



Pacific  
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# Kingdom of Tonga National Aquaculture Management and Development Plan 2018–2022



Prepared by the Tonga Ministry of Fisheries  
with assistance from the Pacific Community  
and supported by the  
New Zealand Foreign Affairs and Trade Aid Programme and the  
Australian Department of Foreign Affairs and Trade





# Kingdom of Tonga

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Noumea, New Caledonia, 2018

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# Abbreviations and Acronyms

AAC	Aquaculture Advisory Committee	MLC	Ministry of Labour and Commerce
ACIAR	Australian Centre for International Agricultural Research	MOF	Ministry of Fisheries
ADL	aquaculture development license	MORDI	Mainstreaming of Rural Development Innovation
CEO	Chief Executive Officer	M&E	monitoring and evaluation
COP	Code of Practice	PRC	People's Republic of China
DFAT	Department of Foreign Affairs and Trade	PROP	Pacific Islands Regional Oceanscape Program
EIA	environmental impact assessment	R&D	research and development
EU	European Union	SEAFDEC	South East Asian Fisheries Development Centre
FCD	Fisheries Compliance Division	SMA	special management area
FMDD	Fisheries Management and Development Division	SPC	the Pacific Community
FO	Fisheries Officer	TAG	Technical Advisory Group
FSD	Fisheries Science Division	TOP	Tongan pa'anga
ICT	information, communication technology	TSDF	Tonga Strategic Development Framework
JICA	Japan International Cooperation Association	UNDP	United Nations Development Programme
MFNP	Ministry of Finance and National Planning		

# Foreword

It gives me great pleasure to present to the Government and people of Tonga, especially aquaculture sector stakeholders the ‘Kingdom of Tonga National Aquaculture Management and Development Plan 2018–2022’.

This plan draws and builds on the progress from the ‘Tonga Aquaculture Commodity Development Plan 2010–2014’ that guided the aquaculture sector development from 2010–2014, and the ‘Tonga National Aquaculture Management and Development Plan (2014–2019)’, which will become redundant after the approval of this plan.

The plan is divided into three parts. Part 1 provides a general introduction on the aquaculture sector. Part 2 provides the measures that will ensure sustainable aquaculture, while Part 3 describes aquaculture development and lays out the country’s development aspirations. Overall, the plan maps the Kingdom’s aquaculture sector development and management vision and aspirations to achieving a sustainable, meaningful and secured aquaculture sector for the people of Tonga. In doing so, the plan sets out the management objectives, management measures, development objectives and, most importantly, the priority aquaculture commodities identified for Tonga for the next five years.

The vision of this current plan is informed by experiences over the past few years under the previous plans and two in-country workshops carried out in 2017 with the government, aquaculture stakeholders, and community members involved in aquaculture development.

Aquaculture is a key priority of the Tongan government and this plan is a demonstration of commitment to the aquaculture sector. The government will commit to ensuring its implementation and the monitoring of its progress. However, its success will depend on the collective effort of aquaculture stakeholders such as the aquaculture industry, communities, development partners and donors.

Lastly, I would like to seize this opportunity on behalf of Tonga’s Ministry of Fisheries to thank everyone involved in realizing this important policy document. A special ‘thank you’ goes to the hardworking staff of the Ministry of Fisheries, aquaculture players, stakeholders and communities for availing their time to assist with producing this document. Finally, I would like to recognize and thank the Pacific Community and New Zealand Ministry of Primary Industry (MPI) for its technical guidance throughout the whole review and development process.

# Approval

## **APPROVAL OF THE KINGDOM OF TONGA NATIONAL AQUACULTURE MANAGEMENT AND DEVELOPMENT PLAN 2018–2022**

This Kingdom of Tonga National Aquaculture Management and Development Plan 2018–2022 is produced and should be used in accordance with Part II, Section 4 of the Aquaculture Management Act (No. 15) of 2003.

Made this \_\_\_\_\_ Day of \_\_\_\_\_ 2018

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**Honourable Semisi Taulangi Fakahau**

**Minister for Fisheries**



# Part 1: General introduction

In the Pacific, dependency on fisheries resources for social and economic well-being, food security and livelihood cannot be overstated. However, given continued population growth, climate change and natural disasters, and a growing dependency on a cash economy, most fisheries resources, particularly coastal fisheries, are under pressure and exploited at a level that is not sustainable to meet continued food security and livelihood needs for Pacific Islanders.

It is, therefore, important that aquaculture is explored as a viable and integrated option for sustaining this dependency on fish for food security and livelihood. Aquaculture has the potential to supplement or even offset existing fisheries, and contribute to the social and economic growth, livelihoods and food security needs of a country's people.

Tonga and its natural environment, especially the marine environment, offers some of the most suitable conditions for farming various aquaculture products. This opportunity was put forward during the review consultation for this plan. However, a number of challenges were also highlighted and continue to hinder the expansion of the aquaculture sector in Tonga, some of which include the lack of capital, skilled labour, access to markets and finance, and regular seed supply; natural disasters; lack of record keeping capacity; and the need for improved extension services and networking.

Aquaculture is one of the top development priorities of the Tongan Government and comes under the Ministry of Fisheries (MOF). The 'Kingdom of Tonga National Aquaculture Management and Development Plan 2018–2022' (hereafter, the Aquaculture Management and Development Plan) is a compendium of current management practices and development goals for the sector that are to be carried out over the next five years. Furthermore, the plan is a working document that links management with development and provides the practical and coherent platform for regulation, management, technical development and investment to grow together in a coordinated manner. The plan, developed in close consultation with stakeholders and in accordance with section 4 of the Aquaculture Management Act (2003), sets out a five-year vision and development aspiration for the management and development of the aquaculture sector in Tonga. It is foreseen that the effective and participatory implementation of the objectives and strategies in this plan will contribute to addressing the challenges identified, and lead to a viable and secured aquaculture sector for Tonga.

## 1.1 Current status of aquaculture development

Aquaculture operations in the Kingdom have mostly been undertaken as part of research and development (R&D) activities, and a good summary of the history of aquaculture in Tonga is provided in the Tonga Aquaculture Commodity Development Plan 2010–2014. Two commodities are still currently being farmed: mabe and giant clam. About 23 farms are involved in the farming of mabe, which is marketed locally and targets the domestic market, especially the tourism sector. Mabe farming is a well-established sector with second-generation farmers. Farms have been established in Vava'u, where the activity started, and more recently around Tongatapu and Ha'apai. The mabe sector is well structured, with an ongoing research programme funded by the Australian Centre for International Agricultural Research, seed supply from the Sopu hatchery and a Pearl Farmers Association among the advancements to date. Giant clams are exported overseas for the lucrative aquarium trade market. Aquarium companies purchase clams from the government hatchery and export the clams overseas. Over the past 10 years, 9,469 kg of clams, valued at TOP 50,552, have been exported.

Another commodity that is considered as an aquaculture commodity but currently is being collected from the wild is the mozuku seaweed. Two companies are involved in the collection, processing and export of this product, and have been in operation for over ten years. Approximately 1.2 tonnes of mozuku, valued at TOP 54,126, have been exported over the last 10 years.

## 1.2 Current opportunities and constraints

While mabe and giant clam farming has been successful, aquaculture development has not reached its full potential in Tonga. Mabe, giant clam and seaweed have been the key focus of aquaculture development efforts although future directions will focus on consolidating and developing existing sectors further (i.e. mabe). A commodity prioritisation process (section 3.3) was developed, in consultation with stakeholders, for the diversification of commodities to help improve food security and create new livelihood opportunities. Table 1 summarises and categorises the opportunities and constraints identified through community consultations in Tongatapu and Vava'u in April 2017. These findings were used in formulating development objectives (section 3.2).

## 1.3 Institution, legal and policy framework

The main legal instrument for the management and development of aquaculture in the Kingdom is the Aquaculture Management Act (2003). The Aquaculture Management Regulations (2008) provide the regulatory framework that the Aquaculture Management and Development Plan will complement. Tonga's Ministry of Fisheries (MOF) is the government agency mandated under the Aquaculture Management Act to manage and develop the country's aquaculture sector.

Other relevant legislative instruments that contribute to the sustainable management and development of the aquaculture sector include the Fisheries Management Act (2002), Environment Management Act No. 27 (2010), and the Animal Diseases Act (1978).

Regional and international instruments such as the Convention on International Trade in Endangered Species will also play key roles in aquaculture management and development in the Kingdom.

This plan is developed in line with higher national overarching policy documents such as the Tonga Strategic Development Framework (2015–2025), and MOF policies and strategies such as the Tonga Fisheries Sector Plan, 2016–2024, and will form the basis of operationalising aquaculture-related goals under those overarching policies.

**Table 1.** Constraints and opportunities in Tonga for the development of aquaculture, as identified through consultations with stakeholders in Tongatapu and Vava'u.

