Strategic Priorities for Transforming Food Systems

Executive Summary

The COP30 Presidency has placed food systems transformation at the heart of its climate agenda, recognizing that climate change threatens the livelihoods of over 500 million[1] small-scale producers and worsens hunger for more than 700 million[2] people already facing food insecurity. Food systems also generate nearly a third of global greenhouse gas emissions while receiving only 3%[3] of climate finance. Catalyzing investment in science-backed solutions offers an opportunity to strengthen resilience, cut emissions, and enhance global food security.

The Food Systems Transformation – Science and Philanthropy Advisory Group (FST-SPAG) was launched in Brazil in March 2025 to support the COP30 Presidency's food systems agenda. Co-chaired by Embrapa, Community Jameel, and CGIAR, the group convenes leading scientific organizations and philanthropic actors to identify and elevate programs that are rigorous, investable, and scalable.

Methodology

The FST-SPAG has identified **four priority areas** that directly support COP30's Food and Agriculture Axis:

1. Harnessing **data science**, **AI**, and **emerging technologie**s
2. Scaling sustainable **inputs** for agricultural resilience
3. Developing climate-resilient and climate-friendly **crops**
4. Supporting sustainable **livestock** systems

Guided by these priority areas, the FST-SPAG is developing a pipeline of investable projects that are supported by science and rigorous evidence.

This pipeline is guided by the following **four principles**:

1. **Healthy diets** and **nutritional security** should be central to climate goals.
2. **Women**, **vulnerable farmers**, and **Indigenous Peoples and Local Communities (IPLCs)** must benefit directly from innovation.
3. Innovations should be **scalable** and work **in coordination with the wider ecosystem.**

[1] Pacha, MJ., and Clements, R. (2021) Fairtrade Climate Change Projects: Learning from experience. Fairtrade International.
[2] FAO, IFAD, UNICEF, WFP and WHO. 2025. The State of Food Security and Nutrition in the World 2025 – Addressing high food price inflation for food security and nutrition. Rome.
[3] Global Alliance for the Future of Food. Public Climate Finance for Food Systems Transformation (2024 update). N.p.: Global Alliance for the Future of Food, 2024.

4. **Farmer perspectives** and **traditional knowledge** must inform policies and innovations.

Strategic Priorities

1. Harnessing the power of data science, AI, and emerging technologies

Digital technologies, especially AI, have immense potential to accelerate food systems transformation. They can help anticipate climate risks, guide adaptive practices, improve resource use efficiency, and open new market opportunities for farmers. Yet deployment remains uneven, with rural connectivity gaps and the digital divide limiting progress. Strategic recommendations are as follows:

- **Scale risk assessment and crop yield forecasting models:** expand the use of satellite and geospatial technologies, climate and weather forecasts to anticipate climate risks to enable proactive adaptation.
- **Build research and data integration platforms:** establish platforms that combine open data with cutting-edge research, bridging science, farming communities, and policy. Invest in systems that integrate diverse datasets to enhance their use in decision-making, from the local to the global level.
- **Expand digital market platforms:** invest in farmer-facing tools that combine climate advisories with market functions, such as price information, direct buyer connections, and access to finance, to reduce transaction costs and strengthen farmers' bargaining power.
- **Monitor food and nutritional security:** deploy digital tools to track local food insecurity levels, generate data on dietary diversity, and inform targeted subsidies and policy interventions.
- **Develop cost-effective AI and monitoring tools:** advance affordable AI-driven applications and data collection tools for monitoring, evaluation, and impact assessment.

2. Scaling sustainable inputs for agricultural resilience

Sustainable inputs, including biofertilizers, biopesticides, and bioherbicides, are central to reducing chemical dependency while improving soil and ecosystem health. These solutions are cost-effective and scalable, but adoption remains limited. At the same time, transforming the broader fertilizer supply chain and embedding it within integrated land-use approaches can amplify impact, linking soil regeneration, biodiversity, and climate goals. Strategic recommendations are as follows:

- **Strengthen the scientific foundation:** invest in soil microbiome research to enhance plant resilience, soil health, carbon sequestration, and water retention; advance field pilots and translational initiatives to inform scalable solutions.
- **Build evidence for policy and investment:** support research programs and data platforms that quantify bioinputs' contribution to mitigation, adaptation, and soil

health improvement, to ensure financial incentives that can help inform policy and finance.

- **Integrate diverse knowledge systems:** combine scientific, local, and traditional knowledge to foster innovations that are both contextually relevant, sustainable, and responsive to farmers' realities. Invest in innovation hubs, participatory trials, and knowledge-sharing platforms that facilitate farmers' contributions and uptake.
- **Strengthen farmer adoption systems:** expand farmer-facing capacity-building networks, technical assistance, and rural extension, while linking adoption efforts to evidence and financing mechanisms.
- **Incentivise soil regeneration:** support programs that restore degraded land, and reduce pressure on new arable areas, reinforcing food security, climate resilience, and environmental conservation.
- **Develop sustainable markets and value chains:** empower agrodealer networks and other supply chain actors as distribution and service providers. Pair training and digital tools with certification schemes and premium markets, rewarding sustainable practices.

