

TONGA NATIONAL AQUACULTURE MANAGEMENT & DEVELOPMENT PLAN (2014 – 2019)



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**Prepared by Aquaculture Section and Fisheries Management & Planning Section of
Fisheries Division, Ministry of Agriculture and Food, Forests and Fisheries
(MAFFF) and Aus Aid**

FOREWORD

The Kingdom of Tonga Aquaculture Management and Development Plan 2014 – 2019 is intended to provide a comprehensive set of policies aimed at guiding the efforts of the Fisheries Division of MAFFF and the relevant stakeholders to establish commercial aquaculture activities in Tonga's fisheries waters. These efforts are consistent with the directions of Forum Leaders to ensure maximum economic benefit from marine resources. The Kingdom of Tonga begins to witness the wild stocks have diminished to levels which have raised some concerns globally. Clear signs of close to over-exploitation of some important commercial fish stocks, alteration to ecosystems and significant widespread economic losses to small scale fishers.

Without a management and development plan to guide and manage the activities of those engaged in aquaculture, the purposes and objectives to move Tonga's aquaculture capacity into commercialisation will not be achieved. Not only is such a scenario detrimental to the Kingdom's future plans to develop aquaculture into commercialisation, but Tonga could be viewed as failing in its national obligations to contribute to the economic development of the country through the fisheries sector. Therefore failing to implement the necessary policy framework, such as this plan, to maximize economic benefit from aquaculture development and restock the reefs not only discourage the investors who wishes to invest in this sub-sector but it is in itself a failure to uphold national obligation.

The plan has outlined how licenses shall be allocated, categorised and managed. This also provides avenues for communities to utilize their adjacent waters for aquaculture purposes. It is important that communities, aquaculture business owners, and foreign investors and government work together to ensure that this plan reaches its full potential.

To this end, I, as Minister responsible, and on behalf of the Cabinet, welcome this development whole-heartedly. May I also take this opportunity to pledge the support of Cabinet in this endeavour, as we look ahead to the implementation of the plan, over the course of the next five years.



*Hon. Sangster Saulala
Minister of Agriculture and Food, Forests and Fisheries
Kingdom of Tonga
(8 July 2014)*



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ABBREVIATIONS

1. **AAC:** Aquaculture Advisory Committee
2. **TAG:** Technical Advisory Group

3. **EIA** : Environmental Impact Assessment
4. **SPC -HOF**: Secretariat to the Pacific Community – Head of Fisheries

PART 1: INTRODUCTION

The Aquaculture Management and Development Plan 2014 – 2019, have been designed to be used as a guideline for the Fisheries Division and future stakeholders in their quest to establish commercial aquaculture in Tonga. It has been realised that living marine resources, although renewable, must be effectively managed. Fundamentally, the wild stocks have diminished to levels which have raised some concerns globally and the marine wild stocks of Tonga are no different. Clear signs of fishing close to over-exploitation of some important commercial fish stocks, alterations to ecosystems and significant widespread economic losses to small scale fishers.

Aquaculture to Tonga is not a new activity. It has been practised in Tonga since the 1970s by the Fisheries Division with support from the Australian Government and the Japanese Government. The aquaculture centre has been spawning, rearing and culturing mainly giant clams, trochus, green snail and sea weed. This document is setting the steps in which to establish commercial aquaculture for Tonga. The plan establishes mechanisms for the development of a licensing procedure and selection, criteria of licences and establishment of committees. Precautionary approach shall be practice at all times as a major component of sustainable development.

1.1 Policy Statement

The Aquaculture Management and Development Plan 2014 - 2019 will take the form of a gazette policy and guidance paper linked to subsidiary legislation (Regulations) as required under s. 4 of the Aquaculture Management Act 2003, and as such must be explicit. It should address the requirements of the Act and identify and deal with other issues that currently constrain aquaculture development because of administrative deficiencies.

1.2 Purpose & Objectives of the Plan

The main purpose of this plan is to set the stage for which the development of aquaculture activities should be focused in. The sets of objectives provided here should enable criteria and administration to establishing of a commercial aquaculture activity for Tonga.

The main guiding principles for this plan are specifically directed from the Aquaculture Management Act 2003 and in particular are to;

‘To provide for the management and development of aquaculture in the kingdom and other matters incidental thereto’

Objectives of Aquaculture management in the Kingdom of Tonga

- 1) The aquaculture industry will contribute to the economic development and social well-being of the people of Tonga.
- 2) The aquaculture industry will be environmentally sustainable.
- 3) The aquaculture industry will be managed in a manner that considers and balances economic and social gains against environmental costs.
- 4) The aquaculture industry will be managed within a transparent and explicit regulatory framework.
- 5) There will be broad community consultation about aquaculture developments that have potential to impact on specific communities
- 6) Aquaculture product grown for human consumption will be safe and disease-free.

1.3 Scope of the Plan

The scope of the existing management and development plan only covers restricted areas for which aquaculture is to be conducted. The plan is prepared under the provisions of the Aquaculture Act 2003. This also includes any designated coastal community under the Fisheries Management Act 2002, of which the purpose of aquaculture is used.

1.4 Evaluation and Reporting

The Aquaculture Management and Development Plan will be reviewed annually if required. The progress in implementation of the plan should be report in the Ministry's annual report.

PART 2: DEVELOPMENT AND ROLE OF AQUACULTURE ADVISORY COMMITTEE (AAC)

2.1 Aquaculture Advisory committee

The Act requires the establishment of an Aquaculture Advisory Committee. (Section 11 of the Aquaculture Management 2003) The Aquaculture Advisory Committee is required to advise the Minister and Secretary/CEO for MAFFF about.

