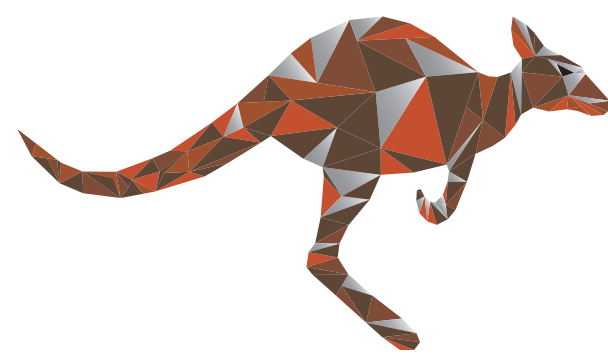


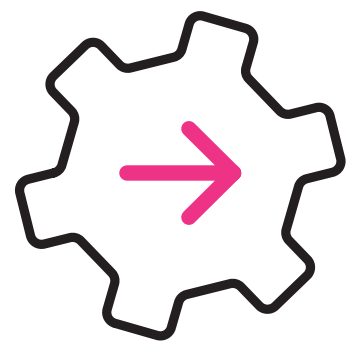
Improving Australia’s Food Security

Lessons learned from the ARDC’s Food Security Data Challenges program

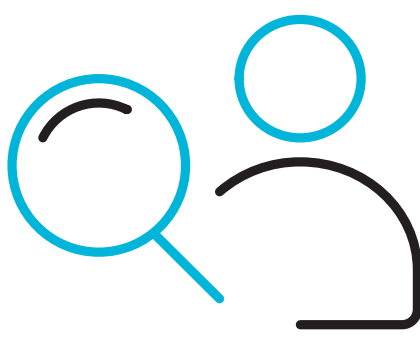


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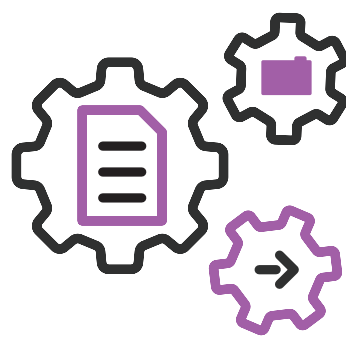
Translational Research Data Challenges



START
with a societal
problem



IDENTIFY
the data
challenge



BUILD
and apply digital
infrastructure

Program Overview

Australia is a food secure nation, with a robust food system, underpinned by strong food safety and biosecurity measures, nourishing its population and meeting the needs of international trade partners¹. However, in the face of future threats such as climate change, biosecurity incursions, pandemics and other challenges and disruptions, strong action to maintain food security is required. To improve research into Australia’s production, consumption and distribution of safe and high-quality food, the ARDC established its Food Security Data Challenges program. As part of the National Collaborative Research Infrastructure Strategy (NCRIS), the program has developed national scale data and digital infrastructure capability aligned with national priority research areas through ten mission driven, national scale, collaborative, projects, addressing data challenges in areas including agriculture, aquaculture, biosecurity, food equity, traceability, as well as cross-cutting topics such as data sharing.

¹ <https://www.agriculture.gov.au/agriculture-land/farm-food-drought/food/national-food-security-strategy>

Program Design

We co-designed the 10 projects in collaboration with key national stakeholders from the research, public and private sectors. Over 11 months of targeted consultations, including a series of meetings, participatory design workshops and roundtable discussions with over 300 stakeholders, we identified key data challenges in Food Security Research. We scoped the projects with lead organisations also identified through the co-design process.

Learn more about
the **Food Security
Data Challenges**
program



Multiscalar Crop Characterisation Network (MCCN)

DOI.ORG/10.47486/DC105

Lead Organisation

Australian Plant Phenomics Network (APPN)

Aim

To develop a framework, standards and recommendations for sharing agricultural data in a clear and consistent way.

Outcomes

- A framework, standards and best-practice recommendations for FAIR publication of heterogeneous data, combined with integration pipelines and user access tools (Python, Jupyter) for scale-appropriate data cubes to explore all aspects of crop development.
- Import assets described with STAC metadata for inclusion in an xarray data cube ready for visualisation, analysis and export.
- Example uses to demonstrate capabilities.

Implementing GS1 Traceability Standards for Orchard Chemical Use and Beehive Movements

DOI.ORG/10.47486/DC109

Lead Organisation

Agriculture Victoria

Aim

To accurately track orchard chemical applications, beehive movements and beehive health indicators facilitating transparency and accountability across horticulture and apirary industry.

Outcomes

- Refinement of existing GS1 standards to accommodate orchard-chemical and apirary hive health data.
- Foundation of a 'Bee-to-Tree' traceability service integrated into existing orchard and apirary management systems, enabling interoperability and permission data sharing for users of both systems.

Building A Traceability Data Infrastructure to Track Provenance and Quality in Australian Seafood Supply Chains

DOI.ORG/10.47486/DC108

Lead Organisation

Queensland Department of Primary Industries (QLD DPI)

Aim

To establish standardised data collection practices and enable end-to-end traceability, safeguarding industry viability, and ensuring the delivery of safe, authentic products to market.

