

Food systems

Institute for
Sustainable Futures

Food systems

are at the intersection of major sustainable development challenges. They intersect climate change, biodiversity, water, energy, economics, gender, social inclusion, digital innovations, and human wellbeing.

There is a need for research to have positive impacts on social, economic, and environmental systems. This requires food research to look beyond production, to focus on value chains, markets, stakeholder values and social equity. We take a 'food systems' approach to understand and address issues across the food value chain and associated human and ecological drivers of change.

We design our food systems research to identify:

- Feedbacks between different food activities and their associated human and ecological drivers
- The role of institutional and individual values and their influence on food activities
- Social and policy opportunities for sustainable food systems governance
- Leverage points to enable sustainable practices across the food system
- Emerging innovations to advance the use of spatial and digital technologies in food systems



Our expertise

As a research intensive institute, we are always adapting methods to meet societal and environmental challenges through research and practice.

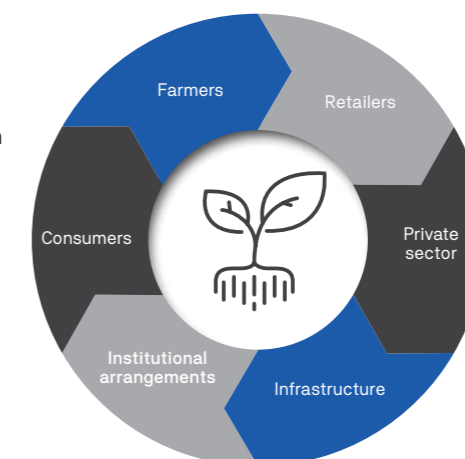
Our expertise includes:

- Vulnerability assessments of food systems
- Spatial mapping and urban planning
- Statistical analysis
- Systems thinking facilitation to build shared understanding of food systems
- Social network analysis
- Research impact assessment and program reviews
- Transformation pathways analysis
- Qualitative visioning and scenario design
- Qualitative interviews and workshops in a cross-cultural context
- Gender and inclusion sensitive design and research practice
- Nexus thinking and analysis

Our way of working is grounded in transdisciplinary practice. We actively involve stakeholders and partners as collaborators through project design, conduct, monitoring and evaluation, and dissemination. We bring together different knowledge sets to provide technical outputs and practical recommendations that can lead to sustained adoption and impact.

Our interdisciplinary methods enable us to look at the quantifiable nature of food systems, whilst exploring the non-quantifiable yet equally important role that knowledge, culture, and values play in food activities. All our projects are inherently driven by systems thinking foundations: we look at the social, economic, and environmental drivers that influence the behaviour of a food system, and ultimately affect food and nutrition security.

We have conducted research and commissioned projects in Australia and internationally on nutrient management, policy studies, food and nutrition security research, spatial mapping, qualitative and participatory research, and agricultural development.



A sustainable food system within planetary limits

Who we are



Dr Dana Cordell



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Our research programs

Our food systems projects are diverse: from urban, to regional and global food systems and across Australia, Europe, Southeast Asia, the Pacific, and Sub-Saharan Africa.

Phosphorus vulnerability and security

A handful of countries control 85 per cent of the world's finite phosphate rock – an essential element in growing our food.

The nature of phosphorus vulnerability is understudied, and there is a pressing need for stakeholders to co-identify context-specific opportunities to adapt, like investing in 'renewable fertilisers' to buffer against price shocks and supply disruptions.

In Sri Lanka, we analysed the links between climate change and phosphorus vulnerability to develop farm and policy interventions. This work enabled us to work with smallholder farmers and envision future pathways for their food systems. Our global Phosphorus Futures project explored the links between clean waterways through improved phosphorus management in Australia, United States, Malawi, and Vietnam. The project identified the major

risks and intervention points to improve water systems and phosphorus recycling.

As part of a collaborative project for CSIRO's National Research Flagships Program's Flagship Collaboration Fund, ISF examined the implications of global phosphorus scarcity for the Australian food system. A policy analysis and flows analysis of the Australian food production and consumption system through to food consumption and excretion identified opportunities for achieving phosphorus security in Australia.

In Malawi, Zambia, and Ethiopia we conducted a visioning workshop to identify barriers and enablers of organics value chains in rural African contexts. This work was supported by the Australia-Africa Universities Network.



Social science and food systems

Food systems are underpinned by how societies, cultures, and political systems define their food strategies.

Our team holds expertise in the interdisciplinary social sciences, drawing from human ecology, political economy, gender studies and the political sciences to understand the human dimensions of food systems.