- 1) Any matter on which the Minister or Secretary/CEO for MAFFF is required to consult the Aquaculture Advisory Committee under the Act*
- 2) Policy, planning and guidelines for the regulation, management and development of aquaculture*
- 3) The elaboration or review of the aquaculture plan referred to in s. 4 of the Act and codes of practice referred to in s. 10 of the Act*
- 4) The approval of plans for collaboration on aquaculture management with foreign or local institutions*
- 5) Cooperation on the management and development of aquaculture among relevant government agencies and local communities*
- 6) Appropriate public awareness programmes on the need for proper management and development of aquaculture*
- 7) The establishment of aquaculture areas and buffer zones*
- 8) Other matters relating to aquaculture which the Minister refers to the Advisory Committee for investigation, deliberation and advice*

Membership of the Aquaculture Advisory Committee is required to consist of

- 1) The Head of Fisheries (who shall be the Chair)*

- 2) *Officer of the Ministry of Lands Environment, Climate Changes and Natural Resources*
- 3) *Officer of the Ministry of Commerce, Tourism and Labour*
- 4) *Officer of the Ministry of Infrastructure*
- 5) *Three representatives of the aquaculture industry appointed by the Secretary of the Fisheries Division in consultation with fish farmer associations¹ and organisations involved in aquaculture affairs.*

The Advisory Committee may co-opt any person with particular expert knowledge or skill but such a co-opted person shall not be entitled to vote.

The Advisory Committee shall determine its procedures.

2.2 Operational aspects of the Aquaculture Advisory Committee

2.2.1 Membership

The membership of the Aquaculture Advisory Committee is established by s. 11 (2) of the Aquaculture Management Act.

Aquaculture industry representatives should be selected for a two-year term. Representatives should, in the first instance, include a nominee of the Pearl Oyster Association (from Vava'u), a representative from the Limu industry, Aquarium industry and a community representative with interest in aquaculture. Industry representatives should have nominated alternate delegates who may represent them when they are unable to attend meetings. Members of the Aquaculture Advisory Committee should be eligible for second and subsequent terms.

A meeting of the Aquaculture Advisory Committee should not be valid, or make decisions, unless a quorum of no fewer than five members is present.

Members of the Aquaculture Advisory Committee may arrange for a proxy to take their place by giving five days notice to the Secretary of the Aquaculture Advisory Committee.

Industry observers may attend open sessions of meetings conducted by the Aquaculture Advisory Committee.

2.2.2 Meeting process and task list

The Aquaculture Advisory Committee should, within 12 months of its formation, meet at least every 3 months in order to:

¹ This association has not been formed yet. As this fishery commences it is advice that an association may be established.

- Consider its terms of reference,
- Determine its operating procedures,
- Review and amend the draft Aquaculture Management Plan and the associated discussion paper that has been developed by the Fisheries Division
- 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 Fisheries Division on any application for an aquaculture development licence or permit to occupy brought to the Committee's attention,
- Encourage the development of codes of practice, as required in s.10 of the Act, and then as required to address specific matters referred to it by the Fisheries Division.

Given that aquaculture development license applications must be assessed within a **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 specific applications. There should be provision for out-of-session review of simple applications by Committee members.

Standing agenda items should include, but not be confined to:

- consideration of the Advisory Committee's role and terms of reference,
- review progress on aquaculture codes of practice (s. 10 of the Act),
- consideration and review of aquaculture development licence applications that trigger the Advisory Committee's involvement (s. 12-17 of the Act)
- inter-agency issues involving aquaculture, both at a national and international level,
- consideration of any application to introduce a species of fish that is not indigenous to Tonga (ss. 28-29 of the Act). In such consideration, the Advisory Committee must co-opt technical advisers from the Fisheries Division and the Department of Environment, Ministry of Lands, Natural Resources and Climate Changes

Meetings of the Advisory Committee will be convened by the Head of Fisheries Division. The meeting convener will be responsible for identifying a meeting venue, circulating an agenda and minutes of the previous meeting at least one week before the date of each meeting, taking minutes and supply of other secretarial services at each meeting, and being responsible for initiating action on each action item developed by the Committee. There shall be a Contract of Services between the Fisheries Division and the Aquaculture Advisory Committee.

2.2.3: Financial considerations

Members of the Aquaculture Advisory Committee will be 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 will be met by the Fisheries Division.

PART III: LAND AND MARINE AREA TENURE FOR AQUACULTURE DEVELOPMENT LICENSING

While the Aquaculture Management Act 2003 allows the Minister and his delegates to undertake aquaculture on aquaculture areas under specified conditions, the process by which aquaculture areas and buffer areas (s. 5-6 of the Act) are allocated and tenured is unspecified in the Act. This creates a fundamental uncertainty about aquaculture licensing procedures, and is a critical bottleneck for aquaculture administration. Rectification of this situation is required urgently, and must be a key component of the Management Plan if investors in the industry are to have any certainty about access to the industry.

3.1 Tenure

The creation of aquaculture areas will initially require different procedures for land-based and inter-tidal and marine-based aquaculture.

Land-based aquaculture authorisation on Crown Land requires that the proponent demonstrate the applicant has a valid lease of the land under consideration, and that the Minister of Lands, Environment, Natural Resources and Climate Changes and Cabinet has approved the availability and use of that land for aquaculture (s. 13(2) of the Act). Once appropriate tenure and approval has been demonstrated, the application can be assessed according to procedures given below.

There are to be *three broad options* for the creation of aquaculture areas and buffer areas in inter-tidal and sub-tidal waters.

The first 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 application for a direct approval for an aquaculture area and buffer area in inter-tidal and sub-tidal areas again 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

collision or other accident involving aquaculture equipment used on the aquaculture area,

- 3) being seen as such a frail form of tenure and certainty by financial institutes 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.

3.2 Granting tenureship

This is the third option which gives a head of power under the Aquaculture Management Act 2003 and Aquaculture Regulations 2008 that enables the Minister responsible for Fisheries to give leases (in the form of Permits to Occupy) for aquaculture areas in manner equivalent to, 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 / 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,
- 4) ensuring administrative consistency.

