



National Aquatic **Biosecurity** **Strategic Plan** for **Papua New Guinea** 2019–2023



Prepared by the Papua New Guinea National Agriculture
Quarantine and Inspection Authority
with assistance from the Pacific Community and
supported by the New Zealand Aid Programme



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Contents

Foreword	iv
1 Introduction	1
1.1 Background	1
1.2 Current aquatic animal health and biosecurity in PNG.....	1
1.3 Biosecurity legal framework in PNG	2
1.4 National stakeholders' roles and responsibilities with regard to aquatic biosecurity	3
2 Rationale.....	5
3 Guiding principles.....	7
3.1 Main objectives of the strategy.....	7
3.2 Vision	7
3.3 Mission	7
3.4 Scope	7
3.5 Activity guidelines	7
4 Strategic work plan.....	9
4.1 Disease management	9
4.2 Improving border control and import and export management	11
4.3 Emergency planning.....	12
4.4 Interagency collaboration.....	13
4.5 International linkages and collaborations	14
4.6 Onfarm biosecurity.....	15
5 Implementation strategies	16
5.1 Identify lead agency.....	16
5.2 Set up interagency technical working group .	16
6 Monitoring and evaluation	16

Abbreviations

AAH	Aquatic Animal Health
ACIAR	Australian Centre for International Agricultural Research
CEPA	Conservation and Environment Protection Authority
FAO	Food and Agriculture Organization of the United Nations
IRA	import risk assessment
JICA	Japanese International Cooperation Agency
MoU	memorandum of understanding
NAQIA	National Agriculture Quarantine and Inspection Authority
NDoH	National Department of Health
NFC	National Fisheries College
OIE	World Organisation for Animal Health
PCR	polymerase chain reaction
PHAMA	Pacific Horticulture and Market Access
PNG	Papua New Guinea
SPC	the Pacific Community

Foreword

There has been a steady increase in aquaculture farming, both with small-scale subsistence farmers and commercial start-up businesses in the last few years, thanks to the National Fisheries Authority which is championing this cause through its Inland Aquaculture Program. The aquaculture sector – like all other industries – can provide employment, increase the living standards of the farming families, and can bring in much foreign exchange.

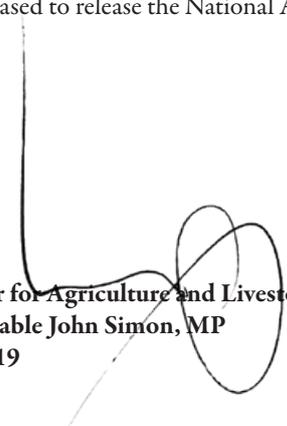
Pests and diseases and lax border security measures can severely affect such industries. The recent detection and confirmation of white spot syndrome in prawns in Queensland, Australia – which completely devastated Australia's prawn farming industry – is a good example.

Papua New Guinea (PNG) used to export wild-caught prawns to Australia but this was banned in 2009 when it adopted new biosecurity measures in response to emerging challenges posed by pests and diseases, and standards developed by the World Organisation of Animal Health for the international trade of aquatic commodities. Until then, PNG was unable to meet those requirements. Except for the tuna industry, there is not much commercial trade of PNG's abundant marine and fisheries resources, and the reasons are many and varied. Probably the most obvious weakness was the lack of aquatic biosecurity management capacity at the competent authority level. This document has been prepared to break this barrier. The National Agriculture Quarantine and Inspection Authority (NAQIA) – with the support of the Pacific Community (SPC) through its Fisheries, Aquaculture and Marine Ecosystems Division – has been developing this capacity within NAQIA since 2017. The National Aquatic Biosecurity Strategic Plan is the product of this commitment.

The plan is a framework that can be used to fill these gaps and guide the management of PNG's aquaculture and fisheries sectors at the border and post-border points, while at the same time develop market access pathways so that local commodities can access regional and international markets.

This plan represents a shared vision of all the relevant stakeholders in the aquaculture and fisheries sectors. Continuous engagement with both the competent authority in charge of biosecurity and the sector should ensure it remains objectively relevant to ensure that not only the intended outcome is fully realised, but also stop the introduction of major exotic pests and diseases, and invasive species, into the country.

I am pleased to release the National Aquatic Biosecurity Strategic Plan for 2019–2023.



