

KNOWLEDGE FOR FISHING AND AQUACULTURE INTO THE FUTURE



FRDC



THE FISHERIES RESEARCH AND DEVELOPMENT CORPORATION'S
RESEARCH, DEVELOPMENT AND EXTENSION PLAN 2015–20

VISION

The FRDC's vision is for Australia to have vibrant fishing and aquaculture sectors which adopt world-class research to achieve sustainability and prosperity.

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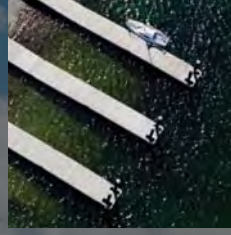
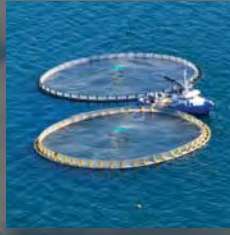
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By 2020 ...

- ... fishing and aquaculture will continue to have improved performance in environmental sustainability
- ... fishing and aquaculture will be more resilient to social, environmental and economic change
- ... fishing and aquaculture businesses will be more productive and profitable
- ... recreational fishers will have improved opportunities for better fishing experiences and will play a greater role in the stewardship of fisheries resources
- ... more Indigenous people will derive benefit from fishing and aquaculture activities and will play a greater role in the stewardship of fisheries resources
- ... information about the science and management of the sustainability of fishing and aquaculture will be more accessible to the consumer and meet consumer's needs.






[The term **industry** refers to the commercial interests of both fishing and aquaculture.]

[The term **jurisdiction** is used to refer to the area of authority of one of the states, the Northern Territory or the Commonwealth.]



OVERVIEW

This research, development and extension (RD&E) plan outlines a significant change in the way the Fisheries Research and Development Corporation (FRDC) will plan and invest in RD&E for fishing and aquaculture over the next five years (2015–20). Since its inception, the FRDC has evolved from being essentially a granting body to one that adds value and strategic focus to RD&E for Australian fishing and aquaculture



The FRDC will use three investment approaches to implement the direction of this RD&E Plan: lead, collaborate and partner. Under these approaches RD&E planning, prioritisation and funding will occur in the following ways:

- **Lead:** The FRDC will allocate a significant portion of the Australian Government’s public-good funding it receives and take the lead in priority setting for RD&E with a national focus.
- **Collaborate:** The FRDC will provide mechanisms and incentives for those sectors or jurisdictions under partnership agreements to leverage their funding where there is alignment with priorities at the national level.
- **Partner:** There will be greater responsibility given to the end users of RD&E to set priorities under partnership agreements. Funding for this RD&E comes from industry contributions, the matching contribution from the Australian Government, and some additional public-good funding for the jurisdictions.

This five-year RD&E Plan has been developed through a comprehensive process of assessing the operating environment for fishing and aquaculture, consultation, analysis and consideration.

Consultation has included the Parliamentary Secretary to the Minister for Agriculture, the Department of Agriculture, those involved in aquaculture, commercial fishers, Indigenous fishers, recreational fishers, research providers, post-harvest processors and fisheries managers from federal, state and territory governments.



The FRDC's new strategic focus will direct RD&E investment during the life of this RD&E Plan towards the three national priorities that have been identified through the consultation process:

- Ensuring that Australian fishing and aquaculture products are sustainable and acknowledged to be so.
- Improving productivity and profitability of fishing and aquaculture.
- Developing new and emerging aquaculture growth opportunities.

This means concentrating on outcomes that will have a greater impact on the future of fishing and aquaculture in Australia.

The FRDC will continue to lead on national RD&E infrastructure that addresses cross-sector and community areas of concern. This infrastructure consists of the FRDC's subprograms and coordination programs as well as RD&E concerning people development, and the delivery of key services (e.g. FishNames, SafeFish).

The FRDC will develop and maintain partnerships with various fishing and aquaculture sectors and jurisdictions, encouraging them to take a major role in developing RD&E priorities. It is expected that sector, jurisdictional and national RD&E priorities will interact and contribute to the achievements of one another.

As well as guiding the FRDC's direction and investment, this RD&E Plan shows how the FRDC will work with stakeholders in the fishing, aquaculture, management and research communities to achieve the targets set out in this RD&E Plan.



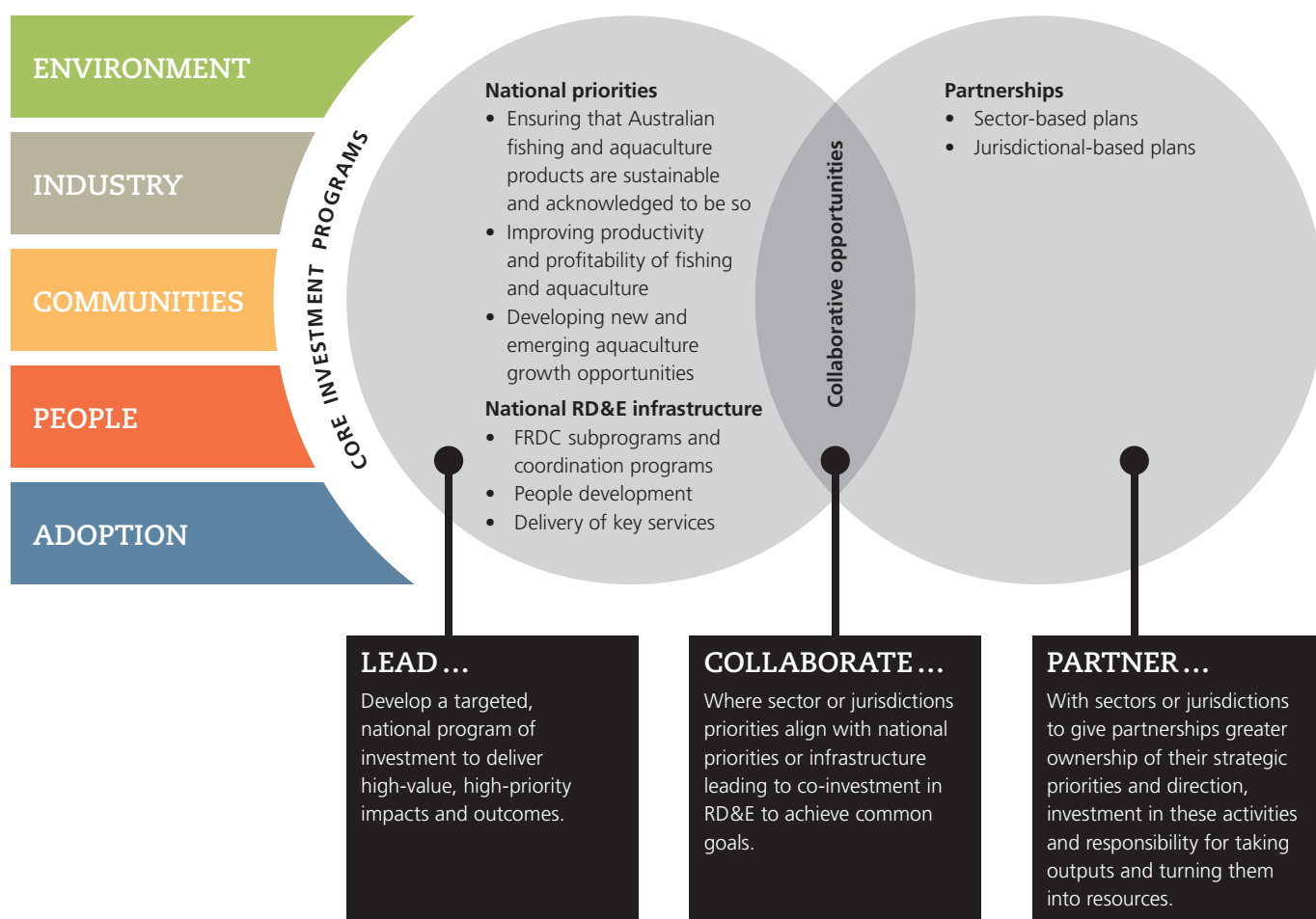
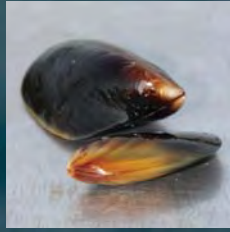
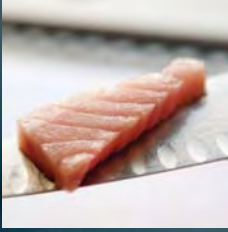


FIGURE 1. The framework for RD&E investment by the FRDC for 2015–20.



Increased knowledge that fosters sustainable economic, environmental and social benefits for Australian fishing and aquaculture.

PLANNED OUTCOMES AND ROLE

2

The FRDC invests in science to create knowledge for the benefit of the Australian community so that Australia's marine and freshwater resources can be managed and used for fishing and aquaculture sustainably.

The primary users of these resources, and of the FRDC's RD&E investment, can be divided into four sectors: aquaculture, commercial fishing, Indigenous fishing and recreational fishing. These sectors have differing ambitions and aspirations—including profit, food production, customary and historical uses, and fishing for sport or pleasure.

The FRDC is a statutory corporation within the Australian Government's Agriculture portfolio and is accountable to the Parliament of Australia through the Minister for Agriculture. The portfolio aims to enhance the sustainability, profitability and competitiveness of Australia's agriculture, food, fisheries and forestry industries.

The FRDC contributes to the achievement of this aim through the following planned outcome.

Increased knowledge that fosters sustainable economic, environmental and social benefits for the Australian fishing industry; including Indigenous, recreational, commercial and aquaculture sectors, and the community; through investing in research, development and adoption.

Formed on 2 July 1991, the FRDC operates under two key pieces of legislation:

- *Primary Industries Research and Development Act 1989* (PIRD Act), formerly the *Primary Industries and Energy Research and Development Act 1989*
- *Public Governance, Performance and Accountability Act 2013* which has replaced the *Commonwealth Authorities and Companies Act 1997*.

It is governed by a board of directors appointed for their expertise and is led by an executive director who manages the day-to-day operations of the organisation through a small team.

PIRD

The PIRD Act sets out FRDC's objectives as follows.

- a) Make provision for the funding and administration of research and development relating to primary industries with a view to:
 - i. increasing the economic, environmental and social benefits to members of primary industries and to the community in general by improving the production, processing, storage, transport or marketing of the products of primary industries,
 - ii. achieving the sustainable use and sustainable management of natural resources,
 - iii. making more effective use of the resources and skills of the community in general and the scientific community in particular,
 - iv. supporting the development of scientific and technical capacity,
 - v. developing the adoptive capacity of primary producers, and
 - vi. improving accountability for expenditure on research and development activities in relation to primary industries.
- b) Make provision for the funding and administration of marketing relating to products of primary industries.