Disadvantages include

- 1) possibly taking some time to develop when certainty about process is a deterrent to 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.
- 3) possibly being judicially uncertain, depending on the provisions and requirements of the Lands Act 1927.

This option is the preferred position of the Fisheries Division '**Granting Tenureship**'.

3.3 Licensing considerations

Assessment and approval or rejection of an application for an aquaculture licence and / or permit to occupy should be risk-based and reflect the potential environmental and social risks and costs, and economic and social gains associated with a particular aquaculture venture. More stringent demands for information, assessment and approval should be required for aquaculture ventures that carry more risk about imposing environmental, social or economic costs onto third parties than simple, self-contained proposals. Fees are shown in **Appendix 3**.

Risk² is defined as the outcome of consequence and probability. Activities that have little consequence and a low likelihood of taking place are low risk; activities that have catastrophic outcomes are highly likely to occur carry extreme risk. For example, individual fishermen who are well trained and go to sea in well-maintained boats are unlikely to die from misadventure. The risks of such operations, on a national scale, are very low. Individual fishermen who go to sea in poorly maintained boats are far more likely to die from accidents. However, on a national scale, the risk, while higher than the previous example, is still not great and may be rated medium. An over-loaded inter-island ferry going to sea in very bad weather has an appreciable probability of sinking and causing major loss of life. The risk, on a national scale, is high. EIA assessments are shown in **Appendix 4**.

Staff from the Fisheries Division who have responsibilities for assessment of applications (the Technical Advisory Group (TAG)), consisting of the;

- CEO (MAFFF),
- Deputy Secretary (Technical Section) and the
- Section Head (Aquaculture and Licensing)

They should carry out an initial assessment to classify the application. Applications should be considered on the basis of environmental risk and economic/social benefits and costs.

3.4 Licence 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

² Risks are rated low, medium and high.

of information required for each Environmental Impact Assessment should vary with the potential environmental consequences of each aquaculture proposal. Broad prescriptions and guidelines for Environmental Impact Assessments (**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 Environmental Impact Assessment under 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.

Guideline for a Business Development Plan for Aquaculture is shown 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 1**). Assessment procedures should give regard to guidelines about responsible aquaculture development given in the FAO Technical Guidelines For Responsible Fisheries 5 (Aquaculture Development) and the “Regional Guidelines for Responsible Aquaculture” (SEAFDEC, 2002), 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 assess 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 / 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 has 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 approved / rejected 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.

3.5 Transitional arrangements

There are a small number of aquaculture operations that exist and operate in the Kingdom of Tonga. They have been authorised to operate under a range of *ad hoc* arrangements that should be formalised as quickly as possible. This includes pearl farming, aquarium culture products and limu farming.

It is proposed that existing aquaculture operations be applied for in a manner almost identical to the application process required of new applications. The significant difference is that existing operations should not be required to complete an Environmental Impact Assessment.

Applications for existing aquaculture operations should be assessed by the Technical Advisory Committee from the Fisheries Division. The Technical Advisory Committee

should then send a recommendation about the operation to the Minister responsible for Fisheries .

Application and licence fees for existing aquaculture operations should be the same as those for new aquaculture development applications and licences.

3.6 Renewal of licences

The Act requires that aquaculture development licences shall be of a term no longer than 10 years. Most aquaculture operations should have a life expectancy greater than ten years, so provision should be made to renew aquaculture development licences. The renewal process does not need to be as demanding as the initial assessment, as the aquaculture operation's viability will have been established by the time renewal is approached. There are existing powers in the Act that can be used to obtain information about the environmental consequences of licensed aquaculture operations and amend conditions on existing aquaculture development licences as required. Applications for aquaculture development license renewals shall be forwarded to the Aquaculture Advisory Committee for assessment and recommendation about renewal or cancellation.

PART IV: MANAGEMENT PROCEDURES

4.1 Application forms, license forms

Application forms and license forms shall be stipulated in the Aquaculture Management Regulations 2008.

Application fees, Aquaculture Development License fees and other important fees shall be paid in full before any aquaculture activity is to proceed. The prescribed fees are provided in **Appendix 3**.

4.2 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 inter-tidal or sub-tidal water is made for the purpose of aquaculture within a three-month time frame, the applications will be referred to the Aquaculture Advisory Committee for comment and advice about a preferred application. The Aquaculture Advisory Committee will develop its advice on a preferred applicant the basis of the application that best meets the objectives of aquaculture management in Tonga, as set out in the Aquaculture Discussion Paper. The Aquaculture Advisory Committee will then assess the preferred application and recommend to the Minister whether the preferred application be accepted or rejected. The non-preferred application will be cancelled.

4.2.1 Spacing between aquaculture areas

There are good historic reasons to ensure 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 polluted areas.

Spacing requirements can be given on a case by case basis, or have general rules applied. Given that Tongan aquaculture is in its infancy, and that there is no good technical base upon which to develop case by case rules, a category-based set of rules should be used for spacing requirements as an interim measure until better data are available.

Category A: Aquaculture development licences have no spacing restrictions.

Category B: Aquaculture development licences should not be issued within 1 km of an existing Category B licensed area, or within 3 km of a licensed Category A licensed area unless the proposed operations are to be in water bodies separated by a peninsular or complex of islands.

Category C: Aquaculture development licences should not be issued within 5 km of an existing Category C licensed area, or within 3 km of a licensed Category B licensed area unless the proposed operations are to be in water bodies separated by a peninsular or complex of islands.

4.2.2 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 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. The licence should expire on the expiry date of the original licence.

4.2.3 Subletting of aquaculture areas

Sub-leasing of aquaculture areas should not be authorised or permitted, as the practice may lead to unproductive speculation and / or disregard for licence conditions.

