



Regional framework on aquatic biosecurity



Developed by the Aquaculture Section of the Fisheries,
Aquaculture and Marine Ecosystems Division (FAME)
of the Pacific Community.



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List of abbreviations

CBD	Convention on Biological Diversity
COFI	Committee on Fisheries (FAO)
EU	European Union
FAME	Fisheries, Aquaculture and Marine Ecosystems Division (SPC)
FAO	Food and Agriculture Organization (UN)
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German International Cooperation Agency)
HOF	Heads of Fisheries
IRA	Import Risk Analysis
JICA	Japanese International Cooperation Agency
M&E	Monitoring and Evaluation
MoU	Memorandum of Understanding
OIE	World Organization for Animal Health
NAQIA	National Agriculture Quarantine and Inspection Authority (PNG)
NFA	National Fisheries Authority (PNG)
PICTs	Pacific Island countries and territories
PNG	Papua New Guinea
SPC	Pacific Community
SPS	Sanitary and Phytosanitary
SPF	Specific Pathogen Free
SWOT	Strengths, Weaknesses, Opportunities and Threats analysis
UN	United Nations
USA	United States of America
USD	United States Dollar
WAHIS	World Animal Health Information System
WHO	World Health Organization (UN)
WTO	World Trade Organization

1 Foreword

On behalf of the Fisheries, Aquaculture and Marine Ecosystems (FAME) Division of the Pacific Community (SPC), I am pleased to present the first *Regional Framework on Aquatic Biosecurity*, which has been developed by SPC through an extensive consultative process with SPC member countries and territories.

Aquatic biosecurity is defined as a “system of standardised protocols to deal with biological risks in aquatic environments” and is therefore key to managing biological risks in aquatic environments, such as exotic pathogens and invasive aquatic species.

The aquaculture sector is an increasingly important economic activity for the Pacific region and its local communities. In order to achieve sustainable development in the aquaculture sector, farmed aquatic species need to be healthy and free from diseases and pests. We must also protect and conserve our rich and highly biodiverse natural aquatic environment.

Coordinated and integrated measures are required to achieve robust aquatic biosecurity, which is vital for maintaining healthy organisms, reducing the risk of acquiring diseases and pests in aquaculture facilities, harvesting high-quality yield and protecting natural aquatic environments from introduced threats.

Aquatic biosecurity actions need a holistic approach that involves government officers and members of the private sector with expertise in different fields, including the environment, aquaculture, fisheries, agriculture, livestock and human health.

In a region like ours – which has comparative advantages, but also many technical and logistical limitations – a regional framework is necessary for facilitating the harmonisation of legislation, capabilities and infrastructure, and protocols related to aquatic biosecurity.

The Pacific Community, in its role as a provider of technical services on matters of importance to the people of the Pacific region, presents this framework as a feasible path towards more sustainable exploitation and management of aquatic resources, which are a key component in our blue economy.

