

REDUCING SYNTHETIC FERTILIZER DEPENDENCE:

A CLIMATE OPPORTUNITY FOR FOOD SYSTEMS RESILIENCE





Reducing dependence on synthetic fertilizers can cut emissions, strengthen food security, and help protect food systems from fossil fuel shocks.

Food systems are deeply connected to fossil fuels, yet this connection often gets overlooked in climate funding.

Synthetic fertilizers are a major part of the problem, tying food production to volatile energy markets while contributing to greenhouse gas emissions, pollution, biodiversity loss, and public health risks.

For climate philanthropy, reducing this dependence offers an opportunity to advance climate goals while building more resilient food systems.

**Promising alternatives already exist.
The challenge is to help them grow.**

THE CHALLENGE: OUR FOOD SYSTEMS ARE HOOKED ON FOSSIL FUELS

When we think about fossil fuel dependence, we tend to think about energy, transportation, and industry. But food systems consume more than [15%](#) of global fossil fuel use and account for around [40%](#) of global petrochemical use, much of it linked to synthetic fertilizers and plastic packaging.

Synthetic nitrogen fertilizers are a critical part of this connection. Around [99%](#) are derived from fossil fuels, with fossil gas a major feedstock and energy source. This leaves farmers exposed to volatile energy prices, concentrated supply chains, and geopolitical disruption.

The recent disruption around the Strait of Hormuz has made this vulnerability harder to ignore. Up to [30%](#) of global fertilizer trade passes through the strait, creating a potential chokepoint for supplies. When energy and fertilizer markets are disrupted, the effects can ripple through farming costs, food prices, and food security.

But fossil fuel dependence in food systems carries climate costs as well as supply-chain risks. Applying synthetic fertilizers releases methane and nitrous oxide (N_2O), two “superpollutant” greenhouse gases that are far more potent and damaging than carbon dioxide (CO_2). Superpollutants make up more than [27%](#) of global emissions today.

Fertilizer production and use also contribute to air and water pollution, soil degradation, and biodiversity loss, with consequences for ecosystems and human health. Securing fertilizer supplies may ease short-term disruption, but it does not address the underlying dependency.

Reducing reliance on synthetic fertilizers can help tackle this source of climate risk while building food systems that are better equipped to withstand future shocks.



THE SCALE OF THE OPPORTUNITY

Promising approaches to reduce synthetic fertilizer dependence already exist, but support and financing remain uneven. To date, **food and agriculture systems only receive 4.9% of climate finance**, leaving a major gap between the scale of the challenge and the investment needed to address it.

Approaches that can reduce synthetic fertilizer dependence are already being developed and tested around the world.

These include diversified farming systems, natural nitrogen fixation, nutrient recycling, locally produced bio-inputs and stronger markets for lower-input agriculture.

But these promising solutions do not scale on their own. They need evidence, financing, infrastructure, supportive policies, market access, and opportunities for farmers and communities to learn from one another.

Philanthropy can help fill these gaps. It can support early-stage approaches, fund shared research and learning, strengthen enabling conditions, and connect efforts that might otherwise remain fragmented across climate, agriculture, food, and health portfolios.

The opportunity is not to fund one universal solution. It is to help build the conditions for diverse, locally appropriate approaches to reduce dependence on synthetic fertilizers and deliver multiple benefits.

Investing in this transition can help:

- ◆ Address interconnected risks across climate, food security, energy, public health, and geopolitical resilience.
- ◆ Reduce fossil fuel dependence in food systems, helping to constrain a key growth market for fossil fuels.
- ◆ Strengthen resilience to future food price and supply shocks.
- ◆ Improve public health, water quality, soil health, and biodiversity outcomes.
- ◆ Reduce emissions from food production.



WHAT PHILANTHROPY COULD HELP UNLOCK

1

REDUCE THE NEED FOR SYNTHETIC FERTILIZERS

Support farmer-led transitions to farming approaches that improve soil health, diversify crops, recycle nutrients, and harness natural nitrogen fixation. These practices can reduce reliance on synthetic inputs while supporting resilient livelihoods and healthier ecosystems.

Spotlight: Andhra Pradesh, India

Community-Managed Natural Farming in Andhra Pradesh is one of the world's largest agroecological initiatives. Launched in 2016, it aims to support the transition of millions of farmers through community-level training and public programs.

The approach combines crop diversification, biological pest control, soil conservation, and locally available natural inputs to reduce or avoid synthetic fertilizers and pesticides.

According to the initiative's reported results, participating farmers have seen an average [49%](#) increase in net income, largely associated with a 44% reduction in input costs.

The funding opportunity:

Support policy reform, farmer-led transitions, extension services, and the long-term learning needed to understand how these approaches perform across different contexts.