The PIRD Act now includes a legislative objective that allows for the FRDC to undertake marketing activities. The FRDC will work with industry stakeholders, if requested, to develop and engage in promotional activities. Likewise, it will publish a separate marketing plan closely linked to this RD&E Plan, linking RD&E to marketing activities. An evaluation process will also be developed.

The FRDC contributes to a strategic national approach to fishing and aquaculture RD&E that aims to share knowledge, build cohesion and establish common goals between sectors. Partnerships and previous RD&E are considered in planning and investment processes, to maximise leverage and reduce duplication.

The FRDC has improved the way it plans, prioritises and invests in RD&E. A major achievement in this area has been the development of industry partnership agreements which have given greater responsibility in the RD&E planning and investment process and have better aligned the priorities with end-user needs. In this RD&E Plan, the FRDC will use a similar approach with the jurisdictions.

While not undertaking RD&E itself, the FRDC partners with project-specific researchers and research organisations. It then facilitates the extension, adoption and commercialisation of research and development results, and evaluates the benefits, with a primary focus on end users of RD&E and markets.

As a quality-certified organisation (AS/NZS ISO 9001:2008) FRDC's RD&E investment is supported by a rigorous, quality-management system that includes reviewing performance and implementing changes to ensure continuous improvement.

A KEY ACTIVITY FOR THE FRDC IS TO IDENTIFY GAPS IN DATA AND KNOWLEDGE IN ORDER TO INFORM END USERS. INFORMATION AND DATA SHOULD BE THE FOUNDATION FOR ALL MARKETING ACTIVITIES, TO ENSURE STAKEHOLDERS HAVE THE INFORMATION NECESSARY FOR EFFECTIVE MARKETING INVESTMENT.



Revenue base

Revenue for RD&E investment is based on a co-funding model between the Australian Government and the commercial fishing and aquaculture industries. Funds are collected by the Commonwealth, state and territory governments as a part of their fisheries management activities.

As stipulated in the PIRD Act, and shown in the figure below, the FRDC's primary revenue source is based on:

- a) the Australian Government providing unmatched funds equivalent to 0.50 per cent of the average gross value of Australian fisheries production (AGVP) for the current year plus the two preceding years,
- b) fishers and aquaculturists providing contributions via government, and
- c) the Australian Government matches this amount up to a maximum of 0.25 per cent of AGVP.

FIGURE 2. The basis of the FRDC's revenue.



The majority of resources the fishing and aquaculture sector uses are publicly owned, with no part of the environment in which they operate being owned by any single person or enterprise.

The Australian Government provides funding that contributes to research for the sustainable use and development of these resources on behalf of the people of Australia, not just for those who use them for commercial or private gain. This component of funding, and the research it funds, is termed as 'public good'.

There is no legislative impediment to fishers and aquaculturists contributing to the FRDC above the maximum level at which the Australian Government will provide a matching contribution.

The fishing and aquaculture industry contributes to the FRDC on the basis that RD&E will be targeted to its needs and will deliver economic and social benefits. The Australian Government matches industry contributions on the basis that the beneficiaries of research should pay roughly in proportion to the benefits received, but the government should contribute to the spillover benefits to the wider community.

In addition, significant funding is also received by the FRDC from RD&E providers, both as cash and in-kind contributions through projects that have been successful in their applications for funding.

Funds for marketing activities will be treated separately from RD&E funding. They will be collected from the sectors through a different means to those for RD&E and are not eligible to be matched by the Commonwealth. The FRDC will ensure there is a clear separation and reporting of these activities.



FRDC's stakeholders

The FRDC works with a diverse and geographically-dispersed group of stakeholders and the four main sectors of fishing and aquaculture (aquaculture, commercial fishing, Indigenous fishing and recreational fishing) are not mutually exclusive. For example, Indigenous fishers may participate in customary fishing, conduct aquaculture and commercial fishing, and fish recreationally.

FRDC's stakeholders include:

- federal, state and territory governments, including fisheries and natural resources managers
- all fishing and aquaculture sectors
- the Australian community, on whose behalf aquatic natural resources are managed
- seafood consumers
- the research community, including universities, government fisheries organisations, further education organisations (e.g. TAFE), international research organisations and private-sector research providers.

The FRDC regularly engages with its stakeholders through:

- four ministerially-declared representative organisations to which the FRDC is accountable under legislation:
 - National Seafood Industry Alliance (representing the seafood industry)
 - Australian Recreational and Sport Fishing Industry Confederation Inc. trading as Recfish Australia (representing recreational and sport fishers)
 - Commonwealth Fisheries Association (representing commercial fishers who operate in Commonwealth fisheries)
 - National Aquaculture Council (representing the aquaculture industry)
- the Governance Committee that supports the National Fishing and Aquaculture RD&E Strategy and the National Research Providers Network which represents fishery and aquaculture researchers (FRDC is a member of both groups)
- partnerships between the FRDC, industry sectors and jurisdictions
- the Australian Fisheries Management Forum, representing government agencies responsible for fisheries management (FRDC is an observer)
- the FRDC subprograms and coordination programs.

The FRDC Board regularly meets at locations where it can meet with those involved in fishing and aquaculture and hear their views on issues first hand.

CONSULTATION, NETWORKING AND CONNECTING THOSE INVOLVED IN FISHING AND AQUACULTURE IS THE STRENGTH OF THE FRDC AND IS PIVOTAL TO ITS BUSINESS.

Sector profiles

There is considerable diversity among fishing and aquaculture stakeholders. While four broad groups can be identified, there is wide variation within each group.

For example, the aquaculture sector has large companies that employ hundreds of people supported by expensive equipment, and harvest thousands of tonnes of product. It also has small businesses who farm in land-based dams with very little capital and who harvest small volumes.



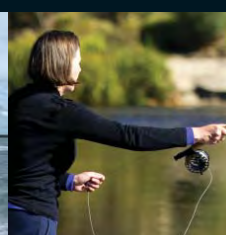
AQUACULTURE



COMMERCIAL



INDIGENOUS



RECREATIONAL



POST-HARVEST

The **seafood industry** includes those concerned with the commercial take, culturing, processing, preserving, storing, transporting, marketing and selling fish and fish products (including pearling).

The term **social licence** is now often used in relation to most primary industries and the mining industry. It refers to the level of acceptance or approval continually granted to an operation or project by the local community and other stakeholders, and changes through time.

AQUACULTURE

The aquaculture sector can generally be described as having business 'smart', value-adding ventures, with larger enterprises processing, packaging and branding their own produce. The sector is currently dominated by Atlantic Salmon with significant contributions from pearl, oyster and prawn producers and by the ranching of Southern Bluefin Tuna.

Increased consumer demand for Australian-produced seafood is driving industry growth and creating opportunities to integrate production from the 'hatchery' through to consumers. Aquaculture is on course to be the major provider of seafood.

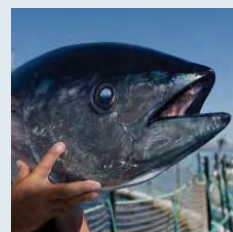
Aquaculture in this country is in a position to capitalise on progress in breeding and disease management, and from associated technological advances that can increase yield while reducing environmental impact. Improved production techniques also have the potential to 'grow' seafood with the smallest use of environmental resources of any primary production sector.

Of major consideration for Australian aquaculture is its ability to make its end product affordable and economical, both domestically and internationally. The cost of production has been relatively high in Australia compared to other countries. Advanced techniques and technologies have the potential to reduce how much it costs to make Australian aquaculture a more competitive industry.

Aquatic animal health remains a challenge for this sector, with disease outbreaks continuing to be a major risk and there is a need for further research on disease diagnostic capability, surveillance and treatment.

A major impediment to the increase of aquaculture is access to suitable production areas (both land and water). This is mostly a concern in coastal regions close to residential areas, where conflict can arise between the industry, local communities and recreational users of the waterways. Lack of support from some sections of the community is a major factor impacting access to suitable locations. Further research is needed to understand and evaluate the interactions between aquaculture, local users, communities and other fishing and aquaculture sectors.

Certification processes are being used in aquaculture to promote environmental and production credentials, and build consumer and societal trust. Those in aquaculture believe that achieving such credentials will improve public perceptions of this sector.





COMMERCIAL FISHING

The commercial fishing sector has a long history in Australia. A need to reduce pressure on some fish stocks and better consolidate entitlements in these fisheries has led to a smaller but more sophisticated and modern industry. This has been combined with improvements in the management of Australian commercial fisheries and has resulted in a balance between long-term environmental sustainability and economic viability.



However, these characteristics do not apply across the entire sector and there are a number of small fisheries that do not necessarily have management practices that best suit the scale of their operations.



The commercial fishing industry is made up of about 15,000 licence holders. A small number of operators take a large portion of the harvest (by value and volume). These are diverse enterprises that may hold multiple licences. They may work in a range of fisheries and, in some instances, are integrated along the supply chain. The remainder of the commercial fishing sector is made up of a large number of small owner-operator businesses. They are vital to sustaining small coastal communities and are passionate about what they do—supplying Australia with seafood.



In recent times the commercial fishing sector has focused on obtaining third-party certification of fishing practices and management to display its sustainability credentials and this will continue. Additionally, sustainability issues arising from external environmental factors (e.g. pollution, climate variability, disease, biosecurity and habitat destruction, including through coastal development), will have to be considered by the sector.

Australia's marine waters are increasingly a multi-user environment, reducing access to areas for all types of fishing and aquaculture production. There are competing claims for these waters, not only between fishing and aquaculture, but from other users such as the oil and gas industry, and from those wanting more areas protected.

Streamlining governance and regulation is an on-going priority for those involved in commercial fishing. Within this is the desire to continue investigating co-management approaches, to give greater responsibility and stewardship to commercial fishers.

Economic viability of the sector requires long-term meaningful access to resources, efficient harvesting methods, elimination of unnecessarily complex legislation, better use of underutilised species and opportunities to increase yield.

The Australian commercial fishing industry now competes in a global market with access to quality seafood from a range of countries. There is an ongoing need to differentiate Australian seafood to an increasingly discerning consumer—whether they be in China, Europe, the United States or Australia.



