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Opportunities for expanding the Aquaculture Industry in Northern Australia

Joint Select Committee on Northern Australia

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Introduction

CSIRO welcomes the opportunity to provide input to the Joint Select Committee on Development of Northern Australia's consideration of opportunities for expanding the aquaculture industry in Northern Australia including:

- the ability to commercialise new innovation;
- develop new aquaculture projects and products; and
- seek out new markets.

CSIRO has a strong history in aquaculture research to boost the value, competitiveness and sustainability of Australia's aquaculture industry.

Focused on farmed finfish, crustaceans and molluscs, our research improves food production from aquaculture species through integrated studies of genetics, physiology, health, aquafeeds, environments and food science.

Industry potential

Australia faces a growing challenge to balance population growth, economic growth and food production with social and environmental values. Tropical aquaculture has significant potential to contribute to meeting this challenge.

Preliminary broad-scale analysis has indicated that Australia's northern coastline has 1.5 million hectares that are potentially suitable for land-based (pond) coastal aquaculture (McLeod et al., 2002). This analysis takes into account a number of factors including elevation, slope, distance to water, urban buffer zones, and land tenure.

Pond based prawn aquaculture industry shows great potential to expand in northern Australia, given strong 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 world's best practice methods with no adverse environmental impacts in over 30 years of operations. Much of tropical Australia is perfectly suited to meeting the two major requirements for aquaculture development: clean sea water and an abundance of suitable coastal land. In addition the use of seawater with only a small freshwater requirements means that aquaculture enterprises are effectively drought proof.

CSIRO is currently providing expertise to assist a number of companies and communities to determine the potential to develop new aquaculture enterprises in coastal regions of Northern Australia. These include a pre-feasibility study for one very large project of up to 10,000 hectares of saltwater ponds in the Northern Territory (Seafarms Group), and several feasibility studies with traditional owners including those in the Cape York region (Archer River catchment), the Northern Territory and Western Australia.

Aquaculture in northern Australia would provide a local market for irrigated crops as feedstock. This could provide significant impetus for northern irrigated agriculture, the growth of which has

been impeded by, amongst other things, high transport costs that significantly erode profitability. A local market for cropping outputs would overcome this constraint.

CSIRO has a strong history of industry engagement and research to support development of Australia's aquaculture industries – both in terms of breed and feed technologies and environmental management and land use considerations. Breed and feed technologies have demonstrated tripling of production of seafood protein by area, further improving the potential profitability of aquaculture enterprises.

Ability to commercialise new innovation

While there are strong markets and areas suitable for industry development, uptake has been constrained because investors do not have confidence to invest in potential projects due to uncertainty in two areas:

- the status of land with potential for aquaculture development
- environmental regulatory requirements

In both these areas there are many differences between jurisdictions and higher uncertainty than in southern states like Tasmania where land use and environmental requirements are clear. The Productivity Commission identified in 2004 that "aquaculture production is subject to an unnecessarily complex array of legislation and agencies".

Uncertainty about land

While CSIRO analysis indicates that of NT, WA and Queensland each have over 500,000 ha potentially suitable for pond aquaculture development (totalling over 1.5 million ha), a lack of clarity in the zoning of this land means that investment in it for aquaculture purposes poses a high risk. This lack of clarity applies to both development of aquaculture facilities and the irrigated crops to provide feedstock.

If jurisdictions were to create aquaculture zones by way of a spatial planning framework at a catchment scale to allow for strategic cropping and aquaculture development this would place aquaculture on an even footing with other agricultural enterprises and reduce investor risk. It would take potential industry development beyond ad-hoc.

If zoning was clear at the catchment scale, then potential investors could narrow and define geographic scope to develop specific project proposals.

Environmental regulatory requirements

As is the case with land use, jurisdictions vary in their environmental regulatory requirements and in some cases have yet to be developed to the stage that potential aquaculture enterprises have certainty about the conditions that need to be met to acquire a licence to operate. A 2004 Productivity Commission report provides describes environmental regulatory arrangements of aquaculture across Australia. The current situation leads to a "catch 22" where potential investors do not have the required certainty to invest in new aquaculture development projects and the lack of project proposals means that the regulatory requirements are yet to be developed and

implemented. Where development has been stimulated and new projects are proposed the environmental requirements can be unclear.

