



Building a national isotopic data resource

We're bringing together disparate isotopic data from across Australia into a single, national digital platform. Help us shape this important resource to tackle challenges in water, food, biosecurity, forensics and more.

The challenge

Stable isotope ratios are unique chemical signatures or 'fingerprints' used to understand the environment and verify food credentials. For example, we can use the stable isotope ratios of oxygen in plants to understand movement of water through the soil-plant-atmosphere continuum or groundwater flows and storage, and the stable isotope ratios of carbon in soils to understand the nutrient cycles relating to soil health as well as geological patterns. This makes stable isotopes an evidence-based solution for governments and the agricultural and food industry to verify the geographical origin, sustainability, production and distribution of food products around the world.

Although there is a wealth of public isotopic data, it currently exists in many forms across different organisations. The data needs to be brought together in a trusted way so that it can be readily used to support Australia's agriculture, water and food system as a whole. It's a big challenge, beyond the realms of a single organisation, to connect these rich databases in a way that's trusted, shareable and useful.

Our solution

We're building a national digital platform that brings together a wealth of disparate isotopic data from across Australia's national research organisations, and sets the standard for isotopic data measurement, so that it can be used to tackle our biggest challenges in water, food, biosecurity and forensics.

We are leading the development and bringing together expertise on isotopes, supply chains and data harmonisation in partnership with the Australian Nuclear Science and Technology Organisation, Geoscience Australia and the National Measurement Institute. The work received co-investment from the Australian Research Data Commons as part of their Food Security Data Challenges program.



Our impact

By coordinating this effort between national partner organisations we can ensure long-term utility of valuable data and balance potential commercial and scientific outcomes. This data will serve as objective, quantifiable evidence that can be trusted by regulators and the public.

Ultimately, we'll be able to use these public data collections to create accessible and trusted verification tools that can tell us where our food comes from and how it was grown. We want to ensure equitable access across industry to these science-based verification methods and approaches.

By ensuring FAIR (Findable, Accessible, Interoperable, Reusable) data principles, the stable isotopic data will be accessible as part of a national-scale data ecosystem.

The solution will also answer the pressing challenge to align frameworks and data standards to maximise traceability system innovation and interoperability identified in the Department of Agriculture, Fisheries and Forestry's (DAFF) National Agricultural Traceability Strategy 2023–2033.

This project contributes to the Trusted Agrifood Exports Mission's goal to digitally transform Australia's agrifood supply chain and grow export premiums across commodities. The Mission is a partnership with DAFF.

Food security – overcoming barriers to trade

Demand is increasing for independent evidence to verify a product's authenticity for market access. Examples include demand for low-emission commodities and products such as beef, cotton for the fashion industry or canola for biofuels.

Our solution could use data to visualise food production regions by type of food and trace the origin of a product through the spatial modelling of environmental stable isotope ratios.

Sustainable food production and a circular economy

To support the UN Sustainable Development Goals there is a need to improve the use of food already produced through the implementation of circularised food production systems. While there are acknowledged benefits, there are food safety risks to consider.

Researchers can utilise our stable isotopic data platform to drive the development of standards for food reuse and recycling, which can assist agricultural industries in minimising food waste and improving sustainable practices.

How to engage

We are seeking to engage with Australian agribusinesses, including peak bodies and representative groups, universities and other research organisations that have an application for one of the use cases highlighted above, or have an additional use case for publicly available isotopic data. Use cases will help to inform the national digital platform's development, ensuring it is developed in a way that's relevant, accessible and serves the needs of different sectors.

Reach out to us on the contact details below to find out how you can get involved.



This project received co-investment from the ARDC. The ARDC is funded by the National Collaborative Research Infrastructure Strategy (NCRIS).

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