4.2.4 Production statistics

All aquaculture licence holders must be required to provide bi-monthly returns, giving details of production, standing stock, mortalities and numbers of employees as a condition of licence. A draft bi-monthly production return is given in **Appendix 3**.

4.2.5 Aquaculture operations that use fisheries resources taken from the wild

Many forms of aquaculture are based on the take of fisheries resources from the natural environment. Examples include (but are not confined to) the take of broodstock from hatcheries, the take of naturally occurring oysters for pearl culture, the capture of 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 management operation needs to use fisheries resources taken from the natural environment. All applications for aquaculture that propose the use naturally occurring fisheries resources must have received an appropriate authority from the Fisheries Division.

4.2.6 Aquaculture product to be exempt from regulations applied to fishery products

Aquaculture product produced on a licensed aquaculture area should not be subject to size limits, seasonal marketing requirements and any other provision specific to restriction of capture fisheries. Product from a licensed aquaculture area that would otherwise be in contradiction of a regulation of the Fisheries Act must be certified by an authorised officer of the Fisheries Division as being aquaculture product after that officer has satisfied himself / herself that the product in question is in fact aquaculture product. No product from capture fisheries can be taken into a licensed aquaculture area.

4.2.7 Markers and Signage

Areas in which aquaculture is authorised need to be marked in order that exclusive access to the aquaculture premise can be notified, that potential hazards to shipping can be identified and that the community in general can be made aware that the aquaculture premise is being used 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 require 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 on every aquaculture development licence issued by the Fisheries Division.

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 of the boundaries of the area(s) in which they are authorised to operate, or who do not maintain signs properly.

4.2.8 Policing, regulatory aspects, penalty provisions

Penalty provisions for offences against the Regulations of Aquaculture Management Act will be built into the Regulations where relevant.

4.2.9 Performance indicators, time lines and review

Aquaculture authorities have been used for unproductive speculation in other jurisdictions. In the case of such of authorities being in inter-tidal and sub-tidal areas, there is a cost of some form to the broader community, which is supposedly balanced by the economic and social benefits derived from the aquaculture operation. If the proposed aquaculture operation does not proceed, these benefits are not realised.

There should be a general principle that aquaculture licenses should be used for the purpose they were intended. Aquaculture licence holders whose licences give them access to inter-tidal and sun-tidal waters who do not meet the planned development phases of their business plans should be asked to show why their licence should not be cancelled. In the event of a licence holder of a licence that authorises aquaculture in inter-tidal and sub-tidal areas not initiating development of the planned aquaculture operation within one year of the licence issue, the licence should be cancelled.

APPENDICES

APPENDIX I: SPC-HOF Principles for Aquatic Organisms Introduction and Translocation for Aquaculture and Culture-Based Fisheries, 2003

Purpose, benefits and risks

1. The introduction and movement of aquatic organisms should have a clear economic, social, or environmental benefit.
2. It should also be shown why similar benefits cannot be attained by utilising indigenous or local strain of species. The use of an indigenous species is preferable to introducing a new species.
3. Introduction and movements of aquatic organisms may lead to new and emerging pests, pathogens and diseases. Therefore, such activities may pose risks to the importing country. Risk arises from both the intended transfer species and also from pathogens, parasites and symbiotic associated with this species.

Risk assessment

4. Proposals for introduction and movements must be assessed from a holistic perspective, taking into account a full review of the potential hazards and an assessment of the options for mitigation.
5. The impacts to existing aquaculture operations and culture fisheries and the habitat to which the movement will be made should be considered. In addition the risks to natural ecosystem, rural livelihoods, food security, public health and trade should be taken into account.
6. When there is considerable uncertainty about the biology of the proposed species or the possible risks associated with the translocation, the Precautionary Approach should be adopted.
7. The first movement (introduction) of a new species into a new area will require special considerations in light of the risk of introducing new pests, parasites, pathogens and genetic material.

Notification and engagement of stakeholders

8. Formulation of policy and legislation concerning introduction and movements should seek to engage all stakeholders in a participatory process. In addition, governments should establish advisory groups with links to independent and scientifically competent expert bodies.
9. Translocation into regions that are shared zone between two countries should be approved by relevant authorities in both territories concerned. Under such circumstances the proponent country should inform its neighbour of the intended translocation.

