



Australia's National  
Science Agency

# Inquiry into the Australian Aquaculture Sector

House standing committee on  
Agriculture and Water Resources

CSIRO Submission 21/752

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Main Submission Authors:

**Mat Cook and Alistair Hobday**

Enquiries should be addressed to:

[Redacted contact information]  
[Redacted contact information]  
[Redacted contact information]  
[Redacted contact information]  
[Redacted contact information]



# Introduction

CSIRO welcomes the opportunity to provide input to the House standing committee on Agriculture and Water Resources inquiry into the Australian aquaculture sector.

CSIRO provides scientific knowledge and tools in support of Australia's aquaculture industry regarding:

- improved aquaculture to boost the value, competitiveness and sustainability of the Australian and global aquaculture industry
- innovative science impacts in the fields of Applied Breeding, Nutrition, Animal Health, Environment, Socioecological Assessments and Production Systems, with a focus on farmed finfish, crustaceans and molluscs<sup>1</sup>
- informed management of environmental risks via system modelling
- the mitigation and amelioration of environmental impacts including climate change

## CSIRO response to Terms of Reference (ToR)

Below is a brief summary of key areas in which science can inform decisions related to the Terms of Reference for this inquiry.

### **a) the nature and current status of Australia's aquaculture sector;**

Current value of the Australian Aquaculture sector is approximately \$1.74billion. Consumption of seafood in Australia is anticipated to increase modestly over the next five years, with Aquaculture industry revenue forecast to grow at an annualised 2.0 per cent over the five years through 2025-26, to \$1.9 billion. The increase is driven by aquacultures higher sustainability versus declining wild fish stocks. The Australian market is dominated by four main players, representing over 40 per cent of industry revenue in 2020/21, with Tassal (25.1 per cent) and Huon (13.4 per cent) the two largest players. Outside the major players the industry is highly fragmented and diverse containing many small and individual businesses.

Australia's aquaculture industry is small by global standards, accounting for less than 1 per cent of the global value of aquaculture production. Australia however has a reputation for producing safe, sustainable, high-quality and high-value aquaculture products.

Australia's substantial expertise in aquaculture provides significant economic and trade benefits, including consulting, equipment and technology, marketing, and research and development in for example, restocking, feeds, disease diagnostics and aquaponics.

With a large amount of marine estate a real opportunity for Australia is the development of world leading Offshore Aquaculture Industry. However, aside from some private and State-based scoping initiatives, offshore aquaculture remains undeveloped. Here the key opportunities reside also on

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<sup>1</sup> <https://research.csiro.au/aquaculture/>

the scale of production and in particular the co-deployment and infrastructure investments for joint marine energy and aquaculture developments. Further opportunities for offshore aquaculture are also in relation to the decommissioning of oil-gas platforms that can be turned into seafood and energy production ventures<sup>2</sup>.

Previously, CSIRO has identified a large amount of land mass in Northern Australia, amenable to onshore pond based Aquaculture. Pond based prawn aquaculture industry shows great potential to expand in northern Australia, given untapped market potential (Australia currently imports around 37 000 Tonnes/annum) and one of the highest returns per land use area known. To date the industry has outstanding environmental credentials adhering to worlds best practice methods with no adverse environmental impacts in over 30 years of operations. Much of tropical Australia has perfect climatic conditions and water quality parameters, an abundance of the 2 major requirements for aquaculture development: clean sea water and coastal land. In addition, the use of seawater with only a small freshwater requirements means that aquaculture enterprises are effectively drought proof. This sort of development would not only suit larger commercial operators but would provide an opportunity for smaller scale aquaculture development, in conjunction with traditional owners.