WHAT PHILANTHROPY COULD HELP UNLOCK

2

DEVELOP ALTERNATIVE NUTRIENT SYSTEMS

Help scale safe, locally appropriate alternatives to fossil-fuel-derived inputs, including bio-inputs, organic amendments, and circular nutrient systems that turn organic waste and agricultural by-products into useful resources.

Decentralized, community-led models can also reduce dependence on concentrated supply chains.

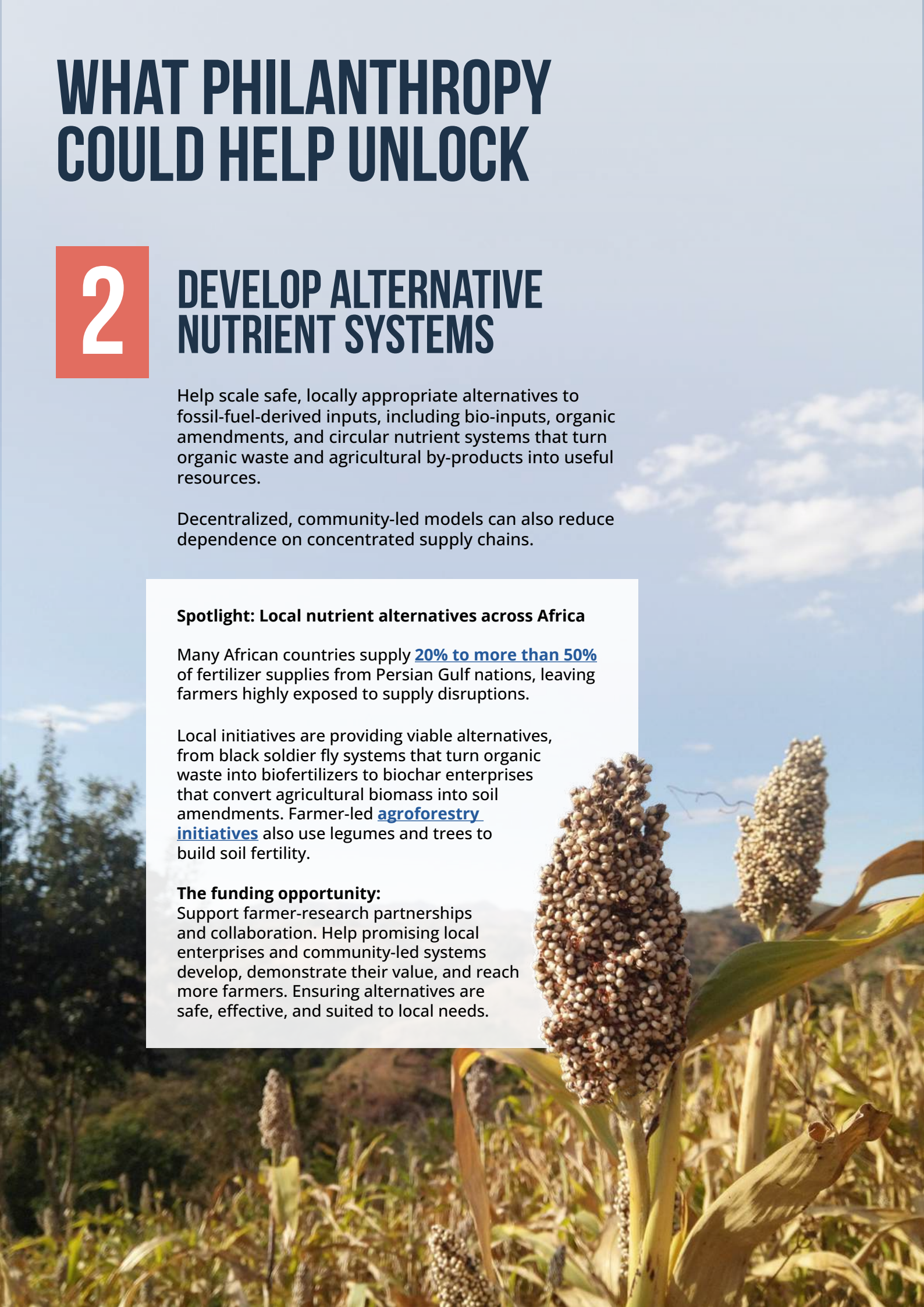
Spotlight: Local nutrient alternatives across Africa

Many African countries supply [20% to more than 50%](#) of fertilizer supplies from Persian Gulf nations, leaving farmers highly exposed to supply disruptions.

Local initiatives are providing viable alternatives, from black soldier fly systems that turn organic waste into biofertilizers to biochar enterprises that convert agricultural biomass into soil amendments. Farmer-led [agroforestry initiatives](#) also use legumes and trees to build soil fertility.