Constraints	Opportunities
<b>Markets</b>	
<ul style="list-style-type: none"> <li>▪ Market access (trade barriers domestic and international)</li> <li>▪ Marketing (standard price, export compete with locals on price during cruise ship days, branding)</li> <li>▪ Lack of official standard and certification</li> <li>▪ Lack of trademark, global brand</li> <li>▪ Need for branding, certification strategy for whole of sector</li> <li>▪ Marketing (access, volumes, quality)</li> </ul>	<ul style="list-style-type: none"> <li>▪ More regular supply of markets (giant clam)</li> <li>▪ Supply of food for local markets</li> <li>▪ Access to tourism market</li> <li>▪ Some unique products (e.g. mozuku)</li> <li>▪ Certification (via conservation and sustainability values of aquaculture practices)</li> </ul>
<b>Governance and management</b>	
<ul style="list-style-type: none"> <li>▪ Rules and licenses need to be easier for farmers to understand</li> <li>▪ Lack of records (spat supplied to seeds produced)</li> <li>▪ Need for better planning and budget justification</li> <li>▪ Lack of extension services (not lack of knowledge and skills but shortage of staff)</li> <li>▪ Lack of licensing for trading pearls (fair price, records, checks and balance sheet)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Existing licensing framework</li> </ul>
<b>Awareness and understanding of the potential place and role of aquaculture</b>	
<ul style="list-style-type: none"> <li>▪ Lack of community awareness and understanding of special management areas (SMAs) and aquaculture</li> <li>▪ Poor public perception on SMAs and aquaculture</li> <li>▪ Communities need to understand the economic benefits of aquaculture activities</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aquaculture to make fisheries more sustainable</li> <li>▪ Job creation at local level</li> <li>▪ Food security</li> <li>▪ Government revenue</li> <li>▪ Key roles for women in production, processing and marketing</li> </ul>
<b>Access to seed, equipment, skills and technology</b>	
<ul style="list-style-type: none"> <li>▪ Seedling supply (seaweed)</li> <li>▪ Supply of spats (volumes, numbers, season)</li> <li>▪ Lack of capital (equipment such as dive gear, boats, pontoons)</li> <li>▪ Lack of equipment (boats, tools)</li> <li>▪ Cost of training people</li> <li>▪ Lack of skilled labour (crafting, business, marketing, networking)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Existing professional aquaculture associations that can be leveraged for sharing of pooled equipment and facilities (e.g. showrooms, boats, seeding equipment)</li> </ul>
<b>Best practice for sustainability and profitability</b>	
<ul style="list-style-type: none"> <li>▪ Losses (spat mortality, predation, soft shell, theft)</li> <li>▪ Natural disasters (only one hatchery, mabe nurseries all on Tongatapu)</li> <li>▪ Not enough value adding</li> </ul>	<ul style="list-style-type: none"> <li>▪ Source of income for farmers</li> <li>▪ Capacity building in new technology</li> </ul>
<b>Commercialisation and start up</b>	
<ul style="list-style-type: none"> <li>▪ Lack of incentive from government</li> <li>▪ Loan schemes do not match farmers' requests (missed opportunities)</li> <li>▪ Lack of capacity to scale up</li> <li>▪ Access to finance (Tonga Development Bank)</li> </ul>	

# Part 2: Aquaculture management plan

## 2.1 Authorities and role

### 2.1.1 Aquaculture Advisory Committee

#### 2.1.1.1 *Function and membership*

The Aquaculture Management Act required the establishment of an Aquaculture Advisory Committee (AAC). The role of the AAC is to advise the minister, as set out under section 11 (1) (a)–(h) of the act. Basically, the AAC's role is to provide advice on:

- managing, controlling and developing aquaculture,
- overseeing the implementation and review of the Aquaculture Management and Development Plan,
- overseeing outreach programmes,
- establishing aquaculture areas and buffer zones, and
- any other matter that the minister seeks advice on in relation to aquaculture.

The composition of the AAC, as outlined in Section 11(2) of the Aquaculture Management Act and includes:

- the Chief Executive Officer for MOF who is the Chair of the Committee;
- an officer from the Department of Environment;
- an officer from the Ministry of Commerce and Consumer, Trade, Innovation and Labour;
- an officer from the Department of Marines and Ports; and
- three representatives of the aquaculture industry.

In addition, the AAC is able to invite anyone with particular knowledge or skills on any matters, but their role is limited to expert advice with no voting rights.

Aquaculture industry representatives are selected for a two-year term. Representatives should, in the first instance, consist of: 1) a nominee of the Pearl Oyster Association (from Vava'u), 2) a representative from the limu (seaweed) industry, 3) a representative of the aquarium industry, and 4) a community representative with an interest in aquaculture. Industry representatives should nominate alternate delegates who may represent them when they are unable to attend meetings. AAC members are eligible for second and subsequent terms.

A meeting of the AAC is not be valid and decisions cannot be made unless there is a quorum of no fewer than five members.

AAC members can arrange for a proxy to take their place by giving five days' notice to the AAC Secretary. Industry observers may attend open sessions of meetings conducted by the AAC.

#### 2.1.1.2 *Meeting procedure and task list*

The AAC meets at least every three months in order to:

- consider its terms of reference;
- determine its operating procedures;
- oversee the implementation and review of the Aquaculture Management and Development Plan;
- review the fee structures for aquaculture licensing;
- participate in, and support, the development of a strategic Business Development Plan for Aquaculture in Tonga;
- review and advise the minister on any application for an aquaculture development licence or permit brought to the Committee's attention; and
- oversee the development, implementation and review of the codes of practice, and then as required to address specific matters referred to it by MOF.

Given that aquaculture development license applications must be assessed within three-month period of receipt in the absence of

supplementary requests for information (s.15 (1) of the Act), meetings may be convened to consider and review specific applications. There should be a provision for the out-of-session review of simple applications by AAC members.

AAC meetings are convened by the CEO, as the chair of the committee. The meeting convener is responsible for identifying a meeting venue; drafting and circulating an agenda and minutes of the previous meeting at least one week before the date of each meeting; taking minutes and supplying other secretarial services at each meeting; and being responsible for initiating action on each action item developed by the committee.

#### 2.1.1.3 *Financial considerations*

AAC members are remunerated for their participation in committee meetings, to the extent of the amount specified in the standing Cabinet agreement on meeting allowances. Travel costs of members travelling from islands other than Tongatapu are met by MOF.

### 2.1.2 Ministry of Fisheries

MOF is the mandated government agency – through the Aquaculture Management Act – as the primary regulatory institution to control and oversee aquaculture management and development in the Kingdom. Its role includes:

- implementing, ensuring compliance with, and enforcing the Aquaculture Management Act;
- implementing and ensuring compliance with the aquaculture management and development plans;
- providing secretarial assistance to AAC on aquaculture matters;
- issuing aquaculture licenses and enforcing license conditions;
- providing guidance to AAC on the review, implementation and approval of aquaculture management and development plans; and
- demarcating aquaculture areas and buffer zones in accordance with the act.

### 2.1.3 Aquaculture private sector

The aquaculture private sector in Tonga is primarily composed of the seaweed (mozuku) and mabe. The role of the aquaculture private sector in aquaculture management and development will be specific to each sector. However, generally the role includes:

- assisting MOF with aquaculture management and development;
- complying with the Aquaculture Management Act through its associated plans, strategies and guidelines;
- Growing and expanding aquaculture in Tonga; and
- complying with license conditions.

## 2.2 Licenses or authorisations

Any person or company wishing to carry out aquaculture or aquaculture-related activities must do so with a valid license issued by the minister. Farmers currently operating without a license should seek assistance from the MOF to work through the licensing process and comply with the Aquaculture Management Act. The types of licenses applicable are outlined in section 2.2.2 below.

### 2.2.1 License considerations

A license Technical Advisory Group (TAG) should be established, comprising the following individuals:

- the CEO of MOF;
- the deputy CEO of the Fisheries Science Division;
- the head of the Aquaculture Section; and
- the head of the Licensing Section.

The main function of this TAG is to carry out initial assessments to classify applications before making recommendations to the AAC for its final assessment and recommendation to the MOF minister. Applications should be considered on the basis of environmental risk and economic and social benefits and costs. The license categories are attached in Appendix 2.

### 2.2.1.1 *Transitional arrangements*

There are a small number of aquaculture operators in the Kingdom, including pearl farmers, aquarium culture producers, and limu farmers. Such operators must apply for a license – as set out in this plan and in accordance with the Aquaculture Management Act – and comply fully with other requirements such as license fees. However, an environmental impact assessment may be commissioned by the minister if he or she has reasons to believe that such operations may have detrimental impacts on the environment (as required under section 27 of the Act).

### 2.2.1.2 *License renewal*

The Aquaculture Management Act requires that aquaculture development licences be for a term of no longer than 10 years. Most aquaculture operations should have a life expectancy greater than 10 years, so there should be a provision to renew aquaculture development licences. The renewal process does not need to be as demanding as the initial assessment because the aquaculture operation's viability will have been established by the time of renewal. Applications for license renewal should be forwarded to the AAC.

### 2.2.1.3 *License fee*

All license fees must be paid in full before a license is issued or any aquaculture activity is begun. The prescribed fees are provided in Appendix 3.

### 2.2.1.4 *Allocation rules in the event of duplicate applications, tender for allocation in certain situations*

If more than one application for tenure of a particular area of intertidal or subtidal water is made for the purpose of aquaculture within a three-month time frame, the applications will be referred to the AAC for comment and advice about a preferred application. The AAC will develop its advice on a preferred applicant on the basis of the application that best meets the objectives of aquaculture management in Tonga, as set out in this plan. The AAC will then assess the preferred application and recommend to the minister whether the preferred application be accepted or rejected. Non-preferred applications will be cancelled.

## 2.2.2 License management procedures

### 2.2.2.1 *Spacing between aquaculture operations*

There are good historic reasons to ensure that most forms of aquaculture operations (those that occur in marine waters, those that use intakes and discharge effluent water into fresh water or the sea) should be spaced sufficiently far apart to minimise the risk of disease transmission and localised pollution.

Spacing should be strictly set in accordance with the type of activity or license category and the outcome of an environmental impact assessment, and included in the license terms and conditions.