Potential environmental impacts in terms of the escape of stock or diseases are mitigated through quarantine and biosecurity regulations and monitoring requirements. While stringent, these requirements are clear to potential aquaculture operators and do not pose the same uncertainties as some other requirements. While the intensive nature of aquaculture increases the risk of disease, detection is rapid due to monitoring and the protocols for managing outbreaks are clear and effective. In its history in Australia there does not appear to have been any issues with disease escaping from aquaculture facilities and impacting adjacent environments.

The case of the Great Barrier Reef catchments

Between 1995 and 2001, Australian scientists conducted a major, multidisciplinary program of research that examined several prawn farms throughout the production cycle for several successive years. A key focus was on the ecological impacts of farm discharges on downstream environments and the development of cost-effective effluent treatment systems. The research program was the most comprehensive analysis of the environmental impacts of prawn farming ever conducted.
Results from this program indicated that:

- **Untreated** discharges from Seafarm (Australia's largest prawn farm) resulted in levels of elevated nutrients that were only transiently detectible for a short distance (2 km) from the point of discharge and there were no obvious effects on downstream sediment processes.
- A subsequent study of a barramundi cage farm in a tidal creek demonstrated that elevated nutrient originating from the activities could not be detected, due to the inherent dynamics of mangrove creeks.

As a result of this work, to even further reduce or eliminate the risks of any adverse impacts, and recapture otherwise wasted nutrients, the Australian prawn farming industry developed and implemented **discharge water treatment systems** that enabled them to comply with the strictest aquaculture discharge standard in the world (set by QLD EPA and endorsed by GBRMPA in 2002). A direct result of the comprehensive body of scientific research on the environmental impacts of prawn farm discharges, the introduction of discharge treatment systems and compliance with the strictest discharge water quality standards in the world, is that the industry has operated for 20 years with no adverse impacts on adjacent ecosystems.

However, in 2008 SEWPAC/GBRMPA imposed the new constraint that any new prawn farm must operate with zero net nutrient or sediment levels in their discharge waters. The technology to enable the industry to operate under the new constraint is yet to be developed and the industry already operates under the strictest discharge water quality standards in the world. In effect, this is a ban on the development of aquaculture in coastal regions adjacent to the Great Barrier Reef. The aquaculture industry is being required to meet targets required by no other industry which, if imposed equally, would require that most land based industry near the Great Barrier Reef cease operation.

A potential solution to moving beyond the current aquaculture development impasse with SEWPAC/GBRMPA would be to develop a spatial planning framework that includes; environmental and social values, species, production systems, market demand and surrounding uses of on-shore, nearshore and offshore regions. The approach has already enabled the Gold Coast City Council to achieve sustainable expansion of prawn farming in South East Queensland. This was achieved using the discharge water quality standards ratified in 2002. In this context, there is no scientific basis for imposing a constraint of zero net nutrient or suspended solids.

The outputs from a spatial planning framework would provide a rigorous basis for establishing aquaculture zones along the Queensland, NT and WA coast. Tasmania and South Australia have already successfully developed and implemented science based aquaculture zones and the associated policies. If all Northern Australia jurisdictions were to adopt a similar approach, in collaboration with all stakeholders, this could remove the most critical obstacle to environmentally, socially and economically sustainable development of aquaculture in while ensuring that there continues to be no adverse impacts to the ecosystem health of adjacent waters.

References

McLeod, I.; Pantus, F.; Preston, N. 2002 The use of geographical information systems for land-based aquaculture *Aquaculture Research 33:241-250* http://onlinelibrary.wiley.com/doi/10.1046/j.1355-557x.2001.00667.x/pdf

Productivity Commission 2004 *Assessing Environmental Regulatory Arrangements for Aquaculture*, Canberra http://www.pc.gov.au/research/completed/aquaculture