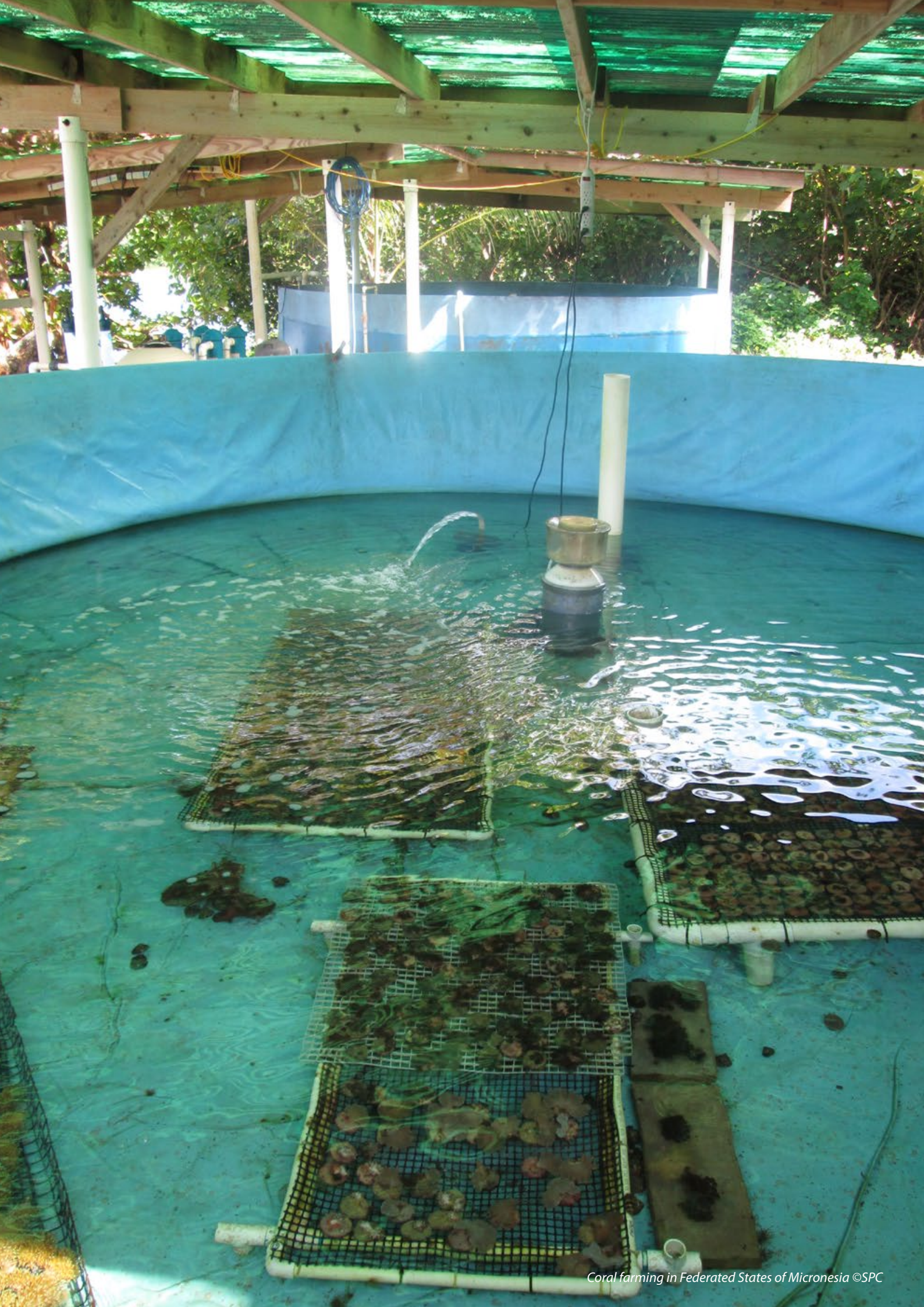
My thanks to the members and SPC staff who have contributed to this important step forward for aquatic biosecurity in this region.

Sincerely,

Neville Smith

Fisheries, Aquaculture and Marine Ecosystems (FAME) Director

Pacific Community



2 Vision

People, communities, industries and governments of Pacific Island countries and territories (PICTs) working together to improve aquatic biosecurity in the region, in order to meet international standards and ensure food safety and security through technically feasible, economically viable and environmentally friendly practices.

3 Purpose

The purpose of the *Regional Framework on Aquatic Biosecurity* is to provide regional guidance on the harmonisation, development and implementation of coherent aquatic biosecurity policies at regional and national levels.

The effective implementation of aquatic biosecurity policies will help to achieve the following:

1. Improvement of the sustainability and productivity of the aquaculture sector.
2. Maintenance of the traditional and cultural uses of aquatic resources in the Pacific region.
3. Facilitation of the development of new aquaculture production systems.
4. Maintenance and strengthening of the capacity of the aquaculture sector to engage in fair trading practices.
5. Protection of the health and biodiversity of aquatic organisms and aquatic ecosystems.
6. Maintenance of the high-health status of wild and farmed aquatic organisms within the Pacific region.

4 Scope

This regional framework is focused on two major components of the broad “aquatic biosecurity concept”, namely: (1) aquatic animal health management; and (2) deliberate aquatic species introductions and translocations. Not included in this regional framework are areas such as food safety (e.g. bio-toxin contamination) and biological risks associated with the use of living modified organisms. These areas are also important to the development of the aquaculture sector in the Pacific region and should be covered under separate strategies.