### 2.2.2.2 *Transferability*

The Aquaculture Management Act provides that in the event of the death of a licence holder who is a natural person, the heirs of that person may apply for a new licence to continue the aquaculture operation. By implication, the original licence lapses in the event of the licence holder's death. There are, however, simple legal procedures available that effectively allow for aquaculture licences to be transferred between people via a company structure. For the sake of administrative simplicity and the encouragement of aquaculture development, licences and associated leases or forms of tenure should be transferable. A licence transfer should only be permitted when the associated form of tenure is also transferred. The conditions required in the original aquaculture development licence (including the business development plan) should be maintained when the licence is transferred.

### 2.2.2.3 *Subleasing of aquaculture areas*

Subleasing of aquaculture areas should not be authorised or permitted because the practice may lead to unproductive speculation and/or disregard for licence conditions.

## 2.2.3 Reporting requirements

### 2.2.3.1 *Reporting on production*

As a condition of the licence, aquaculture licence holders are required to provide bi-monthly reports, giving details of production, standing stock, mortalities and number of employees. The 'bi-monthly product return form' is available on the MOF website and is also available as a hard copy from the MOF head office.

### 2.2.3.2 Reporting disease outbreaks

All license holders must report sudden mortality events immediately as these can be associated with disease outbreaks. Sudden mortality and large-scale signs of disease should be reported to the MOF main office in Tongatapu or to regional offices. Guidelines are provided in the National Strategy on Aquatic Biosecurity on surveillance, disease identification, reporting and emergency response procedures.

## 2.2.4 Land and marine area tenure

### 2.2.4.1 Aquaculture in marine areas

Aquaculture activities can only be undertaken in declared aquaculture areas. The impact of aquaculture activities in these areas on other users – as well as the impacts of those other users on aquaculture activities – is mitigated by the establishment of buffer zones. The MOF, in consultation with relevant stakeholders, should develop guidelines for establishing buffer zones. In developing the guidelines, consideration should be given to the type and impacts of an aquaculture operation, and the vicinity of dwellings and important installations. Appendix 4 sets out the procedures for declaring aquaculture areas and buffer zones. The list of intertidal and marine aquaculture areas already gazetted under the Aquaculture Management Act can be obtained from MOF.

### 2.2.4.2 Tenure for land-based aquaculture areas

While intertidal and marine aquaculture areas have been gazetted, land-based aquaculture areas have yet to be formalised. MOF, in consultation with relevant stakeholders, will establish a procedure for declaring land-based aquaculture areas. In the absence of that, and to allow for potential interested land-based aquaculture farming activities, the paragraph that follows set out an option that should be considered.

Land-based aquaculture authorisation on Crown Land requires that the proposal is accompanied with a copy of the applicant's lease of the land where aquaculture will take place. The proposal should also include a statement from the Ministry of Lands confirming that applicants can demonstrate the suitability of that land for aquaculture activities. The application will then be assessed by MOF according to procedures given for an aquaculture development license in section 2.3.1.

## 2.2.5 Code of Practice

- The minister, in consultation with the AAC, develops and publishes a Code of Practice (COP) in relation to aquaculture management and development in accordance with the Aquaculture Management Act;
- The minister may require farmers to develop COPs for each aquaculture commodity they are farming, and should cover such areas as farming space and risk assessment;
- COPs may provide guidelines and cover the following areas: biosecurity, import and export risk assessment, farming design, dimensions and standards, and environmental, social and economic risk assessment.

## 2.2.6 Introduction of new aquaculture species or commodity

All new or alien species to be introduced into the Kingdom for aquaculture purposes must be done so in a manner consistent with national laws and following guidelines provided under the National Strategy on Aquatic Biosecurity. Generally, the requirement must include a risk assessment on the species, and should cover environmental, social and economic implications. Assessment procedures should consider both the Food and Agriculture Organization's 'Technical Guidelines For Responsible Fisheries', which provides guidance on responsible aquaculture development, and the 'Regional Guidelines for Responsible Aquaculture' produced by the Southeast Asian Fisheries Development Center. Assessment procedures should also be bound by any other international treaty or convention to which Tonga is a signatory.

## 2.2.7 Aquaculture operations that use wild-caught fisheries resources

Many forms of aquaculture are based on utilising fisheries resources from the natural environment, such as taking broodstock for hatcheries, naturally occurring oysters for pearl culture, juvenile fish for on-growing in aquaculture facilities, and the capture of baitfish for aquaculture feed. There needs to be consistency between fisheries and aquaculture management when a proposed aquaculture operation is planning to use wild fisheries resources. All applications for aquaculture that propose the use of wild-caught fisheries resources that are under a moratorium or specific management rules must have authority from MOF.

## 2.2.8 Aquaculture products to be exempted from regulations applied to capture fishery products

Aquaculture products that are produced on an aquaculture area should not be subject to size limits, seasonal marketing requirements, and any other restrictions specific to capture fisheries. Products from an aquaculture area that would otherwise be in contradiction of a regulation of the Fisheries Act must be certified by an authorised MOF officer as being an aquaculture product

*after* that officer has satisfied himself or herself that the product in question is, in fact, an aquaculture product. No product from a capture fishery can be taken into a licensed aquaculture area (unless a permit has been granted from MOF for the collection of broodstock or juveniles for post-capture-based aquaculture).

Export guidelines for aquaculture products should be developed in line with the Tonga National Strategy on Aquatic Biosecurity.

### 2.2.9 Marking and signage

Declared aquaculture areas, especially where active aquaculture operations occurs, should be clearly demarcated. This is so that any potential hazards to shipping can be identified, and that the community, in particular, is made aware that the aquaculture area is being used strictly for the purpose of aquaculture.

The exact size, wording and form of signs will vary on a case-by-case or industry-by-industry basis. The Ministry of Infrastructure (Marine and Ports Division) may have particular requirements for signage in areas where there is substantial boat traffic.

Given these uncertainties, the exact form and wording for signs identifying the location of aquaculture premises should be developed on a case-by-case basis and incorporated as a condition of every aquaculture development licence issued by MOF.

Markers that identify the location of aquaculture areas must be positioned accurately in order that the aquaculture operation occurs where it has been authorised to operate. Penalty provisions should be provided for people or companies that place markers and signage outside the boundaries of the area(s) in which they are authorised to operate, or who do not maintain signs properly.

## 2.3 Monitoring, control, surveillance and enforcement

Monitoring, control, surveillance and enforcement is an important part for the management and development of aquaculture, and the following activities should be implemented.

### 2.3.1 Aquaculture development license

All aquaculture and related activities should only be conducted through an aquaculture development license (ADL) in accordance with the Aquaculture Management Act:

- This license should be issued by the CEO following advice from the AAC;
- The application form, criteria for assessment, license format, license conditions and fee payable for the license are found on the MOF website<sup>1</sup> and are also available in hard copy format from the MOF headquarters and regional offices.

### 2.3.2 Aquaculture export license

The aquaculture export license (AEL):

- is issued by MOF;
- applies to any person(s) or companies wishing to export aquaculture commodities or products;
- application form, criteria for assessment, license format, license conditions and fee payable for the AEL license are found on the MOF website and are also available in hard copy format from MOF.

### 2.3.3 Monitoring production

MOF will develop and implement a monitoring mechanism for the collection of production data in accordance with ADL conditions.

### 2.3.4 Monitoring diseases and establishing biosecurity measures

MOF will work in close collaboration with the aquaculture private sector to develop a disease surveillance programme and establish biosecurity best practices according to the guidelines provided in the National Strategy on Aquatic Biosecurity.

### 2.3.5 Theft

During stakeholder consultations, theft of aquaculture products from farms was reported as an issue, thus making it a challenge in aquaculture development. While it could be addressed by law, other practical options such as choosing farm sites close to homes and communities and hiring security guards to protect farms could help address theft. Currently, no license is required for the trade in pearls, but if such a license was required it would help reduce the amount of theft, thus ensuring transparency as to the origin of the pearls being sold.

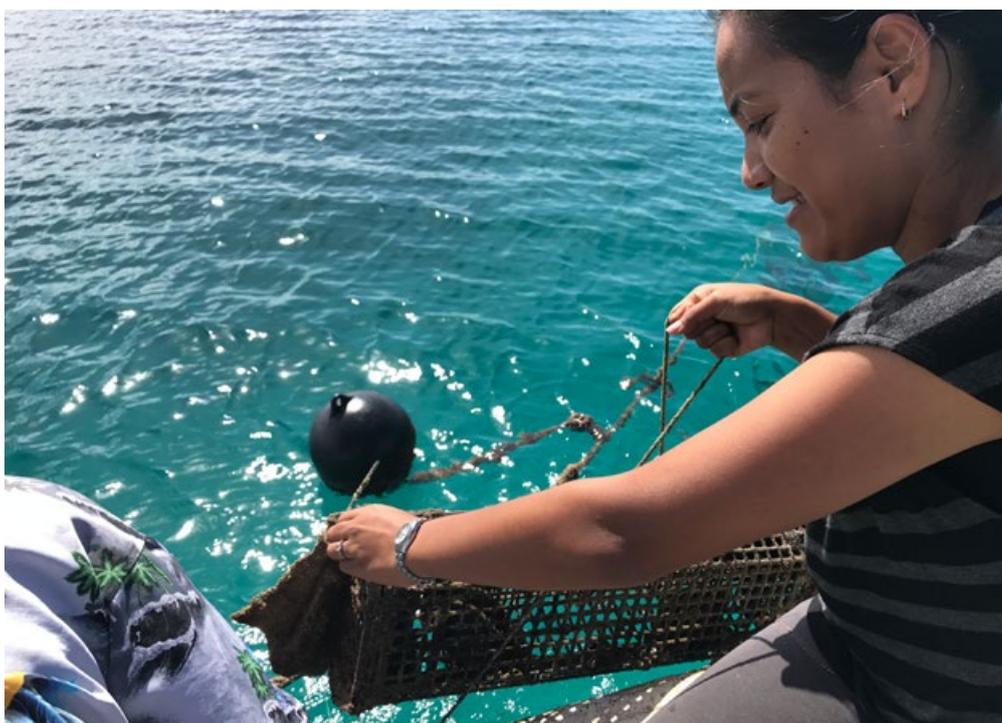
<sup>1</sup> <http://www.tongafish.gov.to/>

## 2.4 Review and amendment

This five-year Aquaculture Management and Development Plan will be reviewed at the end of five years. To better align and contribute to MOF's overall vision and progress, however, it could be reviewed annually if there are major changes in MOF legislation and policy direction.