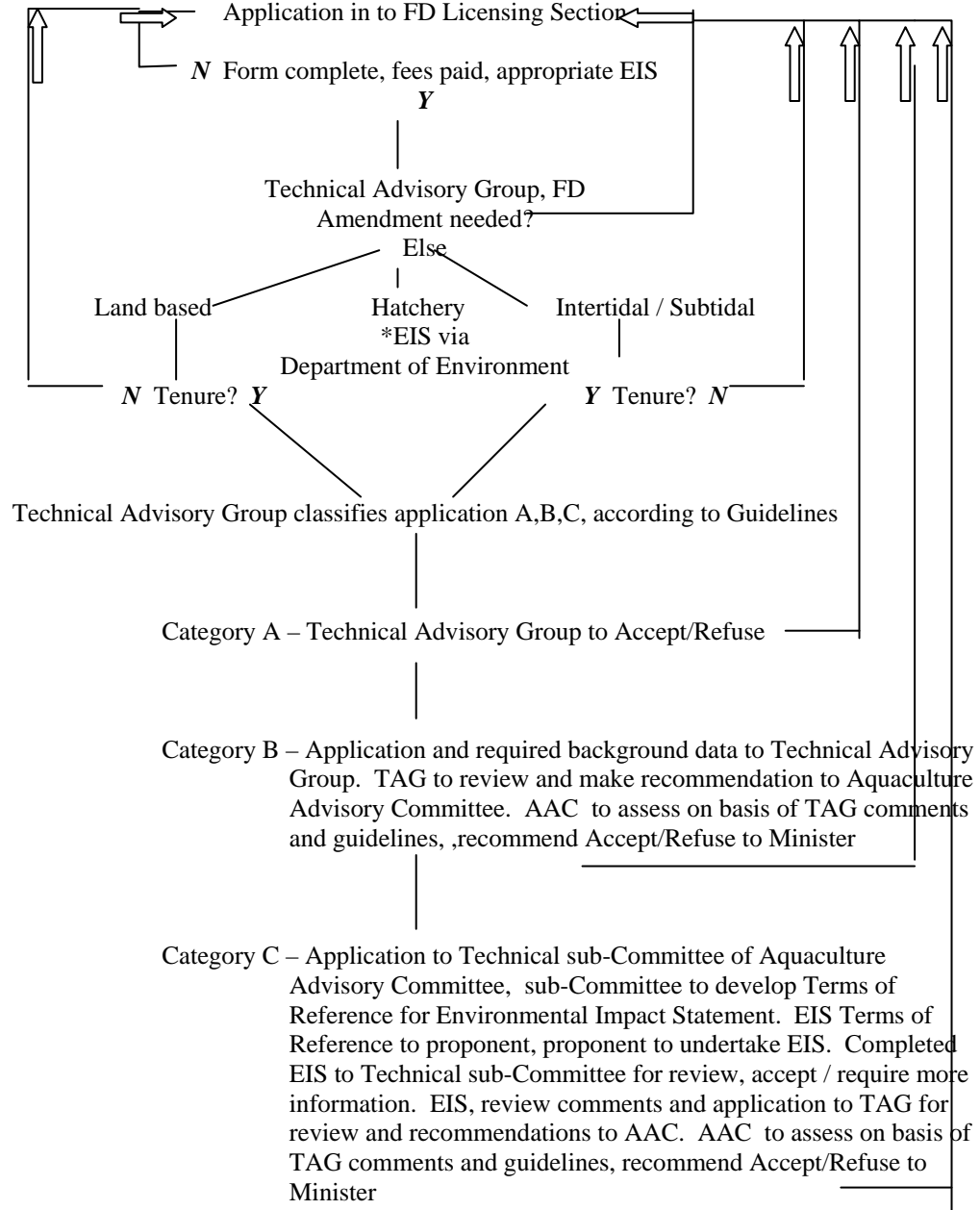
Quarantine and release strategies

10. When introducing a new organism attention should be focused on the prevention of the spread of diseases and pests that might accompany the import through the implementation of an effective quarantine measure.
11. Quarantine measures should be based on scientific principles and be practical, cost-effective and easy to implement by utilising readily available facilities. Individual countries may need to adopt, modify or vary guidelines to suit their own particular situations and resources.
12. Movements of aquatic organisms should be conducted within the provisions given in existing relevant national and international agreements and instruments such as the United Nations FAO fisheries code of conduct and convention for biological diversity.
13. All introductions must be treated as open water stocking even if made to aquaria or closed water bodies (dams or ponds). The possibility of the species establishment into the natural environments should not be disregarded.

Roles and responsibilities, capacity building and awareness raising

14. National governments have a key responsibility to manage the risks arising from the introduction and movement of aquatic organisms. This includes the responsibility to reject applications for introductions when the risks of the introduced species itself are deemed unacceptably high; and to terminate an introduction if the specimens are found to be carriers of unwanted organisms.
15. The varying capacity, special circumstances and requirements of developing countries to implement quarantine programs should be taken into account by development agencies and donor institutions.
16. Collaboration among the governments, public institutions, and the private sector, including all stakeholders, is important to achieve the full purpose of effective management of aquatic organism transfers.
17. Policy makers, enforcement agencies, stakeholders and the general public need to be made aware of issues related to, and the need for, policy on the introduction and movement of aquatic species and this should be high on national agendas.

APPENDIX 2: Schematic – Aquaculture Assessment and Licensing Process



*If a hatchery – refer to Dept of Environment for Terms of Reference for an EIS, then treat as Category C application

Details of the Schematic - Aquaculture Assessment and Licensing Process

Category A includes (but is not confined to)

1. Freshwater raceways, freshwater cage culture of indigenous fish and self contained ponds with no discharge outside the proponent's property boundaries:

Fisheries Division Technical Advisory Group to assess and recommend approval/rejection without reference to the Aquaculture Advisory Committee, subject to proponent supplying a business plan, Environmental Impact Assessment and satisfactory information about tenure, approval by the Ministry of Lands for aquaculture usage, chemical usage, disease risk, monitoring and management and impact on ground water quality.

2. Fresh water stocking with indigenous species:

Fisheries Division Technical Advisory Group to assess and recommend approval/rejection after reference to appropriate Designated Community or adjacent community (if such a group exists and is relevant), but without reference to the Aquaculture Advisory Committee, subject to proponent supplying a business plan and satisfactory information about the state of native fish resources, disease monitoring, impact on existing flora and fauna via the required Environmental Impact Assessment, and the existence of an agreed allocation and cost recovery process by the Designated Community or the local community who may harvest stocked fish. The assessment process is to consider advice from the Designated Community or local community and any technical advice about the potential impact of restocking, and economic and social benefits as the basis of recommending approval/rejection to the Minister.

3. Freshwater hatcheries:

Fisheries Division Technical Advisory Group to assess and approve/reject without reference to the Aquaculture Advisory Committee, after receiving advice and support from the Department of Environment in relation to the Environmental Impact Assessment required under the Environmental Impact Assessment Act (which shall be used as the Environmental Impact Assessment as required under the Aquaculture Management Act). The aquaculture development licence application's assessment should also be subject to the proponent supplying a business plan and satisfactory information about tenure, chemical usage, disease risk, monitoring and management and impact on ground water quality, approval by the Ministry of Lands for aquaculture usage.