**b) opportunities and barriers to the expansion of the aquaculture sector:**

**a. including ability to access capital and investment;**

Aquaculture is well positioned to play an ever more important role in the economies of hundreds of coastal and river communities across Australia. With wild-catch fishery production plateauing, there is an opportunity for aquaculture to bridge the gap between supply and demand. To do so will require Australia's aquaculture industry to capitalise on a number of opportunities, including:

- *Developing internationally competitive operations:* price competitiveness may not be the focus for Australia aquaculture, due to the low cost of overseas imports. High value and high-quality product however may offer a competitive advantage for Australia.
- *Rising environmental standards:* sustainability and environmental considerations are imperative for the establishment of new opportunities and operations of the mature sectors. Our environmental modelling teams have cutting edge system models that can be used to examine connectivity, nutrient loading, disease transmission, growth patterns, and environmental health. We have developed integrated risk assessment tools that have been used in Australian and International fisheries and other salmon farming areas (e.g., Chile).
- *Competition for suitable sites and skilled workforce:* responsible innovation, environmental conditions, and appropriate access to supply chain and workforces may reduce the number of suitable sites. We have both training programs (e.g., PhD and Post-doc) to build the skills of the husbandry and environmental workforce, and techniques to select the best sites for particular industries.

**c) opportunities to streamline and increase the effectiveness of the current regulatory frameworks that govern aquaculture activities in Australia;**

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<sup>2</sup> <https://www.csiro.au/en/research/technology-space/energy/offshore-oil-and-gas/decommissioning-offshore-infrastructure>

Feedback from CSIRO's industry stakeholders indicates that to best fit the needs of the industry, existing policies would require updating to recognise aquaculture as a distinct agriculture sector, while integrating their concerns into resource use and development planning, improved standards, and sustainability.

Regulators, industry and the community generally realise that management and regulations will need to be updated over time. This approach is adaptive and allows for continual improvement.

This adaptive approach should not be at the expense of the precautionary principle. While there is no single definition of this principle, it was included in the 1992 Rio Declaration on Environment and Development where it was positioned as an underlying element of the broader framework for sustainable development.

*In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (Principle 15, Rio Declaration on Environment and Development, 1992).*

The precautionary principle has been included in a range of Australian law and policy, including the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), and legislation in most States.

**d) the ability for businesses to access and commercialise new innovations to expand aquaculture.**

CSIRO has identified significant opportunities for innovation in the aquaculture sector, and has exploited these to work with industry to deliver innovative solutions that realise efficiencies, improve yield and quality in a sustainable manner.

An example is the many years of R&D CSIRO conducted in partnership with Ridley Agriproducts to develop the novel ingredient, Novacq®.

Novacq® is a microbial biomass-based ingredient made by converting carbon waste, like bagasse and molasses, into a growth enhancing aquaculture supplement<sup>3</sup>. It is an environmentally friendly product that can reduce aquacultures reliance on feed supplements such as krill and squid which, in turn, reduces pressure on marine resources harvested from finite reserves. Novacq® containing diets are now available commercially for the Australian prawn industry. Lessons learnt from the Novacq® journey can be applied to streamline further innovations in the pipeline.

Australian aquaculture, while world-leading in some areas, can also learn from experiences and approaches developed elsewhere in the world. For example, CSIRO has recently completed work with Chilean partners (SIMA Austral) to develop system approaches to manage environmental impacts and biosecurity risks<sup>4</sup>. CSIRO's environmental modelling teams have developed cutting edge system models that can be used to examine connectivity, nutrient loading, disease transmission, growth patterns, and environmental health. CSIRO and partners are taking some of the elements of the SIMA project in Chile and applying them to Australian domestic projects.

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<sup>3</sup> <https://www.csiro.au/en/research/animals/Aquaculture/Novacq-prawn-feed>

<sup>4</sup> <https://research.csiro.au/sima-austral/en/home/>

## Summary

Capitalising on opportunities to expand the Australian aquaculture industry can benefit from the world class research delivered by Australia's innovation system. As Australia's national science agency, CSIRO has the necessary multi- and trans-disciplinary capabilities and collaborative relationships to deliver solutions at-scale to support aquacultures sustainable growth. This support could encompass evidence-based solutions to offer innovations for expansion as well as the social science research and data necessary to establish the social licence critical to supporting it.

CSIRO welcomes the opportunity to provide the committee with any further information relating to this submission if this would assist the inquiry.

**As Australia's national science agency and innovation catalyst, CSIRO is solving the greatest challenges through innovative science and technology.**

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