Outcomes

- CrabTrace, a traceability system for end-to-end tracking of individual mud crabs through the supply chain, improving transparency and delivering tangible benefits to fishers, regulators and other supply chain stakeholders.
- A minimum set of traceability data and metadata standards aligned with GS1 and Global Dialogue on Seafood Traceability (GDST) standards.

Connecting/Federating Stable Isotopic Data Resources

DOI.ORG/10.47486/DC103

Lead Organisation

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

Aim

To bring together public data collections that support the provision of evidence of food authenticity.

Outcomes

- Isotopes.au, a national federated data platform that unifies and connects stable isotopic datasets observing the FAIR data principles. The platform brings together stable isotope data from environmental samples collected by public science institutions.
- A common standard template for representing stable isotope results and associated metadata available for public use.

Increasing Food Security through Liberation of Fishing and Aquaculture Data

DOI.ORG/10.47486/DC101

Lead Organisation

Fisheries Research and Development Corporation (FRDC)

Aim

To unlock the value of unused or underutilised fishing and aquaculture data.

Outcomes

- A national data platform to safely share fishing and aquaculture data and provide access to analysis tools.
- A data catalogue using agreed community metadata standards to aid discoverability of Australian fisheries datasets.
- Analysis tools that allow researchers to gain insights without moving data outside the storage platform

Data Sharing Initiative

DOI.ORG/10.47486/DC102

Lead Organisation

Federation University

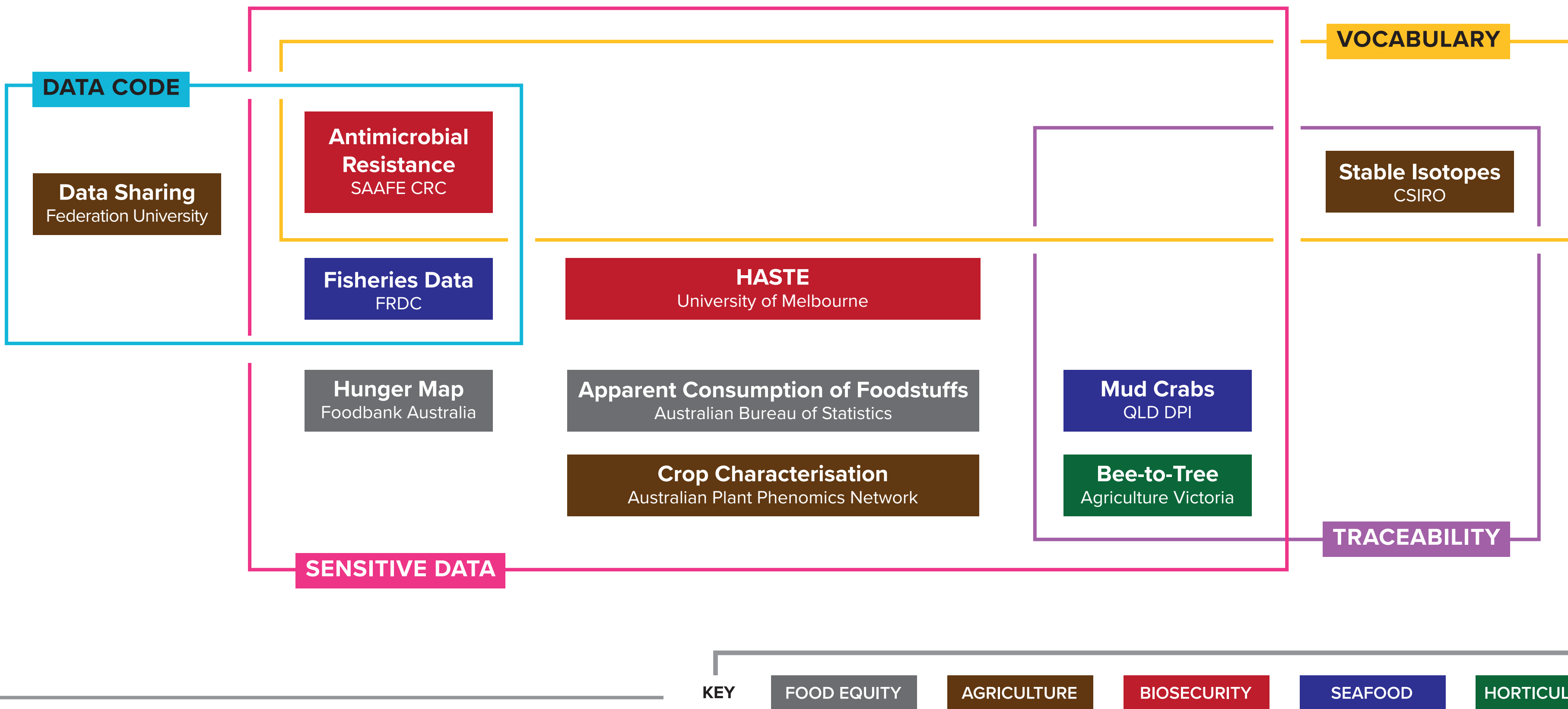
Aim

To enable food producers to safely and confidently adopt new technologies, participate in research, and share their data.