5 Overall goal

The improvement of aquatic biosecurity in Pacific Island countries and territories.

Guam case study

Guam is the only Pacific territory that has managed to produce and maintain a Specific Pathogen Free (SPF) strain of white-leg shrimp (*Penaeus vannamei*) through the implementation of strict biosecurity measures at the national level and at the national shrimp hatchery, which is being managed by the University of Guam, in close collaboration with the Department of Wildlife.

The SPF strain is being distributed to local shrimp farmers in Guam with very promising production results. The SPF strain is also exported very successfully to foreign countries, such as Australia and China, for use as SPF shrimp broodstock.

During the past five years, SPC has provided technical support to shrimp hatchery technicians and managers on shrimp diseases management, with a special emphasis on diagnostic techniques through various training sessions and workshops.

6 Objectives and expected outcomes

Objective 1 – Governance:

To harmonise, develop and promote enforcement of coherent national aquatic biosecurity policies, regulations, procedures and practices.

- **Outcome 1.1.** Regulatory framework on aquatic biosecurity is reviewed, developed and/or updated at the national level.
- **Outcome 1.2.** Enforcement strategies are defined and implemented.

Objective 2 – Practices:

To improve aquatic biosecurity practices and infrastructure at the national level.

- **Outcome 2.1.** National databases on aquatic animal health are improved and/or developed.
- **Outcome 2.2.** National and regional capacities on health certification for live aquatic organisms are developed and maintained.
- **Outcome 2.3.** Sub-national (on-farm), national and regional capacities on relevant disease diagnosis, surveillance and reporting are developed and maintained.
- **Outcome 2.4.** National and regional emergency response plans for aquatic pathogens are developed, regularly reviewed and applied when needed.
- **Outcome 2.5.** National and regional capacities on risk analysis that are applied to aquaculture are developed and maintained.

Objective 3 – Transfer of aquatic species:

To ensure responsible use and control of aquatic species translocations and introductions in the context of aquaculture activities, through the development and implementation of standardised import risk analysis procedures.

- **Outcome 3.1.** National and regional capacities on import risk analysis that are applied to aquaculture are developed and maintained.
- **Outcome 3.2.** Guidelines for import risk analysis for the movement of live aquatic organisms are developed and adhered to.
- **Outcome 3.3.** National and regional capacities on quarantine for live aquatic organisms are developed and maintained.
- **Outcome 3.4.** National infrastructure and operations for quarantine of live aquatic organisms are improved and/or developed and maintained.
- **Outcome 3.5.** National and regional capacities on border control are developed and maintained.

Objective 4 – Training and cooperation:

A coherent regional approach to capacity building, coordination and collaboration in aquatic animal health and biosecurity, with particular reference to diagnosis, surveillance, reporting, quarantine, border control and the prioritising of research and development activities.

- **Outcome 4.1.** Major regional research and education areas on aquatic biosecurity are identified, developed and supported.
- **Outcome 4.2.** Priority training needs at the regional and national levels are identified, developed and implemented.
- **Outcome 4.3.** Regional cooperation on aquatic biosecurity is promoted and supported.



7 Guiding principles

The effective development and implementation of aquatic biosecurity will take place:

1. through an engagement process that will inform, consult, involve, collaborate with and empower governments, businesses, communities and people in PICTs;
2. in a culturally sensitive, economically viable and environmentally friendly manner;
3. in a technically accessible manner;
4. by promoting gender equality and the participation of women across the decision-making spectrum;
5. by promoting long-term sustainable production and trade;
6. by promoting economic development and benefits at regional, national and local levels;
7. by recognising the importance of risk analysis in existing and future aquaculture developments;
8. by maintaining and enhancing the health of aquatic stocks that are used by the aquaculture sector;
9. by enhancing regional networking of existing and future human and technical resources; and
10. by promoting transparency and accountability in reporting.

Solomon Islands case study

The Ministry of Fisheries and Marine Resources of Solomon Islands, based on the requests from various national stakeholders, has been working very enthusiastically for several years on the introduction of an improved strain of Nile tilapia (*Oreochromis niloticus*) for aquaculture purposes. The country has another tilapia species, *Oreochromis mossambicus*, which was introduced throughout the 1970s and 1980s for mosquito control purposes. This species of tilapia is not very performant and farmers are currently getting discouraged because of low production results. Although there is a lot of interest in tilapia farming in the country, for domestic consumption, the current “non-performing” tilapia species is limiting the expansion of the farming activity.

