



Australian Government

**Fisheries Research and
Development Corporation**

**Submission by the
Fisheries Research and Development Corporation
to the Productivity Commission Inquiry
into the Australian
Rural Research and Development Corporations Model**

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Contents

Executive summary	3
Introduction	6
The FRDC's business model	7
Current service delivery framework	11
The Australian fishing and aquaculture industry	15
The industry's operating environments	15
How the FRDC plans its RD&E.....	19
Integration with national primary industries RD&E policy and processes	19
Priorities for RD&E investment.....	21
The FRDC's RD&E investment framework policy.....	22
How the RDC model operates in relation to stakeholder consultation	24
Impact of FRDC's RD&E investment	25
Case studies	27

Executive summary

This submission is to be read in conjunction with the major submission by the Council of Rural RDCs, to which the FRDC has been a contributor.

The Fisheries Research and Development Corporation (FRDC) is one of 15 rural research and development corporations; one of six established under the *Primary Industries Energy Research and Development Act 1989*. As a statutory authority, FRDC is governed by the *Commonwealth Authorities and Companies Act 2001*.

The FRDC plays a pivotal role in maximising the benefits from investment by governments and industry in fishing and aquaculture research, development and extension (RD&E). This pivotal role arises from the positioning of the FRDC such that it can effectively communicate with governments and respond to their priorities and needs, industry needs and research provider capacities across Australia. It maximises the returns by adding value to the RD&E by:

- using its knowledge of the RD&E skills, capacities and capabilities around Australia to direct collaborations on projects to improve their quality;
- ensuring that any new research draws upon the store of pre-existing knowledge and research outcomes sponsored through the FRDC;
- ensuring RD&E is coordinated and that the benefits are shared as widely as possible
- investing in skills shortages and people development more generally to overcome identified weaknesses in RD&E capacity
- encouraging the sharing of infrastructure and skills across the research spectrum through facilitating collaboration and minimising costs of projects.

The FRDC is unique among the rural research and development corporations in placing natural resource management at centre stage, at the same time as addressing productivity and development of the commercial wild-catch and aquaculture sectors, recreational opportunities, and the unique needs of indigenous communities. It also plays a leading role in balancing the investment priorities between public good related natural resource management and industry productivity and development. The majority of the FRDC's RD&E investment has addressed public good priorities to ensure sustainable fisheries management and sustainable habitats as well as addressing areas of market failure. Dependency on the sustainability of the aquatic resource is the common link across the FRDC's diverse investors and end-users.

The FRDC's business environment

The FRDC is responsible for planning, funding and managing government and industry funds for the purpose of RD&E. The fishing and aquaculture industry has three sectors: commercial (wild catch and aquaculture), recreational and indigenous customary. The commercial sector comprises approximately 120 wild-catch fisheries and 70 aquaculture species. Commercial seafood and products (e.g., pearls) were valued at \$2.2 billion in 2007–08. The recreational sector has 3.4 million participants, who were estimated in a 2001 survey to expend \$1.9 billion on their fishing. Aboriginal and Torres Strait Islander people participate in both commercial and recreational fishing,

and in indigenous customary fishing, which is being identified as a right by legislation and the courts.

A Ministerial direction for the FRDC in 1995 requires industry funds to be collected from the commercial sector through commonwealth, state and territory fisheries management agencies. The FRDC is therefore reliant on voluntary arrangements for each fisheries management agency to collect industry contributions, except for the Australian Fisheries Management Authority, which imposes a levy on behalf of the FRDC. The Australian Government matches commercial sector contributions up to 0.25% of the commercial sector's gross value of production (GVP). Further, the Australian Government provides funding up to 0.5% of the GVP that is not matchable but is to be used for public good RD&E. The Australian Government does not match contributions from the recreational and indigenous customary sectors. The high value placed by the commercial sector on FRDC-managed RD&E is reflected in the sector contributing 169% and 137% of the maximum matchable amount in 2008–09 and 2009–10 respectively. The FRDC also received \$5.3 million from other cash contributions from governments and industry. In 2009–10, the FRDC invested \$24.8 million in funds from governments and industry. This was leveraged by contributions from research providers, industry and other stakeholders to make the total 2009–10 portfolio investment worth \$59.8 million.

The end-users of the FRDC's RD&E investment

The extractive nature of wild fisheries depends on sound science to ensure catches are managed within sustainable limits. The FRDC invests in RD&E to improve knowledge and to develop innovative processes and new technologies to ensure that wild-catch fishing is undertaken in an ecologically sustainable way. As such the end-users of this investment are: government agencies that manage fishing and aquaculture and fish habitats; commercial, recreational and indigenous fishers; conservation groups; and the Australian community.

The emerging aquaculture sector is one of Australia's fastest-growing rural sectors. The early innovators of this industry require, during their start-up endeavours, access to timely RD&E to ensure ideas are commercialised quickly. The FRDC plays a lead role in assisting the sector to develop sustainably. The aquaculture sector also plays a leading role in addressing food security.

The FRDC's RD&E investing framework

In investing in RD&E, the FRDC has to take account of multiple planning directions from: national research priorities (Department of Industry, Innovation, Science and Resources), rural research priorities (Department of Agriculture, Fisheries and Forestry — DAFF), the new Fishing and Aquaculture RD&E Strategy, FRDC RD&E Plan, and various sector and stakeholder RD&E plans. The FRDC has established formal structures and processes to ensure planning and priority direction is consistent with these planning directions. The structures reflect the diversity of stakeholders and the regional nature of fisheries management. Further, the 1992 (amended 1995) Ministerial direction to the FRDC requires industry contributions to be collected by the fisheries management jurisdictions and for the FRDC to have regard for their priorities. The FRDC has a longstanding network of Fisheries Research Advisory Bodies (FRABs) that provides individual fisheries management jurisdiction priorities and advice to the FRDC board. The new National Fishing and Aquaculture RD&E Strategy includes the establishment of a National Priorities Forum and networks for research and for extension and adoption. These new structures will be integrated into the FRDC's existing structure. Further, the FRDC's proposed RD&E Plan 2010–15 essentially replicates the strategies and priorities identified in the National Fishing and Aquaculture RD&E Strategy.

The FRDC's business model

With a staff of only 11 and a board of 9, the FRDC is one of the smaller rural RDCs in terms of staffing levels — but medium in terms of RD&E investment. FRDC boards have pursued a policy to

maximise the investment of funds in RD&E and to minimise expenditure on management and accountability. At present, FRDC management and accountability costs are 11% of total expenditure. Each staff member manages an average of 32 project contracts with 0.48 FTE per million dollars invested. The FRDC has committed significant resources to developing a fully integrated program management software system (OmniFish, internal software; and FishNet, external software for submission of RD&E applications). This system is also utilised by Australian Pork Ltd, Australian Fisheries Management Authority, Seafood CRC and the Condamine NRM alliance. OmniFish delivers considerable productivity in terms of ensuring data is efficiently used and reporting is integrated from financial to project reporting.

Performance of the FRDC's RD&E investment

The FRDC has fully adopted the rural RDC evaluation methodology. Over the past 18 months working with AgTrans Research, the FRDC has completed an assessment of the benefits of its research investment from 2003 to 2008. This comprised a total of \$96 million investment and 440 completed project across 32 clusters. Eighteen were randomly selected for evaluation. The benefits from total RD&E investment (measured over 30 years using a discount rate of 5%) in 18 randomly selected clusters of investment completed during the past five years was estimated as \$1,200 million. In these clusters, FRDC investment was 38.9% of total investment of \$214 million (present value terms). The net present value, \$986 million, gave a benefit–cost ratio of 5.6:1 for each dollar invested by the FRDC and its partners. This was lower than the 10.5:1 recently identified for all rural R&D corporations (over similar but not identical periods), reflecting the high proportion of fishing and aquaculture RD&E that has a spill-over into public good.

In practice, what this means for governments and industry is that FRDC-funded RD&E has, for example:

- contributed to Australian fisheries management being regarded as among the best in the world
- contributed to fisheries such as the Spencer Gulf Prawn Fishery and the Northern Prawn Fishery being regarded by the United National Food and Agriculture Organization as the world's most sustainable prawn trawl fisheries
- contributed to the development of the propagation of Southern Bluefin Tuna
- established principles for the implementation of fisheries co-management
- established the Ecologically Sustainable Development (ESD) Subprogram, which led to the incorporation of a reporting and assessment process for ESD across Australian fisheries; uptake by fisheries management agencies overseas; and further incorporation through the ecosystem-based fisheries management process
- addressed post-harvest market failure issues through the funding of Seafood Services Australia
- addressed ongoing whole-of-supply-chain and industry innovation issues through funding of Seafood CRC.

