



NATIONAL COMMITTEE FOR AGRICULTURE, FISHERIES AND FOOD

The below is a response from the Australian Academy of Science's [National Committee for Agriculture, Fisheries and Food](#) to questions posted in the Critical Technologies Policy Coordination Office's [consultation](#) on The Future of Critical Technologies in the Australian Agriculture and Health Sectors.

If you would like to contact the committee for further discussion, please email nc@science.org.au.

What are the priority critical technologies, current and emerging, in this sector over the next 10 years? Are these reflected in the list provided in the discussion paper?

Priority critical technologies include for biotechnology - genome sequencing, gene editing, synthetic biology – and these link to other technologies such as robotics and AI. Drones and sensing technologies are also extremely important. Other technologies that should be included in the CTPCO list are nanotechnology, as well as sensors in the soil that detect moisture, temperature, fertiliser and micronutrients in crops. Additionally, Distributed Ledger Technology provides provenance tracing for consumers and producers and can detect food safety and biosecurity breaches. All these technologies should, and do already, work together. As well as being applied to cropping and horticulture, these technologies are applied to livestock industries and aquaculture.

How fast are critical technologies taken up in this sector? What are the barriers to uptake?

Internet connections in rural areas are critical for uptake of many of these technologies. Also training at Universities, TAFE colleges and on farm in digital technologies needs to be enhanced. Cost may become an issue.

Which critical technologies present the best opportunity for commercialisation in Australia?

No comment

What will happen if we do not adopt critical technologies in this sector?

Australia won't compete successfully in export markets and also Australian consumers will lose faith in the provenance of the food they are eating.

What impact do you think critical technologies will have in the future in this sector? For example, on national security, economic prosperity and social cohesion (e.g. ethical or moral considerations).

Food security for Australia and a strong export market for agricultural products are crucial. Transparency along the supply chain is important for producers and consumers.

How should government, industry and academia work together to assess the impact of critical technologies in Australia?

There needs to be continued investment in the value chain—in long-term fundamental and strategic research. More incentives are needed from government for private industry to collaborate, invest and particularly facilitate commercialisation of research discoveries.

What opportunities and risks do you see from biotechnology?

Biotechnology advances are providing a range of products including crops and animals resilient to changes in climate, plant-based and cultured meat products. These latter products are meeting key demands of many consumers for food with a reduced environmental footprint.

Community acceptance of technologies such as genetically modified and gene edited organisms is crucial. As yet such technologies have not been commercialised in Australia for animals, but interestingly several GM or edited animals generated in other countries have changes that enhance animal welfare (eg. hornless cattle and thermotolerant livestock).

Any Intellectual Property issues associated with these technologies (eg. Gene editing) need to be resolved so that the technologies can be used widely without prohibitive costs.

Is there anything else you want to say about the approach to critical technologies in Australia?

These technologies have only been developed due to fundamental and strategic research activities across Universities, government state departments of agriculture and CSIRO. Maintaining and expanding support for fundamental strategic research will ensure a continued pipeline of the knowledge and expertise that underpins the government's identified critical technologies and that allows new technologies to develop.

Clear pathways to commercialise products and processes and longer term vision by Rural Research and Development Corporations are required. These knowledge-intensive technologies require an environment that enables learning and upskilling and they must be embedded in industry. National integration of networked agricultural platforms across diverse geographic regions is required to get the best outcome. These technologies should also be applied to measure our environmental and carbon footprint so that market, particularly European, can be retained.

Overall an enabling environment for transformational change is required. Such an environment values real partnerships and the co-creation of Research Development & Extension programs. This ethos needs to be embedded in day-to-day management of organisations and businesses so that portfolios can be constantly rebalanced and the appropriate capacity that allows the use of emerging technologies at scale is promoted.