

NATIONAL
MARINE

SCIENCE

SYMPOSIUM



The Theme Food Security

*The role that marine science can
play in supporting food security
from our marine resources*

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Acknowledgement of Country

'I would like to acknowledge the Ngunnawal people who are the Traditional Custodians of the Land. I would also like to pay respect to their Elders both past and present and extend that respect to other Indigenous Australians who are present.'

Marine and inland fisheries, together with aquaculture, provide food, nutrition and a source of income to around 820 million people around the world, from harvesting, processing, marketing and distribution.

Key roles for Australia in food security:

- Move towards greater self-sufficiency (noting that Australia imports 72% of its seafood needs)
- Developing the food potential from Australia's EEZ
- Provision of services and capacity building to regional neighbours.

Theme: Food Security



Wild Fisheries
Aquaculture

Aquatic Animal Health and Biosecurity
Food Safety and Innovation





Wild Catch

- Australian commercial fisheries are relatively small by world standards yet have large ecological, social and political footprints
- A large proportion of the catch is high-value species that are mostly exported
- Australia's wild catch fisheries production was 157 505 tonnes (\$1.3 billion) in 2011-12 (ABARES 2013)
- There has been a significant broadening focus of fisheries management within an EBFM context and the science necessary to support it
- Australian fisheries research is highly regarded and well cited
- Research capacity is being enhanced through increased collaboration between fisheries agencies, universities and industry.



Wild Catch: short to medium term research needs

- Value adding of species previously considered as by-product and by-catch (including social acceptability and approaches to marketing)
- Fishery harvest strategies, particularly for data-poor species and fisheries, standardised and reported across all jurisdictions
- Improved information about recreational and Indigenous fishing
- Improved methods to mitigate the impacts of fishing on TEPs, discards and habitats including performance metrics
- Filling of critical information gaps regarding ecosystem processes, the implications of climate change and variability, and a clearer understanding of the dynamic linkages between catchment, coasts and oceans and their role in fishery production.



Aquaculture

- Global growth of aquaculture is expected to continue
- Australian aquaculture value and production has increased substantially over the past decade, from \$724 m and 49,284 tonnes in 2003 to \$1.03 billion and 80,066 tonnes in 2013
- Australian aquaculture focuses on premium products that generate significant economic value.
- Aquaculture breeding and sustainable aquafeeds present a very significant opportunity for sustainable growth of the Australian aquaculture industry and export of Australian knowledge and technology to increase global production.



Aquaculture: short to medium term research needs

- Developing cost-effective aquaculture feeds that minimise or eliminate the use of wild harvest fishmeal and fish oil, while maintaining key quality parameters expected in high quality, healthy seafood
- Aquaculture spatial planning & management framework that encompasses environmental and social values, species selection, production systems, market demand and other uses of adjacent environments
- Increasing the speed of transition from reliance on wild brood stock to the use of domesticated, selectively bred high-health stocks.



Aquatic Animal Health Biosecurity

- Infectious disease is the most significant threat to this sector
- Maintaining Australia's high-health status to enhance our competitiveness and protect Australia's natural resources
- Research has a critical role in expanding our knowledge of disease threats and their management
- Through research, Australia will build capability, capacity and expertise in aquatic animal health, ensuring that the fisheries/aquaculture sector builds resilience and continues to grow sustainably while providing socio-economic and environmental benefits into the future
- It is a priority that systems are in place for the detection and management/control of any exotic incursion or emergence of previously unknown disease
- Australia has some unique aquatic animal species with a range of pathogens that is poorly understood
- It is likely that climate change will be an additional factor influencing disease emergence.



Aquatic Animal Health Biosecurity: short to medium term research needs

- Australia is a large continent with a wide range of biogeographic zones leading to a diversified aquaculture and fisheries sector
- A decentralised network of government labs and university research departments is required to service the aquatic animal health needs of this diverse sector
- Thus expertise on the biology of the range of aquatic animal species and their pathogens/diseases will be developed and maintained
- Nodes of expertise or centres of excellence need to be developed to build on current capability and capacity within disciplines such as epidemiology, virology, bacteriology, parasitology, pathology, diagnostics, exotic diseases, etc.
- New research aimed at disease control needs to include:
 - Development of aquatic chemicals and veterinary products for use in Australia
 - Development of vaccines
 - Development of husbandry interventions.



Food Safety and Innovation

- Food safety is essential for all trade and market access
- Market and consumer preferences are driving innovation and demanding safe, high quality products
- National strategic approach required
- Emerging food safety issues – climate change impacting pathogen and contaminant distribution, novel packaging, longer supply chains, emerging international regulations
- Waste transformation into safe novel products will improve utilisation of resource
- Damaging impact of food safety incidents on markets
- Ensuring international market access requirements are commensurate with risk from Australian product and not cost prohibitive.