Introduction

The FRDC was formed in 1991. It is one of fifteen rural research and development corporations. Six, like the FRDC, are statutory authorities fully owned by the Australian Government and established under the provisions of the *Primary Industries and Energy Research and Development Act 1989* (PIERD Act). Nine, such as Meat and Livestock Australia, have evolved into industry-owned companies established under the *Corporations Act 2001*.

The FRDC has been governed since 2001 by the *Commonwealth Authorities and Companies Act 1997*. Governance is by a ministerially appointed Board nominated by an independent selection committee in accordance with the PIERD Act. The Corporation's history is documented in "Evolution of the FRDC – to 2009" (<http://www.frdc.com.au/aboutus/about-us>).

Although the PIERD Act has had few changes during the past 20 years, the delivery of FRDC services has changed considerably to reflect the needs of end-users of R&D. The initial emphasis on *granting* has evolved to a *partnership approach to investing*. Significantly for the FRDC, this partnership includes both governments (mainly fisheries management agencies) and industry sectors. The early days of the FRDC were characterised by a strong focus on *research*, which has evolved to a balance between all three elements of research, development and extension. The fishing and aquaculture industry in particular has taken a more active role in *development* since its capacity to undertake projects has increased as a result of the FRDC's investment in capacity building. Governments and industry have worked with the FRDC to describe in detail their needs, resulting in significant improvements in data on which to plan the needs and priorities of research, development and extension (RD&E). The recent unanimous support by all fisheries management jurisdictions and peak bodies for the inaugural "Working Together: The National Fishing and Aquaculture RD&E Strategy" is testament to how the RD&E sector has matured. This strategy could easily have resulted in individual strategies being developed for major components such as seafood, aquaculture, wild fisheries, recreational and indigenous customary fishing. The FRDC's leadership and facilitation saw one strategy being agreed to that includes, for the first time, one RD&E plan for fishing and aquaculture. As the only national body that covers the entire fishing and aquaculture industry, the FRDC plays a unique role in creating structures and processes to ensure that the industry and governments work well together.

The FRDC is widely recognised and respected within the fishing and aquaculture industries for its national leadership role (for example, a 2008 Ipsos survey disclosed overall recognition of the FRDC and knowledge of its activities was 85 per cent). The FRDC brand, systems and recognition factor have considerable commercial value. The respect that parties have for the FRDC to deliver timely outcomes to address their needs is reflected by the significant investments that the FRDC manages — both for government bodies and for industry contributions — that are well above the maximum that can be matched.

This submission details:

- the FRDC's business model
- the Australian fishing and aquaculture industry
- impact of the FRDC's RD&E Investment
- how the FRDC plans its RD&E investment.

This submission should be read in conjunction with the submission by the Council of Rural Research and Development Corporations, which provides a more detailed analysis of the economic rationale for Australian Government investment.

The FRDC's web site, www.frdc.com.au, provides more detail on the FRDC from planning and corporate documents to industry statistics and project reports.

The FRDC's business model

Many entities conduct research relating to the fishing and aquaculture industry, but the FRDC is the only organisation with a mandated national role in planning, investing, extending and managing RD&E.

The FRDC has a very strong reputation for governance among governments and industry. Evidence for this is in the additional funds that governments have asked the FRDC to invest, including the DAFF Federal Budget Initiative for Aquatic Animal Health (\$4 million), Department of Climate Change and Energy Efficiency climate change adaptation projects (\$3.5 million), and DAFF recreational fishing projects (\$1 million).

The Australian Government and the fishing and aquaculture industry co-invest in the FRDC. The Corporation also manages significant co-investment by federal, state and territory governments in FRDC-funded projects.

KEY FEATURES OF THE RURAL R&D CORPORATIONS

During the two decades since they were established, the rural research and development corporations (RDCs) have proved to be a successful model for advancing innovation in rural research, development and extension (RD&E) — especially in the presence of market failure. They have enabled productive partnerships for investment by governments and industry in science, producing significant benefits to RDC investors and other stakeholders.

Some important characteristics of the RDC model are as follows:

- The RDC model is focused on influencing the full range of interactions along the innovation chain, rather than focusing on generating new knowledge for its own sake. This results in applying significant resources to translating research outputs into practical outcomes and government policies.
- RDCs are not research grant agencies; rather they treat RD&E as an investment in economic, environmental and social benefits to their respective industries and to the people of Australia.
- RDCs are required to conduct their activities in accordance with strategic plans and annual operational plans that must be approved at ministerial level.
- RDCs ensure that a balance is achieved between the respective government and industry priorities.
- RDCs are fully accountable to their major stakeholders and to the wider community.
- In addition to their collaboration on specific RD&E matters, RDCs work closely together on policy issues to increase the effectiveness and efficiency of the national application of rural RD&E.

In addition to its reporting to the Minister and Parliament, the FRDC formally reports to the annual meetings of its ministerially appointed representative organisations: the Commonwealth Fisheries Association, the National Aquaculture Council, and Recfish Australia. Appointment of the representative organisations, and the Corporation's consultation with and reporting to them, are in accordance with its enabling legislation.

The FRDC invests in RD&E across the entire fishing and aquaculture industry, and the industry's value chains, through a variety of flexible approaches. Among them are open-call applications; formal industry partnership agreements with industry sectors; subprograms and coordination programs tailored to industry sectors or activities; short-term tactical research investment; and specifically targeted commissioned R&D.

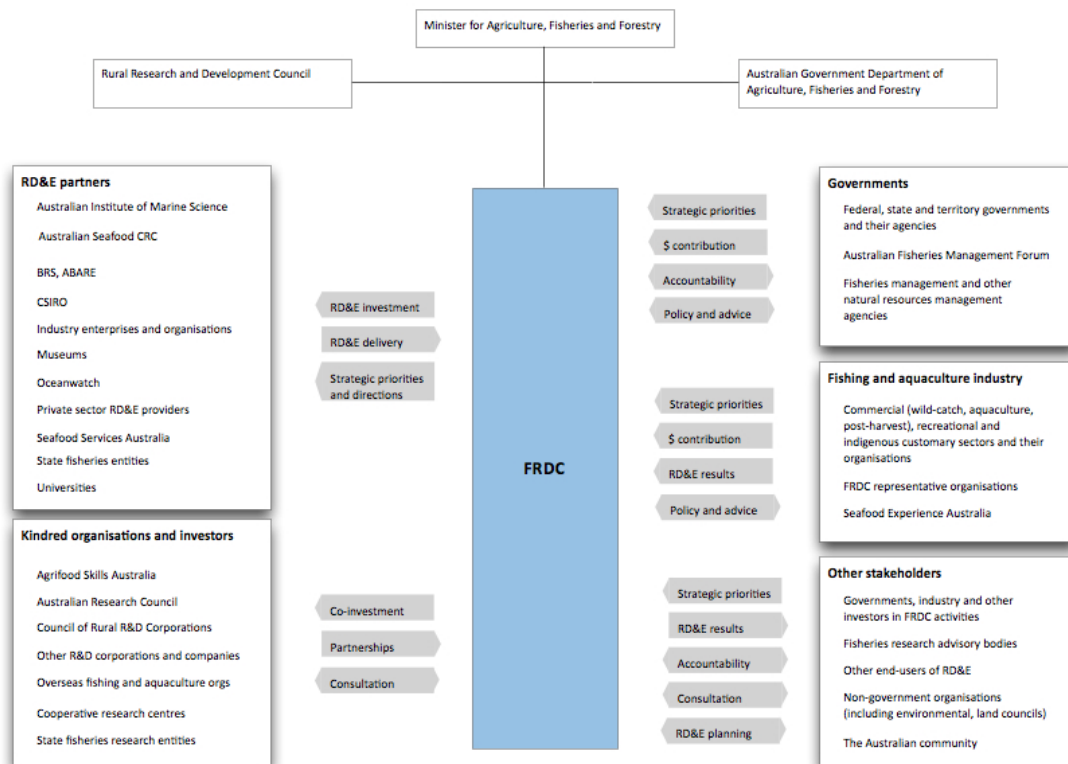
The business environment in which the FRDC operates is characterised by:

- a high emphasis on natural resource management and public good research
- diverse priorities of governments and the diverse sectors of the fishing and aquaculture industry
- geographic diversity, because Australia’s waters extend from the tropics to the Antarctic and include both marine and freshwater, and hence a particularly high requirement for local relevance of RD&E
- a broad range of products, including about 600 commercial species, about 1000 recreational species and 100 farmed species; and consideration of more than about 100 protected species
- a relatively complex, disaggregated and dispersed industry voice requiring particular attention to be paid in consultative approaches.