Minister for Agriculture and Livestock
Honourable John Simon, MP
June 2019

1 Introduction

1.1 Background

Aquatic animal health management and standardised import and export requirements for aquatic organisms and their products are crucial for the long-term sustainable development of the aquaculture and fisheries sectors in Papua New Guinea (PNG). Aquatic biosecurity can be defined as a set of standardised measures and procedures to manage biological risks in aquatic environments, such as the risk of pests, diseases and aquatic invasive species.

Biosecurity is not just about stopping diseases and pests at the borders; the concept also includes protecting national livelihoods, human health and the environment.

Moreover, the aquaculture sector is a growing sector in PNG and, thus, clear and precise aquatic biosecurity measures should be developed, promoted and implemented to assure that this sector is growing in a healthy and sustainable way. There has been a steady increase in the demand for the importation of aquatic organisms and for the export of other marine fisheries to regional and international markets.

Sensing these developments, PNG's National Agriculture Quarantine and Inspection Authority (NAQIA) requested support from the Pacific Community (SPC) in 2017 to help develop its internal aquatic animal health management capacity, and draft an Aquatic Biosecurity Strategic Plan. An inclusive stakeholder consultative workshop was held from 6 to 9 March 2018. The end result is the present five-year strategy, which has been developed with the objective of covering existing gaps and addressing major needs identified by NAQIA, the National Fisheries Authority (NFA) and other stakeholders in the area of aquatic biosecurity and aquatic health management. One of the most important aspects when promoting better aquatic biosecurity practices is governance. It should be noted that PNG has a very comprehensive regulatory framework on aquatic biosecurity and general biosecurity (see Table 1), which is a very positive attribute for the long-term sustainability of the aquaculture sector.

1.2 Current aquatic animal health and biosecurity in PNG

PNG lacks aquatic animal health and biosecurity management capacity, both at the technical and operational level. Current efforts by NFA and private sector developers are merely investing in the sustained and economical production within the sector. Biosecurity is not a priority, whether it be at the border or within a farm. As a result, there is minimal investment in aquatic biosecurity. Current legislation concerning the trade of aquatic resources is either lacking, spread across jurisdictions, or is misinterpreted. This further impedes progress on market access pathway development.

1.3 Biosecurity legal framework in PNG

NAQIA has the overall mandate for all biosecurity-related work on both terrestrial and aquatic animal health and trade at the border. Several pieces of legislation empower NAQIA to conduct import risk assessments in consultation with other stakeholders, including the Conservation and Environment Protection Authority and NFA. The Fisheries Management Act (1998) provides for and promotes the management and sustainable development of the fisheries sector in PNG. There is, however, limited scope on biosecurity. Table 1 outlines the existing legislation dealing with aquaculture, biosecurity, animal health and food safety.

Table 1. Current legal framework on aquatic animal health and biosecurity

Legal instruments	Date	Scope	Comments related to the coverage of aquatic biosecurity in legal documents
Fisheries Management Act	1998	Aims to promote the management and sustainable development of fisheries within PNG	Relates to fisheries and aquaculture Not specific regarding aquatic biosecurity Currently being reviewed
Fisheries Management Regulation	2000	Provides protocols for an operating facility to be authorised by a license	Relates to fisheries and aquaculture
NAQIA Act	1997	Inspects all animals and plants (aquatic/terrestrial) and prevent exotic pests and diseases from entering the country.	Relates to plants and animals (terrestrial and aquatic)
Animal Disease Control Act	1952	Focuses on both terrestrial and aquatic animal health management through minimising the introduction of exotic species.	Adopted from Australia prior to PNG's independence
Animal Disease and Control Regulation	1995	Provides quarantine protocols, including those to be implemented when introducing exotic animals into PNG.	Quarantine protocols
Plant Disease Control Act	1952	Focuses on both terrestrial and aquatic plant health management through minimising the introduction of exotic species.	Adopted from Australia prior to PNG's independence
Biosecurity Bill (2018)	In progress	Harmonises the NAQIA Act, Animal Disease Control Act, Animal Disease and Control Regulation, and the Plant Disease Control Regulation.	In draft form with the Attorney General
National Biosafety Framework	In progress	Devoted to assessing and minimising the biological risks associated with the use of genetically modified organisms.	In draft form
Environment Act	2000	Protects the environment from environmental harm in instances where an environmental license is required, and describes the different levels of activities that could cause negative impacts to the environment.	Relates to the environment
Environmental Water Quality Criteria Regulation	2002	Focuses on the minimum water quality criteria that should be maintained for both fresh and marine water when implementing aquaculture activities	Relates to water
Conservation and Environment Protection Authority (CEPA) Act	2014	Controls the movement of protected species with regards to trade, and enables the establishment of CEPA as an authority	Relates to the environment in general terms
Customs Act	1951	Controls the entrance of goods and regulates ports of entry.	NAQIA and Customs are linked through an online system

