Australian Government
Geoscience Australia

Geoscience Australia's Submission to the Inquiry into growing Australian agriculture to $100 billion by 2030

About this Submission

Geoscience Australia's submission addresses the Terms of Reference in the House Standing Committees on Agriculture and Water Resources inquiry into growing Australian agriculture to $100 billion by 2030. This submission identifies some barriers to achieving that goal, and proposes some strategies to overcome those barriers. The strategies are based upon existing Geoscience Australia programs and functions.

Barriers to be addressed to achieving the goal

Disaster resilience of the agricultural sector, and related industries and communities. In its June 2019 report to the Queensland Reconstruction Authority, Deloitte estimated that disasters are expected to cost the Australian economy $39billion by 2050, and the agricultural sector will be expected to be able to adapt to changing climate conditions. The "North and Far North Queensland Monsoon Trough" of early 2019 demonstrated the enormous cost of disasters to the livestock industry in particular, including the destruction of large sections of grazing land, long lead times for restocking, and damage to supporting infrastructure.

Availability of suitable water. Australia is the driest inhabited continent on earth, and our soils have naturally high salinity levels. In many parts of Australia, agriculture is heavily dependent upon groundwater. These factors make water use and management a key challenge, and pose risks to the economic and environmental sustainability of agriculture.

Limited understanding of how to work out where the best places for primary production growth are in Australia. A number of government policies are in place to help drive agricultural investment and sector resilience, such as *the Developing our North* and *the Disaster Risk Reduction* Framework in the Australian Government, and similar policies at other levels of government. The data to underpin both strategic decision-making by government and industry groups, and tactical decision-making by individual businesses, is often locked up or not easy to use. This makes

decision-making costly as specialised skills and funds are required to unlock the data.

Potential strategies to achieve the goal

Use of satellite and spatial technology.

Australian business and citizens rely on openly accessible satellite positioning technologies – to navigate ourselves from Point *A* to Point *B*, or to automate the next generation of electric vehicles. The most recent Australia-specific study reported the economic value of precise satellite-delivered positioning technology over a 30-year period is $7.6 billion, with the agricultural sector representing 29 per cent of this growth alone, or $2.2 billion.

A recent report into the economic benefits of precise satellite-delivered positioning infrastructure highlighted substantial improvements for the agricultural sector.

- For livestock, the ability to remotely manage livestock movements reduces the need for physical fencing, minimises overgrazing, and can identify when a herd is under stress. This reduces capital costs and mitigates risks to herd health.

- In horticulture, it leads to the efficient deployment of horticulture inputs, the reduction of hazard and disease relocation (and the resulting crop loss), and to enhanced horticulture yield maps.

- In broadacre farming, this infrastructure leads to a more efficient deployment of inputs like sprayer or seeds and, ultimately, a reduced cost to the farmer.

- In forestry, it leads to a reduction in forestry-related health and safety risks, and a reduction in fees associated with surveying and environmental management.

Use of openly-available, reliable and nationally consistent data from government.

The vast data holdings of government are now being organised in such a way that helps governments and industry better understand the impact through time of changes in land management practices, water quality and erosion – all key inputs for the management of agricultural land, businesses, and systems.

The Australian Government, and many state and territory governments, have committed to making that government-held data available to business and citizens with few restrictions on use, and in many cases at no cost to the user.

Critical datasets to reduce the risk of decision-making, and to reduce the cost of growing the sector, include:

- High-resolution elevation data is critical for effective farm planning. This data is used to better inform and manage flood modelling, community safety,

bushfire hazard, groundwater recharge, erosion management and farm operations and risk.

- Surface water datasets provides information critical for the sustainable use of water and risk modelling to plan for future floods, hazards and other natural disasters. These products, and their related systems and data archive are used currently by government organisations and businesses to better manage water resources across the Murray-Darling Basin, and better inform farmers and livestock producers nationally about their paddock boundaries and the quality of feed on their land.

- Geophysical and hydrogeological data (a) identifies areas suitable for irrigation and those at risk of salinity, including infrastructure design, and irrigation and cropping strategies. For example, this data informed the development strategy for the expansion of the Ord Valley in 2012 and helped attract federal and state government investments of approximately $500 million. Subsequently, the release of 13,400 hectares of land attracted a $700 million investment over six years.

- The location of agricultural assets, and their exposure to environmental hazards, is important for determining the long-term viability of agriculture and informs where infrastructure may need to be built to mitigate the potential impact of disasters on primary producers and supporting businesses.

Tools and capability development to help business use this data

The value of openly-available data is enhanced by providing tools to make that data easy to use, and for government to provide opportunities to encourage business to develop innovative solutions using that data and technology.

Such tools provide repeatable, reliable and robust ways of analysing this information, historically and into the future. They help policy makers and small-to-medium businesses better understand and anticipate water markets, the severity of the drought across regions, the availability and quantity of water for stock, and the health of environmental systems, such as wetlands. They also improve the efficiency of the environmental monitoring and compliance programs, estimated half-a-billion dollars per annum, by automating the data capture process.

These products, and their related systems and data archive are used currently by government organisations and businesses to better manage water resources across the Murray-Darling Basin, and better inform farmers and livestock producers nationally about their paddock boundaries and the quality of feed on their land.