An innovative approach to project management — underpinned by an ISO-certified quality management system — gives the FRDC much flexibility, while at the same time enabling it to work as a virtual organisation many times its actual size.

With its many partners (figure 1), the FRDC extends the results of RD&E and pursues adoption (and when appropriate, commercialisation) by end-users and along the value chain. Its RD&E outputs also raise awareness of vital issues related to the fishing and aquaculture industry such as industry development, social and economic impacts on communities, and the health benefits of seafood.

Figure 1: The FRDC’s organisational context



Not all entities involved with the FRDC are shown.
 For simplicity, only the relationships between the FRDC and other entities are shown — not relationships between those entities.
 Many of the entities have multiple relationships with the FRDC: for example, CSIRO is a co-investor and a research provider.

Governments intervene in economic activity to improve efficiency (i.e., using resources to produce the greatest net benefits to the community) and equity (i.e., benefits and costs are shared among the community). Outcomes include measurable economic benefits, and environmental and social benefits that are often difficult to express in monetary terms. In relation to fishing and aquaculture RD&E, the Australian Government intervenes because private markets fail to deliver adequate efficiency and equity to the people of Australia.

For the commercial sector, market failure occurs either through not pricing at all, or not pricing equivalently, the environmental regulatory requirements for competitive seafood products. For the recreational and indigenous customary sectors, this occurs because the activity is “non-market”. For these fishers, the benefits are not monetary but rather the attainment of a diverse range of social outcomes that depend on healthy aquatic environments. The Australian Government’s public good investment in fishing and aquaculture is also in the interests of sustainable stewardship of aquatic resources. A more detailed discussion of the economic rationale for Australian Government investment in fishing and aquaculture RD&E is contained in the CRRDC submission.

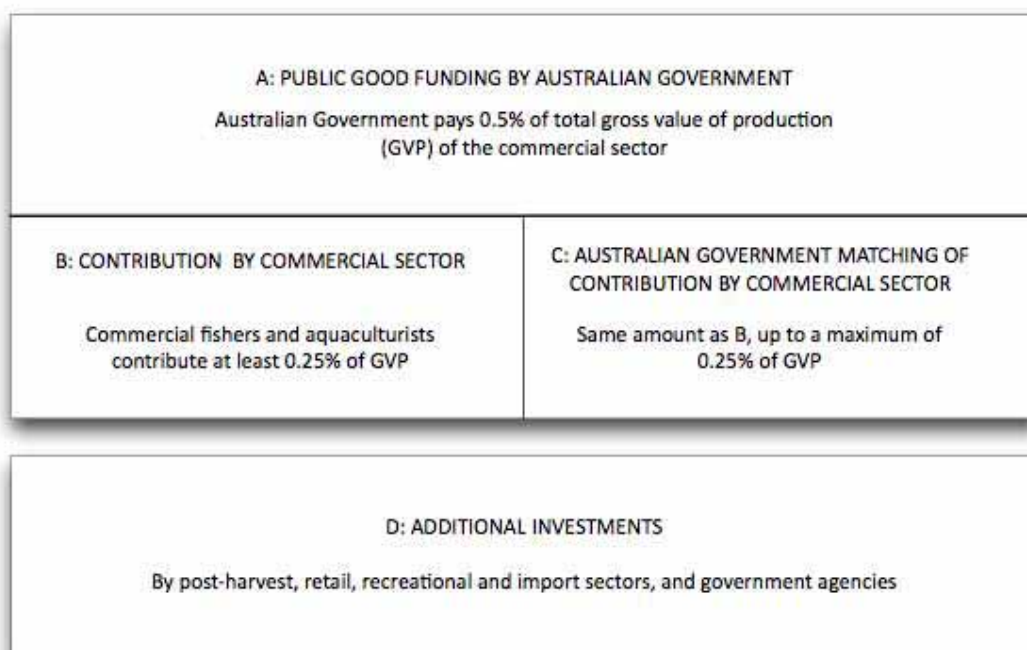
The Australian Government’s contribution to the FRDC reflects the broader stewardship role that the Corporation plays in investing in fishing and aquaculture RD&E.

There is no legislative impediment to commercial fishers and aquaculturists contributing to the FRDC above the maximum level at which the Australian Government provides a matching contribution. Investment has risen well above that level in recent years, reflecting industry recognition of the high quality of the FRDC’s governance and management systems, and an excellent record for delivering RD&E results. Additionally, other entities can and do contribute to the FRDC.

Australian Government and industry contributions for each financial year are provided in the FRDC’s annual report.

The Corporation is one of the simpler RDCs with its focus being on RD&E only. RDCs source their revenue from a variety of sources from pre-wharf / pre-farm gate, supply chain and importers. The Corporation’s revenue base is represented in figure 2.

Figure 2: The FRDC’s revenue base

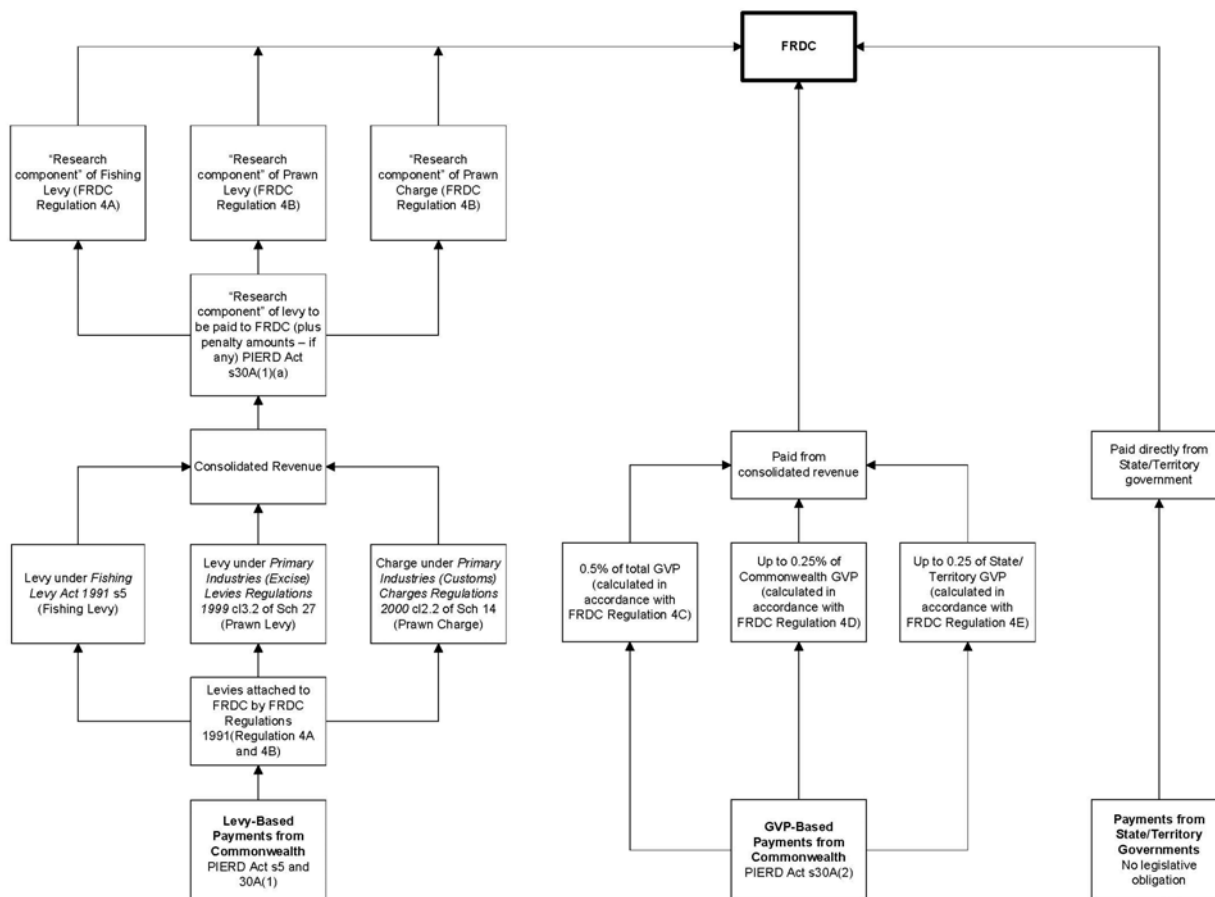


As shown in panel D in figure 2, FRDC also manages funds for RD&E investment from other sources, including Australian government (DCCEE, DAFF, CRCs), industry and other state and territory governments. Other funds from industry can come from groups or companies that are post-wharf or post-farm-gate (e.g., the Sydney Fish Market).

In investing government funds, FRDC funding criteria stipulate that:

- end-users of RD&E should pay roughly in proportion to the benefits received
- the greater the spill-over benefits, the greater the proportion the Australian Government should contribute.