1.4 National stakeholders' roles and responsibilities with regard to aquatic biosecurity

Table 2 lists the stakeholders and their roles and responsibilities with regard to aquatic biosecurity and aquatic health management, and those that may play specific roles in implementing the strategic plan over the next five years. It should be noted that this list is not exhaustive and other partners and stakeholders – at the national, regional and international level – will be contacted and involved during the implementation stage of this strategy, as and when necessary.

Table 2. National stakeholders' roles and responsibilities with regard to aquatic biosecurity

Stakeholder	Roles and responsibilities
National Agriculture Quarantine Inspection Authority	<p>Role: The national authority in charge of quarantine and inspection of agriculture products, including all types of vegetables, animals and fish (live organisms and their products).</p> <p>Responsibility: The control, prevention and eradication of biological risks associated with the agriculture sector.</p>
National Fisheries Authority	<p>Role: The management of fisheries resources, including oceanic and coastal fisheries, as well as aquaculture.</p> <p>Responsibility: The provision of technical and financial assistance to fishermen and farmers regarding production standards.</p>
National Fisheries College	<p>Responsibility: Provide training on fisheries- and aquaculture-related subjects at the national level.</p>
Conservation and Environment Protection Authority	<p>Role: The national authority in charge of environmental-related matters.</p>
Fish farmers	<p>Role: Farming aquatic organisms (at least until a certain stage in the life cycle).</p>
Importers	<p>Responsibility: Involved in importing aquatic commodities (live or dead) from abroad into PNG.</p>
Exporters	<p>Responsibility: Involved in exporting aquatic commodities (live or dead) from PNG waters to abroad.</p>
Fishermen (fisheries enterprises)	<p>Responsibility: Involved in the capture of aquatic organisms from PNG national waters.</p>



Aerial photograph of Nago Island research station.

2 Rationale

The aquaculture sector is a renewable sector unlike the extractive Industry sector. The aquaculture and the fisheries sectors are critical economic and environmental areas of activity that: provide wholesome and healthy food, create employment, can be used for recreational purposes, and can supplement wild fishery stocks for commercial and village-based subsistence harvesters. These sectors can also be used to provide protection for, and restore, aquatic animals that face extinction. Aquaculture also provides many other benefits, including pharmaceutical uses (e.g. the use of carrageenan from farmed seaweeds), education (public aquariums), stress reduction (home aquariums) and, most importantly, they generate much needed income for the sector and contribute to the national gross domestic product.

In addition, PNG has not reported any of the World Organisation for Animal Health (OIE)-listed diseases for aquatic animals, and this creates opportunities for its aquatic and fisheries resources to be exported to international and regional seafood markets. To create a pathway for this, the relevant competent authorities in charge of quarantine and inspection (e.g. NAQIA) and fisheries management (e.g. NFA), along with other key stakeholders (including exporters), need to work together to facilitate such exports.

Developing and implementing a national aquatic animal health strategic plan has become an urgent need for two major reasons: 1) the growing need to protect PNG's domestic commerce and resources, and 2) to mitigate the advent of new biosecurity-related regulations developed and adopted by potential regional markets, for the importation of live aquatic animals and their products from PNG.



Freshwater farming center in Ayura in PNG's Eastern Highlands.

3 Guiding principles

The National Aquatic Biosecurity Strategic Plan for Papua New Guinea will be based on the guiding principles and goals listed below. In addition, the scope of the strategy is defined in this section.

3.1 Main objectives of the strategy

The main objectives of the plan are to:

- develop and implement clear standards to manage biological risks in aquatic environments in PNG;
- improve knowledge on the status of aquatic health at the national level;
- conserve traditional practices relevant to aquatic organisms; and
- ensure healthy, sustainable and productive aquaculture and fisheries development in PNG.

3.2 Vision

The vision of this strategy is a sustainable aquaculture and fisheries sector with robust aquatic biosecurity systems in place, to assure the protection of the environment, aquatic organisms, humans and the economy of PNG.