How is Geoscience Australia already accelerating growth in the primary production sector?

We build and operate the infrastructure

The Australian Government invested $224.9 million into Geoscience Australia from 2018-19 over the next four years to provide reliable positioning data across Australia. *Positioning Australia* will be a national operational infrastructure that will provide accurate, precise and instant positioning across Australia and its maritime zones. Positioning accuracy will be improved from the current five to 10 metres, which we receive via Global Navigation Satellite Systems (GNSS) like the USA's GPS, to 10 centimetres across Australia. In areas where there is mobile phone coverage, Positioning Australia will deliver positioning precision of between three to five centimetres.

The Australian Government committed over $50 million to establish the *Digital Earth Australia* (DEA) program over the next three years, and ongoing. DEA translates libraries of free satellite imagery into decision-ready information about Australia's natural and built environments going back three decades, which provides a basis for forecasting impacts into the future.

We make available trusted, national, decision-ready data

Geoscience Australia coordinates access to a number of trusted, national coverage, decision-ready datasets that make decision-making faster and cheaper for the primary production sector. These datasets are available openly and at no cost to business and citizens.

- Elevation data from the Commonwealth, states and territories is available through the ELVIS portal. ELVIS provide 80,000 orders for elevation data a year used across industry sectors, including agriculture and environmental engineering applications.

- Surface water data and how it changes through time. *Water Observations from Space* is a continent-scale map of surface water.

- Fractional Cover, which is a continent-scale map of green vegetation (leaves, grass, and growing crops), brown vegetation (branches, dry grass or hay, and dead leaf litter), and bare ground (soil or rock). This dataset helps land managers determine which parts of their property show heavier grazing or are under-utilised and ensure all of their feed is used.

- Geophysical and hydrogeological data to identify areas suitable for irrigation and those at risk of salinity.

- Infrastructure and hazard information to identify which farm assets and businesses may be exposed to potential disasters.

We help business use the data and tools

Three AgTech companies were successful in seeking to use Digital Earth Australia to grow their businesses, through the first round of the program's incubator project, *DEA Labs*:

- Cibolabs will use DEA to improve on-farm decision-making for Australian red meat producers;

- DataFarming will use DEA to automatically map paddock boundaries; and

- NGIS Australia and Decipher will use DEA to provide farmers with pasture analytics.

The Economic Fairways online decision support tool is currently being tested to integrate geoscience, infrastructure and economic data and models to allow scenario planning and the assessment of resource-extraction investment. The online tool currently allows external users to access model assumptions as well as change parameters to model economic development in real time. Economic Fairways can be equally applied to investment opportunities for primary production, in order to provide insights into the economic viability of development in regional and remote Australia.

The Australian Exposure Information Platform allows a farmer, a business or an emergency service authority to identify which assets lie in the path of a potential disaster, and therefore help inform mitigation measures.

Who is Geoscience Australia?

Geoscience Australia is Australia's pre-eminent public sector geoscience organisation. We are the nation's trusted advisor on the geology and geography of Australia and its marine jurisdiction. We collect, quality control, analyse and disseminate science and technology that helps us describe and understand the Earth and its resources. We apply this information in a way that benefits decision-making across government and multiple sectors of the Australian economy.

Geoscience Australia builds on the organisation's historic focus of resource development to incorporate data and analysis on natural hazards, such as tsunami and earthquakes, and environmental issues, such as the consideration of the impacts of climate change or the quality and quantity of Australian water. We provide advice on matters specific to groundwater, marine and coastal ecosystems, energy and mineral exploration, natural resources, carbon capture and storage, vegetation monitoring, the age of the Earth's foundations, and geographic position and location.

We are committed to building Australia's resources wealth, now and into the future; supporting Australia's community safety to strengthen our resilience to the impact of hazards; securing Australia's water resources to optimise and sustain their use; managing Australia's marine jurisdictions to support sustainable use of our marine environment; creating a location-based Australia to use detailed and fundamental geographic location information to develop the nation; and enabling an informed

Australia to equip government, industry and community with geoscience data and information to make informed decisions for our nation.

In the Federal Budget 2018-19, Geoscience Australia was funded by the Australian Government explicitly to grow Australia's technology and science in support of Australian businesses and regional Australia. In its investment, the Federal Government focused on technologies, infrastructure and products that improved the accuracy, reliability and consistency of satellite data specific to positioning and remote sensing. These datasets help us understand where we are in relation to other things—like navigation platforms on your smart phone—and provide us with a bird's eye view of our natural resources.

These investments were part of a broader Government agenda to grow space-enabled technologies to support Australian industries, like agriculture, broadly, in a way that is sustainable, meaningful and coordinated. Recent studies suggest that such an investment would enjoy substantial economic returns. The Australian Civil Space Strategy (2019-2028) suggests that the value of such an investment to industry over the decade to 2023-24 would add an annualised 8.6 per cent growth to Australia's economy – substantially higher than the expected overall growth of GDP over the same period: 2.7 per cent.

As a government organisation, Geoscience Australia is at the forefront of the digital infrastructure, the scientific datasets and the industry collaboration that will get us there and ensure this value is realised across sectors.