Outcomes

- A digital, customisable Data Sharing Agreement Tool and accompanying user guide, to improve data sharing practices between food producers and providers.
- Training materials for certification against the National Farmers' Federation's Australian Farm Data
- Code, to improve transparency and encourage data sharing.

Connections Between Food Security Data Challenges Projects



Advancing Agribusiness: Digital Transformation to Prevent Pathogen Resistance and Improve Food Security

DOI.ORG/10.47486/DC104

Lead Organisation

The Cooperative Research Centre for Solving Antimicrobial Resistance in Agribusiness, Food, and Environments (SAAFE CRC)

Aim

Lay the groundwork for a nationwide data asset incorporating data on antimicrobial use and resistance.

Outcomes

- A SAAFE Data Code providing guidelines that promote the sharing of antimicrobial use and antimicrobial resistance data in safe and secure manner addressing risks and challenges of cross-sectoral data sharing, validated with industry in the water, wine and horticulture sectors.
- An analysis of the current landscape of existing data platforms to provide insights for practical pathways for industries to further develop their data systems.
- A platform enabling cross-sectoral data standardisation and/or augmentation for SAAFE CRC Industry partners' AMU/R data assets.

Enhancing the Apparent Consumption of Foodstuffs (ACSF) Dataset to Inform Food Consumption Patterns

DOI.ORG/10.47486/DC106

Lead Organisation

Australian Bureau of Statistics (ABS)

Aim

To report on the apparent consumption of key foods and nutrients in smaller geographical areas.

Outcomes

- Establishment of data infrastructure to report food consumption at a sub-national level, including a report published on the ABS Website.
- Enhancement of the ACSF data asset to improve data coverage, accuracy, timeliness and accessibility for food security research.

Enhancing Models for Rapid Decision-Support in Emergency Animal Disease Outbreaks (HASTE)

DOI.ORG/10.47486/DC110

Lead Organisation

University of Melbourne

Aim

To support the real-time integration of models into emergency response decision-making processes in the agriculture sector.

Outcomes

- Consultation with government and industry partners to identify key gaps.
- Real-time modelling and analytics for biosecurity outbreak scenarios, including interactive data visualisations.
- Decision-making workflows aligned with jurisdictional response systems.
- Capacity-building activities to embed tools into operational use across government and industry.

Mapping Food Insecurity and Food Relief in Australia

DOI.ORG/10.47486/DC107

Lead Organisation

Foodbank Australia

Aim

To develop a comprehensive map of the incidence and depth of food insecurity, and of the provision of food relief.

Outcomes

- A map of the incidence and depth of food insecurity in Australia, incorporating food relief distribution data from Foodbank Australia, OzHarvest and SecondBite and updated 6-monthly.
- Expansion of the data relating to First Nations People to improve the robustness of the modelling.
- A web-based public version of the map, including an interactive dashboard.

Selected highlights

- The CrabTrace traceability system developed in the “Building A Traceability Data Infrastructure to Track Provenance and Quality in Australian Seafood Supply Chains” project was the 2025 Queensland iAwards winner in the “Government and Public Sector” category.
- The Hunger Map, developed in the “Mapping Food Insecurity and Food Relief in Australia” project is now a critical tool for both operational and strategic planning. For example, Foodbank, OzHarvest, and SecondBite are using it to support a strategic collaboration to reform food rescue and relief services across Tasmania, using the map to identify areas of unmet need, assess service capacity, determine where new infrastructure — such as storage facilities, distribution hubs, or community access points — should be established, and to optimise transport routes ensuring rescued food reaches communities in need efficiently.
- Isotopes.au, the platform developed in the “Connecting/Federating Stable Isotopic Data Resources” project, now contains 937,430 data records from 3 contributing organisations.
- To date, 14 products, projects and services have been certified against the Australian Farm Data Code through the certification program developed by the “Data Sharing Initiative” project.

Lessons learned

- The overall project co-design process worked well, but took significant amounts of time and effort. For future programs, we will attempt to streamline the process further.
- We were successful in working with the projects as a co-investor and partner rather than a funder. This was partly due to the relationships we built with the project lead organisations during the co-design phase.
- The projects felt that we were supportive and prepared to bring in expertise where needed, while giving them enough leeway to accommodate unforeseen changes and events.
- Some projects would have preferred more regular reporting, while others were happy with our lightweight reporting schedule. This depended mostly on the type of organisation.
- While we facilitated connections between the projects, most projects would have valued stronger, more frequent interactions to further explore synergies.

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CONFERENCE

SciDataCon 2025,
13-16 October 2025,
Brisbane, Australia.

CITE AS

Stefanie Kethers, Sheida Hadavi: Improving Australia's
Food Security: Lessons learned from the ARDC's Food
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