Figure 3: The FRDC's revenue pathways



The 1995 Ministerial direction for FRDC (see page 23) requires industry funds to be collected from the commercial sector through commonwealth, state and territory fisheries management agencies. FRDC is therefore reliant on voluntary arrangements for each fisheries management agency to collect industry contributions, except for the Australian Fisheries Management Authority, which imposes a levy on behalf of FRDC. These contribution arrangements vary considerably between jurisdictions, as does the transparency of reporting to industry on how they are collected. The Australian Government matches commercial sector contributions up to 0.25% of the commercial sector's gross value of production (GVP). Further, the Australian Government provides funding up to 0.5% of the GVP that is not matchable but is to be used for public good RD&E. The Australian Government does not match contributions from the recreational and indigenous customary sectors. Figure 3 depicts the three mechanisms for which FRDC receives its funds:

1. levy-based payments: the only levy is for prawn farmers
2. GVP-based payments from the Australian Government: commercial wild-catch and aquaculture sector contributions from AFMA, state and territory fisheries management jurisdictions
3. payments from governments and recreational, indigenous and commercial post-harvest sectors that cannot be matched: of these, many of the recreational and indigenous investments are contributions as part of one off arrangements linked with individual projects.

The commercial sector contributed 169% and 137% of the maximum matchable in 2008–09 and 2009–10 respectively. During the past ten years the industry matchable contribution has risen from less than 60% to well over the maximum matchable amount: a tangible demonstration of industry support for FRDC and the positive benefits that this investment has delivered to industry and governments. FRDC also received \$5.3 million from other cash contributions from governments and industry in 2009–10. The incentive to invest in FRDC depends on the capacity of FRDC to provide leverage for investors, and the reputation FRDC has for delivering excellence in RD&E outcomes.

Current service delivery framework

The FRDC's role, as defined in its Annual Operational Plan, is:

to invest in fisheries research and development activities in Australia. This includes providing leadership and coordinating the monitoring, evaluating and reporting on R&D activities; and facilitating its dissemination, extension and commercialisation. The FRDC achieves this through coordinating government and industry investment, based on a collaborative approach involving stakeholders to establish and address R&D priorities.

The 2005–10 FRDC RD&E program structure, which is directly aligned with the objectives of the PIERD Act, is as follows.

Program 1: Natural Resources Sustainability

The challenge is to maintain and improve the management and use of aquatic natural resources to ensure their sustainability, and to optimise resource access, resource allocation and opportunities for each sector of the fishing industry, within a rights-based framework. Addressing excess fishing capacity, overfished stocks and overfishing are key management challenges. The community requires the utilisation of fisheries and aquaculture resources to be not only ecologically sustainable, but also economically and socially sustainable. This is a pre-requisite for sectors wanting access to aquatic resources. Aquatic habitats and aquatic animals need to be protected and maintained. Where environmental damage has occurred, methods need to be developed to restore the environment. Fisheries management is evolving from regulation and compliance to more inclusive self-management, accredited systems and incentive instruments that meet the reporting and assessment needs of ecologically sustainable development. The value that the community places on the use of aquatic resource is changing with aquatic and coastal development, increasing wealth and leisure time. Processes that are adaptive to changing values and that facilitate the evolution of the sectors are therefore important. A significant management challenge is to develop adjustment mechanisms to address over-capacity in relation to both the available catch and the economic viability of fisheries.

Program 2: Industry Development

The challenge is to respond to, and take advantage of, increased demand for seafood and for recreational and customary fishing experiences; and to enhance the profitability of the fishing industry. Demand for high-quality seafood is predicted to outstrip supply in both domestic and export markets; and similarly demand for high-quality fishing experiences will outstrip supply. All

three sectors have a challenge to ensure their use of the aquatic resource best meets the demands of their stakeholders. There is a need to increase production and value of the catch (or in some fisheries the value), business profitability and international competitiveness, and to take advantage of future opportunities.

Program 3: People Development

The challenge is to develop people who will help the fishing industry to meet its future needs. The commercial, recreational and indigenous customary sectors of the fishing industry need to be driven increasingly by a culture that is market-focused and that places high value on learning, innovation and professionalism. The Australian community and consumers will benefit from being informed about the health effects of seafood. The fishing and aquaculture industry will benefit from a more informed community that is aware of the economic, environmental and social benefits arising from the industry, and more aware of the significance of the fishing experiences which people enjoy. From such understanding comes an informed community, which among other things enables better decision-making through political processes. The health benefits of seafood and the lifestyle benefits from recreational and indigenous customary fishing need to be identified and communicated to the community. The ways in which the fishing industry supports communities in rural and regional Australia also needs to be better understood.

Historically, the FRDC has invested:

- 40–60% in Program 1
- 20–35% in Program 2
- 2–10% in Program 3.

This investment strategy reflects the high priority that governments and industry have placed on the priorities surrounding fisheries sustainability. FRDC's annual reports provide more detail on expenditure.

It is important to note that, while projects are aligned to programs according to their primary outcome, they usually achieve outcomes across more than one program area. In other words it is not valid, for example, to infer that environmental and social outcomes are not achieved from investment in Program 2.

(Program 4 — the Management, Communications and Accountability Program, defined in the Annual Operational Plan — identifies the elements of management and accountability which enhance the delivery and management of Programs 1–3, the three R&D programs.)

Since management and accountability arrangements contribute to the planned outcomes of FRDC R&D programs, they are crucial to the FRDC's effectiveness and efficiency.

The organisation is led by an Executive Director and supported by 11 staff members. Currently there is one additional staff member over the establishment seconded from the Department of Agriculture, Fisheries and Forestry to cover the People Development Program while the incumbent works on the Primary Industries Standing Committee (PISC) Fishing and Aquaculture Research, Development & Extension strategy and the FRDC's RD&E Plan.

FRDC Board

The FRDC board and chair are appointed by the Minister in accordance with the PIERD Act. The board is responsible for governance, strategic direction and appointing the executive director. There are nine directors: the chair, executive director, and seven non-executive directors selected on the basis of their expertise in compliance with the PIERD Act. The board continually reviews FRDC's governance arrangements and policies. A part of this review process, the board has recently commissioned a review of its own performance and the efficiency of FRDC operational

processes. This has resulted in the board allocating greater time to strategic analysis and improving key partnerships: in particular with the Minister's office, DAFF, and bodies such as the Australian Fisheries Management Forum and FRDC's representative organisations.

Executive Director

The Executive Director works with the Board to ensure that the strategic direction of the board is delivered and that the performance the board is seeking is met. This involves understanding the business environment of the fishing and aquaculture industry and encouraging appropriate investment to gain a return for the industry and governments, while ensuring that their strategic priorities and needs are addressed.

The Executive Director is supported by three functional groups: Business Development, Program Management and Communications.

Business development

The Business Development Group comprises a manager and two staff members. The role is to contribute to the efficient and effective operation of FRDC by overseeing corporate services (including IT, legal, human resources, accounts receivable, accounts payable, financial reporting, management reporting and payroll). The Business development Manager undertakes the role of Chief Financial Officer and Board secretary and actively leading program initiatives, with a particular emphasis on intellectual property issues. In addition, the role actively explores future directions for the business, identifying future pathways in order to achieve the strategic priorities of FRDC.

Program management

The Programs Management function comprises a Program Manager and four staff members. The role of the Programs Manager is to lead the Programs Team to ensure that research, development and extension is appropriately targeted, consistent, timely, delivered and implemented to meet the identified strategic priorities of key stakeholders, achieving relevant outcomes ultimately leading to an improvement in the sustainability and profitability of the Australian fishing and aquaculture industry.

Communications and extension

The Communications and Extension Management function comprises a Communications Manager and one support staff member. The Communications Manager's role is to oversee the provision of a full range of communications services including media, stakeholder management, project extension and publication development and management to assist the industry to be more sustainable and profitable.

Operational efficiency and performance

Since inception in 1991, FRDC's investment philosophy has been to maximise the funds available for RD&E investment. To achieve this, the Corporation has invested considerably in processes (AS/NZS ISO 9001:2008) and technology to deliver efficient and effective program RD&E management services. In this regard, FRDC has committed significant resources to developing a fully integrated program management software system (OmniFish, internal software; and FishNet, external software for submission of RD&E applications). This system is also utilised by Australian Pork Ltd, Australian Fisheries Management Authority, Seafood CRC and the Condamine NRM alliance. OmniFish delivers considerable productivity in terms of ensuring data is efficiently used and reporting is integrated from financial to project reporting.

Table 1 details the key measures for 2009–10.