INDIGENOUS

Indigenous Australians are a distinct group by virtue of their ancient ties to the land and sea, carried on through traditional practices that include fishing. Indigenous fishing occurs in coastal, estuarine and inland waters, taking a mix of species, some of which are also important to other fishing sectors. Marine and freshwater species are an important food source and a component of many ceremonial and social events. A culture of 'no waste' ensures fish are shared within communities and families. Indigenous Australians also take part in the aquaculture, commercial fishing and recreational sectors across Australia.

Fishing helps Indigenous communities retain their independence and connection to country, reinforces social networks through the sharing of gathered food, and maintains traditional fishing knowledge. Fish and fishing are important educational tools with customary fishing practices being passed on to successive generations.

Many Indigenous Australians believe their traditional fishing rights have not been sufficiently recognised by governments across Australia. Several state and territory governments and authorities do explicitly recognise some Indigenous rights through legislation.

Improved understanding and engagement is needed between Indigenous fishers and policy makers, resource managers, researchers and other stakeholders to improve the adoption of useful research. Many national and regional agencies are working with Indigenous Australians to improve outcomes, but there is significant work needed to create better futures for Indigenous Australians by acknowledging the value of their traditional use and management of aquatic resources in policy and/or legislation.

Australia's Indigenous communities are increasingly seeking ways to develop their fishery resources with the aims of improving diets, nutrition and health; retaining young people in communities; engaging in regional employment by developing local trade and business skills; demonstrating cultural heritage and collaborating in investment opportunities. A key area is advancing appropriate governance and economic models to best support individual and community economic development.





RECREATIONAL

Aquatic resources present recreational fishers with opportunities for hobby, sport or vacation-related activities. These include exercising and relaxing, socialising with friends and family, meeting new people, seeing new places, engaging with nature, and providing a source of food.

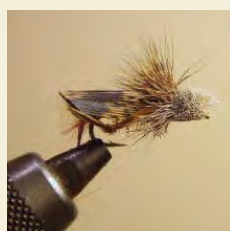
The main economic value of the recreational sector comes through the business activities that support it. This includes the bait industry, tackle manufacturers and retailers, fishing tourism, charter and guide operators, as well as the money spent in communities by anglers during fishing trips.

Resource management in the recreational fishing sector is achieved—not by limiting the number of people able to fish—but by controlling parameters relating to the catch; for example, bag limits, method of catching, spatial or seasonal closures, and minimum or maximum fish sizes.

Australia's recreational fishers are increasingly seeking to take more responsibility for aquatic resources, by making a greater contribution to funding its impacts (economic and catch) and collecting quality data that contributes to research, particularly where they are the sole users of a resource. This will help to maintain the sector's social licence and enhance the quality of fishing experiences, given that healthy aquatic environments are fundamental to it. The FRDC aims to ensure that decision making in this sector is based on accepted ecological, social and economic research.

Environmental health is linked to the recreational sector wanting to improve its angling experiences. This includes what gains can be made by improving the quality of habitats that fish rely at different life stages, and increasing the number of fish available to be caught.

Recreational fishers also want to establish a long-term, sustainable, national funding model to increase the quality of fishing in Australia by investment in RD&E, education, and fisheries enhancement initiatives.



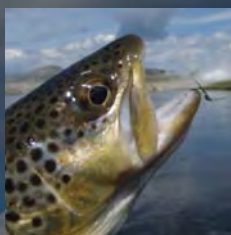
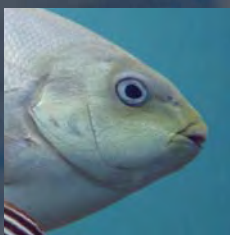
POST-HARVEST

Elements of the post-harvest sector have previously been considered part of the aquaculture or commercial fishing sectors but, more recently, they have become a sector in their own right. This sector could therefore benefit from the FRDC undertaking marketing activities on its behalf.

There are many opportunities to improve the profitability of fishing and aquaculture in the post-harvest sector. These include reducing processing waste, improving the value-add of processed products, and better understanding of consumer needs. RD&E funded by the FRDC could answer questions in all of these areas.

The post-harvest sector includes some businesses that are vertically integrated (i.e. they control a product from harvest to consumer delivery). However, many businesses only operate in one area of the supply chain. There are many opportunities to improve profitability through better supply-chain connections.





| Volume | | Value | |
|---------------------|---------------|--------------|---------------|
| Species | Volume | Species | Value |
| Salmonids | 42,978 tonnes | Salmonids | \$497 million |
| Australian sardines | 38,437 tonnes | Rock lobster | \$451 million |
| Prawns | 21,145 tonnes | Prawns | \$277 million |
| Oysters | 12,530 tonnes | Abalone | \$190 million |
| Tuna | 11,376 tonnes | Tuna | \$177 million |

TABLE 1. Top five species by volume and value in 2012–13 for both aquaculture and commercial fishing (ABARES, 2014).



OPERATING ENVIRONMENT

3

Australia is a maritime nation—over 80 per cent of its 23 million people live within 50 kilometres of the coast. It has the third largest marine territory in the world (8,148,250 square kilometres) and its diverse seascapes, which stretch from the tropics to sub-Antarctic islands, reflect unique biodiversity and deliver a flow of goods and services. However, because of relatively low productivity, Australia ranks only 52nd in the world in terms of the volume of marine fish landed.

Fishing and aquaculture also occur in a range of freshwater environments including the tropics, semi-arid regions and the temperate highlands of the southern states.

There is a broad mixture of people who fish and farm the more than 600 targeted and produced species supported by Australia's diverse environments, including on lakes, rivers, estuaries, beaches and at the sea, using a wide variety of methods and equipment.

In 2012–13, commercial fisheries production was 157,252 tonnes, with an estimated value of this harvest of \$1.38 billion. Aquaculture production for the same period was around 80,066 tonnes, with a value of around \$1.03 billion.

Estimates of harvest, participation and value of the Indigenous and recreational fishing sectors are difficult to determine.

The most recent estimates available (2001) calculated a national recreational catch of 48,400 tonnes, with a retained catch of about 30,000 tonnes. The estimate for Indigenous customary fishing practices was about 2000 tonnes.

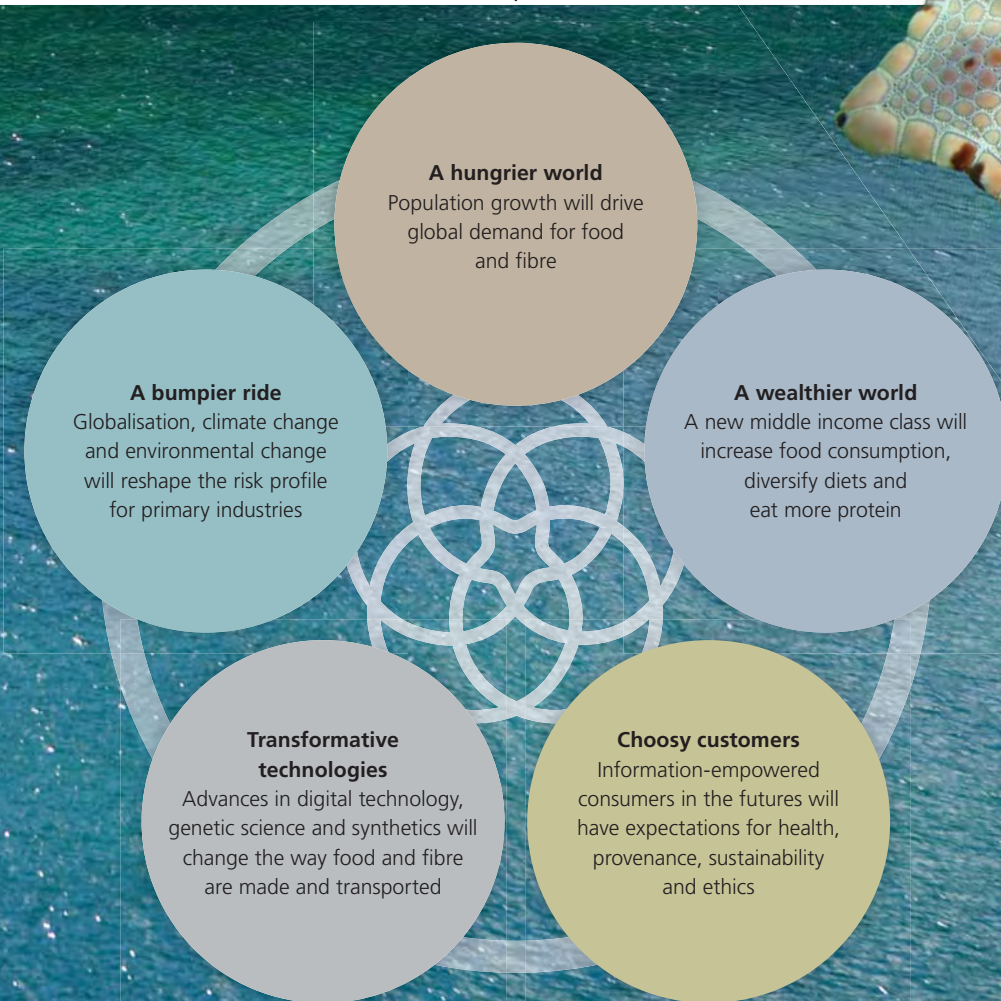
Disaggregated data for Indigenous commercial fishing or aquaculture are not available and are included in the aggregate figures provided in the table on the opposite page.

Data from peak organisations in the recreational sector suggests that it makes a significant contribution to the value of fisheries Australia-wide through the purchase of boats, fishing equipment and other associated costs. Using a proxy valuation method for the economic value of recreational fishing, a FRDC project (2012–2014: *Measuring the economic value of recreational fishing at a national level*) estimated a total value of \$2.56 billion for the recreational sector in 2013 (including flow-on contributions).

In June 2014, the FRDC commissioned a review to gain a better understanding of the operating environment for fishing and aquaculture in Australia. The resulting report, *2014 Australian Fishing and Aquaculture Sector Overview* (FRDC project 2014–503.20), has been used, along with other planning documents such as the *Australian Fisheries Managers Forum Statement of Intent*, to identify drivers and opportunities for 2015–20. These are discussed in the following section.

The operating environment for fishing and aquaculture is conceptually similar to five 'megatrends' which are expected to influence primary industries globally over the next 20 years. These are identified in the Rural Industries Research and Development Corporation's (RIRDC) report *Rural Industry Futures – Megatrends impacting Australian agriculture over the coming twenty years*. Those drivers and opportunities relevant to fishing and aquaculture are shown in the figure below. The commonality between fishing and aquaculture and the broader primary industries, suggests there is potential for fishing and aquaculture to work with, and learn from, other primary industries.