The funding opportunity:

Support farmer-research partnerships and collaboration. Help promising local enterprises and community-led systems develop, demonstrate their value, and reach more farmers. Ensuring alternatives are safe, effective, and suited to local needs.



WHAT PHILANTHROPY COULD HELP UNLOCK

3

SUPPORT THE TRANSITION TO HEALTHIER, LOWER-IMPACT DIETS

Food-system resilience is shaped not only by how we farm, but also by what we grow and eat. Supporting healthy, plant-rich diets in high meat-consuming regions can reduce demand for fertilizer-intensive feed crops. Stronger markets for legumes can also support more diverse crop rotations and natural nitrogen fixation.

Spotlight: Connecting farming and food markets in France

In France's Drôme Valley, the [Biovallée initiative](#) brings farmers, public institutions, and residents together to develop a healthier local food system. Its goals include expanding organic farmland, increasing local and organic food in public catering, and reducing synthetic inputs in conventional farming.

Organic farmland had grown from [19% in 2008 to 38% in 2023](#), more than three times the national average, while public procurement for school, hospitals, and other public institutions has helped create reliable markets for local, lower-input producers. School meals in the region now include daily vegetarian options, primarily from local sourcing, helping to normalize plant-rich eating from an early age.

The funding opportunity:

Support public procurement, market development and policies that connect lower-input farming with affordable, healthy food.



WHAT PHILANTHROPY COULD HELP UNLOCK

4

BUILD THE EVIDENCE

Fund research, on-farm trials, monitoring, and shared learning to understand what works, where, for whom, and at what scale. Evidence should go beyond yields to include farm income, input costs, soil health, water use, labor requirements, and resilience across multiple growing seasons.

Better tracking of funding flows can also help reveal whether investment is reaching agroecological and lower-input approaches at a scale that matches their potential.

Spotlight: Making agroecological investment more visible

The [Grassroots Evidence for Agroecology](#) initiative helps research and grassroots organizations build evidence from farmer knowledge and locally collected data.

Meanwhile, the [Agroecology Coalition's financial assessment and tracking tool](#) helps funders, investors, and governments identify investments that support interconnected outcomes, including biodiversity, farmer knowledge and resilient livelihoods.

The funding opportunity:

Invest in robust, transparent evidence and shared learning so funders and policymakers can make better-informed decisions about where resources can have the greatest value.



WHAT PHILANTHROPY COULD HELP UNLOCK

5

CREATE THE CONDITIONS FOR CHANGE

Farmers need more than alternatives to synthetic fertilizers. They need access to knowledge, infrastructure, markets, and policies that make lower-input farming practical and economically viable.

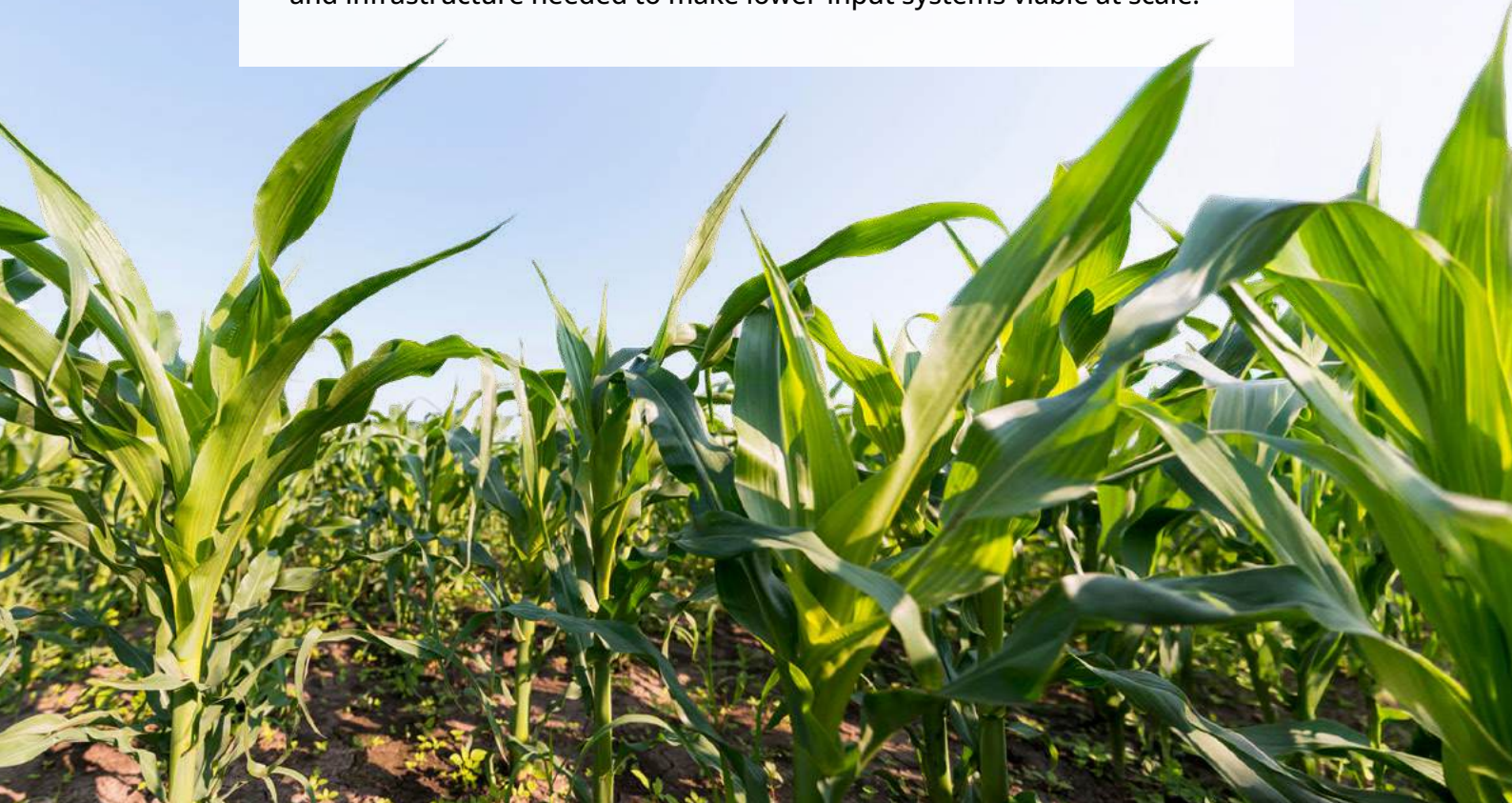
Philanthropy can help strengthen farmer-to-farmer learning, improve market access, support policy and subsidy reform, and build procurement systems that reward more diverse, lower-input production.