Table 1: Management data and operational performance measures for 2009–10

FRDC data	2009–10
RD&E expenditure	\$24.0 million
Total RD&E portfolio	\$59.8 million
Staff – FTE	12
Contracts managed	388
Operational performance measures	
FTE per million invested	0.48
Management and accountability as percentage of total expenditure	11%
Contract/staff ratio	32
Average contract value	\$140,000
Milestone processing efficiency	26 days
Invoice processing efficiency	12 days
Application success rate for annual open call (described on page 23)	50%

The FRDC's management and accountability costs for 2009–10 were 11% of total expenditure. During the past 10 years this cost has increased from about 8% to 11%, mainly as a result of deliberately deciding to provide services more finely tuned to individual client needs and to give greater emphasis to planning, commissioning, extension/adoption, reporting and accountability.

The Australian fishing and aquaculture industry

A detailed overview of the fishing and aquaculture industry can be found in the “Fishing and Aquaculture Sector Overview” report (<http://www.frdc.com.au/research/national-framework>). The fishing and aquaculture industry is one of the most complex of Australia’s primary industries in terms of both its structure and the natural resources on which it depends. Most of the industry’s business environments are made more complex by their dependence on access to natural resources that are publicly managed in the interests of present and future generations.

THE FISHING AND AQUACULTURE INDUSTRY

The fishing and aquaculture industry includes any industry or activity conducted in or from Australia concerned with taking, culturing, processing, preserving, storing, transporting, marketing or selling fish or fish products.

The industry’s three main sectors comprise:

- commercial wild-catch fishers, aquaculture producers and post-harvest enterprises
- recreational fishers and associated commercial enterprises
- indigenous customary fishers.

[The commercial sector is also referred to as the “seafood industry”, although non-food items such as pearls are included among its products. Aboriginal and Torres Strait Islander people are involved in the commercial and recreational sectors in addition to fishing in continuance of their ancient customs.]

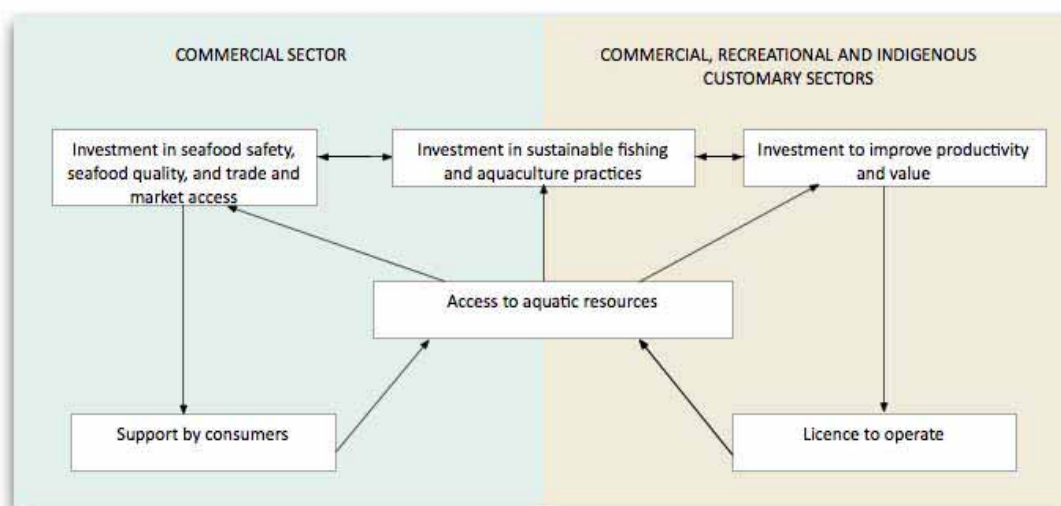
Although not part of the fishing and aquaculture industry, entities with strong involvement in the industry are:

- the federal, state and territory governments (especially their fisheries managers and other natural resource managers)
- research partners (including universities, fisheries research organisations, and industry and private sector providers) and research investors (such as the Australian Seafood CRC)
- the people of Australia (on whose behalf aquatic natural resources are managed, and as consumers).

The industry’s operating environments

The principal factors in the operating environments of all sectors of the industry are shown in figure 4, and are intrinsic to the following outline of each sector.

Figure 4: Principal factors in the industry's operating environments



Commercial sector

As shown in table 2, in 2007–08 the gross value of commercial fishing and aquaculture production (wharf and farm gate value) was \$2.19 billion, making the seafood industry the sixth most valuable food-based primary industry.

Table 2: Economic data on the commercial sector

Sector	Economic value	Tonnage	Notes
Commercial sector (wild-catch and aquaculture)	Annual gross value of production: \$2.19 billion	236,000 tonnes	Estimated direct employment: 30,000
Commercial wild-catch	Annual gross value of production: \$1.32 billion	174,000 tonnes	Estimated direct employment: 20,000
Aquaculture	Annual gross value of production: \$0.87 billion	62,000 tonnes	Estimated direct employment: 10,000
Export	\$1.34 billion	44,000 tonnes	Predominantly high-value, low-volume products: principally Rocklobster, pearls, Abalone and Southern Bluefin Tuna

Sources: *Australian Fisheries Statistics 2008*; Australian Bureau of Statistics and industry data. Employment estimates are somewhat approximate because of limitations in census and survey data. Dollar and tonnage figures are rounded.

Demand for seafood is rising in Australia because of increasing affluence and increasing awareness of seafood's prominent role in a healthy diet. In Asian markets, consumption is also increasing with the growth of the middle class. World supply to affluent consumers will continue to be limited, giving rise to higher prices.

Globally, as population heads towards an estimated 9.2 billion by 2050 (about the maximum carrying capacity of the planet, according to the UN Food and Agriculture Organization), fishing and aquaculture will need to play a large part in meeting world demands — especially aquaculture. The

increasing role of aquaculture is well established, 2009 being the first year in which world aquaculture production for seafood matched wild-catch production. In Australia, marine and onshore aquaculture is a rapidly growing part of the commercial sector. The FRDC and the National Aquaculture Council have set an annual harvest target for aquaculture of 100,000 tonnes of seafood by 2015, double the production of 2003–04.

Despite this strong growth, Australia’s “gap” between supply and demand is expected to grow. Yet for the wild-catch sector it will not be increased tonnages that will secure a profitable and therefore viable future but increased value of sustainable catches. For both the wild-catch and aquaculture sectors, improvement in profitability must occur throughout the seafood value chain. Both sectors will need to concentrate on value-adding to products; consistent approaches to product quality; more capital investment; more product promotion; control of rising costs, including energy costs; counteracting barriers to trade access; and better definition of value chains.

Recreational sector

There is an inextricable link between recreational catch and commercial catch in fisheries management. For some fisheries, the recreational catch is higher than the commercial catch. For this reason, understanding recreational fishing activity is important to the overall management of the fisheries resource.

The recreational sector asserts that recreational fishing contributes to Australians’ health and well-being at individual, family and community levels, and that allocation of fish resources should be based on providing optimal benefits to the community. A core belief is that healthy aquatic environments are fundamental to sustainable recreational fishing and fish resources, and that recreational fishers must therefore share in the stewardship of fish resources through partnerships in decision-making. In turn, management decisions affecting recreational fishing should be based on sound scientific ecological, social and economic information. From a low base, progress has recently been made in increasing this information.

The participation rate and estimated direct expenditure have immense implications for the total economic value (table 3) and social value of the recreational sector. However, data collection, analysis and reporting of resource use, performance and economic factors have been very limited. Knowing more about the quantum and efficiency of the economic value chains for recreational fishing products and services is likely to be highly beneficial.

Table 3: Economic data on the recreational sector

Sector	Economic value	Tonnage	Notes
Recreational	Estimated direct expenditure: \$1.9 billion per year	At least 30,000 tonnes	Participation: 3.4 million people

Source: *National Recreational and Indigenous Fishing Survey of Australia, 2001*. Dollar and tonnage figures are rounded.

Indigenous customary sector

Fishing and shell-collecting is a very important part of many Aboriginal and Torres Strait Islander people’s cultural life. Harvesting is not only a cultural activity that satisfies personal, domestic, ceremonial, educational and communal needs; it also pre-empts expenditure on purchased food. However, economic and social data encompassing these activities are limited.

The highest participation rate of indigenous customary fishing occurs in the Northern Territory, where 92 per cent of the Aboriginal and Torres Strait Islander population of Northern Australia

aged 5 or older are estimated to fish each year. However, the total population of Aboriginal and Torres Strait Islander people is higher in the eastern states than in the Northern Territory, even though the rate of participation is lower. Consequently, customary fishing is carried out in a wide range of urban and rural environments, not only in defined indigenous lands.