FIGURE 3. The five 'megatrends' that will influence primary industries over the next 20 years (adapted from RIRDC, 2015).



Drivers and opportunities for 2015–20

Public perception and social licence

The public perception of fishing and aquaculture affects all sectors, both commercially in terms of selling produce but also in terms of access to resources. Fishing and aquaculture in Australia has a history of improved stewardship and a focus on best practice. However, community perceptions may, at times, not differentiate between good fishing and aquaculture management practices in Australia and those elsewhere in the world. This influences what the community thinks about fishing and aquaculture operations in this country which, in turn, flows on to consumer perceptions about the purchase of seafood. This is a major component of the megatrend towards 'choosy customers'.

During the 2013 Seafood Directions conference four main issues were raised — social licence to operate (including resource access), productivity and profitability, market access, and sustainability.



Community perceptions—good and bad—can have a strong influence, via government regulation, on access to natural resources across all primary industries. For Australia's fishing and aquaculture sectors to continue to have community endorsement for their activities, all sectors must be—and be seen to be—sustainable, humane and consistent with wider community expectations and standards (megatrend—choosy customers).

Public perception of fishing and aquaculture, coupled with political influence, has been a major concern of fishing and aquaculture RD&E and management in recent times. This has been due to increased access to all forms of information through the internet, especially social media. Public perception has arguably been the single greatest emerging issue for fishing and aquaculture since FRDC's 2010–15 RD&E Plan.

OPPORTUNITIES

- Use targeted research to understand and anticipate community concerns and formulate appropriate responses, including effective engagement strategies.
- Inform community and environmental organisations about how fisheries and aquaculture producers value the marine resources they depend on, including the status of those resources.
- Communicate reliable scientific knowledge to the community on the status and standard of Australia's fishing and aquaculture resources, management and practices in an accessible, engaging and trustworthy form.
- Develop and adopt standards to guide the science and management of natural resources in the marine environment that provide for best practice, high transparency and allow for that performance to be measured.



Environmental health

Seafood production and the health of ecosystems on which it depends are strongly linked. RD&E must continue to provide information about the sustainable management of not only fishing and aquaculture resources but also the environments where they exist (megatrend—a bumpier ride).

Ecosystem health is not only impacted by seafood sectors but also by climatic effects and other human activities. Marine waters are becoming crowded with more shipping, expanding oil and gas industries and increased coastal development. All these demands impact on the marine environment and must be considered in the science and management of fishing and aquaculture.

Environmental health is also inextricably linked to public perceptions (megatrend—choosy customers). When assessing the sustainability of fishing and aquaculture, consumers usually consider how the sector affects, or possibly affects, the environment in which the sector operates.

Habitat rehabilitation has been another key concern in RD&E for fishing and aquaculture in recent times. By restoring any degraded aquatic environment to a healthy state there is the opportunity to increase the breeding potential of various species by providing the conditions required for certain life stages. Healthy ecosystems are more resilient to environmental impacts, and it is therefore in the interest of all stakeholders to ensure that all fishery habitats are in the best condition possible.

OPPORTUNITIES

- Develop tools and resources to monitor, understand and adapt to fishing and aquaculture's impacts on fish stocks and ecosystems so both remain sustainable.
- Identify new and more efficient methods of producing and harvesting seafood.

Food security, globalisation and market access

The world's rising population obviously brings with it increased demand for food (megatrend—a hungrier world), some of which will come from seafood. An extra billion consumers globally are expected by 2030, needing an estimated additional 25 million tonnes of seafood. Seafood is an important dietary component for the expanding Asian middle class, which increasingly seeks branded 'safe' seafood. It is also a much-needed source of protein for developing countries.

Commodity price forecasts from the World Bank (2014) suggest a modest real price gain for fish to 2030, but larger gains for fishmeal and the oil ingredients needed for aquaculture.

A major contributor to world population growth is expected to be the Asian middle class which is also growing in wealth. We are expecting a world with many more people (megatrend—a hungrier world) and one which is more affluent (megatrend—a wealthier world).

Aquaculture production has grown steadily in Australia over the past few decades and has shown potential for further increases, both in species that are currently produced and those that are new and emerging.

Bycatch and discards continue to be an issue for fishing worldwide, but could present opportunities for increasing the harvest by adding value to the caught product.

Adding value to processing waste also has the potential for increasing seafood availability. By making better use of under-valued species, Australia's commercial fishing sector can increase productivity and profitability through innovation in technology (megatrend—transformational technologies) and better management practices and regulations.

Increasingly, Australia's Indigenous communities are looking for opportunities to develop their fishery resources to: improve diets, nutrition and health; retain young people in communities; improve local employment options; increase trade and business skills; demonstrate cultural heritage; and collaborate in investments.

OPPORTUNITIES

- Understand consumer and market needs (domestic and international) to assist both aquaculture and the commercial fishing sectors.
- Optimise production efficiency and overall profitability.
- Add value to bycatch, discards and processing waste to increase seafood availability.
- Develop new aquaculture opportunities and expand those that are existing.
- Understand drivers and impediments to increasing productivity and profitability.
- Capitalise on technological advances and transformational technology to improve productivity and profitability.
- Provide research and analysis to support efficient, open trade and market access.
- Develop approaches to better support individual and community economic development for the Indigenous sector.





Resource access and allocation

The people and enterprises that catch and grow fish and other seafood need long-term access to aquatic resources to meet their individual and sectoral needs. However, competition is increasing from within fishing and aquaculture sectors, from external sources, and from the reduction of fishable zones through legislation of marine protected areas (megatrend—a bumpier ride). The ‘space’ for fishing and aquaculture is becoming very crowded.

OPPORTUNITIES

- Establish and document the aspirations of the sectors in relation to access and allocation of aquatic resources.
- Establish an appropriate rights-based framework to maximise the economic, environmental and social values from the use of aquatic resources. This will require accurate social and economic data.



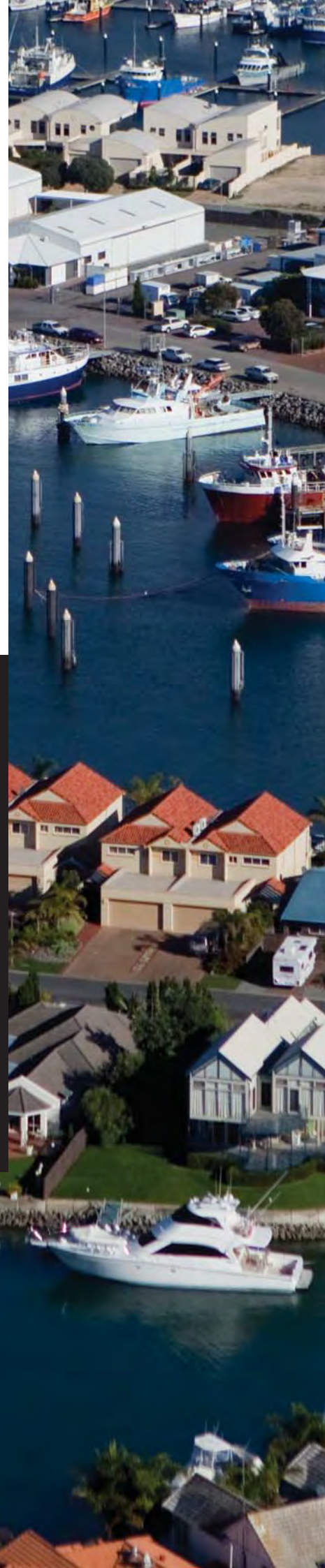
Resource management

The focus within natural resources management has changed from single issues (target stocks or generally isolated environmental concerns) to broader interactions between the environment, economy and communities across all sectors of fishing and aquaculture (megatrend—a bumpier ride). This is in line with current expectations of the Australian public (megatrend—choosy customers) and best practice.

Formal management of fishing and aquaculture resources has been focused on commercial interests. To ensure alignment with best practice expectations there is now momentum for the inclusion of all sectors of fishing and aquaculture in management, including Indigenous and recreational fishing.

OPPORTUNITIES

- Develop management practices and processes that better incorporate the needs, actual catch and effects of all sectors to effectively manage resource access and allocation.
- Create a fisheries management ‘standard’ to foster innovative, streamlined and cost-effective natural resource management, with greater emphasis on protocols and data.
- Reform the national regulatory framework to ensure standards such as the Australian Shellfish Quality Assurance program provide for internationally acceptable public health protection and for expanding market access.





People development and capacity building

All sectors of Australian fishing and aquaculture need strong, effective, connected leadership to respond well to the challenges and opportunities before them. There is concern worldwide about the declining number of students enrolling in courses and pursuing careers in the primary industries. Australia is not immune from this trend.

OPPORTUNITIES

- Attract, train and maintain a skilled workforce, including researchers, fishers, innovators and resource managers at the sector, jurisdictional and national levels.
- Identify an effective consultation process to collect high-quality, relevant data on the training needs of the fishing and aquaculture sectors in Australia.
- Foster leadership, professionalism and entrepreneurship across all sectors of fishing and aquaculture to help build resilience.
- Bring together the different sectors of fishing and aquaculture to build capacity, develop cross-sector programs and networks.

Aquatic animal health and biosecurity

Disease-causing organisms, including exotic, new and emerging pathogens, are a significant threat to Australian fisheries, aquaculture and their associated ecosystems. This risk is expected to rise with increased globalisation and impacts from changing environments. Australia's systems for managing aquatic animal diseases are highly regarded, however, serious disease outbreaks have shown that these systems must be actively maintained and, where possible, strengthened to prevent and mitigate disease outbreaks.