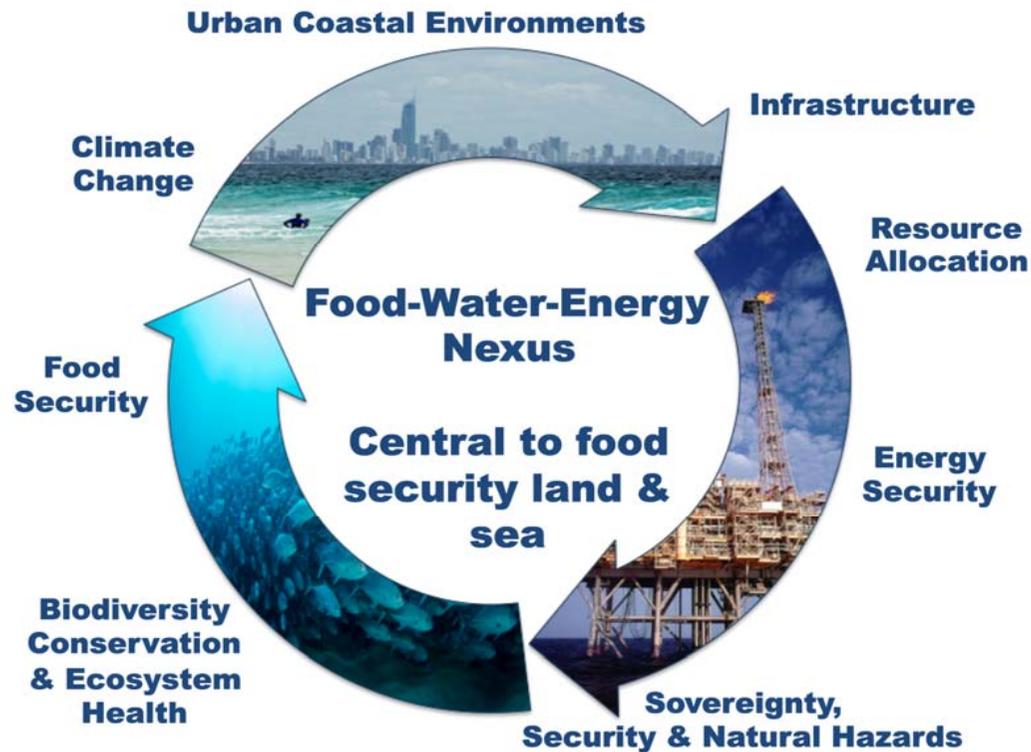
Food Safety and Innovation: short to medium term research needs

- Development of programs to produce cheap, rapid diagnostics for on farm/in-line factory use for risk management of pathogens and contaminants e.g. rapid screening techniques for marine biotoxins and norovirus
- Product development and innovative processing techniques to improve value from “waste”
- Improved knowledge of marine biotoxin events to understand at risk seafoods to mitigate impacts: uptake mechanisms, monitoring tools, bloom prediction, harvest strategies, etc.
- Development of a range of traceability options for the seafood industry to meet international regulations, including innovative automatic systems to prove integrity and provenance and improve product inventory
- Trade and market access research to maintain access, resolve technical barriers to trade, support local risk management, and build our seafood safety credentials
- Defining benefits of seafood consumption to balance risk messages to consumers
- Research into emerging food safety issues to develop appropriate risk management e.g. *Clostridium* in packaged seafood.

Cross cutting issues

- Agreed national science and management standards to support increased efficiency across jurisdictions and improved community confidence
- The role of spatial management and multiple resource management (including those for other purposes, such as conservation), and develop performance measures
- Methods to better integrate coupled socio-economic and biophysical approaches to resource assessment, including cumulative impacts
- Research on social license to operate and define activities necessary to support debate around acceptable impacts and environmental standards
- Implementation of new observational technologies, remote sensing, genetic and biochemical methods including linkages with other observing infrastructure such as IMOS – to address data constraints.