Reviewing the plan falls under the purview of the AAC, which determines a process for the review and amendment of the plan to ensure transparency and good governance.

It is also important to note that once the Aquaculture Management and Development Plan for 2018–2022 is approved by the minister, the Tonga Aquaculture Management and Development Plan 2014–2019 is immediately terminated and no longer valid.



©Poasi Fale

Nursery growout of *Pteria penguin* winged pearl oysters in baskets



©Poasi Fale

Growout of *Pteria penguin* winged pearl oysters on long lines

# Part 3: Aquaculture development plan

## 3.1 Preliminary considerations

### 3.1.1 Purpose

The primary purpose of this Aquaculture Management and Development Plan is to set out the guiding principles, vision, aspirations and goals of the Kingdom in relation to sustainable aquaculture development. More specifically, the plan:

- provides a roadmap for aquaculture stakeholders in terms of aquaculture development;
- promotes and raises awareness of the aquaculture sector in the Kingdom;
- further clarifies and deals with the provisions and requirement of the Aquaculture Management Act, especially those issues that currently constrain aquaculture development because of administrative deficiencies; and
- prepares and sets the stage for the promotion of commercialised aquaculture.

### 3.1.2 Scope

The scope of this plan covers all aquaculture operations as defined under the Aquaculture Management Act of 2003, including imports and exports of live farmed aquatic organisms and their products.

### 3.1.3 Vision

An ecologically sustainable and an economically viable aquaculture sector that is inclusive and supports the well-being of people and communities in the Kingdom.

### 3.1.4 Goal

The goal of this Aquaculture Management and Development Plan is to develop a resilient and integrated aquaculture sector that will increase the value and productivity of aquaculture. This will provide opportunities for technological uptake, capacity growth and employment, and the production of healthy food and livelihood activities based on domestic and export markets.

### 3.1.5 Policy statement

The aquaculture industry will contribute to the economic and social well-being of the people of Tonga through an inclusive and transparent process that is supported by sound management and development that balances economic and social gains against environmental costs.

### 3.1.6 Guiding principles and values

Table 2 lists the key guiding principles and values that underpin the development and implementation of this plan.

**Table 2.** Key guiding principles and values highlighted during consultation.

Principles and values	Description
Economic viability	An aquaculture sector or activity that is profitable regardless of the scale
Livelihood and food security	Achieve economic growth and address food security challenges
Evidence-based	Develop aquaculture activities based on targeted research and development
Commercialisation	Develop effective pathways to commercialisation
Socially acceptable	The forms of aquaculture developed are accepted by, and provide direct or flow-on benefits to, the community
Technical visibility	The techniques and technologies already exist or are transferable to Tonga and can be supported over time
Environmentally friendly	An aquaculture sector or activity that poses minimal negative impacts to the environment
Ecosystem approach	The integration of aquaculture within the wider ecosystem such that it promotes sustainable development, equity, and resilience of interlinked socioecological systems <sup>2</sup>
Inclusiveness	Promotion of participation and empowerment of all stakeholders, including women, youth and vulnerable groups in aquaculture management and development
Good governance	Promotion of transparency and accountability in decision-making
Market driven	An aquaculture sector that is driven by market demand
Best practice	Aquaculture practices that are environmentally and socially aware while providing opportunities for food security and livelihood.
Ambitious	Answer key challenges for different island groups
Realistic and achievable	Focus on commodities with potential



Seaweed farming in Tonga

© A. D'Andrea

<sup>2</sup> Aquaculture development. 4. Ecosystem approach to aquaculture. FAO Technical Guidelines for Responsible Fisheries. No. 5, Suppl. 4. Rome, FAO. 2010. 53 p.

## 3.2 Development objectives and actions

This plan contains 7 objectives articulated into 40 actions (see Table 3) to direct MOF, and the aquaculture sector and its stakeholders, in the development of aquaculture in the Kingdom. Each action is further expanded into implementation steps in a detailed table provided in Appendix 1.

**Table 3.** Objectives and actions developed from opportunities and constraints highlighted through aquaculture stakeholder consultations in Tongatapu and Vava'u.

### Objective 1: Develop and improve market access to aquaculture products for both domestic and export markets.

- 1.1 Improve knowledge of the potential markets as well as market requirements
- 1.2 Product certification to meet market demands and requirements
- 1.3 Branding for Tonga aquaculture products
- 1.4 Market development

### Objective 2: Promote good governance and best practice for aquaculture management and development.

- 2.1 Ensure legislation and regulations governing aquaculture management and development in the Kingdom remain updated
- 2.2 Ensure licensing and permitting regime for aquaculture management and development
- 2.3 Ensure Standards and Code of Practice for aquaculture management and development
- 2.4 Regulate the trading of pearl and assist with the traceability required for branding and certification through licensing
- 2.5 Provide guidelines for the development of aquaculture at the community level
- 2.6 Provide guidelines for investors, including large-scale operations
- 2.7 Develop and implement the National Strategy on Aquatic Biosecurity

### Objective 3: Raise awareness and understanding of the importance and potential of aquaculture in Tonga.

- 3.1 Raise awareness and understanding of the importance of aquaculture and its contribution to food security, livelihoods, social and economic growth
- 3.2 Raise awareness of the potential and requirements for commercial aquaculture development in Tonga
- 3.3 Engage communities in the decision or planning process in aquaculture development
- 3.4 Improve the knowledge of fish farmers regarding better aquaculture practises and hygiene strategies for fish farms

### Objective 4: Improve input for aquaculture such as feeds, seeds, broodstock, equipment, skills and technology.

- 4.1 Upgrade the existing hatchery for use of mabe production and research and development of other potential commodities
- 4.2 Develop a scheme where farmers have access to equipment at a lower cost
- 4.3 Develop and improve methods of spat collection from the wild
- 4.4 Strengthen existing activities (mabe and seaweed)
- 4.5 Investigate species diversification according to prioritisation process and capacity to grow
- 4.6 Provide technical support to stakeholders during commercialisation
- 4.7 Ensure that imported inputs (feeds, seeds, broodstock) comply with measures developed under the National Strategy on Aquatic Biosecurity

### Objective 5: Promote and ensure that the aquaculture industry contributes to the economic development and social well-being of the people of Tonga.

- 5.1 Research better farming practices such as farm visits
- 5.2 Conduct an economic assessment of current aquaculture farming to improve profitability of the sector
- 5.3 Conduct a supply chain analysis of existing activities
- 5.4 Better farming practices/strategies that are technically feasible, economically viable and environmentally sound
- 5.5 Implement Code of Practices, National Strategy on Aquatic Biosecurity and other regulations

### Objective 6: Improve partnership, collaboration and networking.

- 6.1 Include aquaculture development in broader development processes
- 6.2 Increase the involvement and empowerment of communities to improve the quality of aquaculture products from communities
- 6.3 Involve the broader community in aquaculture development (communities, private sectors, finance, experts)
- 6.4 Continue the development of existing industry representative bodies
- 6.5 Develop a research advisory body for consultation on current and future development projects
- 6.6 Foster exchange with overseas institutions in the public and private sector
- 6.7 Encourage international collaboration on aquatic animal health and aquatic biosecurity

### Objective 7: Promote pathways to aquaculture commercialization.

- 7.1 Establish a financial scheme to support farmers with the commercialisation of aquaculture production
- 7.2 Conduct business planning and management training
- 7.3 Develop and establish programmes aimed at attracting investors
- 7.4 Design and establish pilot farms that focus on production models
- 7.5 Create a pool of local operators (to partners with entrepreneur and investors)
- 7.6 Ensure aquaculture exports (live organisms and seafood products) are conducted and based on the export requirements and standards of the National Strategy on Aquatic Biosecurity

### 3.3 Commodities and concepts diagnostic and prioritisation

Through the initial consultation process with government and private stakeholders, it was agreed that the process of prioritisation for the next development plan was not to come up with a list of commodities and assign activities for each of those commodities. Rather, the prioritisation process should be a decision-making tool that not only enables the government to choose appropriate commodities and methods of farming them (i.e. concepts), but also provides a diagnostic for those proposed commodities and concepts so that development funds can be directed toward areas needing improvement. Specifically the diagnostic and prioritisation matrix will assist in:

- assessing the relevance of current commodities under development through a structured method of ranking commodities and concepts, and producing a list of areas where improvement is required;
- identifying suitable new commodities and concepts for diversification through the ranking obtained;
- identifying areas to develop and improve to allow for the exploration of new commodities and concepts from the diagnostic obtained; and
- assessing the suitability of new proposals from investors using the same matrix developed for this plan.