Category B includes (but is not confined to)

1. Intertidal stick and rack culture, or hanging bag culture (indigenous species):

The Fisheries Division to supply data on local fisheries and other forms of access that may be affected by the proposal. The Ministry of Ports to supply data on impact of excluding shipping from the proposed Aquaculture Area, and risk in the event of aquaculture equipment being lost from the Aquaculture Area in adverse weather. Application and technical assessment to be initially undertaken by the Technical Advisory Group then referred to the Aquaculture Advisory Committee for comment, advice and recommendation on the basis of balancing environmental costs of the proposal against potential social and economic gain from Environmental Impact Assessment. Assessment should be subject to proponent supplying a business plan and details of operating procedures, including site marking, notification to shipping and security procedures. Assessment staff must also Ministry comments and consider loss of access and natural resource usage to local communities and fishers, following consultation with the Designated Community or local community (if such a group exists and is relevant). Assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

2. Marine longline culture that involves no feeding (indigenous species):

The Fisheries Division to supply data on local fisheries that may be affected by the proposal. The Ministry of Ports to supply data on impact of excluding shipping from proposed Aquaculture Development Area, and risk in the event of aquaculture equipment being lost from the Aquaculture Development Area in adverse weather. Application and technical assessment to be initially undertaken by the Technical Advisory Group then referred to the Aquaculture Advisory Committee for comment and advice on the basis of balancing environmental costs of the proposal against potential social and economic gain from Environmental Impact Assessment. Aquaculture Advisory Committee to assess and recommend approval/rejection of the application on the basis of balancing environmental costs of the proposal against potential social and economic gain to the Minister responsible for Fisheries. Assessment should be subject comments from relevant Ministries, the proponent supplying a business plan and details of operating procedures, including site marking, notification to shipping and security procedures. Assessment staff must also consider loss of access and to local communities and fishers, following consultation with the Designated Community or local community (if such a group exists and is relevant). Assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

3. Coastal marine hatchery (land based):

Proponent to supply data on impact of proposal on mangroves and intertidal environment, and to identify source of water, giving details about impact of inlet and outfall construction on local environment and impact on local fisheries and community access, via an Environmental Impact Assessment study as required under the

Environmental Impact Assessment Act and Aquaculture Management Act. Proponent to identify amount and quality of discharge water, identifying anticipated change in nitrate and phosphate levels from ambient (input) water quality and net annual nutrient loading that may be attributable to the hatchery. Application and technical assessment to be initially undertaken by the Technical Advisory Group after receipt of advice and support from Department of Environment in relation to required Environmental Impact Assessment, then referred to the Aquaculture Advisory Committee for comment and advice on the basis of balancing environmental costs of the proposal against potential social and economic gain from Environmental Impact Assessment. Aquaculture Advisory Committee to assess and recommend approval/rejection of the application on the basis of balancing environmental costs of the proposal against potential social and economic gain, comments from relevant Ministries and on the basis of proponent supplying an acceptable business plan and details of operating procedures, environmental and community impacts to the Minister responsible for Fisheries. Assessment staff must also consider loss of access and to local communities and fishers, following consultation with the Designated Community or local community (if such a group exists and is relevant). If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

4. Open marine water restocking with indigenous species:

Proponent to advise Fisheries Division about state of natural resource, and the likelihood of displacing, rather than supplementing population levels of species under consideration. Fisheries Division Technical Assessment Group to assess risk of open water stocking program causing disease outbreak in natural population. Designated Communities and local communities to be consulted about allocation of restocked fish resources, policing requirements and cost-recovery procedures. Application and technical assessment to be initially undertaken by the Technical Advisory Group, then referred to the Aquaculture Advisory Committee for comment and advice on the basis of balancing environmental costs of the proposal against potential social and economic gain from Environmental Impact Assessment. Aquaculture Advisory Committee to assess and recommend approval/rejection of the application on the basis of balancing environmental costs of the proposal against potential social and economic gain, comments from relevant Ministries and on the basis of proponent supplying an acceptable business plan and details of operating procedures, environmental and community impacts a fair allocation and cost recovery process to the Minister responsible for Fisheries Risk assessment should be made in the light of the principle precautionary. Assessment staff must also consider loss of access and to local communities and fishers, following consultation with the Designated Community or local community (if such a group exists and is relevant). If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process. The assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical

Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

Category C includes (but is not confined to)

1. Fresh water stocking with non-indigenous species:

Proponent to undertake a detailed Environmental Impact Assessment, with terms of reference developed by a technical sub-committee reporting to Aquaculture Advisory Committee. The sub-committee should include representatives from the Fisheries Division and the Department of Environment. The Terms of Reference should give particular attention to the risk of disease introduction, the risk of the introduced species triggering an uncontrollable population explosion, the risk of the introduced species displacing native species and details of social and economic benefits. The technical sub-committee should then undertake an appraisal of the Environmental Impact Statement, calling for more information where relevant. The proponent must consult with Designated Communities and the broader community about allocation of restocked fish resources, policing requirements and cost-recovery procedures and offer detailed procedures or alternatives about these matters. The Environmental Impact Assessment, its technical assessment and the application should then be referred to the MoF Technical Advisory Group and the Aquaculture Advisory Committee for comment and advice. Aquaculture Advisory Committee to then assess and recommend approval or rejection of the application to the Minister on the basis of comments from relevant Ministries, balancing risks of irreversible biological impacts against potential social and economic gain, taking into account the SPC guidelines about introduction of non-indigenous species (Appendix 1). Risk assessment should be made in the light of the precautionary principle. The assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