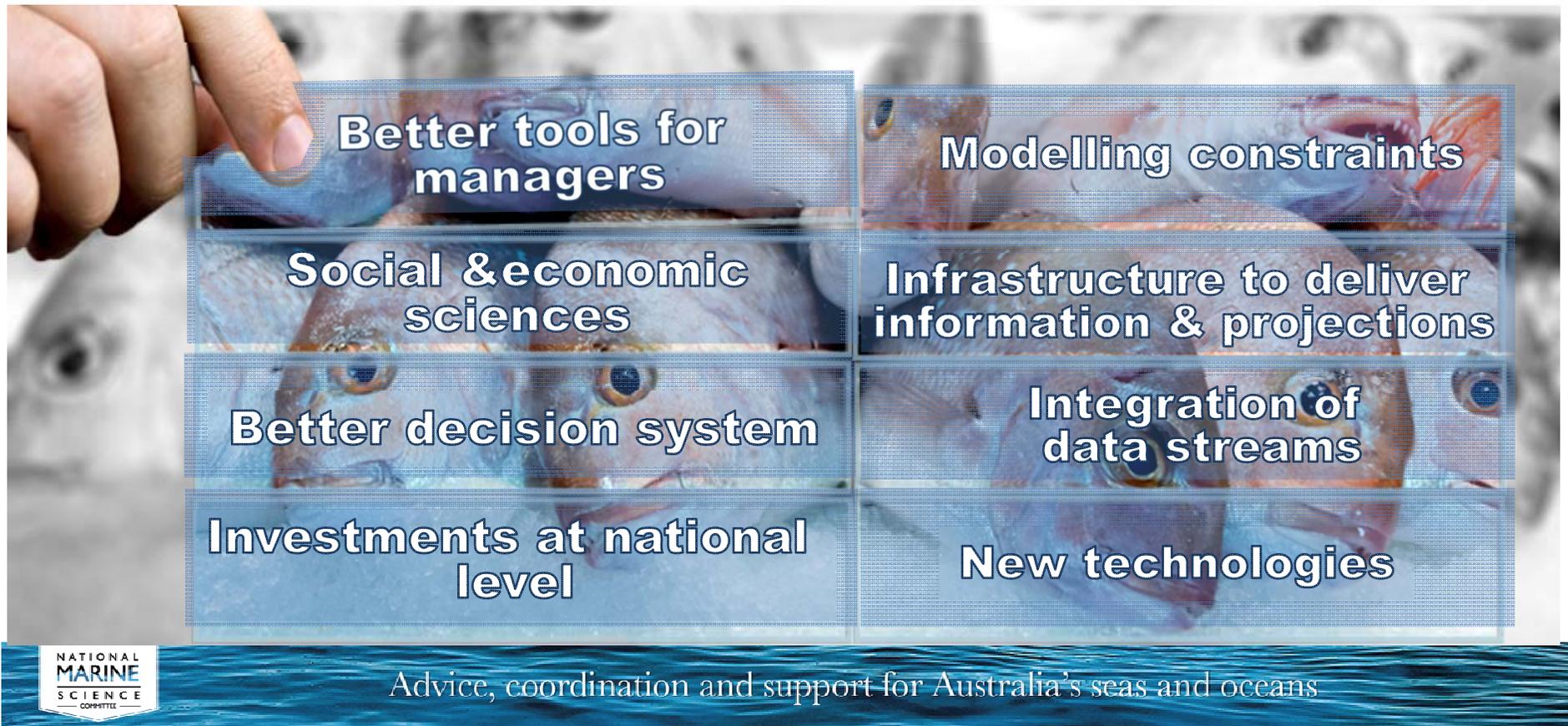
Linkages with other Themes



All themes are interconnected - linked across land and sea

Challenges

- Focus research to address sustainability of production, greater self-sufficiency and provision of food to countries suffering falls in production



The image shows a hand pointing to a grid of eight challenge areas. The grid is divided into two columns and four rows. The background of the grid is a close-up of several fish. The text in each cell is as follows:

Better tools for managers	Modelling constraints
Social & economic sciences	Infrastructure to deliver information & projections
Better decision system	Integration of data streams
Investments at national level	New technologies