The prioritisation matrix was applied to existing and potential commodities and proposed concepts (e.g. giant clam aquaculture for the aquarium trade or food security; sea cucumber aquaculture for farming or stock enhancement/sea ranching) in order to guide decision-making process on the species to farm and the models of farming.

The diagnostic and ranking of commodities for their suitability to farming and their benefits to Tonga was carried out through an analysis of benefits against feasibility. Feasibility is considered from the perspective of the farmer investing his resources in a new venture. From consultations with government and private stakeholders, it was possible to identify:

- the factors of feasibility (i.e. opportunities and constraints), using mabe and seaweed as contextual case study commodities; and
- the areas of benefit that are contained in the guiding principles and values identified with stakeholders (section 3.1.6).

Some feasibility factors and benefits were added to the list following a group discussion in order to provide a realistic assessment that is specific to the context of Tonga. Factors of feasibility and benefits are listed by category in Table 4 and Table 5, respectively.

During consultations, several potential aquaculture commodities were considered for prioritisation. For each commodity, a score was given to each factor of feasibility (Table 4) and benefit (Table 5). Criteria were scored as 0 (absent or none), 1 (low), 2 (fair) or 3 (high or good). The sum of benefits is plotted against the sum of the feasibility factors in order to compare commodities against one another (Fig. 1). Note that the scores obtained reflect the current state of development of the aquaculture sector in Tonga. Consequently, future planning will need to update this analysis to account for developments and changes of circumstances.



Spawning of *Pteria penguin* winged pearl oysters at the Ministry of Fisheries Sopa hatchery

**Table 4.** Factors of feasibility for the development of aquaculture commodities in Tonga.

Factors of feasibility	Description
<b>Economic feasibility</b>	
Local market	Can the product be sold locally (e.g. at town or village market)?
Domestic market	Can the product be sold nationally?
Export market	Can the product be exported?
<b>Technical feasibility</b>	
Site availability	Are sites available for farming the commodity using current farming techniques?
Access to technology	Is in-country technology available?
Access to inputs	Are seed, feed, materials and equipment easily accessible?
<b>State of advancement</b>	
Technical expertise	Does Tonga have the technical expertise to produce this commodity?
Existing government assets	Does MOF possess assets (e.g. hatchery, farms, feed mill) to assist in the development of the sector?
Existing private assets	Are there existing assets in the private sector?
<b>Biological feasibility</b>	
Production efficiency	Is the commodity known to be efficient (e.g. low food conversion ratio, low labour input)?
Presence of species or strain in country	Is the proposed commodity present in the country, and if present is it managed for the control of spread and impact?
Favourable climatic and environmental conditions	Is the water temperature (and salinity) and productivity adequate for farming the proposed commodity?
<b>Social feasibility</b>	
Culturally acceptable	Is the commodity accepted from a cultural perspective?
Acceptable under customary laws	Can the farming system be easily developed under customary laws?
<b>Governance</b>	
Favourable regulation	Are national regulations favourable to this type of development?
Existing industry representative bodies	Is the commodity supported by an industry development and advocacy representative body?
<b>Risk</b>	
Low risk with natural disasters	Is this type of commodity and/or development susceptible to natural disaster?
Low risk of disease	Is the commodity robust or is it susceptible to disease?
Low market risk	Is the market for the commodity volatile?

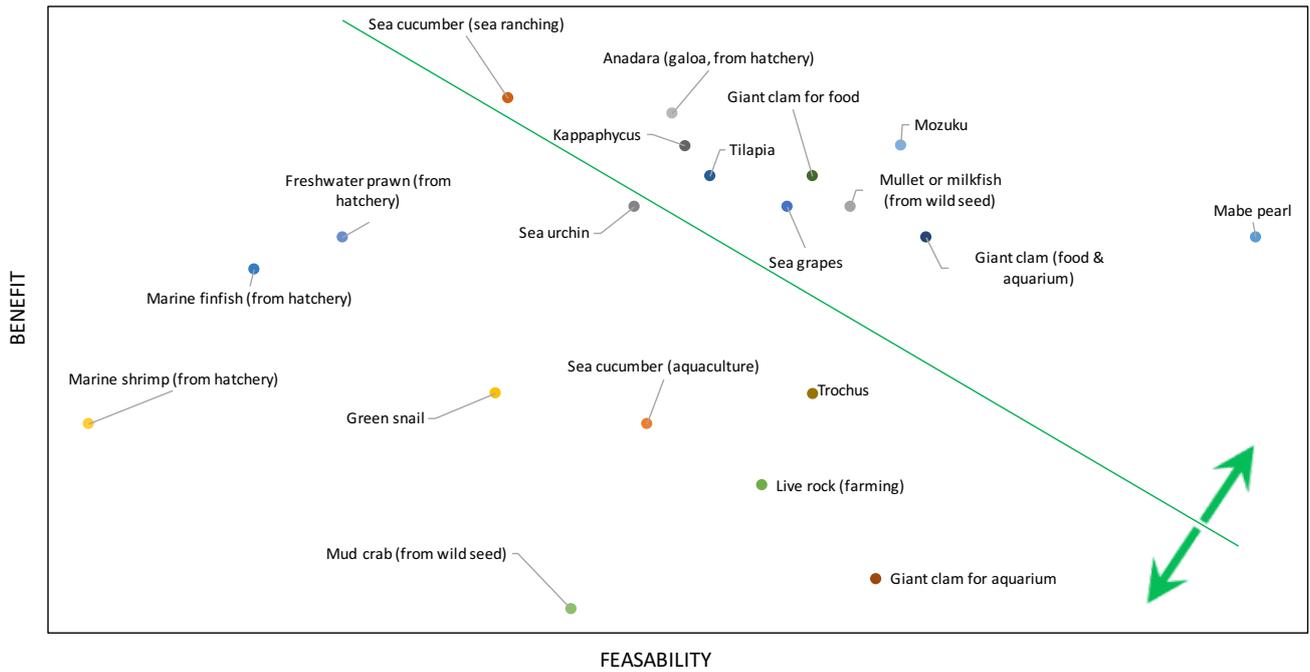
**Table 5.** Areas of benefits that would result from the development of aquaculture commodities in Tonga.

Areas of benefit	Description
<b>Economic benefits</b>	
Increase fisheries productivity	Aquaculture of the commodity will increase productivity compared with effective fisheries management
Increase value of production	The value of fisheries production is increased
Increase export	Aquaculture of the commodity will improve the country's balance of trade
Livelihood opportunity	The commodity provides the opportunity for cash income
Scale	The scale refers to the total size of production, whether it is the sum of many small famers or a few large operations
<b>Socioeconomic benefits</b>	
Flow-on benefits to communities	This includes the creation of employment as part of associated activities (e.g. handicrafts, processing)
Provides equal opportunity	Provides opportunity for gender-balanced activities
Regional employment	Through the increase in the number of farmers
Employment	Engagement of people in economic activities
Reach	About the uptake of farming of the proposed commodity across a country (adapted to several island groups) and/or across socioeconomic groups
Integrate with others	The activities associated with aquaculture of a commodity integrate with existing activities (e.g. other fisheries, tourism)
<b>Capacity building</b>	
Enhance technology and capacity	Development of the commodity will enable in-country capacity development
Increase the capacity to cope with disasters	The farming systems and/or stock is resilient to natural disasters and will provide a source of food and/or income post disaster
Environmental benefit	The activity assists in conservation and/or management of wild fisheries
Import substitution	The proposed commodity provide self-sufficiency
Food security	The farming of the proposed commodity increase food security at local and national level



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Seeding of *Pteria penguin* winged oysters for the production of Mabe pearls



**Figure 1.** Result of commodity prioritisation based on stakeholder consultations in Tongatapu and Vava'u. This graph is not prescriptive of the commodities that should or should not be farmed. Rather, it is a decision-making and planning tool. Commodities can be selected according to the development goal being targeted (e.g. livelihood, food security, marine or freshwater, large/small scale operations) by simply moving the green line up or down along the axis indicated by the green arrows. Additionally, areas that need to be improved to raise feasibility can easily be identified through the matrix.

Conclusions from the prioritisation process:

1. Commodities that are currently being developed (mabe and kappaphycus) are highly relevant to Tonga in the current state of advancement.
2. It is important to consider different models for the same commodity. For instance, growing giant clams for both food and the aquarium trade provides more benefits than for aquarium only and it is also more feasible than for food only.
3. Depending on the development need (e.g. livelihood or food security), the prioritisation graph (Fig. 1) provides a simple way to identify a suitable commodity for diversification. For instance, if Tonga wanted to diversify for food security it would have several options: giant clams (for food and aquarium trade), mullet or anadara. While not as feasible now, mullet and anadara would provide greater benefits than giant clams.

Importantly, the diagnostic and prioritisation matrix is not an exclusive process. The decision of which commodities and concepts are being developed should be based primarily on livelihood needs, food security and export commodities, and should take advantage of the tourism trade. Once the need is defined, the matrix can be used to select a suitable commodity candidate. Suitable candidates are found in either the top left or the top right square of the graph. The top right square contains the commodities and concepts with higher feasibility and higher benefits. In the top left square are the commodities and concepts with high potential benefits but low feasibility, thus requiring greater research and development investment in order for the farming of the commodity to come to fruition. Table 6 provides examples of commodities and concepts of high benefit and high feasibility, and those with high potential benefits requiring greater research and development investment.