By taking this scenario into account, a very comprehensive process has been followed by the Ministry, in order to formalise the introduction of the aforementioned improved Nile tilapia, known as the GIFT (Genetically Improved Farmed Tilapia) strain, from Malaysia.

The Ministry has followed very strict biosecurity measures, including the following:

1. Development of a comprehensive and transparent Import Risk Analysis.
2. Signature of a Memorandum of Agreement with the facility of origin in Malaysia, the WorldFish centre.
3. Development of detailed import requirements, including strict quarantine protocols.
4. Establishment of a new quarantine area in Honiara.
5. Establishment of a broodstock management and hatchery unit in Honiara.

The strict biosecurity process followed by the Ministry in Solomon Islands is serving as a reference for other PICTs that are following similar introduction processes for aquaculture purposes.

8 Stakeholder engagement

National and regional stakeholder engagement is critical to the successful uptake and implementation of the regional framework in order to improve aquatic biosecurity in PICTs. Setting an engagement plan will allow for the following:

- Information, consultation and empowerment of government, non-government and private sector stakeholders.
- Greater awareness of stakeholders' roles and responsibilities.
- Prevention of unnecessary duplication of effort across jurisdictions.
- Greater participation of stakeholders.
- Behavioural change across the entire decision-making spectrum from civil society and communities to government agencies.

Engagement with key stakeholders will be enhanced through various approaches such as the following:

- Information – e.g. articles in newsletters, journals and newspapers, website, social media and open discussion groups.
- Consultation – e.g. surveys and meetings/workshops with focus groups such as policy makers, animal health practitioners, World Animal Health Information System (WAHIS, link: <https://www.oie.int/en/animal-health-in-the-world/wahis-portal-animal-health-data/>), operators, etc.
- Collaboration – e.g. workshops for the participatory development of new policies and procedures on implementation, and monitoring and evaluation (M&E) of aquatic biosecurity strategies.
- Empowerment – e.g. delegate implementation, and M&E to country authorities and the private sector.

Papua New Guinea case study

Papua New Guinea (PNG) has been farming and fishing various species of shrimp (e.g. banana shrimp, giant tiger prawn) for many years, with a focus on exporting them to various Asian countries. However, in the past five years, the export demand has been declining due to various reasons, including biosecurity concerns from importing countries.

For this reason, the National Fisheries Authority (NFA) and the National Agriculture Quarantine and Inspection Authority (NAQIA), through the signing of a Memorandum of Understanding, have been working together towards improving aquatic biosecurity measures in the shrimp sector.

A summary of the actions taken is presented below:

1. Establishment of a national pathogens list (notifiable pathogens/diseases) at the national level, for targeted wild and farmed aquatic animals.
2. Screening of notifiable diseases in wild and farmed shrimp stocks.
3. Development of a targeted epidemiological surveillance programme that is based on the results of the aforementioned screening.
4. Regular reporting to the World Organization for Animal Health (OIE) on the national aquatic animal health status, including shrimp diseases.
5. Exchange with the biosecurity competent authorities of "tentative" importing countries regarding import requirements of the country of destination.

Thanks to these actions, the PNG shrimp sector has been able to get access to new export markets, including Taiwan, Hong Kong and Australia in the past two years.

Furthermore, these promising results have encouraged NFA and NAQIA towards the development and updating of the national import requirements for aquatic animals and their products in order to maintain the national high-health status and improve transparency of aquatic exports.

9 Monitoring and evaluation

Monitoring and evaluation (M&E) is an important component of the *Regional Framework on Aquatic Biosecurity*. It ensures that performance information from the key actions are captured and disseminated so that they contribute to achieving the intended outcomes and objectives.

A “monitoring and evaluation committee” should be established prior to the implementation of the regional framework and would involve government officers, the private sector and independent experts. This committee would hold regular meetings to ensure the smooth running of the regional framework.