OPPORTUNITIES

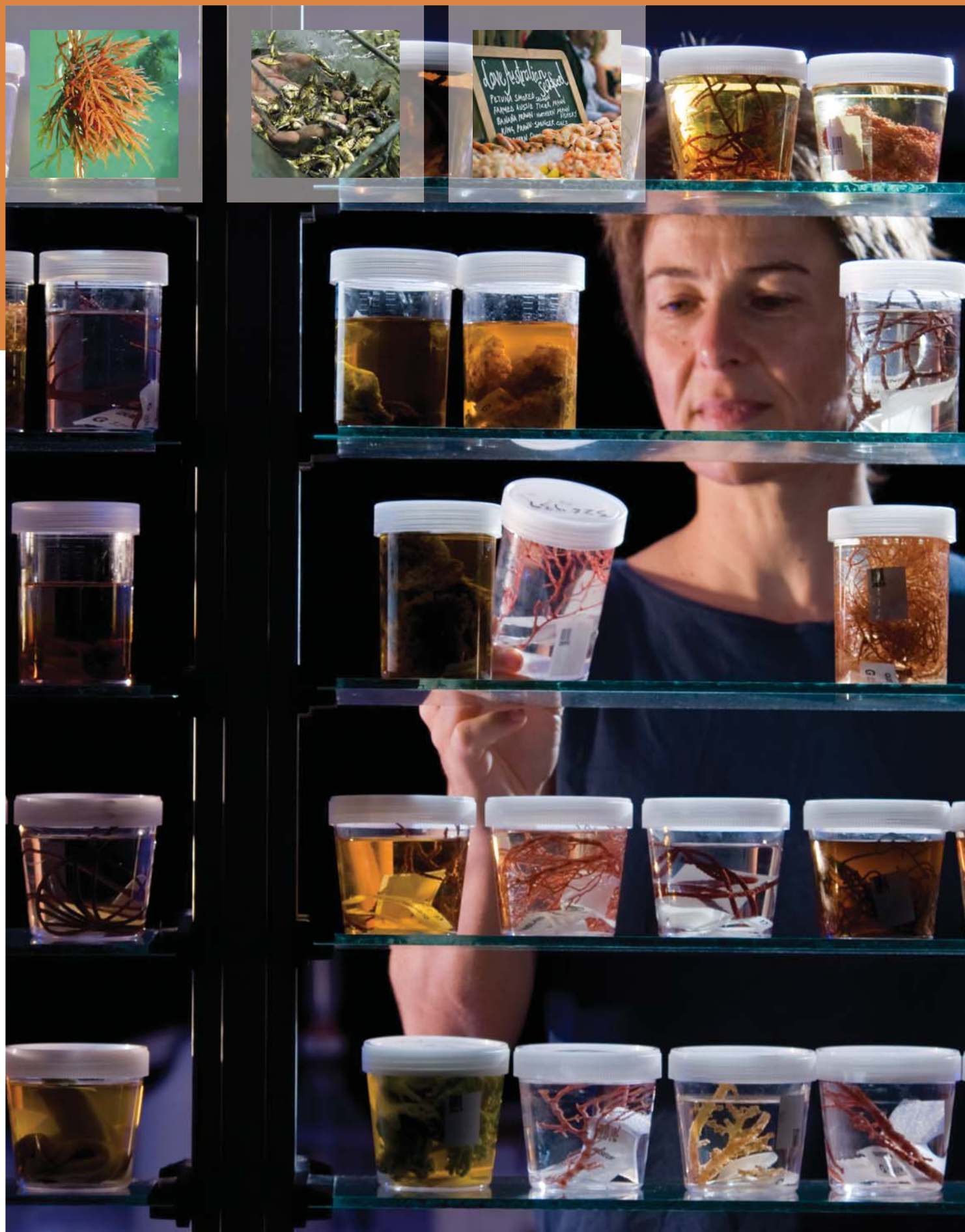
- Strengthen Australia's capacity to prevent disease outbreaks (through stronger quarantine and biosecurity), detect diseases when they occur (through diagnostics and surveillance), and reduce their impacts (through genetics, vaccines and approved veterinary medicines).

Technological advancements

The pace of change in this area across the world is expected to continue. New technology is being used in many more sectors and industries improving efficiencies and effectiveness (megatrend —transformative technologies).

OPPORTUNITIES

- Identify new and existing technologies that can be used to improve current practices and performance.



A NEW STRATEGIC FOCUS

4

The FRDC's RD&E Plan 2015–20 is focused on maximising impacts by concentrating on knowledge development around three national priorities:

1. Ensuring that Australian fishing and aquaculture products are sustainable and acknowledged to be so.
2. Improving productivity and profitability of fishing and aquaculture.
3. Developing new and emerging aquaculture growth opportunities.

The FRDC invests in RD&E to generate knowledge that can be used to create change which will benefit the fishing and aquaculture sectors and this in turn, benefits Australia more broadly. The FRDC's focus in 1991 was primarily on research for the management of commercial fisheries, which was mainly concerned with target stocks and environmental effects, and reflected the agreed priorities at that time.

Investment by the FRDC has evolved to reflect the broader base of fishing and aquaculture stakeholders, the increased sophistication of end users and higher standards of the community. This has meant there is more RD&E targeted at such things as the economic and social drivers of change across the fishing and aquaculture sectors. (For more information See *Evolution of FRDC* available from FRDC's website www.frdc.com.au under about FRDC.)

Previous FRDC RD&E Plans have included the many diverse activities relevant to all stakeholders and has resulted in a range of sector-specific plans including FRDC's industry partnership agreements, subprograms and coordination programs. This previous work forms a solid base for the RD&E Plan 2015–20. The focus of this Plan is national research priorities and RD&E infrastructure, to be funded mainly through the public-good element of FRDC's revenue.



National research priorities

Ensuring that Australian fishing and aquaculture products are sustainable and acknowledged to be so



Consumers and communities are empowered by information and are increasingly scrutinising the use of natural resources. They are becoming choosier about the food they eat, where it comes from, how it is produced or caught, and its sustainability. The FRDC's overview of fishing and aquaculture, along with stakeholder feedback, shows this situation is apparent in the Australian fishing and aquaculture sector, but is impacting all other sectors.

The FRDC has conducted significant RD&E aimed at ensuring that Australian fishing and aquaculture is sustainable, and this will continue. It is vital that the sustainability of fishing and aquaculture in Australia is maintained and this information is available to the public.

Aim: By 2020, the community has effective access to, and understanding of, RD&E that supports fishing and aquaculture sustainability and improves perceptions of Australian seafood.

Strategy: Build understanding of the drivers of social licence to operate and respond to community concerns and needs for information with science-based evidence.

Continue to prioritise investment in RD&E that contributes to the sustainability of fishing and aquaculture, including consideration of target species; bycatch species; threatened, endangered and protected species; and the broader marine environment.



DELIVERABLES

- Increased knowledge about how community values align with the values of Australian fishing and aquaculture sectors, with the aim of improving community perceptions.
- An Australian fisheries management and/or technical standard that addresses all fisheries and can be adopted by any management agency in Australia.
- A scheme for responsible fisheries management that can specifically be applied to small-scale, data-poor Australian fisheries.
- Bycatch performance metrics.
- Community net benefit metrics.
- An increased number of commercial species assessed in the national *Status of Key Australian Fish Stocks Reports*.
- A reduction in the percentage of species classified as 'undefined' in the national *Status of Key Australian Fish Stocks Reports*.
- Expanded capacity to connect with seafood consumers and markets in Australia and abroad, and use of these channels to understand community perceptions to tell the Australian fishing and aquaculture story across the sectors.

TARGETS

Community attitudes to fishing and aquaculture are more positive based on an awareness of Australian seafood's sustainability performance and the value it provides to local communities.

- Ensure information on the performance and value of Australia's fisheries is readily available.
- Increase the number of species to 200 in the national *Status of Key Australian Fish Stocks Reports*.
- Reduce the number of species classified as 'undefined' from the current figure of approximately 30 per cent to less than 10 per cent.
- Increase positive perceptions of commercial fishing from 28 per cent to 40 per cent by 2020 as measured through independently-commissioned FRDC stakeholder surveys.





Improving productivity and profitability of fishing and aquaculture

Australia's fishing and aquaculture industry is in a good position to capitalise on the greater global demand for seafood. The world's population is growing along with global wealth, especially with an expanding Asian middle class.

While these factors raise the prospect for increased trade of fishing and aquaculture resources, Australia is also entering into free trade agreements with a number of Asian countries. The benefits of these agreements are likely to be reduced costs and an increase in the volume of product traded.

Greater use of what has traditionally been 'waste', including bycatch and discard species in commercial fisheries, is another way of improving the value of production.

Productivity and profitability are regularly a top priority for those in aquaculture and commercial fishing, and increasingly so in the Indigenous and recreational sectors. It will be important for each sector to understand its goals in this area and what its strengths and weakness are in terms of opportunities and threats.

Aim: By 2020, deliver RD&E for fishing and aquaculture to increase productivity and profitability consistent with economic, social and environmental sustainability.

Strategy: Invest in RD&E to understand the drivers of, and impediments to productivity and profitability growth in all fishing and aquaculture sectors; research means of increasing sustainable production and profitability; link these to business education; encompass the needs of Indigenous communities.

DELIVERABLES

- Efficiency improvements along the entire supply chain to improve market access, through strategic market intelligence and knowledge that will ultimately influence profitability.
- More sustainable and profitable use of underutilised and undervalued species.
- New technology solutions to improve productivity and profitability, where these can be feasibly implemented.
- Habitat rehabilitation to improve productivity and profitability for the fishing and aquaculture sector.
- Social contribution is supported by the fishing and aquaculture sector so it can capture the non-monetary value of activities across sectors.
- The gross value of production of Australia's fishing and aquaculture resources is increased.

TARGETS

- Provide RD&E to support increased trade of fishing and aquaculture products into countries with free trade agreements by some 300 per cent.
- Understand the quantity of potential production from Australia's fishing and aquaculture resources.
- Understand and improve the utilisation of fisheries resources by Indigenous Australians.
- Identify obstacles that may hinder, and opportunities to increase productivity through habitat rehabilitation and improvement.

Developing new and emerging aquaculture growth opportunities

Finfish aquaculture has been one of the great success stories of the Australian seafood industry over the last two decades. Worldwide it is likely to be aquaculture that supplies the greater proportion of the increased demand for seafood.

Aquaculture has seen steady advancement over the past 30 years, with some sectors (such as Atlantic Salmon) having unprecedented growth over a much shorter period. There is still considerable potential within this sector, especially with the diversification in finfish species. There are a number of aquaculture ventures that could be expanded with RD&E, as has been proven by examples from overseas.

DELIVERABLES

- A nationally-coordinated strategy for the growth of new aquaculture subsectors.
- RD&E to address barriers to aquaculture development including improved:
 - hatchery production technologies
 - breeds
 - feeds and feeding systems
 - husbandry
 - health systems
 - market access and/or value add.

TARGET

- Advance two or more emerging aquaculture opportunities/species for which RD&E has identified clear opportunities and technologies for good production and profitability growth.

Aim: By 2020, deliver RD&E sufficient for the significant commercialisation of at least two emerging aquaculture growth opportunities with demonstrated potential for profitable business operations.