**Table 6.** List of commodities with high benefits and feasibility for Tonga in terms of livelihood or food security.

Highest benefit and feasibility	High benefit but requiring greater research and development
Livelihood	
Mabe pearl	Kappaphycus
Giant clams for food and aquarium trade	Sea cucumber (sea ranching)
Mozuku	
Food security	
Giant clams for food and aquarium trade	Anadara (galoa) from hatchery seed
Mullet and milkfish (from wild seed)	Sea grapes
Giant clams for food	Tilapia

Based on this analysis, MOF is choosing to develop high feasibility commodities such as mabe pearl, and to continue long term research and development, within and beyond the timeframe of this current development plan, to improve the feasibility of high benefit commodities such as

- Sea cucumber for sea ranching
- Seaweed (Kappaphycus, Mozuku and sea grapes)
- Giant clam
- Finfish (tilapia, mullet, milkfish)

### 3.4 Implementation

The implementation framework found in Appendix 1 was prepared in close collaboration between MOF and its stakeholders. This implementation plan will provide a guide for MOF and its stakeholders in the effective and timely implementation of this plan. The implementation plan is an integral part of the Aquaculture Management and Development Plan but subject to regular review to ensure the necessary attention and reallocation of resources for effective implementation.

MOF will be the lead agency in overseeing the coordination, implementation, review and updating of this implementation framework. Because it is an implementation framework for the plan, the review and updating of the implementation framework does not necessarily have to be approved by the AAC.

### 3.5 Monitoring, evaluation and learning

Monitoring and evaluation (M&E) is an important part of the successful implementation of this plan. It provides the opportunity to ensure that activities implemented are achieving the expected outcomes (monitoring) and answering the question of ‘Are we doing the right things?’ (evaluation).

MOF has developed an M&E framework based on the implementation table, and to be used for the monitoring and evaluation of the progress in implementing the plan. The M&E framework is a separate working document to be made public on MOF’s website.

# Appendices

## Appendix 1. Implementation plan

### Implementation of the Tonga Aquaculture Management and Development Plan for 2018–2022<sup>3</sup>

Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks	
Administration of the plan	Final copy of the plan produced with the MOF ministers signature	D/CEO (FMDD)	No resources needed	Jan 2018	No funds needed	Minister's availability for briefing and signature	
	Layout and printing	FO (FMDD), FO (ICT)	TOP 500	Jun 2018	FMDD annual budget	ICT staff to be at the office	
	Upload to website	FO (FMDD), FO (ICT)	No resources needed	One month after date of approval	No funds needed	ICT staff to be at the office	
	Make copy available to the Head of the Division, line ministries, other stakeholders, High Commissioners	FO (FMDD)	TOP 500	Jun 2018	FMDD budget	No risk	
	Public announcement/ launching/ media release	D/CEO (FMDD) Media Officer (CEO Office)	TOP 400	Jan 2018– Dec 2022	FMDD Budget	Public awareness may not include in the Media schedule for the month	
	Implementation	FSD, FMDD, FCD			MOF annual budget, SPC, NZ MPI	Funding available from other donors	
	Mid-term and final review for monitoring, evaluation and learning	FMDD, FSD with assistance from SPC Coastal Fisheries Programme		Jan 2018– Nov 2022	SPC Coastal Fisheries Programme under NZ MFAT funding		

<sup>3</sup> For definitions to the abbreviations and acronyms used in this table see the Abbreviations and acronyms list at the beginning of this document.

**Objective 1: Develop and improve market access for aquaculture products to both domestic and export markets**

Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks
1.1 Improve knowledge of the potential markets as well as market requirements (e.g. volumes, quality, standards, certification, biosecurity, branding)	1.1.1 Undertake market analysis survey (both domestic and international markets including cruise ship surveys for mabe)	Marketing Officer (FMDD) with input from external experts	Travel allowance and airfare for domestic market analysis	2018–2021	ACIAR project, World Bank funding, FMDD budget	No funding for market visit
	1.1.2 International market visit (to continue for mabe under ACIAR project)	ACIAR project coordinator with Marketing Officer (FMDD) and input from external experts	Seek funding from PROP and ACIAR for market visit to international market to, unless already funded (e.g. ACIAR mabe project)	2018–2021	PROP, FMDD budget, ACIAR project	
1.2 Product certification to meet market demand and requirements	1.2.1 Training of farmers and artisans in product quality control (ACIAR mabe project)	Marketing Officer (FMDD), Head of Aquaculture section, MLC and ACIAR Project Coordinator	ACIAR project for work on product quality control and certification	2018–2021	ACIAR project	Availability of SPC staff
	1.2.2 Research certification needs, benefits and options					
	1.2.3 If there is a need for certification, develop a model suitable for Tonga (including guidelines to comply with certification requirements)					
1.3 Branding for Tonga aquaculture products	1.3.1 Develop brand strategy for mabe	Marketing Officer (FMDD) and ACIAR Project Coordinator	ACIAR project	2018–2021	ACIAR project	
1.4 Market development	1.4.2 Develop and implement national marketing plans for relevant commodities (e.g. mabe)	Marketing Officer (FMDD) and ACIAR Project Coordinator	ACIAR project	2018–2022	ACIAR project	
	1.4.1 Assist individuals farmers, carvers and distributors to develop their markets					

**Objective 2: Promote good governance and best practice aquaculture management and development**

Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks
2.1 Ensure legislation and regulation governing aquaculture management and development in the Kingdom remains updated	2.1.1 Review aquaculture regulation to ensure it reflect changes made in the plan	Legal Officer, D/CEO (FMDD)	Work schedule of Legal officer	Legislative review	No funding needed	Availability of Crown Law Office to process the amendments to the regulations
	2.2.1 Combining aquaculture management and development plans with aquaculture commodity plan	D/CEO, FO (FMDD)	Allocate time to draft these documents to include in the plan (This activity will be completed together with the plan)	2017-2018	SPC Coastal Fisheries Programme and MOF	Time available for MOF team tasked to do this work Availability of SPC staff to assist with the drafting
	2.2.2 Draft clear licensing procedures, categories, and terms and conditions	D/CEO, Licensing Officer (FCD), Legal Officer				
2.2 Ensure licensing and permitting regime for aquaculture management and development	2.2.3 Review the aquaculture area 'granting tenureship' process with view to streamline and avoid planning and judicial conflicts	D/CEO, Licensing Officer (FCD), Legal Officer				
	2.3.1 Produce Code of Practice for aquaculture management and development	Head of Aquaculture Section	Technical assistance and capacity building from SPC Coastal Fisheries Programme Conduct training of farmers for each commodities	2018 2020	SPC Coastal Fisheries Programme and MOF	
2.3 Standards and Code of Practice for aquaculture management and development	2.3.2 Train farmers on the Code of Practice					
	2.4.1 Development of regulation on pearl trading	D/CEO, Licensing Officer (FCD), Legal Officer	Technical assistance and capacity building from SPC Coastal Fisheries programme	2018 2019	SPC Coastal Fisheries Programme under NZ MFAT funding	Fund availability and prioritisation by SPC
2.4 Licensing for pearl trading to regulate the trading of pearl and assist with the traceability required for branding and certification	2.4.2 Implementation of pearl trading regulation (including reporting and monitoring)					
	2.5.1 Produce guidelines for the development of community-based aquaculture in consultation with stakeholders	Head of Aquaculture Section	Staff available to work with SPC on the guidelines and conduct training of with community based farming groups	2018 (2019?) 2020	SPC Coastal Fisheries Programme under NZ MFAT funding	Fund availability and prioritisation by SPC
	2.5.2 Train farmers and groups on the community based aqua farming model					
2.5 Provide guidelines for the development of aquaculture at community level	2.5.3 Technical manuals and code of conduct for the development of the mabe sector	ACIAR project coordinator	ACIAR project	2018-2022	ACIAR	
	2.6.1 Develop guidelines for small- & large-scale investor and make these available on MOF website for domestic and foreign investors to access	Head of Aquaculture Section, FO (ICT)	Staff available to work with SPC on the guidelines	2021	SPC Coastal Fisheries Programme under NZ MFAT funding	Fund availability and prioritisation by SPC
2.6 Guidelines for investors, including large-scale operations						
2.7 Develop and implement the National Aquatic Biosecurity Strategy	2.7.1 Develop and implement the National Aquatic Biosecurity Strategy	D/CEO (FMDD), Head of Aquaculture Section	Technical assistance and capacity building from SPC Coastal Fisheries Programme	2018	SPC Coastal Fisheries Programme under NZ MFAT funding	

**Objective 3: Raise awareness and understanding of the importance and potential of aquaculture in Tonga**

Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks
3.1 Raise awareness and understanding on the importance of aquaculture and its contribution to food security, livelihood, social and economic growth	3.1.1 Conduct Public announcement and media release first month after the approval of the plan (TV Program – Vava'u, Tongatapu)	D/CEO (FMDD), FO (FMDD), Head of Aquaculture, FO (ICT Section)	TOP 400	2017 and ongoing	FMDD budget	Availability of staff to carry-out this activity
	3.1.2 Send copies of the approved Plan to High Commission offices/donor agencies (Aust, NZ, UNDP, MORDI, EU in Tonga for their information)					
	3.1.3 Send copies of the approved Plan to line ministries (Department of Env. Department of Lands and survey, Marine Dept., MCCITL)					
	3.1.4 Socioeconomic analysis of the mabe pearl farming sector					
3.2 To raise awareness of the potential and requirements for commercial aquaculture development in Tonga	3.2.1 Upload approved plan and guidelines into MOF website.	ACIAR project coordinator	ACIAR project	2018–2022	ACIAR	Availability and capability of media staff to develop the advertisement and awareness programme
	3.2.2 Policy officer to join SMA team in SMA consultation and deliver overview presentation on aquaculture development requirements and process					
	3.2.3 Production of guidelines for aquaculture (CoP, investors, community aquaculture)					
	3.2.4 Develop a short advertisement on potential for commercial aquaculture					
3.3 Communities are engage in the decision or planning process in aquaculture development	3.3.1 Nominate representatives from communities (Vava'u, Ha'apai, Tongatapu) in the Aquaculture Advisory Committee	D/CEO (FMDD)	TOP 6000	2017 and ongoing	FMDD Budget	Decision by MOF on membership of the Advisory Committees
3.4 Fish farmers improve their knowledge on better aquaculture practises and hygiene strategies for fish farms	3.4.1 Coordinate meetings and workshop for farmers/private sector/local communities to coincide with the development and publication of new guidelines	Aquaculture manager and ACIAR project coordinator	ACIAR project and FMDD	2017 and ongoing	ACIAR and FMDD budget	Availability of technical assistance to conduct training