2. Open marine water restocking with non-indigenous species:

Proponent to undertake a detailed Environmental Impact Assessment, with terms of reference developed by the technical sub-committee reporting to Aquaculture Advisory Committee. The sub-committee should include representatives from the Fisheries Division and the Department of Environment. These Terms of Reference should give particular attention to the risk of disease introduction, the risk of the introduced species triggering an uncontrollable population explosion, the risk of the introduced species displacing native species and details of social and economic benefits. The technical sub-committee should undertake a technical appraisal of the Environmental Impact Statement, calling for more information where relevant. The proponent must consult with Designated Communities and the broader community about allocation of restocked fish resources, policing requirements and cost-recovery procedures and offer detailed procedures or alternatives about these matters. The Environmental Impact Assessment,

its Technical Assessment and the application should then be referred to the MoF Technical Advisory Group and Aquaculture Advisory Committee for comment and advice. The Aquaculture Advisory Committee to then assess and recommend approval or rejection of the application on the basis of comments from relevant Ministries, balancing risks of irreversible biological impacts against potential social and economic gain, taking into account the SPC guidelines about introduction of non-indigenous species. Risk assessment should be made in the light of the precautionary principle. The assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

3. Land-based pond culture using seawater (e.g. prawn farms, estuarine fish culture):

Proponent to undertake a detailed Environmental Impact Assessment, with terms developed by the technical sub-committee reporting to Aquaculture Advisory Committee. The sub-committee should include representatives from the Fisheries Division and the Department of Environment Aquaculture Advisory Committee. These Terms of Reference should give particular attention to the construction impact of water inlet and outlet lines (including community access to the waterfront), impact of pond construction on mangroves and coastal environments, the risk of disease introduction, the risk of nutrient discharge from ponds into the sea and associated consequences, the potential for ground water and land contamination from pond leakage and adversely affecting adjacent ecosystems the social and economic benefits to be derived from the proposal. The technical sub-committee should undertake a technical appraisal of the Environmental Impact Statement, calling for more information where relevant. The Environmental Impact Assessment, its Technical Assessment and the application should then be referred to the MoF Technical Advisory Group and the Aquaculture Advisory Committee for comment and advice. Aquaculture Advisory Committee to then assess and recommend approval or rejection of the application on the basis of comments from relevant Ministries, balancing risks of irreversible biological impacts against potential social and economic gain. Risk assessment should be made in the light of the precautionary principle. The assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

4. Marine longline culture that involves no feeding (non-indigenous species):

Proponent to undertake a detailed Environmental Impact Assessment, with terms developed by the technical sub-committee reporting to Aquaculture Advisory Committee. The sub-committee should include representatives from the Fisheries Division and the Department of Environment Aquaculture Advisory Committee. These Terms of Reference should give particular attention to the risk of disease introduction, the risk of the introduced species triggering an uncontrollable population explosion and the risk of the

introduced species displacing native species. The technical sub-committee should undertake a technical appraisal of the Environmental Impact Statement, calling for more information where relevant. The Environmental Impact Assessment, its Technical Assessment and the application should then be referred to the MoF Technical Advisory Group and the Aquaculture Advisory Committee for comment and advice. The Aquaculture Advisory Committee to then assess and recommend approval or rejection of the application on the basis of comments from relevant Ministries, balancing risks of irreversible biological impacts against potential social and economic gain, taking into account the SPC guidelines about introduction of non-indigenous species. Risk assessment should be made in the light of the precautionary principle. The assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

5. Cage culture of hatchery reared spat/fingerlings, or controlled on-growing of juveniles taken from the wild (indigenous species).

Proponent to undertake a detailed Environmental Impact Assessment, with terms developed by the technical sub-committee reporting to Aquaculture Advisory Committee. The sub-committee should include representatives from the Fisheries Division and the Department of Environment Aquaculture Advisory Committee. These Terms of Reference should give particular attention to the construction impact of cages on local fauna and flora, the risk of disease introduction by caged fish acting as a vector, the extent of nutrient discharge from cages into the sea and associated consequences, the displacement of existing fishing and other activities from the proposed site, and the social and economic benefits to be derived from the proposal. The technical sub-committee should undertake a technical appraisal of the Environmental Impact Statement, calling for more information where relevant. The Environmental Impact Assessment, its Technical Assessment and the application should then be referred to the MoF Technical Advisory Committee and the Aquaculture Advisory Committee for comment and advice. The Aquaculture Advisory Committee to then assess and recommend approval or rejection of the application on the basis of advice from relevant Ministries, balancing risks of irreversible biological impacts against potential social and economic gain. Risk assessment should be made in the light of the precautionary principle. The assessment from Aquaculture Advisory Committee to be forwarded to the Minister responsible for Fisheries with a recommendation to accept or reject the application. If license approved, MoF Technical Advisory Group and licensing staff to develop appropriate license conditions, based on comments from assessment process.

APPENDIX 3: Schedule of Fees

1. Fee for application for an aquaculture development licence for a business or company: \$300
2. Fee for application for an aquaculture development licence for a Designated Community: \$100
3. Fee for application for a permit to occupy in inter-tidal and sub-tidal waters: T\$100 per hectare for intensive aquaculture, \$100 per km² for extensive aquaculture.
4. Licence fee for Category A form of aquaculture – \$100 per year
5. Licence fee for Category B form of aquaculture – \$400 per year
6. Licence fee for Category C form of aquaculture – \$1,000 per year
7. Transfer fee for an aquaculture development licence: \$50
8. ‘Permit to occupy’ – \$500 per hectare per year for first three years of the licence life of an intensive operation.
9. ‘Permit to occupy’ – \$500 per km² per year for first three years of the licence life of an extensive operation.
10. After completion of the third year of each Permit to Occupy’s life, 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: Guidelines for the conduct of environmental impact assessments (EIA).

All aquaculture development license applications must be accompanied by an Environmental Impact Assessment, other than those for freshwater and marine hatcheries, which trigger a requirement for an Environmental Impact Assessment under the Environmental Impact Assessment Act 2003.