Strategy: Identify research constraints to industry growth— such as lack of potential markets, cost of production, survival, deformities and uniformity of growth—and invest in RD&E to determine successful and competitive commercial activity.



National RD&E infrastructure

The FRDC has three subprograms (aquatic animal health and biosecurity, recfishing research and the Indigenous reference group) and one coordination program (social science and economics research coordination) that will be supported during the life of this Plan. These groups have been created to deal with RD&E issues that have a national focus. Representatives include experts tasked with developing and monitoring RD&E in the specific area, and are provided with a budget (see table on page 44). There is no exclusion to new coordination or subprograms being created under this RD&E Plan.

The FRDC will continue with this system of nation-wide groups and lead in these areas of RD&E. It will also lead in the areas of people development and service delivery. Details of these areas follow.

People development

Having strong leadership capacity will generate strong fishing and aquaculture communities that are productive, profitable and resilient to change, therefore people development remains an important focus for RD&E.

Long-standing and ongoing projects include the National Seafood Industry Leadership Program and funding participants to the Australian Rural Leadership Program. Within this RD&E Plan, the FRDC will create opportunities for industry to collaborate or co-invest in projects to ensure continued capacity building for fishing and aquaculture.

STRATEGIES

- Continue to invest in leadership capacity building.
- Co-invest with partners in other areas of capacity building.
- Invest with universities in students to study marine science-specific topics relevant to FRDC stakeholders.
- Collect and analyse data to better understand the training needs of fishing and aquaculture.
- Partner in the development of research centres of excellence.



Delivery of key services

The FRDC has invested in services that support fishing and aquaculture on important issues such as data to facilitate international trade and the creation of relevant fisheries-based Australian Standards. The FRDC will continue to provide these services with new cost-effective operating models being developed that will allow for expanded services.

Continuing service activities include those related to standards, auditing and trade. Changes to FRDC's enabling legislation now make it possible for FRDC to engage in marketing activities that include promoting Australia's seafood products, recreational fishing activities and world-leading management practices.

The FRDC will also focus on a more integrated information technology platform that allows for more efficient use of its archive of electronically-held records and data to help streamline program activities, from management and reporting to communications and marketing.



STRATEGIES

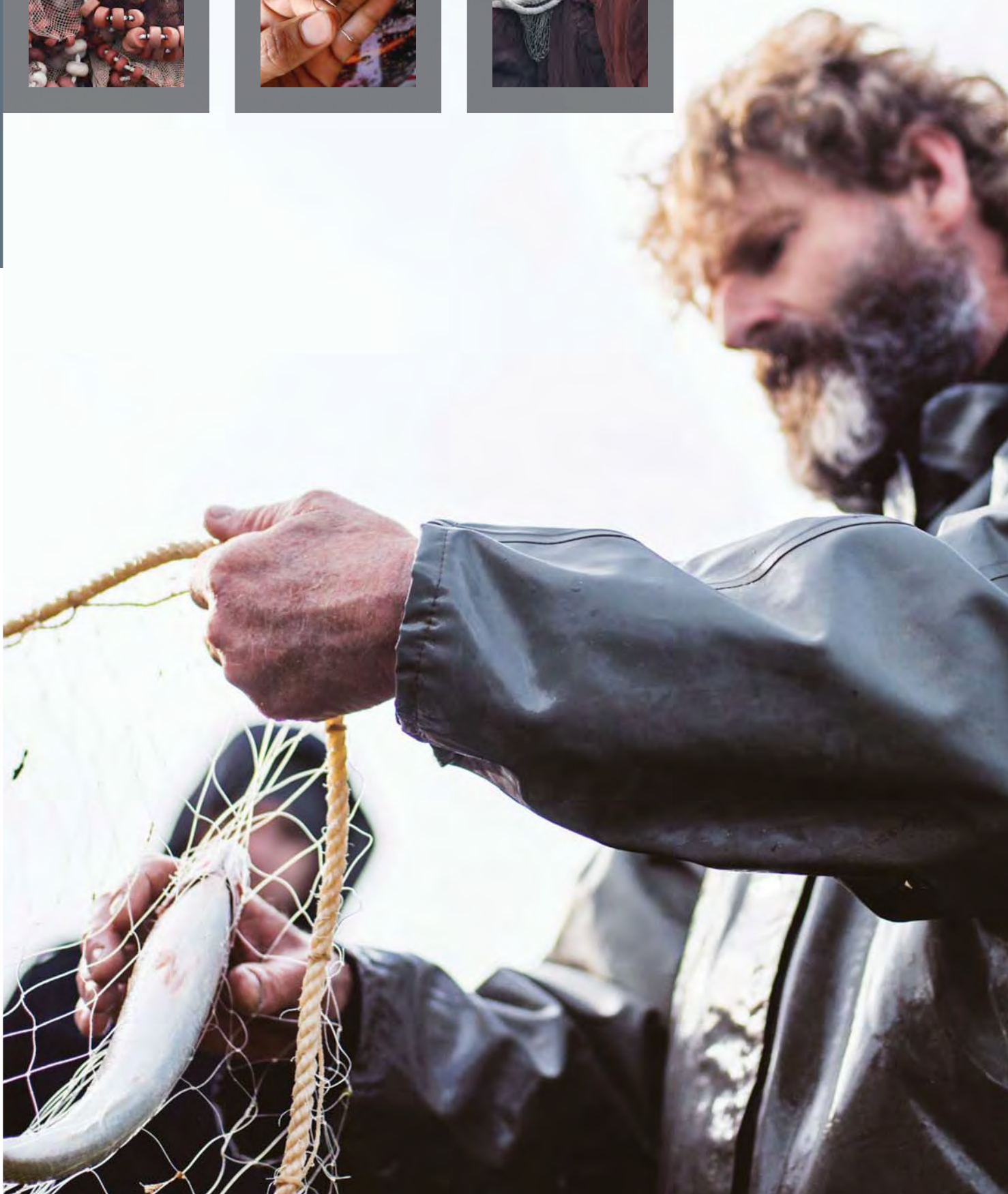
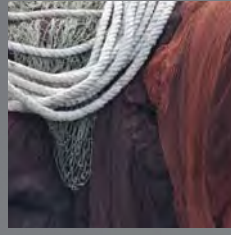
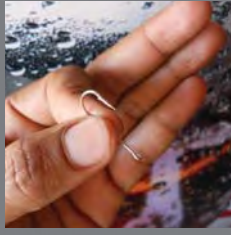
- Maintain FRDC's accreditation to develop Australian Standards.
- Continue to supply trade market access data.
- Continue the SafeFish program.
- Maintain access to fisheries data and statistics.



Jurisdictional and industry sector research priorities


Under partnership agreements the RD&E priority-setting process will be led by the relevant sector or jurisdiction. This process must be consistent with the requirement that the FRDC maintain a balanced portfolio (see page 35), and be agreed to by the FRDC Board.

The national priorities do not have to be identically reflected by industry sectors and jurisdictions, however, it is expected there will be some cross over. FRDC's three core priorities have been formed by those that were common to its stakeholders. It is anticipated that they will be adopted by a number of sectors and jurisdictions.





IMPLEMENTING THIS RD&E PLAN



The FRDC will invest in RD&E using the following three investment approaches: lead, collaborate and partner.

Lead

The FRDC will lead RD&E prioritisation and investment in three national priority areas, as well as areas of national RD&E infrastructure (including subprograms and coordination programs).

Collaborate

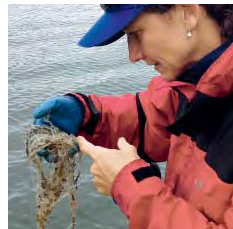
The FRDC will provide a vehicle so that sectors or jurisdictions may leverage funding where there is alignment between their RD&E priorities and those at the national level. This will encourage sectors to collaborate.

Collaboration in specific areas of RD&E such as people development, service functions and social sciences will be actively encouraged by the FRDC.

Partner

The FRDC will enter into partnership agreements with specific sectors and jurisdictions to jointly develop and implement their RD&E priorities. These agreements will set out guidelines, timelines and evaluation processes, from funding applications to the adoption of RD&E outputs. This will help link sector-based or jurisdictional plans with the FRDC RD&E Plan, and ensure they incorporate the objects of the PIRD Act (see page 8). Further information on partnership agreements is in the FRDC's investment-framework policy available on the FRDC website.

Funding for these activities will combine financial contributions from the relevant sector or jurisdiction, coupled with funding from the Australian Government's matching contribution.



FRDC's RD&E program areas

The FRDC has five programs of RD&E investment that directly align with its governing legislation, the PIRD Act:

- environment
- industry
- communities
- people
- adoption.

RD&E investments in these program areas will be assessed to ensure the FRDC maintains a balanced portfolio that meets the short- and long-term needs of its stakeholders, including the Australian Government and the Australian community.

Environment

This program relates to RD&E that supports natural resource sustainability in managing fishing and aquaculture activities in Commonwealth, state and territory waters. Many components of FRDC-funded RD&E focus on improving the sustainable use of Australia's aquatic resources.

Industry

This program relates to RD&E that assists the production and value of seafood. It could be in the form of business profitability, international competitiveness, opportunities for productivity increases, resource access, and experience or wellbeing benefits. This program aims to help all sectors improve their overall performance.

Communities

This program relates to RD&E that maintains the long-term sustainability of the commercial sector by understanding the interactions and co-dependence between fishing and aquaculture, and the wider community. It is enhanced by knowledge about the social importance of fisheries.

People

This program relates to RD&E that is needed to attract and advance people who will lead fishing and aquaculture towards a sustainable and profitable future. The FRDC has taken a strong role in this area, from employing and developing young researchers, through to facilitating access to leadership development for all sectors of fishing and aquaculture.

Adoption

This program relates to how project outputs are delivered so they can be easily adopted and support stakeholder decision making and practices. The FRDC continually works with researchers and end users to determine and implement the best way of extending these results. In addition, the FRDC is continuing to develop its systems to ensure its 'knowledge bank' is widely accessible.

A balanced research portfolio

The FRDC's investment in RD&E is driven by the needs of its stakeholders. This RD&E Plan aims to deliver against the strategic national priorities and be more targeted in three major areas:

1. Ensuring that Australian fishing and aquaculture products are sustainable and acknowledged to be so.
2. Improving productivity and profitability of fishing and aquaculture.
3. Developing new and emerging aquaculture growth opportunities.

Sectors and jurisdictions will lead in the development of their own RD&E priorities which must be consistent with FRDC's program areas.