3.3 Mission

The strategy's mission is to develop and promote PNG's fisheries and aquaculture sectors while safeguarding aquatic resources from potential aquatic biosecurity risks.

3.4 Scope

The National Aquatic Biosecurity Strategic Plan will provide policy guidelines and direction on: 1) aquatic animal health management; 2) national standards for imports and exports of live aquatic species and their products (seafood products); 3) regulatory instruments related to aquatic biosecurity; 4) emergency planning in case of aquatic species disease outbreaks; 5) interagency collaboration in the area of aquatic biosecurity; and 5) international collaboration on aquatic biosecurity.

The strategy is focused on the three main areas¹ listed below, within the broad concept of aquatic biosecurity:

- 1. Aquatic animal health management:** including aquatic species diseases diagnosis, prevention, control, treatment, surveillance and national and international reporting, with special emphasis on farmed aquatic species.
- 2. Aquatic species imports and exports:** including the development and/or update of national standards for live aquatic species (and their products), imports and exports, with special emphasis on quarantine procedures and operations, certification schemes, permitting, border control, import risk analysis and environmental impact assessment. This component also includes future introductions of aquatic species for aquaculture purposes.
- 3. Food safety of aquatic products:** including the development and/or update of food safety standards for national and international markets, with special emphasis on farmed aquatic products.

3.5 Activity guidelines

Activities listed in Section 4 – regarding the work plan, which are mostly focused on capacity building, institutional strengthening and development and/or implementation of standards and procedures – should be based on:

- science-based standards;
- transparent and collaborative processes;
- essential, logical and feasible guidelines; and
- consistency with international standards.

¹ It should be noted that capacity building, institutional strengthening, and research and education are considered to be issues under the present National Aquatic Biosecurity Strategic Plan.

4 Strategic work plan

A detailed work plan for the period 2019–2023 is provided in this section.

4.1 Disease management

Background: This component is focused on the management of diseases (in animals) and pests (in plants and microalgae, macroalgae and seaweed) of the most important farmed aquatic species in PNG, including disease screening, diagnosis, control, treatment, surveillance and reporting at the national and international level (e.g. OIE).

Expected outcome 1: Aquatic species health is managed in order to maintain current national health status and increase export opportunities.

Table 3. Activities, timeline, resources and responsible officers

Activities	Timeline (x indicates implementation year)					Responsible stakeholders/ Responsible officers*	Comments
	2019	2020	2021	2022	2023		
4.1.1 Development of a National Pathogens List	x	x				1. NAQIA <ul style="list-style-type: none"> Epidemiology Unit Biosecurity officers 2. NFA <ul style="list-style-type: none"> Export and Certification Division Fisheries officers Aquaculture and Inland Fisheries Division <ul style="list-style-type: none"> Aquaculture officers 3. SPC Aquaculture Section	<ul style="list-style-type: none"> The National Pathogens List will be developed based on specific selection criteria (e.g. disease spread, relevant to trade, pathogenicity). Need to develop a surveillance system for the different production systems. OIE/FAO will provide technical support where necessary.
4.1.2 Screen testing of listed pathogens		x	x	x	x	1. NAQIA <ul style="list-style-type: none"> Biosecurity officers Laboratory services 2. NFA <ul style="list-style-type: none"> Export and Certification Division <ul style="list-style-type: none"> Fisheries officers Aquaculture and Inland Fisheries Division <ul style="list-style-type: none"> Aquaculture officers 3. PHAMA 4. Private investors <ul style="list-style-type: none"> Exporters and importers 	<ul style="list-style-type: none"> A screening surveillance for OIE-listed pathogens in wild aquatic animals should be implemented for market access purposes. Polymerase chain reaction (PCR) test kits, proper PCR Lab, PCR machine, reagents, skilled personal. PHAMA may support financially. Shrimp diseases could be tested in 2018 under PHAMA support.
4.1.3 Epidemiological National Surveillance Program to be developed for listed pathogens, based on screening results		x	x			1. NAQIA <ul style="list-style-type: none"> Epidemiology Unit Aquatic Animal Health (AAH) biosecurity technical officers 2. NFA 3. PHAMA	<ul style="list-style-type: none"> Targeted and general surveillance protocols will be developed and summarised in a national surveillance programme for aquatic organisms. SPC to provide technical input into sampling frame calculation.
4.1.4 Implementation of the surveillance programme		x	x	x	x	1. NAQIA <ul style="list-style-type: none"> Epidemiology Unit Biosecurity officers (field and Laboratory) 2. NFA 3. Provincial fisheries divisions	<ul style="list-style-type: none"> Involve relevant stakeholders.