**Objective 4: Improve input for aquaculture such as feeds, seeds, broodstock, equipment, skills and technology**

Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks
4.1 Upgrade existing hatchery to be used for mabe and R&D for other potential commodities	4.1.1 Draft project proposal (including hatchery design) to seek funding for building of the multipurpose marine hatchery	Head of Aquaculture, D/CEO (FMDD), ACIAR project coordinator	Staff of Aquaculture Section to seek funding. SPC-FAME for technical assistance, funds available from ACIAR project for hatchery upgrade	2018	ACIAR, PROP, AUSAID, WORLD BANK	Lack of funding available for building of the new hatchery
	4.1.2 Upgrade of existing Sopu hatchery			2018		
	4.1.3 Train staff on production of new commodities, as required			2021–2022		
4.2 Develop a scheme where farmers could have access to equipment at a lower cost	4.2.1 Seek assistance from Ministry of Finance and National Planning (MFNP) on possible scheme for farmers or extending the existing duty exemption for fishing input to other material and equipment required at start up	D/CEO (FMDD), Head of Aquaculture Section	Consult MFNP FOR update on status of fund allocated for MOF	2017	Government of Tonga	Funding allocate from MFNP may already use by other fisheries subsectors
4.3 Develop and improve method of collection of spats from the wild	4.3.1 Design and implement spat collection trial in Vava'u to identify best areas and seasonality	Head of Aquaculture and staff	TOP 2000, staff available to carry out the activity	2018–2019	FSD budget + technical assistance from SPC Coastal Fisheries Programme under NZ DFAT funding	Shortage of staff to deliver this activity Fund availability and prioritisation by SPC
	4.3.2 Design a spat collection programme from the results obtained in the trial			2020–2021		
	4.3.3 Compare wild collected spat with hatchery spat			2019–2022		
4.4 Strengthen existing activities (mabe and seaweed)	4.4.1 2 <sup>nd</sup> Phase of ACIAR Project to address post-harvesting of mabe and other related activities	Head of Aquaculture Section and staff and ACIAR project coordinator	Staff to upgrade their knowledge on sea weed farming and as well as mabe production	2018–2022	ACIAR project for mabe SPC for seaweed trials	Fund available for trials for Kappaphycus seaweed farming
	4.4.2 Sea weed – Trial farming of Kappaphycus seaweed			2017–2018		
	4.4.3 Carry out other technical and economic assessments as required			2019–2022		
4.5 Investigate species diversification according to prioritisation process and capacity to grow	4.5.1 Identify potential new commodities for Tonga and produce a development plan for one newly identified commodity	Head of Aquaculture Section and staff	SPC technical assistance Staff to assist SPC in this work	2018–2019	SPC Coastal Fisheries Programme under DFAT funding	Fund availability and prioritisation by SPC
	4.5.2 Conduct research and development on species diversification of prioritised commodities		Aquaculture staff to be trained in planning and R&D activities	2021–2022		
4.6 Provide technical support to stakeholders during commercialisation	4.6.1 Train farmer in post – harvesting processing of seaweed	Head of Aquaculture and ACIAR Project Coordinator	Staff time, MOF facilities in Tongatapu, Vava'u and Haapai	2018 and ongoing	ACIAR project	Not enough funding for training of farmers from all the islands
	4.6.2 Train mabe carvers to meet market standards					
4.7 Imported inputs (feeds, seeds, broodstock) to comply with measures developed under the National Strategy on Aquatic Biosecurity	4.7.1 Implementation of biosecurity measures required under the National Strategy on Aquatic Biosecurity which applies to fish farmers, aquaculture manager, biosecurity and quarantine officers, and customs	Head of aquaculture section and staff		2017 and ongoing	SPC	Fund availability and prioritisation by SPC

**Objective 5: Promote and ensure that the aquaculture industry contributes to the economic development and social well-being of the people of Tonga**

Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks
5.1 Research into better farming practices such as farm visits	5.1.1 Organise farm visit to established farm in the region or abroad.	Head of Aquaculture	Staff to draft proposal and organise visit	2018	FSD budget	Approval of funding from MOFNP
	5.1.2 Seek funding from JICA, PRC and Australian to fund a mission tour by team compose of rep. of MOF, farmers, and others					
5.2 Conduct an economic assessment of current aquaculture farming to improve profitability of the sector	5.2.1 Conduct economic analysis of each priority commodity (mabe, seaweed)	Principal Fisheries Officer (FMDD) and ACIAR Project Coordinator	Staff available to conduct this work, ACIAR project	2019	FMDD budget, SPC and ACIAR	Availability of SPC staff to assist Tonga in this work
	5.2.2 Conduct economic analysis of potential commodity					
5.3 Supply chain analysis of existing activities	5.3.1 Conduct supply chain analysis of existing activities commencing with mabe	Principal Fisheries Officer (FMDD) and ACIAR Project Coordinator	Staff available to conduct this work, ACIAR project	2018–2022	FMDD budget, ACIAR and SPC	Availability of SPC staff to assist Tonga in this work
5.4 Better farming practices/strategies that are technically feasible, economically viable and environmentally sound	5.4.1 Conduct research on new farming method that are technically feasible and economically viable in Tonga based on priority and potential commodities	Head of Aquaculture Section and ACIAR project coordinator	ACIAR project	2018 and ongoing	ACIAR	Funding may not be available for all implementation steps
	5.4.2 Organise farm visit to established farm in the region or abroad				Australia, SPC, JICA, PRC	
	5.4.3 Seek funding from JICA, PRC and Australian to fund a mission tour by team compose of rep. form MOF, farmers, etc.		Staff time and availability			
5.5 Implementation of Code of Practices, National Strategy on Aquatic Biosecurity and other regulations	5.5.1 Conduct training of farmers in Code of Practices for each commodity	Head of Aquaculture and staff	Staff, cost of consultation – TOP 4000	2018/19	FSD budget	Time taken for farmers to understand Code of Practice and regulations
	5.5.2 Consult with farmers on requirements from, National Strategy on Aquatic Biosecurity and other regulations					

Objective 6: Improve partnership, collaboration and networking						
Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks
6.1 Aquaculture development is included in broader development process	6.1.1 Identify aquaculture development as one of the priority sub-sector in the fisheries sector	Head of Aquaculture Section	Staff time	Review of the Tonga Strategic Development Framework to include Aquaculture development	FSD budget	Lack of awareness by donor agencies and insufficient prioritisation at government level
	6.1.2 Annual budget preparation to negotiate with MFNP for more funding to assist the implementation of the plan					
6.2 Increased involvement and empowerment of communities to improve quality of aquaculture product from communities	6.2.1 Assign representatives from communities in the Aquaculture Advisory Committee	Head of Aquaculture and staff	Staff, cost of consultations	2017 and ongoing	FSD budget	Community may focus on SMA and not aquaculture
	6.2.2 Encourage participation of communities in all training					
6.3 Involvement of the broader community in aquaculture development (communities, private sectors, finance, experts)	6.3.1 Allocate one representatives from each of the related sector in the AAC	D/CEO (FMDD)	Staff, cost of consultations	2017, ongoing	FMDD budget	MOF decision on membership of the Aquaculture Advisory Committee
6.4 Continue the development of existing industry representative bodies	6.4.1 Develop associations for each commodity in Tongatapu, Vava'u and Ha'apai	Head of Aquaculture Section	Staff, cost of consultation for the formation of the associations	2017, ongoing	FSD budget	Agreement made by each islands on membership and TOR of each associations
	6.4.2 Create aquaculture associations in Tongatapu, Vava'u and Ha'apai					
	6.4.3 Include a representative from each aquaculture associations in the AAC					
6.5 Develop a research advisory body for consultation on current and future development projects	6.5.1 Identify potential members to form the Research Advisory body	Head of Aquaculture Section	Staff, cost of consultation for the formation of the Advisory body	2017, ongoing	FSD budget	Lack of local expert in aquaculture development
6.6 Foster exchange with overseas institution in the public and private sector	6.6.1 Conduct research on overseas institution that involve in aquaculture development	Head of Aquaculture Section and staff	Staff	2017, ongoing	FSD budget	Lack of local expert in aquaculture development
	6.6.2 Develop network with institutions involve in aquaculture development as well as private sectors					
6.7 International collaboration on aquatic animal health and aquatic biosecurity is strengthened and/or developed	6.7.1 Improve/revitalize and develop collaborative approaches with international and regional organisations on aquatic biosecurity	Head of Aquaculture Section	Staff	2017 and ongoing	FSD budget	

