land grant universities to fund a research program to investigate and identify major environmental changes that can come from coordinating between a number of local farms

²¹ From a conversation with Gene Baur, President & Co-founder of Farm Sanctuary, and from a conversation with Jason Davidson, Senior Food and Agriculture Campaigner at Friends of Earth.

(employing Whole Farm Systems in a cohesive and collaborative setting). Our aim for our program is that it will provide an avenue for participation in Whole Farm Systems that is separate from both industry influence (like local Farm Bureaus may be) and educational endeavors (as other university farm programs may be). It will exist as a stand-alone resource for the furthering of sustainable and community-driven agriculture.

Our program will form tangible ties between local communities and these matching programs. Responsibilities of the program on the community partnership side will include keeping the public informed and communicating about programs and potential environmental benefits to local and regional populations. The program will provide targeted resources such as grant search processes and mentorship opportunities for aspiring farmers within marginalized groups. In addition, there will be funding and administration for educational events and opportunities to introduce communities to whole farm concepts on an experiential or commercial level.

Conclusion

Climate change will impact different communities, geographies, and ecosystems in different ways. A one-size-fits-all solution is not feasible for farmers because inputs and conditions differ by place.

Climate change also has global implications about the food system's ability to meet the food demand of a growing population with increasingly scarce natural resources. This challenge requires solutions by policy makers, scientists, farmers, and more. Rigorous scientific research and government support for said research are two powerful tools at our disposal that we can use to move forward. With the new Biden-Harris administration, and the renewed role of Congress in shaping federal climate change policy, it is imperative to create well-researched science based agricultural targets.

The United States has allocated hundreds of billions of dollars in agricultural subsidies to promote income and food security, but there are inefficiencies in the system which are preventing us from achieving sustainable agricultural goals. This intervention will research, legitimize, accelerate and support sustainable and regenerative agriculture through the extension of Whole Farm Systems. This program could result in scientific or socio-economic breakthroughs in Whole Farm System methods and practice that shape future agriculture. Research from this program could be used as "proof of concept" reports or central documents to cite when propping up Whole Farm Systems. Reports from this program could result in legal or policy changes that bolster Whole Farm Systems and support local, regional agriculture. This program could spawn a network of Whole Farmers who can connect, advocate, and share resources on farming practices, economic strategies, and social barriers.

The overarching lenses of environmental justice, equity, and preservation of ecosystems for future generations plays a defining role in the creation of our farmer-scientist matching program.

With this intervention, we have aimed to balance the hyperlocal needs of farmers, engage state level policy levers in supporting research, and suggest pathways forward that can meet the food needs of a growing global population. This program, while local and regional in conception, could spawn a Whole Farm Systems movement through publication, farmer-scientist networks, funding, community support, economic viability, and interdisciplinary collaboration that shifts the global food system towards more sustainable, equitable, healthy food for all.

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