Table 3. continued

Activities	Timeline (x indicates implementation year)					Responsible stakeholders/ Responsible officers*	Comments
	2019	2020	2021	2022	2023		
4.1.5 Record keeping of surveillance data		x	x	x	x	1. NAQIA <ul style="list-style-type: none"> • Program Manager Standards and Markets Access • Epidemiology Unit • AAH officers 2. NFA	<ul style="list-style-type: none"> • Program Manager Standards and Market Access to be adopted. • Update to the OIE will be provided. • Dedicated computer and accessories.
4.1.6 Training on disease management destined to aquaculture and/or fisheries, biosecurity of-ficers, farmers, exporters and importers		x		x		1. NFA 2. NAQIA 3. SPC 4. Provincial fisheries officers	<ul style="list-style-type: none"> • National training for key stakeholders will be conducted on aquatic diseases, including clinical signs, symptoms, diagnosis, treatment, prevention and reporting.
4.1.7 Establishment of basic laboratory equipment for aquatic diseases testing at the National Vet Laboratory	x	x	x			1. NAQIA <ul style="list-style-type: none"> • AAH Laboratory Technician • Laboratory manager 2. NFA 3. PHAMA	<ul style="list-style-type: none"> • This will also form part of the monitoring and surveillance program. • PHAMA to support the purchasing of equipment and reagents. • European Union support has been sought and formal approval has been given. • Need to build on this support by PHAMA and others.
4.1.8 National training on OIE reporting		x		x		1. NAQIA <ul style="list-style-type: none"> • Biosecurity officers 2. NFA <ul style="list-style-type: none"> • Fisheries and aquaculture officers 	<ul style="list-style-type: none"> • Training on OIE standards and OIE reporting will be given to the OIE national focal point(s) on aquatic animals.
4.1.9 Reporting to OIE on the health status of aquatic species	x	x	x	x	x	1. NAQIA <ul style="list-style-type: none"> • Epidemiology Unit 2. SPC 3. NFA	<ul style="list-style-type: none"> • There will be an OIE focal point for disease notification re: aquatic animals. • AAH technician to support reporting requirements.

* See the list of abbreviations for definitions

4.2 Improving border control and import and export management

Background: The development, validation and enforcement of feasible import and export guidelines for live aquatic organisms and their by-products is one of the most urgent priorities for NAQIA. These guidelines should be aligned with international standards set by OIE, the Convention on the International Trade of Endangered Species and FAO, in order to facilitate international trade and access market opportunities for local fishery and marine commodities

Expected outcome 2: Transparent, inclusive and comprehensive import and export requirements are developed and enforced.

Table 4. Activities, timeline, resources and responsible officers

Activities	Timeline (x indicates implementation year)					Responsible stakeholders/ Responsible officers*	Comments
	2019	2020	2021	2022	2023		
4.2.1 Review, update current protocols and develop new protocols for aquatic commodities	x	x	x	x		1. NAQIA <ul style="list-style-type: none"> Epidemiology Unit Aquatic animal health (AAH) officers 2. NFA 3. SPC	<ul style="list-style-type: none"> SPC's support will cover fish, feed, microalgae and live aquatic organisms, importation and exports.
4.2.2 Establishment and management of post-entry quarantine facility				x	x	1.NAQIA <ul style="list-style-type: none"> AAH biosecurity officers Epidemiology Unit 2.NFA <ul style="list-style-type: none"> Fisheries/Aquaculture officers 3. Private investors <ul style="list-style-type: none"> Exporters, importers and farmers 	<ul style="list-style-type: none"> The facility could be built by private investors or the government. For a privately run facility, monitoring must be done by biosecurity, fisheries, and aquaculture officers.
4.2.3 Capacity building and training on import and export certification and import risk assessment (IRA) process		x		x		1.NAQIA <ul style="list-style-type: none"> Biosecurity officers Epidemiology Unit 2.NFA <ul style="list-style-type: none"> Fisheries/Aquaculture officers 	<ul style="list-style-type: none"> Current certification is done by the chief veterinary officer. Current IRA conducted by the epidemiologist.
4.2.4 National training on farmed aquatic species identification (imports and exports)			x	x	x	1.NAQIA <ul style="list-style-type: none"> Biosecurity permit officers Biosecurity operations officers Aquatic biosecurity officers 2.NFA <ul style="list-style-type: none"> Fisheries/Aquaculture officers 	<ul style="list-style-type: none"> Training on identification and taxonomy of live aquatic organisms, with special emphasis on ornamental species.
4.2.5 Develop operational linkages on quarantine procedures and systems		x	x	x	x	1. NFA 2. NAQIA 3. CEPA 4. Private investors	<ul style="list-style-type: none"> There must be clearly defined internal pathways in which issues can be handled in a timely manner.