FRDC's RD&E portfolio incorporates projects that address issues of national importance for government, levy payers and other fishing and aquaculture stakeholders. The FRDC works to achieve an overall balance of:

- short- and long-term projects
- low- and high-risk projects
- strategic and adaptive research needs
- regional variations and needs
- national, jurisdictional and sector-focused projects.



Extension and adoption of research

Extension and adoption processes are embedded into all FRDC-funded RD&E. How results can be extended begin when a project is approved for funding, are considered in the design and proposal phase where priorities for end users are determined, continue during the project's execution through to the final published report. This is often easier for short-term applied research but needs to be more considered for longer-term, blue-sky research.

The project management process the FRDC follows ensures that results are delivered in a timely manner, and extension and adoption processes are conducted within projects.

Applying for funding

The FRDC investment-framework policy details the principles of FRDC's RD&E investments. More information about the policy and how to apply for funding can be found on the FRDC website (www.frdc.com.au/research).



NATIONAL COLLABORATION

6

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here possible, the
FRDC collaborates
with other primary

industry R&D corporations (RDCs) through
the National Primary Industries RD&E
Framework. The National Framework
consists of 14 sector-based strategies
and eight cross-sector strategies.

The FRDC is a member of the Council
of Rural Research and Development
Corporations and actively engages
in this forum. As with many other
RDCs, the FRDC is continually looking
for opportunities to collaborate on
RD&E that will benefit multiple
primary industries.



Australian Government R&D priorities

The FRDC takes great care to ensure the most efficient and effective links are developed across RD&E for fishing and aquaculture. The objects of the PIRD Act provide the basis of the FRDC's outcome statement—its reason for being—but other major planning documents contain relevant research priorities such as:

- Australian Government Science and Research Priorities
- Australian Government Rural R&D Priorities
- National Primary Industries RD&E Framework—National Fishing and Aquaculture RD&E Strategy and relevant cross-sector strategies
- National Marine Science Plan
- Partnership Agreement Strategic Research Plans (for industry sectors and jurisdictions)
- FRDC subprogram plans
- AQUAPLAN 2014–2019 (Australia's National Strategic Plan for Aquatic Animal Health).



National Fishing and Aquaculture RD&E Strategy

The National Fishing and Aquaculture RD&E Strategy 2015–20 (the Strategy) aligns with the National Marine Science Plan which is one of the main planning documents for marine science in Australia. The FRDC was a major contributor to the Strategy and this RD&E Plan draws on several priority areas from the Strategy.

By having compatible priorities and themes with the two national plans the FRDC can assess how to provide leadership, address RD&E gaps, deliver objectives, and work to establish national initiatives that support major research services.

The FRDC will draw on international research expertise and outputs—where relevant—to minimise duplication, maximise efficiency and develop partnerships with the potential to increase returns for stakeholders.



RURAL RESEARCH AND DEVELOPMENT PRIORITIES

AUSTRALIA'S SCIENCE AND RESEARCH PRIORITIES

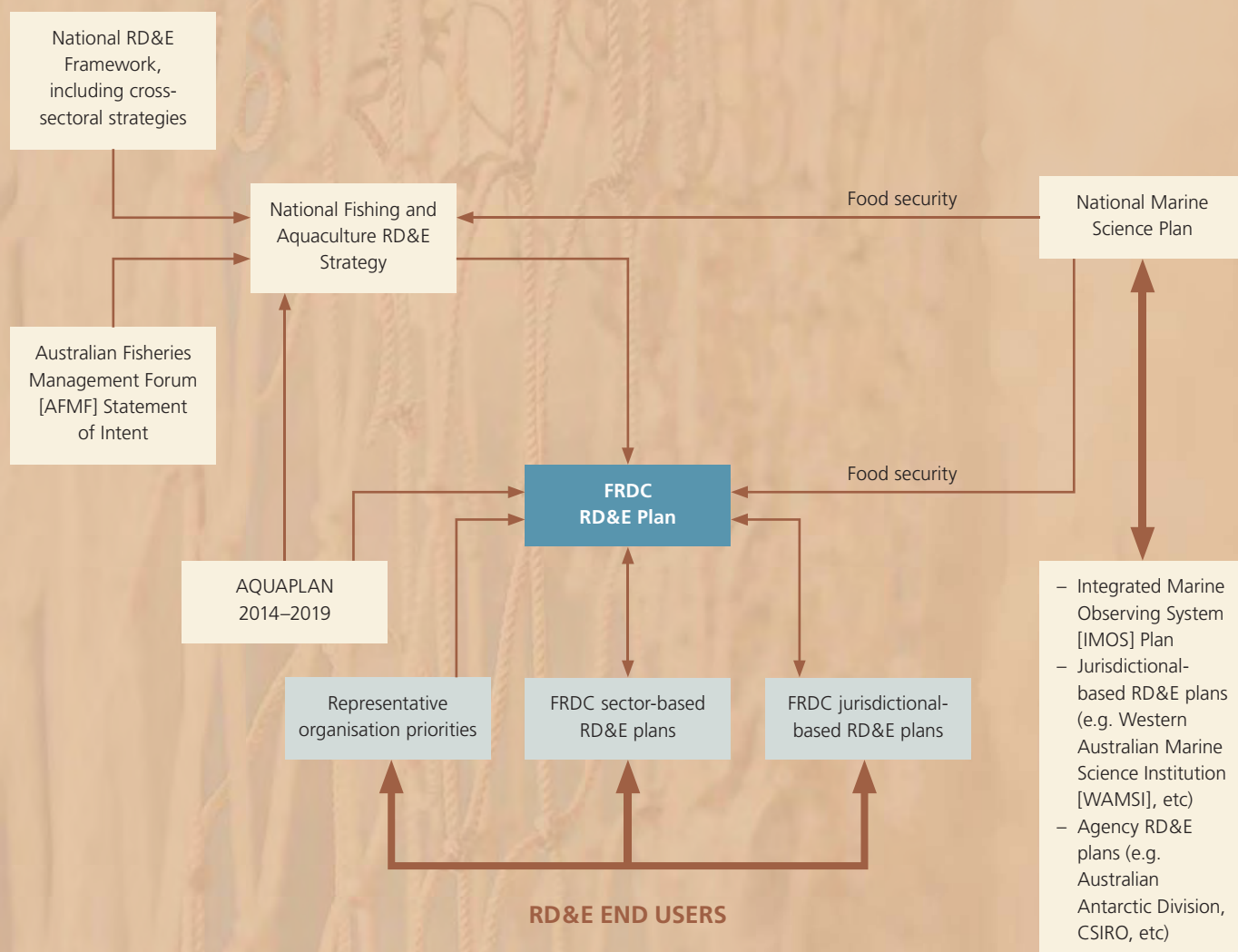
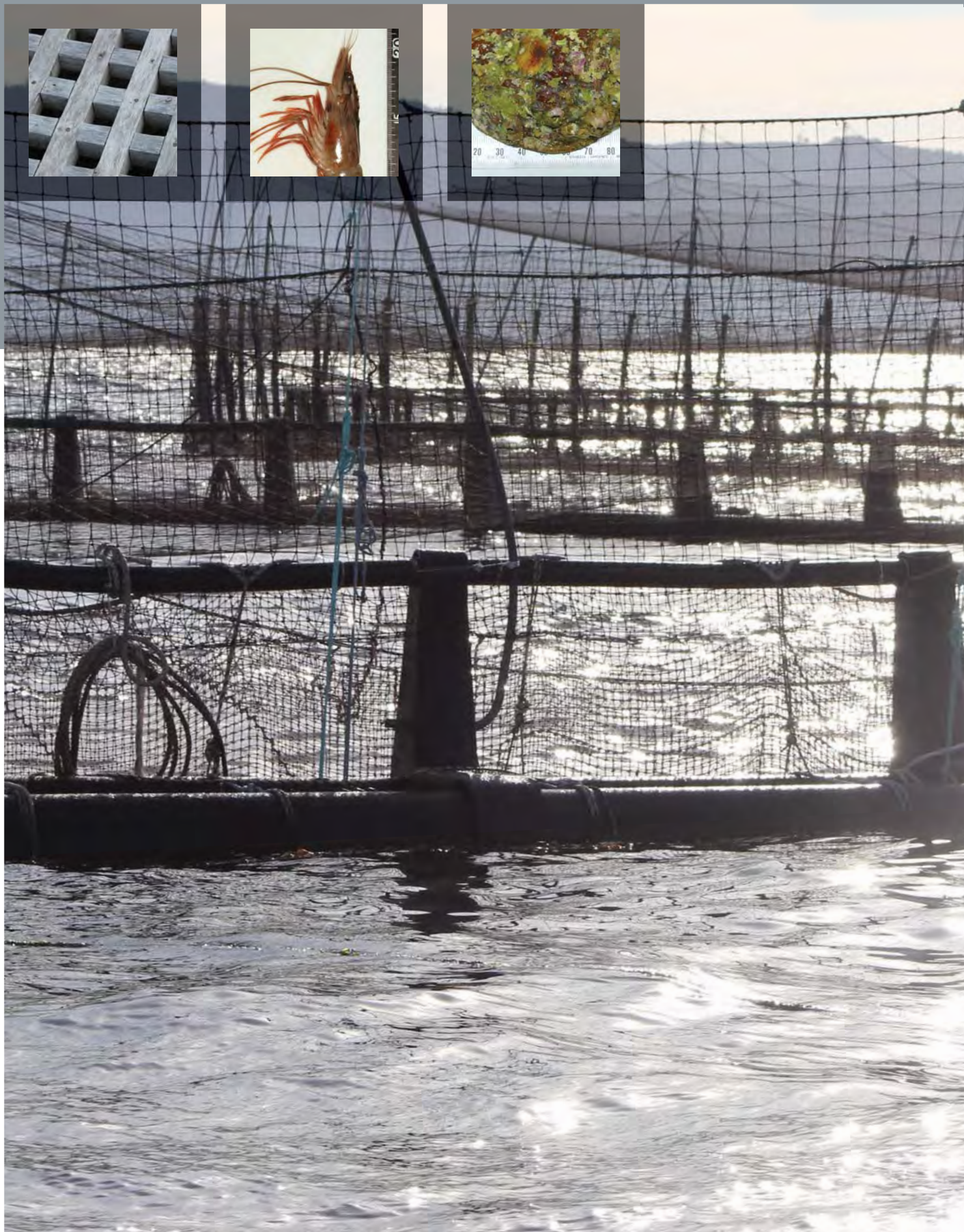


FIGURE 4. The planning environment and how the FRDC's RD&E Plan links to other major planning documents.