Customary rights, which have started to be defined in fisheries management legislation, allow for harvest for communal consumption. They also prescribe a level of access to protected species, including turtles and dugong.

Some indigenous groups have gained explicit rights or commercial access through the courts: for example, in 2008 the High Court of Australia handed down the *Blue Mud Bay* decision, which gave exclusive access rights over the intertidal zone to the Yolngu people of north-east Arnhem Land. Such decisions are giving rise to both social and economic opportunities.

In addition to their customary activities, Aboriginal and Torres Strait Islander people also participate in commercial and recreational fishing. The challenges and opportunities for their involvement in the commercial and recreational sectors are similar to those of other participants, although associated cultural and social factors are often different: for example, Aboriginal and Torres Strait Islander fishers consider that although barter between communities may provide an economic benefit, it is a customary activity that needs to be recognised in fishing rights.

More information:

Fishing and aquaculture statistics by ABARE:

<http://www.frdc.com.au/resources/australian-fisheries-statistics>

Comprehensive description of the industry's business environment:

<http://www.frdc.com.au/plans>

then select "Overview of the Australian fishing and aquaculture industry"

How the FRDC plans its RD&E

Fishing and aquaculture RD&E has to be well tuned to the many diverse — and often competing — uses of aquatic resources. The FRDC has therefore established strong, wide-ranging links with its stakeholders. Government entities (especially fisheries management and other natural resources management agencies) are equal with industry entities in their significance.

The FRDC sets its strategic directions by facilitating and consolidating the views and priorities of all its key stakeholders. Chief among them are government investors and the Corporation's industry representative organisations: the Commonwealth Fisheries Association, the National Aquaculture Council, Recfish Australia, and Aboriginal and Torres Strait Islander groups.

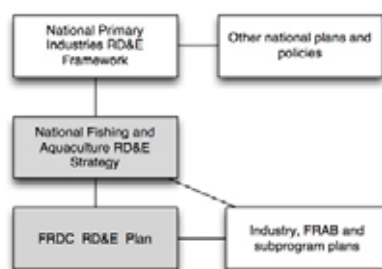
As shown in figure 6 (page 20), the FRDC has directly aligned its planning, management and reporting of RD&E program activities to the objects of the PIERD Act.

The FRDC's programs incorporate responses to a wide range of Australian Government priorities, including the National Research Priorities and the Priorities for Rural R&D relevant to the FRDC; and to significant national plans and policies including those of the fishing and aquaculture industry.

The immediate relationships of the FRDC's RD&E plan with other plans are shown in figure 5.

Figure 5: Relationships of the FRDC's RD&E plan with other plans

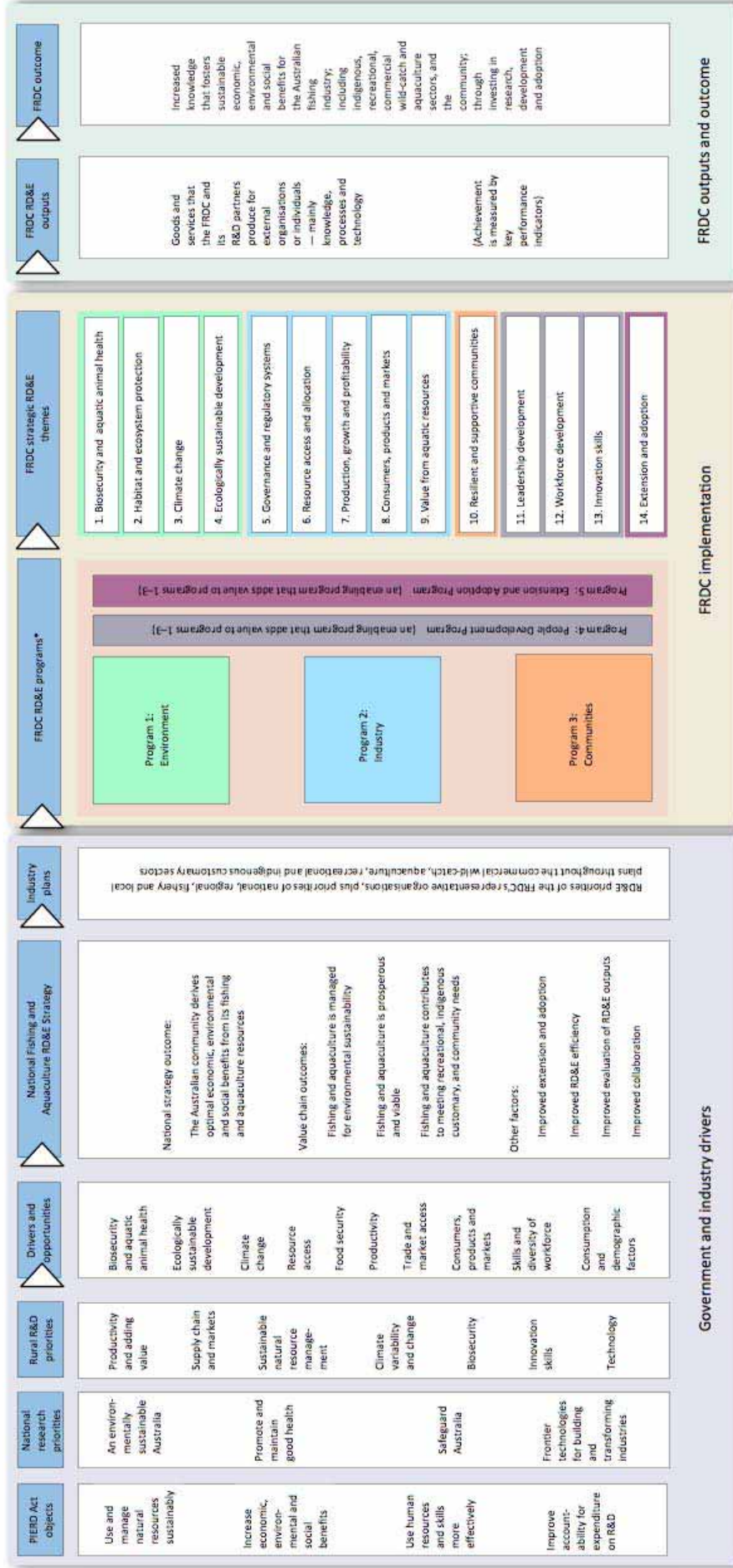
To undertake its RD&E planning activities, the FRDC maintains formal structures and processes. They include Commonwealth, state and territory Fisheries Research Advisory Bodies (FRABs) that undertake RD&E planning relating to their respective jurisdictions; and subprograms (such as the aquatic animal health subprogram) and coordination programs (such as the social sciences research coordination program) that undertake RD&E planning on a national scale. In addition, to provide more certainty for planning, investing in and managing RD&E, the Corporation enters partnership agreements with governments and major industry sectors. The specific RD&E is identified through sector-specific strategic plans that cover the ways in which the partners will collectively invest in the RD&E activities.



Integration with national primary industries RD&E policy and processes

The over-arching framework for primary industries is the National Primary Industries Research, Development and Extension Framework, to which governments, the research and development corporations, research providers and primary industry peak bodies have contributed. The document that outlines the future RD&E directions of the fishing and aquaculture industry within that framework is *Working Together: the National Fishing and Aquaculture RD&E Strategy*. It is shown, among other elements of the FRDC's planning environment, in figure 6.

Figure 6: FRDC's planning environment



* An additional program (the Management, Communications and Accountability Program) derives from the fourth object of 4.3 of the PIERD Act. It does not undertake RD&E activities.

During the five-year currency of this RD&E plan, the policy context (left end of diagram) and research structure (right) may well change. For the current diagram, please visit www.frdc.com.au/plans. The wording of the PIERD Act objects, national research priorities and priorities for rural R&D has been heavily condensed in this diagram. The full text is available via www.frdc.com.au/plans

The National Fishing and Aquaculture RD&E Strategy, in advancing the principles of the Primary Industries Ministerial Council's Statement of Intent, describes the systems and processes to:

- cooperate to encourage the establishment of a more efficient and effective RD&E system nationally
- maintain RD&E funding levels and improve the capability of the national system in priority areas
- share information, plans and priorities for investment in RD&E
- facilitate access to national research capability (people, infrastructure and information) by industry and R&D partners across Australia
- refresh the rural R&D priorities and encourage more consistent, rigorous monitoring of performance of R&D targeting and delivery
- facilitate rapid uptake of research and innovation
- work cooperatively to improve the administrative processes and effectiveness of information sharing and management
- freely share knowledge, including through minimising barriers to RD&E created by intellectual property protection
- monitor, evaluate and report on the performance of the national fishing and aquaculture industry RD&E system.