Category A aquaculture proposals should describe or give relevant information about

- 1) the location of the proposed aquaculture venue, and the (physical) area in which the proposed aquaculture is to be developed
- 2) a general description of the area in which the proposed aquaculture development is to occur. This description should include, but not necessarily be confined to, an overview of soil type, vegetation, fauna and the extent to which the site has been disturbed from its natural condition
- 3) a description of native fish and other aquatic fauna in any natural water body that may be impacted by the proposed aquaculture proposal, through either pond construction or release of aquaculture products
- 4) proposed method of discharge from any ponds or raceways
- 5) changes in water quality parameters in the immediate vicinity of the proposed aquaculture operation that may occur during the proposed aquaculture operations
- 6) a description of the amount and nature of any chemicals to be used in the proposed aquaculture operation, and of their disposal
- 7) a description of biofoulants that may develop in the course of the proposed aquaculture operation, and of their disposal
- 8) a description of any disease monitoring and control methods to be used in the proposed aquaculture operation
- 9) a description of any changes to the environment, both within the proposed aquaculture area and in the immediate vicinity of the area, that may occur as a consequence of the proposed aquaculture operation.

Freshwater hatcheries:

Terms of Environmental Impact Assessment to be developed by the Department of Environment (as under the Environmental Impact Assessment Act), and in consultation with the Aquaculture Advisory Committee. The Assessment will be used as the Environmental Impact Assessment as required under the Aquaculture Management Act).

Category B aquaculture proposals should describe or give relevant information about

- 1) the location of the proposed aquaculture venue, and the (physical) area in which the proposed aquaculture is to be developed
- 2) a general description of the area in which the proposed aquaculture development is to occur. This description should include, but not necessarily be confined to, an overview of soil or seabed type, vegetation, fauna and the extent to which the site has been disturbed from its natural condition
- 3) a description of native fish and other aquatic fauna in the area that may be impacted by the proposed aquaculture proposal
- 4) a description of any flora and fauna that will be removed or destroyed as a consequence of the proposed aquaculture venture
- 5) a description of systems that will be used to ensure aquaculture equipment does not move from the proposed aquaculture site, if this is a relevant consideration
- 6) proximity and nature of any other licensed aquaculture operations within 5 km of the proposed aquaculture operation
- 7) proposed method of discharge from any ponds or raceways
- 8) changes in water quality parameters in the immediate vicinity of the proposed aquaculture operation that may occur during the proposed aquaculture operations
- 9) a description of the amount and nature of any chemicals to be used in the proposed aquaculture operation, and of their disposal
- 10) a description of biofoulants that may develop in the course of the proposed aquaculture operation, and of their disposal
- 11) a description of any disease monitoring and control, and parasite control, methods to be used in the proposed aquaculture operation
- 12) details of any monitoring of environmental parameters in and adjacent to the proposed aquaculture venture, including monitoring to examine if native species are being displaced, if this is a relevant consideration
- 13) a description of any changes to the environment, both within the proposed aquaculture area and in the immediate vicinity of the area, that may occur as a consequence of the proposed aquaculture operation.

Coastal marine hatchery (land based):

Terms of Environmental Impact Assessment to be developed by the Department of Environment (as under the Environmental Impact Assessment Act), and in consultation with the Aquaculture Advisory Committee. The Assessment will be used as the Environmental Impact Assessment as required under the Aquaculture Management Act).

Category C aquaculture proposals should describe or give relevant information about

- 1) the location of the proposed aquaculture venue, and the (physical) area in which the proposed aquaculture is to be developed
- 2) a general description of the area in which the proposed aquaculture development is to occur. This description should include, but not necessarily be confined to, a description of soil or seabed type, vegetation, fauna and the extent to which the site has been disturbed from its natural condition
- 3) a description of disease and parasite monitoring and surveillance of any animal proposed for aquaculture that is not indigenous to the Kingdom of Tonga and is to be introduced into the Kingdom's waters
- 4) a description of native fish and other aquatic fauna in the area that may be impacted by the proposed aquaculture proposal
- 5) a description of any flora and fauna that will be removed or destroyed as a consequence of the proposed aquaculture venture
- 6) a description of systems that will be used to ensure aquaculture equipment does not move from the proposed aquaculture site, if this is a relevant consideration
- 7) proximity and nature of any other licensed aquaculture operations within 5 km of the proposed aquaculture operation
- 8) proposed method of discharge from any ponds or raceways
- 9) changes in water quality parameters in the immediate vicinity of the proposed aquaculture operation that may occur during the proposed aquaculture operations
- 10) potential impact of the proposed aquaculture venture on groundwater in the immediate vicinity of the operation
- 11) a description of the amount and nature of any chemicals to be used in the proposed aquaculture operation, and of their proposed methods of disposal
- 12) a description of biofoulants that may develop in the course of the proposed aquaculture operation, and of their disposal

- 13) a description of any disease monitoring and control, and parasite control, methods to be used in the proposed aquaculture operation
- 14) details of any monitoring of environmental parameters in and adjacent to the proposed aquaculture venture, including monitoring to examine if native species are being displaced, if this is a relevant consideration
- 15) a description of any changes to the environment, both within the proposed aquaculture area and in the immediate vicinity of the area, that may occur as a consequence of the proposed aquaculture operation.

APPENDIX 5: Guidelines for a Business Development Plan for Aquaculture

The following information should be provided:

- Location and area of the proposed business
- Nature of the operation, in terms of species to be cultured and method of aquaculture to be used
- Area of land or water proposed to be used for aquaculture
- Infrastructure associated with the proposed aquaculture operation
- Time over which the proposed aquaculture project is to be established, and phases in which the development is to occur
- Proposed annual production schedule
- Description of employment over the project's lifetime
- Detailed management plan that describes procedures for dealing with disease, predators, biofouling, machinery breakdown, equipment failure, theft and other contingencies
- A detailed, time-structured budget that estimates costs, income and cash flow throughout the proposed project's life
- Markets for aquaculture product, market size, price structure of market
- Details of the proponent's technical and management experience
- A summary of how the proposed aquaculture operation is to be financed