* See the list of abbreviations for definitions

4.3 Emergency planning

Background: PNG does not have an aquatic animal disease emergency response plan but does have a fully developed generic plan for terrestrial animals, which covers all animal disease situations and was developed in consultation with stakeholders, including the Department of Health, Police, and the National Disaster Office. Disease-specific technical guidelines for various other diseases have also been developed and used.

There is capacity available in reviewing the existing generic plan for terrestrial animals and developing an aquatic animals emergency response plan for farmed and wild aquatic organisms.

Expected Outcome 3: PNG would be able to respond to emergency disease situations

Table 5. Activities, timeline, resources and responsible officers

Activities	Timeline (x indicates implementation year)					Responsible stakeholders/ Responsible officers*	Comments
	2019	2020	2021	2022	2023		
4.3.1 Review existing emergency animal disease for terrestrial animals	x	x				1. NAQIA 2. NFA 3. All stakeholders	
4.3.2 Develop Aquatic Animal Emergency Plan		x	x			1. NAQIA • Aquatic biosecurity officer 2. NFA • Fisheries/Aquaculture officers 3. SPC 4. Private investors • Aquatic biosecurity officers • Fisheries/Aquaculture technician	• There will be a separate document from the terrestrial one.
4.3.4 Testing of the Aquatic Animal Health Emergency Plan			x	x	x	1. NAQIA 2. Customs 3. CEPA 4. Farmers • Biosecurity operations officers • Aquatic biosecurity officers • Customs officers	• A table top simulation exercise is required to start off.

* See the list of abbreviations for definitions



A. Rainbow trout farm **B.** Tilapia cages

4.4 Interagency collaboration

Background: There is existing collaboration between NAQIA and NFA under the current memorandum of understanding (MoU) that was signed in 2012. The MoU was reviewed last year (2017) and covers the following areas:

- Use of the NAQIA laboratory for histamine testing.
- Exports of tuna and other fisheries products: health certification and export permit.
- Assessment of import permits for fisheries products.
- IRAs for aquatic products.
- Delegation of powers between agencies, where necessary.
- Collaboration regarding border control.

Both NAQIA and NFA are developing bilateral agreements with specific countries, such as Indonesia, for border control and control of transboundary diseases.

It is vital for similar MoUs to be developed between NAQIA and other stakeholders to clearly outline their respective obligations with regard to the trade and health status management of aquatic animals.

Expected outcome 4: NAQIA should have MoUs with national stakeholders for effective interagency collaborative programmes for decision-making.

Table 6. Activities, timeline and responsible officers

Activities	Timeline (x indicates implementation year)					Responsible stakeholders/ Responsible officers*	Comments
	2019	2020	2021	2022	2023		
4.4.1 Review and develop specific MoUs between partners and stakeholders that are involved in aquatic organisms production, or regulating and exports and imports		x	x			1. NAQIA-AAH officer 2. NFA 3. NDoH 4. CEPA 5. SPC	<ul style="list-style-type: none"> • A specific MoU between NAQIA and CEPA and NDoH is required.

* See the list of abbreviations for definitions



A. Nile tilapia ponds **B.** Nursery ponds in Ayura

4.5 International linkages and collaborations

Background: A working group discussion was held during the consultation workshop to assess the most important international and regional partners in the areas of general biosecurity, aquaculture and aquatic animal health and the results are provided below.

The linkages and exchanges with international organizations and institutions that are involved in general biosecurity, aquaculture and aquatic animal health should be maintained, promoted and strengthened as a feasible way to increase the efficacy and impact of the present strategy.