These principles are adopted in both the National Fishing and Aquaculture RD&E Strategy and the FRDC's RD&E Plan. Since the principles give rise to significant public good outcomes, commitment of public funding is necessary to address them. The implementation of the Major–Support–Link concept will deliver more efficient and coordinated fishing and aquaculture RD&E. For FRDC, and its government and industry contributors, this means improved value for money from investments that are more targeted on high priorities. Further, the emphasis on extension will increase the rate and timeliness of adoption.

Priorities for RD&E investment

The diversity of the fishing and aquaculture activities and resources that are managed results in a complex priority setting process. The nature of FRDC's investment in fisheries management related RD&E is that there is a considerable public benefit associated with this investment. This reflects the government's stewardship role to ensure the aquatic natural resources are sustainably managed for future generations use and enjoyment. This includes those members of the community that are non-extractive users of the aquatic resource.

A 2009 report, *Evaluating Australia's Marine Capture Fisheries*, identified a gap between current and best-use performance. The report proposed the following 10 areas in which to improve fisheries management performance, in order of priority:

1. strategic approach to management: more flexible fisheries management to respond to future change and a more strategic approach to management for each fishery, including the setting of clear objectives for performance across all uses
2. allocation of shares/rights for all users: efficient, transparent allocation of shares and associated property rights for all commercial, recreational and indigenous customary uses

3. better data at fishery level for all users: concerning fish stocks, mortality, total economic value, community views and other data to track performance
4. sustainable fishery operations based on sound economics: economically sustainable operation of the fishery, based on a greater awareness and use of economic analysis to inform management decisions about fishing chain values and performances
5. a documented harvest and management strategy for each fishery with goals set for sustainability of the ecosystem, biomass and target stock
6. participation of users in managing change: increased participation and collaboration of commercial, recreational and indigenous customary fishery users in fisheries management and implementation of change
7. integration of recreational fishing into overall sustainability targets and the harvest strategy for the fishery
8. adoption of ecosystem or multi-species approaches to fishery management
9. education and techniques for all users and managers to achieve best performance
10. provision of information to the community on the performance and resource status of wild-catch fisheries, and the need to conserve the fisheries resource.

The ten priority areas address community, government and industry needs. The public and private benefits of fisheries RD&E investment are difficult, and in some cases impossible, to separate — certainly in relation to attempts to separately value them. The areas identified above are, in part, influencing current and future RD&E investments as the FRDC works closely with bodies such as the Australian Fisheries Management Forum.

The FRDC's RD&E investment framework policy

The Australian Government's investment in fisheries RD&E activities via the FRDC is governed by the *Primary Industries and Energy Research and Development Act No 17, 1990*. The FRDC invests in partnership with governments and industry stakeholders, and develops an R&D plan for a five year period to identify directions and direct investment in accordance with section 19 of the Act.

The success of the FRDC's planning, investment, management and adoption framework is measured by an evaluation process that ensures the framework is based on adaptive management. The investment evaluation framework includes the agreed national plan; key performance Indicators (KPIs) and targets for measuring success; an investment framework that ensures investment against priorities where research can contribute to a significant improvement; total portfolio evaluation based on RDC evaluation methodology; and continual review of the planning and investment framework by the Board based on the performance KPIs.

The FRDC has implemented the Rural R&D Corporation Evaluation Framework methodology (<http://www.ruralrdc.com.au/Page/Evaluation+/Methodology.aspx>) to achieve the total portfolio evaluation assessment. This is based on a rolling series of cost-benefit analysis of project clusters, based on the previous five years' investment. The results of the project cluster assessments links to the agreed KPIs that are relevant that cluster. This process ensures that the investment decisions are continually being adjusted to ensure optimal investment performance. Given FRDC's dual investment role of both public good and industry benefit, the investment policy is not solely based on maximising investment returns as the broader public good benefit needs to be addressed. FRDC is continually refining its KPIs to ensure they are meaningful and measurable. Research to improve the measurement of environmental and social KPIs that relate to natural resource sustainability and people development is ongoing. Improving the measurement of

ecological and social impacts is being led by the CRRDC as part of the ongoing development of evaluation methodology.

The Ministerial direction to the FRDC

In May 1995, the Minister issued a directive in accordance with the PIERD Act, s. 143(1) that:

(a) FRDC is to ensure that industry funds raised from a particular fishery, industry sector or State/Territory are spent within a five-year period starting from the year of receipt on research and development projects that are of direct relevance to:

- (i) that fishery; or
- (ii) industry sector; or
- (iii) the State/Territory in which the funds were collected.

(b) In determining the projects in which funds are to be spent under (a), FRDC is to have regard to the advice of the relevant management agency and industry sectors acting in collaboration through relevant FRAB; and

(c) FRDC is to recognise the Australian Fisheries Management Authority, operating in consultation with its Management Advisory Committees, as the FRAB relevant to Commonwealth-managed fisheries, including Joint Authority fisheries managed under Commonwealth law.

The FRDC's investment framework

The FRDC employs a mixed investment model that achieves flexibility in working towards the Corporation's planned outcome. Partnerships give emphasis to strategic and tactical RD&E priorities of governments and industry while investment in blue-sky ideas is also part of the pursuit of innovation.

The avenues for FRDC investment are as follows.

Annual open call

An annual competitive round ensures a transparent, competitive process and encourages a broad range of researchers and projects. The open call also encourages novel ideas for fishing and aquaculture RD&E.

The call begins about March or April, when the FRABs, subprograms and coordination programs call for expressions of interest based on the needs of stakeholders or to address priorities in their strategic plans.

Tactical Research Fund

A competitive round, three times a year, enables investment to be secured in a timely manner to address subjects of immediate concern to industry and government stakeholders. The fund covers short tactical projects of an applied nature.

National initiatives

The FRDC invests in issues of national importance. In doing so, it has regard for national and rural research priorities and the National Fishing and Aquaculture RD&E Strategy. Subprograms and coordination programs may be established to drive forward specific initiatives. Examples include

the National Marine Biodiversity, Resources and Fisheries Climate Change Program (jointly funded with Department of Climate Change, Energy and Efficiency), Aquatic Animal Health Program, Recfishing Research (with co-investment from the DAFF Recreational Fishing Industry Fund) and the Social Sciences Research Coordination Program.

Major Sector Fund

The FRDC may enter into a partnership agreement with a major industry sector, providing the sector with more certainty for planning, investing in and managing R&D and adopting results. RD&E needs are outlined in the strategic plans required by the partnership agreement. Investment may be made through open or closed tender, commissioned activity, or competitive rounds. Examples are agreements with the Tasmanian Salmon Growers Association and the Australian Southern Bluefin Tuna Industry Association. The FRDC's investment in the Australian Seafood Cooperative Research Centre also occurs within the Major Sector Fund.

People Development Program

The FRDC invests in activities to achieve the goals of its People Development Program through the program's annual operational plan. Professional development awards, which support individuals and groups to build skills, knowledge and networks, are a significant component of the program. Other activities may be commissioned or tendered. Applications addressing program goals are also welcomed through the annual competitive or Tactical Research Fund rounds.

Extension and Adoption Program

Through this program the FRDC invests in activities to support effective transfer of RD&E outputs to end-users and to improve the likelihood of end-users implementing change as a result of FRDC investment. Priorities and activities are described in the FRDC's Extension and Adoption Plan. Applications addressing program goals are also welcomed through open or closed tender, commissioned activity, or competitive rounds.

How the RDC model operates in relation to stakeholder consultation

The strength of the RDC model is the way it leads and facilitates the government industry partnership. The FRDC has established strong, wide-ranging links with its diverse stakeholders and a system of formal consultative structures and processes to address their RD&E priorities. Government entities (especially fisheries management and other natural resources management agencies) are equal with industry entities in their significance.

Structures include Commonwealth, state and territory Fisheries Research Advisory Bodies (FRABs) that undertake RD&E planning relating to their respective jurisdictions. Taking a leadership and facilitative role, the FRDC invests in issues of national importance and in doing so it has regard for national and rural research priorities and the National Fishing and Aquaculture RD&E Strategy. Subprograms and coordination programs may be established to drive forward specific initiatives. Examples include the Aquatic Animal Health Subprogram and the Social Sciences Research Coordination Program that undertake RD&E planning on a national scale. In addition, to provide more certainty for planning, investing in and managing RD&E, the Corporation enters partnership agreements with major industry sectors. The specific RD&E is identified through sector-specific strategic plans that cover the ways in which the partners will collectively invest in the RD&E activities.

Impact of FRDC's RD&E investment

Both industry and government investors benefit from the FRDC's RD&E outputs, details of which are published in the Corporation's annual reports. The efficiency of production of RD&E outputs has benefited from continual improvement in the collaborative planning approaches pursued by the Corporation.