**Objective 7: Promote pathways to aquaculture commercialization**

Actions	Implementation steps	Responsibilities	Resources	Timeframe	Funding	Risks
7.1 Establish a financial scheme to support farmers into commercialization	7.1.1 Seek assistance from Ministry of Finance and MFNP on possibility to have a scheme for farmers	D/CEO (FMDD), Head of Aquaculture Section	Consult MFNP FOR update on status of fund allocated for MOF	2017	Government of Tonga	Funding allocate from MFNP may already use by other fisheries sub – sectors
7.2 Conduct business planning management training	7.2.1 Develop a training program for farmers and include business management training	Marketing Officer	Cost of training, staff	2018	FMDD budget	Lack of funding in this financial year to complete training of all farmers
7.3 Develop and establish programmes aim to attracting investors	7.3.1 Streamline process and procedures for foreign investors to use if planning to conduct	Media Officer (CEO Office), D/CEO (FMDD), Head of Aquaculture	Staff	2018	FMDD budget	Lack of knowledge in drafting program of investors
7.4 Design and establish pilot farms that focuses on production models	7.4.1 Develop pilot farms that focus production model that related to priority and potential commodity in Tonga	Head of Aquaculture Section	Staff	2020	SPC under Aquaculture Division funding or other external funding	SPC may not have funding to conduct this work
7.5 Create a pool of local operators (to partners with entrepreneur and investors)	7.5.1 Develop a programme to encourage local operators to partners with entrepreneur and investors	Head of Aquaculture Section	Staff	2021	SPC under Aquaculture Division funding or other external funding	SPC may not have funding to conduct this work
7.6 Aquaculture exports (live organisms and seafood products) are conducted based on the export requirements/ standards of the National Strategy on Aquatic Biosecurity	7.6.1 Compliance with export requirements and standards	Head of Aquaculture Section	Staff	2017 ongoing	SPC under Aquaculture Division funding or other external funding	SPC may not have funding to conduct this work

## Appendix 2. License categories

Licence applications should initially be classified into three categories.

**Category A.** Classification includes proposals that involve little risk to the environment and minimal risk of adverse social or economic impacts to communities in the immediate vicinity of the proposed aquaculture operation. This category is designed to cover largely self-contained operations.

**Category B.** Classification includes proposals that involve some impact on the social or economic welfare of adjacent communities, and may have some environmentally adverse consequences. The risks about the operation causing long-term environmental perturbations should be low.

**Category C.** Classification involves proposals that involve some impact on the social or economic welfare of adjacent or regional communities, and/or may have some environmentally adverse consequences. The risks about the operation causing long-term environmental perturbations may be uncertain or moderate.

All applications for a new aquaculture development licence are required to supply an environmental impact assessment (s. 13 (4), Aquaculture Management Act). The level of information required for each EIA should vary with the potential environmental consequences of each aquaculture proposal. Broad prescriptions and guidelines for EIAs (Appendix 4) should be given to applicants once the classification of their application has been determined. Aquaculture proposals that involve the establishment of a freshwater or marine hatchery, or are deemed to be major projects by the Minister for Lands, Environment, Climate Change and Natural Resources will trigger the requirement for an EIA under the Environmental Impact Assessment Act 2003. Staff from the Fisheries Division and Department of Environment should work together to ensure that common terms of reference are developed for proposals that trigger the need for Environmental Impact assessments under both the Aquaculture Management Act and the Environmental Impact Assessment Act.

Guidelines for a Business Development Plan for Aquaculture are presented in Appendix 5. The depth and complexity of the business plan should reflect the complexity and extent of the proposed aquaculture operation. The business development plan should be used as the basis for evaluating social and economic values of the proposed aquaculture venture and for monitoring development performance against planned development.

All proposals that involve the introduction of introduced (non-endemic) species should be considered and assessed on the basis of the SPC guidelines about introduction of non-endemic species (Appendix 5). Assessment procedures should give regard to guidelines about responsible aquaculture development given in the Food and Agriculture Organization Technical Guidelines For Responsible Fisheries 5 (Aquaculture Development) and the 2002 'Regional Guidelines for Responsible Aquaculture', and be bound by any other international treaty or convention to which Tonga is a signatory.

The Technical Assessment Group from the Fisheries Division, when initially assessing applications for aquaculture development licences, should consider the following information when dealing with an application. All applications should supply this information to the relevant level of detail, according to the nature of the application.

1. Does the applicant have proven tenure over the land or water in which the proposed aquaculture operation is to operate?
2. Does or could the proposed aquaculture operation impact on existing industries or activities? If so, what are they? What is the nature of the risks and consequences to those activities?
3. Does the applicant have support of the relevant Designated Community group when relevant?
4. What are the potential environmental impacts, in terms of nutrient discharge, use of chemicals for control of parasites, disease and competitors, uncontrollable release of exotics, disease transfer risk, salination of land areas and loss of structures due to mechanical failure?
5. What considerations for disease monitoring and management requirements are given in the application?
6. Does the proposal involve the introduction of a non-endemic species? If so, have the applicants undergone a detailed examination of the risks involved and have broodstock been quarantined and examined for disease and pathogens by a competent and qualified veterinarian pathologist?
7. What are the potential social and economic benefits? Is there a scoping study, business risk evaluation and business plan?
8. Is the application consistent with the Objectives of the Management Plan?
9. Does the applicant have the technical competence, financial backup and experience to successfully develop the proposed aquaculture venture.

The Technical Advisory Group should then assign each application for an aquaculture development licence into categories A–C.

As a broad principle, applications for aquaculture development licences classified in Category A should be assessed within the Fisheries Division. Applications classified in Category B and C should be referred to the Ministry of Lands, Environment, Climate Change and Natural Resources (Department of Environment and Climate Change), and the Ministry of Infrastructure (Marine and Ports Division). Comments from these agents must be received by the Fisheries Division of MAFFF within one calendar month of the application being sent from the Fisheries Division. Failure to return any comments about the proposed aquaculture operation within the specified time period will be deemed as a statement that the relevant agency expresses no concern about the application under consideration.

Proposals classified into Category A should then be assessed and recommended for approval or rejection by the Technical Advisory Group before the application is forwarded to the Minister responsible for Fisheries for final approval or rejection. Proposals classified into Categories B and C should be referred to the Aquaculture Advisory Committee for review and comment before recommendations are forwarded to the Minister responsible for Fisheries for acceptance or refusal of the application.

## Appendix 3. Schedule of fees

1. Fee for application for an aquaculture development licence for a business or company: TOP 300
2. Fee for application for an aquaculture development licence for a Designated Community: TOP 100
3. Fee for application for a permit to occupy in inter-tidal and subtidal waters: TOP 100 per hectare for intensive aquaculture, TOP 100 per km<sup>2</sup> for extensive aquaculture.
4. Licence fee for Category A form of aquaculture – TOP 100 per year
5. Licence fee for Category B form of aquaculture – TOP 400 per year
6. Licence fee for Category C form of aquaculture – TOP 1,000 per year
7. Transfer fee for an aquaculture development licence: TOP 50
8. 'Permit to occupy' – TOP 500 per hectare per year for the first three years of the licence life of an intensive operation.
9. 'Permit to occupy' – TOP 500 per km<sup>2</sup> per year for the first three years of the licence life of an extensive operation.
10. After completion of the third year of the life of each Permit to Occupy, the annual fee structure should be adjusted to reflect production and economic rent of the venture. The basic fee structure should be retained, but the annual fee for the permit to occupy should be increased to capture 5% of the audited net profit of the aquaculture operation each year.

## Appendix 4. Creation of aquaculture areas and buffer areas

There will be three broad options for the creation of aquaculture areas and buffer zones in intertidal and subtidal waters:

**The first option** is to develop equivalent provisions to s. 24 of the Fisheries (Conservation and Management) Regulation 1994. This regulation gives the registrar (defined in the Fisheries Act (1989) as the Principal Fisheries Officer) the discretion to authorise erection and use of a fish fence. This power of authorisation is virtually unconstrained in terms of limiting location and access rights for such fences. There is no requirement to refer application for construction of fish fences to any other agency.

**The second option** is the application for a direct approval for an aquaculture area and buffer zone in intertidal and subtidal zones. This option offers the advantage of administrative simplicity, but has the disadvantages of:

1. being actually or potentially in conflict with planning schemes developed by government agencies, and existing marine area usage such as port areas and fishing operations;
2. creating the potential for of legal action between the principals of an authorised aquaculture area and any vessel user or other person involved in a collision or other accident involving aquaculture equipment used on the aquaculture area; and
3. being seen as a weak form of tenure by financial institutions as to reduce or negate the possibility of aquaculture proponents obtaining venture capital.

The present Lands Act has no head of power to grant leases for the purpose of aquaculture in inter-tidal and marine areas.

**The third and preferred option called 'granting tenureship'** gives head of power under the Aquaculture Management Act 2003 and Aquaculture Regulations 2008, enabling the Minister responsible for Fisheries to give leases (in the form of Permits to Occupy) for aquaculture areas in manner equivalent and parallel to that allowed for terrestrial areas under provisions of the Land Act. This option has the advantages of:

1. potentially being tailored to give the precise needs and flexibility required of an aquaculture area or buffer area;
2. ensuring the intent of the Aquaculture Management Act is maintained;
3. allowing for rapid assessment of applications once the system has been developed; and
4. ensuring administrative consistency.

Disadvantages include:

1. possibly taking some time to develop which could be a deterrent to the development of an aquaculture industry;
2. generating potential overlap between management and planning arrangements between the Fisheries Division of MAFFF and Ministry of Lands, Environment, Climate Change and Natural Resources; and
3. possibly being judicially uncertain, depending on the provisions and requirements of the Lands Act 1927.