Spotlight: Policy shifts in China

China's Zero Growth Action Plan for Fertilizer Use, launched in 2015, aims to limit fertilizer use and overapplication while maintaining yields. The strategy combines improved application practices, subsidy reform, and diversification of fertilizer inputs, including biofertilizers and nutrient recycling, supported by national extension services. China has since seen a [sustained decline](#) in synthetic fertilizer use.

The funding opportunity:

Support policy research, learning between countries, and the networks and infrastructure needed to make lower-input systems viable at scale.



WHAT PHILANTHROPY COULD HELP UNLOCK

6

BUILD A COMMON AGENDA FOR FOOD AND CLIMATE ACTION

The links between fossil fuels, synthetic fertilizers, food security, and climate risk often fall between funding portfolios. Bringing climate, agriculture, food, health, and philanthropic communities together can help align priorities, coordinate funding, and build a shared agenda for change.

Clear, evidence-based communication also matters. It can help distinguish between different approaches, challenge simplistic technological fixes, and build understanding of why reducing fossil fuel dependence in food systems matters.

Spotlight: Building alliances across movements

The [Uprooting the Fossil Economy](#) network brings together climate, health, and food-system organizations to build a shared understanding of the role of fossil fuels and agrochemicals in food systems. Since its launch in 2023, the network has convened researchers, NGOs, and movements across regions including Europe, Kenya, Sri Lanka, and the United States to connect local experiences, develop shared analysis, and coordinate action.

The funding opportunity:

Support cross-sector convenings, joint learning, collaborative funding, and communication that help turn fragmented efforts into a stronger, more coordinated transition.



THE OPPORTUNITY NOW

The disruption around the Strait of Hormuz may eventually leave the headlines. Our food system's dependence on fossil fuels will remain unless we address it.

Reducing synthetic fertilizer dependence is not a single intervention, and philanthropy cannot drive the transition alone. But it can help unlock the evidence, innovation, infrastructure, policies, and partnerships needed to move promising approaches forward.

The benefits reach beyond emissions: more resilient food systems, less exposure to volatile markets, healthier ecosystems, and stronger food security.

The solutions are taking shape. The opportunity now is to mobilize the funding and collaboration needed to help them scale.



LET'S EXPLORE THE OPPORTUNITY

IPES-Food welcomes conversations with funders, philanthropic advisors, and partners interested in supporting a transition toward more resilient, less fossil-fuel-dependent food systems.

Contact:

Robbie Blake
Communications Manager, IPES-Food
robbie.blake@ipes-food.org

Explore the campaign:
ipes-food.org/fuel-to-fork

ABOUT IPES-FOOD

The International Panel of Experts on Sustainable Food Systems (IPES-Food) is an international non-profit think tank headquartered in Brussels, Belgium.

Bringing together 25 groundbreaking thinkers and practitioners from diverse fields and world regions, we conduct in-depth research, provide policy recommendations, and advocate for sustainable, equitable, and healthy food systems worldwide.

Learn more: ipes-food.org