The FRDC's investment portfolio includes a high proportion of RD&E that targets public-good natural resource management. This makes assessment of the performance of investment during the past five years difficult, since the methodology for assessing quantitative benefits from this type of research is still relatively under-developed.

To ensure independent rigour in assessing FRDC's investment portfolio, the Corporation has collaborated with the other rural research and development corporations in developing a national rural research evaluation framework. The methodology for the framework and the collective reports across the corporations can be found at <http://www.ruralrdc.com.au/Page/Evaluation+/Methodology.aspx>

The benefits from the total RD&E investment (measured over 30 years using a discount rate of 5%) in 18 randomly selected clusters of investment completed during the past five years was estimated as \$1,200 million. In these clusters, FRDC investment was 38.9% of total investment of \$214 million (present value terms). The net present value, \$986 million, gave a benefit–cost ratio of 5.6 to 1 for each dollar invested by the FRDC and its partners. This was lower than the 10.5:1 recently identified for all rural R&D corporations (over similar but not identical periods), reflecting the high proportion of fishing and aquaculture RD&E that has a spill-over into public good. Table 4 shows investment criteria for FRDC investment.

Table 4: Investment criteria for FRDC investment (discount rate 5%)

Years	0	5	10	20	30
Present value of benefits (\$m)	0	7.43	13.46	21.89	27.06
Present value of costs (\$m)	0.77	0.77	0.77	0.77	0.77
Net present value (\$m)	–0.77	6.66	12.69	21.12	26.29
Benefit–cost ratio	0	9.7	17.5	28.4	35.2
Internal rate of return (%)	negative	36.6	39.0	39.4	39.5

In terms of benefits from specific FRDC program outputs,

table 5 shows that the return on investment was highest for Programs 1 and 2, the (then) Natural Resources Sustainability and Industry Development programs. Program 3, the People Development program, had a lower benefit–cost ratio but a higher rate of return.

Table 5: Aggregate investment criteria for the 18 clusters by FRDC program

Criterion or characteristic	Program 1: Natural Resources Sustainability	Program 2: Industry Develop- ment	Program 3: People Develop- ment	Total
Present value of benefits	\$536.9m	\$642.6m	\$20.7m	\$1,200.1m
Present value of costs	\$102.0m	\$104.5m	\$7.6m	\$214.1m
Net present value	\$434.9m	\$538.1m	\$13.1m	\$986.1m
Benefit–cost ratio	5.3:1	6.1:1	2.7:1	5.6:1
Internal rate of return	25.1%	23.0%	60.7%	24.3%
FRDC contribution to total resources invested	40.6%	37.5%	34.7%	38.9%

Note: For total investment, discount rate 5%, 2008–09 dollar terms, discounting to year 2008–09, benefits extend 30 years from the final year of investment.

Further analysis, especially of environmental and social benefits, will form a basis for fine-tuning future RD&E investment. Consideration of public spill-over will include the need to quantify the industry's and public's willingness to pay for environmental and social benefits. The eighteen cluster reports are available from FRDC.

Case studies

Domestication of *Penaeus monodon* – Black Tiger Prawns

Prawn farming commenced in Australia in the 1970s. The principal drivers at the time were the opportunity to develop a valuable new industry, diversification of existing land uses (e.g., sugar farming) and development of a new industry for rural coastal communities to improve their economic and social wellbeing. Australian prawn farming principally focuses on the production of the Black Tiger Prawn. Broodstock are collected from the wild fishery and then induced to spawn in dedicated land-based hatcheries. The industry identified the collection of wild-caught broodstock as a major bottleneck to achieving the industry's priority to reduce operating costs and improve productivity. At the time, imported farmed prawns were being sold on the Australian market with a cost of production ranging from \$3 to \$6/kg; in comparison, at the time it was estimated that Australian costs ranged from \$9 to \$14/kg. Domestication would allow the industry to stock pathogen-free post larvae (PLs) and implement a selective breeding program.

To achieve this goal FRDC working with the Australian Prawn Farmer's Association (APFA) facilitated the formation of the domestication research consortia comprising: FRDC, APFA, CSIRO, DEEDI, AIMS, and the major prawn companies. This collaborative partnership that included a multi-disciplinary research expertise achieved its goal of transferring to industry the technology and processes that has made Australia one of the first countries in the world to domesticate black tiger prawn. The outcome has been that yields have risen from 4-8 tonnes per hectare to one farm recently averaging 17.5 tonnes per hectare over the whole farm. The increased yield has led to increased profit and ability to better compete on domestic markets with imported prawn products. For tropical coastal Australian communities prawn farming offers an alternative from traditional industries. With extensive tropical coastline, Australia is well placed to develop this industry. Related research funded by FRDC with CSIRO, DEEDI, AIMS and APFA has also ensured that the ecological sustainability of the industry meets Australia's stringent environmental requirements.

The benefit to the Australian Government was that Australian prawn farming is providing an alternative, high-technology industry as a new form of diversification to coastal tropical industry. The initiative also contributes to the social resilience of rural communities.

Spatial management in South East Region

As the 2005 proposed Marine Protected Areas (MPAs) for the South East Region and their boundaries were open to negotiation, the commercial wild-catch sector and state fisheries management agencies requested a study to determine the socio-economic impact of the proposed MPAs on the industry and to assess alternative approaches to minimise industry impacts while retaining the biodiversity protection required by the Government. This resulted in FRDC funded project 2005/083, in which the Tasmanian Aquaculture and Fisheries Institute (TAFI) at the University of Tasmania led a consortium of management agencies and commercial sector bodies with an interest in the area.

The objectives were to:

- quantify the commercial fisheries catch for key species within the proposed MPAs for the SE region
- quantify the commercial fisheries economic value associated with the catch within the proposed MPAs for the SE region

- quantify the socio-economic impact of the proposed MPAs on the commercial wild-catch sector
- quantify, in terms of the above objectives, alternative approaches that meet industry needs without compromising the biodiversity objectives of the Australian Government Department of the Environment, Water, Heritage and the Arts.

The major outcomes from the project were as follows:

- The project report on the South East MPAs and their location, characteristics and categorisation was adapted and presented by the industry to the Australian Government.
- The TAFI report and associated industry submission was highly influential in the determination of the final Australian Government decision on boundaries and categories for the MPAs.
- The impact was a 24% increase in the area protected and a more than 90% reduction in the impact on the commercial wild-catch sector, compared to that originally proposed.
- The areas and features of the changed MPAs showed that the biodiversity features included in the final MPAs were somewhat superior to those in the original proposal.

The benefit for the Australian Government was an evidence-based report that allows governments and industry to negotiate improved environmental outcomes without compromising the economic value derived from the related fisheries.

Openness, transparency, clarity and trust in NT fisheries resource management

In March 2007 the full bench of the Federal Court, in what is commonly referred to as the Blue Mud Bay case, recognised the rights of traditional owners in waters overlying Aboriginal land. This decision affected the Northern Territory commercial fishing and seafood industry, valued at approximately \$25 million per annum, and the recreational sector, which is a considerable driver of the Northern Territory economy. It gave rise to a situation unique in Australian fisheries, with considerable opportunities for Aboriginal Territorians.

The decision was appealed to the High Court, which on 31 July 2008 found that although the Fisheries Act was valid, Aboriginal traditional owners have the right to exclude others (including recreational and commercial fishers) from waters overlying Aboriginal land.

In April 2008 the FRDC, in partnership with the Northern Territory Seafood Council, the Amateur Fishermen's Association of the NT and the Northern Land Council, supported a historic multi-sector fact-finding delegation. The delegation, which included commercial and recreational fishers, Aboriginal Territorians and Northern Territory Government representatives, investigated fishery resource management arrangements in New Zealand. The aim was to identify how indigenous participation in commercial operations and recreational and customary fishing are undertaken there.

In travelling together the participants developed trust and respect, and took opportunities to identify issues that had led to ongoing conflict between the sectors. The experience provided new knowledge and skills in working together, and gave many ideas on how participants could grow their businesses.

As a result of this project, over-arching principles, key lessons and a suggested way forward for consultation and negotiation were developed. A particularly positive outcome was acknowledgement of these findings by the Northern Territory Government as part of its overall response to the Blue Mud Bay decision. This will allow the development of a well-considered

position, enabling stakeholders to take positive action on future directions for Aboriginal Territorians in the Northern Territory fishing and seafood Industry.

The agreed take-home message from the project was that “openness, transparency, clarity and trust are prerequisites for moving forward together”.

The outcome will ensure that the Australian Government can negotiate with three sectors that are more likely to understand and achieve common agreement to ensure indigenous rights are acted upon.