Expected outcome 5: Tap into skill level (skills training) and Lab testing capacity abroad

Table 7. Activities, timeline, resources and responsible officers

Activities	Timeline (x indicates implementation year)					Responsible stakeholders/ Responsible officers*	Comments
	2019	2020	2021	2022	2023		
4.5.1 Review of current international partners on aquaculture and aquatic biosecurity (SPC, FAO, JICA, ACIAR)		x	x			1. NAQIA-AAH officer	<ul style="list-style-type: none"> Maintain existing networks for technical support.
4.5.2 Strengthen existing international linkages on aquatic biosecurity	x	x	x	x	x	1. NAQIA – Laboratory Aquatic Technician <ul style="list-style-type: none"> AAH Chief Veterinary Officer 	<ul style="list-style-type: none"> Strengthen international linkages for technical support.
4.5.3 Establishment of new international linkages on aquatic biosecurity	x	x	x	x	x	1. NAQIA – Laboratory Aquatic Technician <ul style="list-style-type: none"> AAH Lab manager 	<ul style="list-style-type: none"> Labs and manufacturers of PCR tests kits for field testing will come from BioLab Thailand.
4.5.4 Attend training, workshops or work attachment programs related to aquatic animal biosecurity	x	x	x	x	x	1. NAQIA-AAH officer <ul style="list-style-type: none"> Laboratory Aquatic Technician Parasitology Technical Officer 	

* See the list of abbreviations for definitions

4.6 Onfarm biosecurity

Background: General standard operating procedures (SOPs) for biosecurity practices at the farm level, for grow-out operations, and hatcheries need to be developed, and farmers need to be trained, gaps identified, needs assessed and improved in order to prevent disease incursion at the farm level.

Expected outcome 6: Biosecurity practices should be applied at farm level

Table 8. Activities, timeline, resources and responsible officers

Activities	Timeline (x indicates implementation year)					Responsible stakeholders/ Responsible officers*	Comments
	2019	2020	2021	2022	2023		
4.6.1 Drafting of SOPs for general biosecurity practises at the farm level		x	x			1. NAQIA <ul style="list-style-type: none"> • Aquatic biosecurity officers 2. NFA <ul style="list-style-type: none"> • Fisheries/Aquaculture officer 3. SPC 4. Farmers	<ul style="list-style-type: none"> • NAQIA may lead the drafting but it is the farmer and aquaculture section of NFA that will mainly ensure that biosecurity concepts are introduced and practiced at the farms.
4.6.2. Training on improved hygiene practices at the farm level		x				1. NAQIA <ul style="list-style-type: none"> • Aquatic biosecurity officers 2. NFA <ul style="list-style-type: none"> • Fisheries/Aquaculture officer 	<ul style="list-style-type: none"> • Aquaculture section of NFA to ensure that biosecurity management concepts reach farms. • NAQIA to play supporting role.

* See the list of abbreviations for definitions



A. B. C. Hatchery and nursery facility in Kavieng, New Ireland Province.

5 Implementation strategies

5.1 Identify lead agency

NAQIA will be the lead agency for implementing this national strategy, in collaboration with key national stakeholders such as NFA, CEPA, fish farmers, fishermen, importers and exporters.

The specific partners involved in each of the activities of the five expected outputs are detailed in the Section 4 of the strategy, which is focused on the work plan.

The coordinator of the strategy at the national level will be the Aquatic Animal Health Officer of NAQIA, assisted by other NAQIA officers, NAQIA technicians, NFA officers, provincial fisheries officers, and other partners, as and when necessary. The SPC Aquatic Biosecurity Specialist will provide online technical assistance and guidance when needed

5.2 Set up interagency technical working group

A national task force for the efficient implementation of the strategy will be established after the official approval and launching of the strategy by mid-2018. The national task force on aquatic biosecurity will comprise the individuals from the following organisations: NAQIA, NFA, CEPA and private sector representatives.

The SPC Aquatic Biosecurity Specialist will be an observer of the task force and will participate in some of the task force meetings via Skype. The task force will meet every six months to assess the status of implementation and define the activities to be implemented in the next two months. Different logistic and administrative arrangements will be needed for the different activities detailed in Section 3, which will be discussed and agreed on by the task force.

6 Monitoring and evaluation

A monitoring and evaluation committee should be established prior to implementing the National Strategy on Aquatic Biosecurity, involving government officers, private sector individuals, and most importantly, one or two independent experts. This committee should hold annual meetings to ensure the smooth running of the Strategy. The main roles of the monitoring and evaluation committee are to:

- ensure the timely and efficient achievement of expected outcomes;
- ensure the timely and efficient implementation of activities;
- provide technical assistance when needed; and
- assess suitable methodologies for the dissemination of relevant achievement.