Our project with Fisheries Queensland allowed us to explore the historical drivers that have influenced engagement between commercial fishers and the state government. Through extensive consultation, surveys, interviews, and

field visits, we produced a series of recommendations to increase the involvement of commercial stakeholders in fishery reform processes.

Our research into transformations towards climate adaptive landscapes has allowed us to explore how communities in Australia and internationally will manage change under different pathways.

Our transdisciplinary food and nutrition security workshop design has allowed us to understand how different research and policy actors throughout Southeast Asia frame smallholder agriculture solutions.

We have assessed the impact of forestry projects funded by the Australian government in Vanuatu since 2002. We identified the economic and social benefits of sandalwood projects to rural economies in Vanuatu through a mixed-methods approach.

We have undertaken a systems analysis of biodiversity concepts, allowing us to identify how critical social concepts can help shift policy and institutional narratives on biodiversity conservation.

Collaborating with Australian Government and United Nations agencies, we are undertaking a three-year study into improving gender outcomes in agriculture and water systems in Myanmar through building capacities in systems and nexus thinking.

Peri-urban food systems

Our Sydney Food Futures Project demonstrated the food security implications of urban expansion and analysed the planning and policy opportunities for advancing peri-urban food production. In partnership with the Sydney Peri-Urban Network, ISF developed a series of interactive food maps of Sydney's current and future food production, and explored with stakeholders the feasibility and desirability of future scenarios and trade-offs to support improved decision making.

To demonstrate the potential future of city food production, ISF organised an edible food wall installation and series of events at Sydney's Powerhouse Museum. The installation and talks gave practical tips and inspiring insights into ways that people can grow edible food in small urban spaces.



Recycled organic waste is also a critical component of our research. ISF collaborated with NSW Farmers and the Greater Sydney Local Land Services on the 'Next Gen Compost' project, to investigate current and potential demand for recycled organics across New South Wales. Together we implemented on-farm trials to demonstrate sustainable soil use and productivity benefits in capsicum and corn crops. We conducted surveys, interviews and other social analyses with stakeholders along the supply chain – growers, supply chain participants and consumers – to identify barriers that vegetable growers face to composting as well as opportunities to drive demand.

Organic waste value chains

Organic waste is not a challenge, but a key opportunity for a resource constrained world. By valuing such waste, new approaches, technologies, and products can move the economy from a linear approach to waste disposal into a circular closed-loop value chain model. An organic waste value chain can mitigate against climate change and tackle climate adaptation by reducing the emissions from current organic waste disposal methods. Innovations in organic waste management can reduce pollution, improve public health and create local employment opportunities – all from this untapped and undervalued waste stream.

The wholesale and retail trade sectors are two of the main contributors of food waste to landfill in NSW. Alongside RMIT, ISF completed research to identify opportunities to help food retail and wholesale businesses reduce and better manage food waste in their operations. The research looked at

where, why, and how much food waste is currently generated by food retail and wholesale businesses, such as supermarkets and grocers. The result was a detailed picture of current sources of food waste, actions already being taken, and barriers to further improvement.

In land-locked Malawi, fertiliser access, improved sanitation, and reversing environmental degradation are key challenges to the security of the local food system of Malawi's second largest city, Blantyre. Our P-FUTURES project brought together key stakeholders in this system, including peri-urban subsistence farmers, the local Blantyre Council wastewater service provider, and the country's primary fertiliser producer, to overcome the challenges being faced. This included exploring risks and vulnerabilities from the global phosphorus challenge, opportunities for Blantyre to effectively adapt, and developing tools to transform the way cities manage phosphorus.

In Sydney, Australia, we facilitated the installation of closed-loop rapid food waste decomposers in two UTS buildings to manage 100 per cent of the organic food waste streams produced on-site. Separated food waste is currently being processed using the decomposer system and transported to Earth Works to generate energy and produce nutrient-rich fertiliser. This ultimately turns the university's food waste into organic fertilisers for local parks and gardens, creating evidence for innovative circular economies.

Who we are

The Institute for Sustainable Futures (ISF) is an interdisciplinary research and consulting organisation at the University of Technology Sydney. We've set global benchmarks since 1997 by partnering with governments, organisations, businesses, and communities to achieve change towards sustainable futures. We utilise a unique combination of skills and perspectives to offer long term sustainable solutions that protect and enhance the environment, human wellbeing and social equity.

Let's collaborate

Whatever change you wish to see in the world, working with us means creating something that will last.

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