3. Developing climate-resilient and climate-friendly crops

Strategic investment in resilient crops is essential to safeguard food security and build resilience in agriculture. Advances in genomics and breeding can produce stress-tolerant and nutrient-rich varieties. These innovations must align with local livelihoods and production systems and address weak seed systems and fragile markets. Strategic recommendations are as follows:

- **Deepen the scientific foundation for crop resilience**: advance the understanding of genetic traits in gene banks and their role in adaptation, and expand the use of genomics-based research to accelerate breeding for resilience.
- **Expand nutritious and diverse crop supply:** develop resilient crop varieties, with yield stability and resistance to drought and heat. Prioritize nutrient-rich, culturally relevant crops and promote neglected and underutilized species.
- **Mobilize climate finance**: position resilient crops within blended finance frameworks that attract investment and scale innovation for adoption and scaling.

4. Supporting sustainable livestock and aquaculture systems

Although livestock and, to a lesser extent, aquaculture systems, contribute to greenhouse gas emissions, they are also vital to global nutrition, rural livelihoods, and environmental responsibility. Livestock, for instance, can produce food where crops cannot grow. Yet, they remain largely underemphasized in climate and food security frameworks. A coordinated, sustainable approach, grounded in existing knowledge and scalable

technologies, can unlock livestock and aquaculture's full potential. Strategic recommendations are as follows:

- **Support responsible land use:** promote livestock systems that conserve soil and water, harness forage diversity, reduce degradation risks, reduce greenhouse gas emissions, and ease deforestation pressures.
- **Protect native biomes through agropastoral models:** advance integrated crop-livestock systems in natural biomes to improve land use efficiency, conserve and restore native vegetation, and enhance biodiversity.
- **Strengthen resilience in vulnerable communities**: reinforce small ruminant systems, tailored to climatic realities and community needs, improving food affordability and availability in scarce seasons and environments;
- **Embed livestock in policy and finance agendas**: position livestock as a cornerstone of nutrition, renewable energy, rural economies, biodiversity conservation, and GHG mitigation.
- **Strengthen market access for low-emission livestock products:** expand labeling schemes and retailer partnerships to create consumer demand and stable purchasing agreements.
- **Promote sustainable protein sources:** advance alternative proteins (cultivated meat, fermentation, improved plants, algae) and sustainable aquaculture as complementary pathways to meet nutrition and climate goals.

We recognize that additional areas are critical for long-term transformation, such as reducing food loss and waste and expanding small-scale mechanization, as well as the integration of renewable energy and sustainable biofuels into agrifood systems.

Conclusion

As climate change threatens the livelihoods of over 500 million small-scale producers and worsens hunger for more than 700 million people already facing food insecurity, food systems transformation is a critical priority for COP30.

The four strategies outlined here represent key entry points where targeted private sector and philanthropic investment in science-led solutions can drive transformative change, and help support the COP30 Presidency's agenda to deliver resilient and equitable food systems.

Appendix

Contributors

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- UK Universities Climate Network

COP30 FST-SPAG Mission

The COP30 Food Systems Transformation Science and Philanthropy Advisory Group was launched in March 2025 in Brazil to support the COP30 Presidency by identifying science-backed, investable food systems projects for dissemination through the official COP30 process.

An advisory group bringing together scientific research and private capital, COP30 FST-SPAG focuses on projects that:

- are supported by science and rigorous evidence;
- are investable; and
- can have a transformative impact on strengthening food systems' resilience to climate change.

Key Outputs

- Pipeline of investable projects
- Annual high-level dialogue
- Partnership facilitation

Members

- Avina Foundation

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- Food and Agriculture Organization of the United Nations (FAO)
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- International Centre for Evaluation and Development (ICED)
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- UK Universities Climate Network

Priority Area	Why This Matters	Gaps and Barriers	Funding Opportunities	Examples of Effectiveness	Potential Scale
Harnessing data science, AI, and emerging technologies	Digital tools can forecast risks, support farm decisions, and expand market access.	Connectivity gaps; fragmented datasets; low trust in AI; women and youth excluded.	• Fund rural connectivity pilots • Support open-data platforms • Target digital inclusion for women/youth • Build governance & trust frameworks	Digital advisories contribute to raising yields XX% under climate shocks (refs).	**XXM farmers** using climate information and early warning.
Scaling sustainable inputs for agriculture resilience	Biofertilizers, biopesticides, and soil enhancers reduce chemical dependence while restoring soils.	Weak R&D; limited local production; low farmer adoption; fragile supply chains.	• Catalyze microbiome & bioinput R&D • Finance adoption networks & extension • Support local production hubs • Demonstrate climate & yield impact	Bioinputs reduce chemical use XX% while maintaining yields (refs).	**XXM ha** with XX% fewer chemical inputs.
Developing climate-resilient and climate-friendly crops	Stress-tolerant, nutritious varieties safeguard food security under climate variability and extremes.	Long breeding cycles; weak seed systems; fragile seed markets.	• Digitize gene bank accessions • Support participatory & genomic breeding • De-risk seed distribution • Invest in biofortified crops	Stress tolerant varieties deliver XX% higher yields under drought/heat (refs).	**XX M ha** of staples with resilient varieties.

Priority Area	Why This Matters	Gaps and Barriers	Funding Opportunities	Examples of Effectiveness	Potential Scale
Supporting sustainable livestock systems	Integrated systems, adapted breeds, and low-emission feeds cut emissions while improving nutrition.	Neglected small ruminants; weak feed innovation; poor animal health networks.	• Pilot methane-reducing feeds • Strengthen small-ruminant systems • Expand integrated crop-livestock models • Fund vaccine networks	Improved systems deliver XX% productivity gains and XX% GHG reduction (refs).	**XX% emission reduction** + doubled productivity for smallholders.