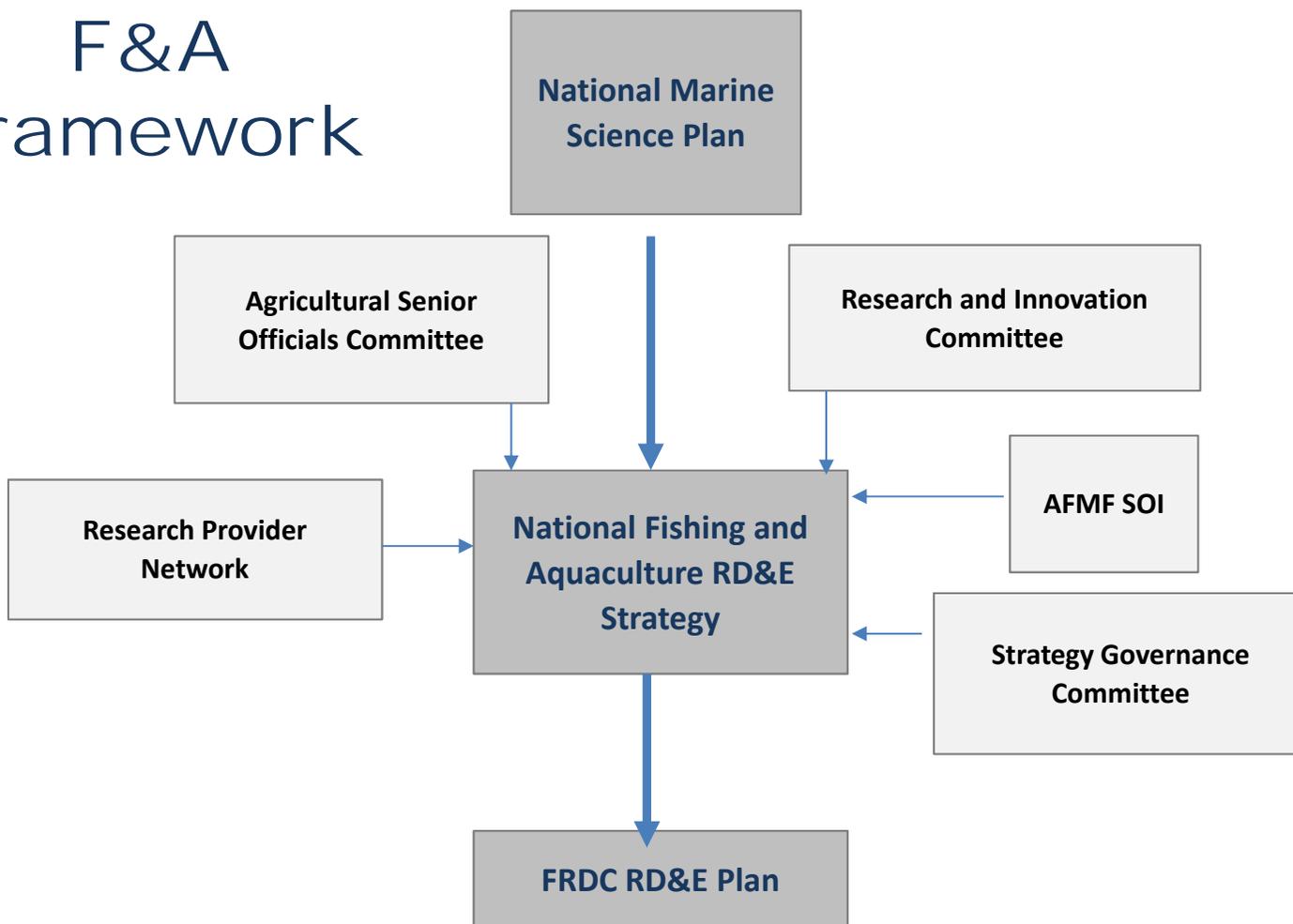
NATIONAL MARINE SCIENCE COMMITTEE

Advice, coordination and support for Australia's seas and oceans

Implementation/infrastructure

- Implementation/infrastructure e.g. increased quantitative skills, more economists and social scientist with experience in marine resources
- Leveraging up of national infrastructure, e.g. IMOS, MNF
- Continuing Primary Industries Joint Ministerial agenda for RD&E
- Construction of a collaborative framework that allows partnership, alignment and funding cross sector and cross discipline.

F&A Framework



Examples of International linkages

- **EU Horizon 20/20:** <http://ec.europa.eu/programmes/horizon2020/>
(notably Blue Growth: Unlocking the potential of Seas and Oceans)
- **Global Ocean Observing System (GOOS):** <http://www.ioc-goos.org/>
- **International Council for the Exploration of the Sea (ICES):**
<http://www.ices.dk/Pages/default.aspx>
- **The North Pacific Marine Science Organization (PICES):** <https://www.pices.int/>
- **Food and Agriculture Organization of the UN (FOA):** <http://www.fao.org/home/en/>
- **National Center for Ecological Analysis and Synthesis (NCEAS):**
<https://www.nceas.ucsb.edu/overview>
- **The Center for Independent Experts (CIE):** <http://ciereviews.org/>
- **WorldFish:** <http://www.worldfishcenter.org/>
- **Aquaculture for Asia:** <http://aquaculture.asia/>
- **RFMOs; NACA**

Conclusion

- Science is central to fisheries management and aquaculture in Australia
- Fishing and aquaculture plays an important and growing role in providing food, culture and recreation for both developing and developed countries
- Fisheries and aquaculture industries are two of many users of the aquatic environment
- Important to align with existing initiatives, eg. Fishing and Aquaculture RD&E strategy and the statement of intent by Australian Fisheries Management Forum
- Methods to better integrate coupled socio-economic and biophysical approaches to resource assessment, including cumulative impacts
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Acknowledgments

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University of Queensland

University of Tasmania

University of Technology, Sydney

University of Technology, Sydney

University of Western Australia Oceans Institute

University of Wollongong

University of New South Wales

Western Australian Marine Science Institution (WAMSI)

Questions



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