EVALUATION AND PLANNED BUDGET

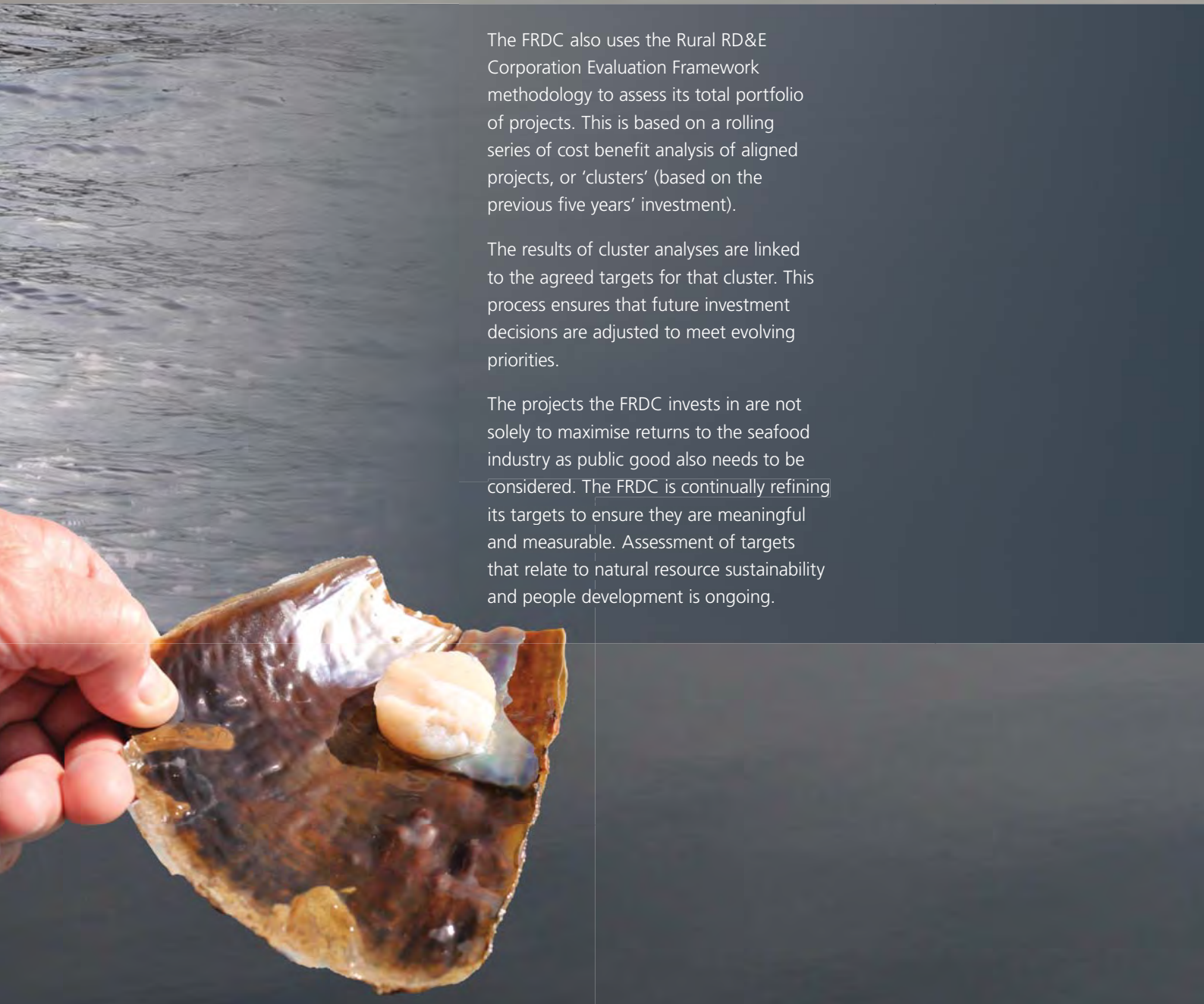
The success of the FRDC's planning, investment, management and adoption is measured by an evaluation framework that is based on adaptive management. The structure of the framework is as follows:

- evaluation of the FRDC's performance against the targets in its RD&E Plan
- a process that ensures investment is made against priorities where research can contribute to a significant improvement
- total portfolio evaluation based on RDC evaluation methodology
- continual review of the planning and investment process by the FRDC Board based on the performance against targets.

Each year the FRDC provides a report to Parliament on its achievements of specified targets and its overall performance. The report is linked to annual portfolio budget statements and an annual operating plan (which is a requirement of the FRDC's funding agreements). These corporate documents are available from the FRDC's website (www.frdc.com.au under about FRDC).

These documents provide a snapshot of the FRDC's performance against annual targets which align with the delivery of the long-term strategic aims of this RD&E Plan (see table on page 43).

The FRDC's accounting, program and quality management systems are all linked. They allow for evaluation of the FRDC's performance of milestone performance and assessment of targets outlined in the annual report and the table on page 43.



The FRDC also uses the Rural RD&E Corporation Evaluation Framework methodology to assess its total portfolio of projects. This is based on a rolling series of cost benefit analysis of aligned projects, or 'clusters' (based on the previous five years' investment).

The results of cluster analyses are linked to the agreed targets for that cluster. This process ensures that future investment decisions are adjusted to meet evolving priorities.

The projects the FRDC invests in are not solely to maximise returns to the seafood industry as public good also needs to be considered. The FRDC is continually refining its targets to ensure they are meaningful and measurable. Assessment of targets that relate to natural resource sustainability and people development is ongoing.



TABLE 2. Aims and targets for each of the three national priority areas during the life of the RD&E Plan.

| Aim | Target | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|--|-------------|--------------|--------------|--------------|--------------|
| By 2020, the community has effective access to, and understanding of, RD&E that supports fishing and aquaculture sustainability and informs improved perceptions of Australian seafood. | The number of species in the national status of key fish stocks increases to include 200 species. | 114 species | | 160 species | | 200 species |
| | The number of species classified as 'undefined' is reduced from the current figure of approximately 30% to less than 10%. | ~30% | | ~20% | | <10% |
| | Positive perceptions of the commercial fishing industry increase from 28% to 40% by 2020 as measured through independently-commissioned FRDC stakeholder surveys. | 28% | 30% | 34% | 36% | 40% |
| By 2020, deliver RD&E for fishing and aquaculture to increase productivity and profitability consistent with economic, social and environmental sustainability. | Provide RD&E to support increased trade of fishing and aquaculture products into countries with free trade agreements by some 300%. | | | | | 300% |
| | Understand the quantity of potential production from Australia's fishing and aquaculture resources. | | | One report | | |
| | Increase knowledge to improve the utilisation of fisheries resources by Indigenous Australians. | | | | | Two reports |
| | Increase knowledge to identify obstacles and opportunities to increase productivity through habitat. | | | | | Two reports |
| By 2020, deliver sufficient RD&E for significant commercialisation of at least two new or emerging aquaculture growth opportunities with demonstrated potential for profitable business operations. | Advance two or more new or emerging aquaculture opportunities/species for which RD&E has identified clear opportunities and technologies for good production and profitability growth, as measured by increases in harvest tonnages. | 500 tonnes | 1,000 tonnes | 1,500 tonnes | 2,000 tonnes | 2,500 tonnes |

Tables 3 and 4 show FRDC's predicted revenue and spending for 2015–20.

Table 3 details expenditure against the program areas while table 4 shows how funding will be spent against national research priorities and infrastructure and the two types of partnership agreements described in this RD&E Plan.



TABLE 3. FRDC financial income and expenditure planning 2015–20.

| | 2015–16 | 2016–17 | 2017–18 | 2018–19 | 2019–20 |
|------------------------------------|--------------|--------------|--------------|--------------|--------------|
| | \$m | \$m | \$m | \$m | \$m |
| REVENUE | | | | | |
| Revenue from Australian Government | 19.24 | 20.21 | 21.22 | 22.28 | 23.39 |
| Contributions | 7.85 | 8.24 | 8.65 | 9.09 | 9.54 |
| Other | 1.27 | 1.33 | 1.40 | 1.47 | 1.54 |
| Total revenue | 28.36 | 29.78 | 31.27 | 32.83 | 34.47 |
| EXPENSES | | | | | |
| Programs | | | | | |
| Environment | 9.72 | 10.16 | 10.64 | 11.17 | 11.71 |
| Industry | 9.72 | 10.16 | 10.64 | 11.17 | 11.71 |
| Communities | 0.49 | 0.51 | 0.53 | 0.56 | 0.59 |
| People | 2.43 | 2.54 | 2.66 | 2.79 | 2.93 |
| Adoption | 1.94 | 2.03 | 2.13 | 2.23 | 2.34 |
| Total programs expenditure | 24.29 | 25.41 | 26.60 | 27.91 | 29.27 |
| Management and accountability | 4.07 | 4.37 | 4.67 | 4.92 | 5.20 |
| Total expenses | 28.36 | 29.78 | 31.27 | 32.83 | 34.47 |

TABLE 4. Allocation of funding across the strategic investment areas, strategic priorities, national infrastructure and partnership agreements.

| EXPENDITURE BY ACTIVITY | 2015–16 | 2016–17 | 2017–18 | 2018–19 | 2019–20 |
|---|--------------|--------------|--------------|--------------|--------------|
| | \$m | \$m | \$m | \$m | \$m |
| Existing contracts, plus recommended approvals for 2015 round (using forecast date) * | 15.59 | 12.16 | 7.10 | 3.06 | 2.02 |
| National priorities | 1.60 | 1.60 | 2.30 | 3.60 | 5.00 |
| National infrastructure | 1.00 | 1.40 | 2.70 | 3.30 | 3.30 |
| Response fund ^ | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| Partnership agreements (industry sectors) | 4.50 | 6.20 | 8.00 | 9.00 | 10.00 |
| Partnership agreements (jurisdictions) | 0.10 | 2.55 | 5.00 | 7.45 | 7.45 |
| Public-good funding within jurisdictional partnership agreements | — | 0.89 | 1.78 | 2.67 | 2.67 |
| Total programs expenditure | 24.29 | 25.41 | 26.60 | 27.91 | 29.27 |

Figures in these tables have been rounded, hence totals may not agree with component figures.

* There are existing contracts for RD&E. This funding is mostly from the sector and jurisdictional partnership agreement line items.

^ The response fund is to conduct urgent RD&E needs outside of other funding processes.



FRDC

KNOWLEDGE FOR FISHING AND AQUACULTURE INTO THE FUTURE

FRDC's Research, Development and Extension Plan 2015–20

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