Main roles of the committee would be as follows:

- Ensuring timely and efficient achievement of expected outcomes.
- Ensuring timely and efficient implementation of activities.
- Providing technical assistance, when needed.
- Assessing suitable methodologies for the dissemination of relevant achievements.

10 Next steps

Pacific Island countries and territories have been actively involved in the development of this *Regional Framework on Aquatic Biosecurity*. The document was reviewed during the third SPC Regional Technical Meeting on Coastal Fisheries, which was held at the SPC headquarters in Noumea from 4–8 November 2019. The document provides a regional framework to improve aquatic biosecurity standards, capacities and infrastructure at sub-national, national and regional levels. Aquatic biosecurity is a concept that should be considered on a regional level in order for it to be meaningful and coherent given that a region such as ours has many comparative advantages for achieving sustainable fisheries and aquaculture development, but it also has a very fragile aquatic ecosystems.

The next section presents the deliverables, activities and implementation timeframe of the six-year action plan (2020–2025) of the framework. The key next steps are to:

- implement the action plan;
- review progress against the action plan at the annual SPC Regional Technical Meeting on Coastal Fisheries (RTMCF);
- assist member countries and territories in sourcing specific funding for in-country implementation;
- conduct a mid-term review in June 2022; and
- prepare a 2025–2030 plan during 2025.

11 Action Plan on Aquatic Biosecurity (2020–2025)

The table below presents the deliverables, activities and implementation timeframe of the six-year action plan of the regional framework.

Specific objectives	Expected outcomes	Indicators	Means of verification	Activities	Timeframe
1. Governance To harmonise, develop and promote enforcement of coherent national aquatic biosecurity policies, regulations, procedures and practices	1.1. Regulatory framework on aquatic biosecurity is reviewed, developed and/or updated at the national level.	⇨ National regulatory frameworks on aquatic biosecurity are specific and precise. ⇨ A competent authority on aquatic biosecurity is identified and roles are allocated.	<ul style="list-style-type: none"> Report on the assessment of the national regulatory framework. Amended/updated national legal instruments. 	⇨ Review existing legislation, regulations, policies and laws on aquatic biosecurity in compliance with international and regional agreements and best practices (e.g. risk analysis, health certification). ⇨ Review import and export requirements, procedures and regulations for aquatic organisms.	Short term (1–2 years) Short term (1–2 years)
	1.2. Enforcement strategies are defined and implemented.	⇨ National regulatory frameworks on aquatic biosecurity are enforced. ⇨ Aquatic biosecurity powers are allocated to specific government officers.	<ul style="list-style-type: none"> National strategies on aquatic biosecurity. Agreements between national agencies that deal with aquatic biosecurity (e.g. MoU). Officially recognised competent authority. 	⇨ Develop and/or update national aquatic animal health strategies. ⇨ Adopt national strategies under existing policies and regulatory frameworks. ⇨ Establish functional linkages between relevant government agencies. ⇨ Identify competent authority on aquatic animal health, when necessary.	Long term (5–6 years) Intermediate (3–4 years) Short term (1–2 years)
2. Practices To improve aquatic biosecurity practices and infrastructure at the national level.	2.1. National databases on aquatic animal health are improved and/or developed, as well as broadening of terrestrial animal health databases to include aquatic diseases.	⇨ Aquatic health status in PICTs is known. ⇨ Aquatic health status in PICTs is timely and transparently reported to the World Organization for Animal Health (OIE).	<ul style="list-style-type: none"> National database. Regional database. 	⇨ Review existing national databases on animal health reporting. ⇨ Enlarge existing national databases to consider aquatic diseases. ⇨ Establish a regional aquatic animal health information system, including regional cultured species database, pathogens database, regional legislation database and regional expert database.	Short term (1–2 years) Intermediate (3–4 years) Long term (5–6 years)
	2.2. National and regional capacities on health certification for live aquatic organisms are developed and maintained.	⇨ Certification of aquatic organisms/products is done based on international/national standards. ⇨ Domestic and export new markets are created due to better compliance with standards.	<ul style="list-style-type: none"> Internationally recognised certification schemes. Compliance with international standards. 	⇨ Assess regional and national needs/expectations on certification schemes and quarantine for live aquatic animals. ⇨ Conduct regular training sessions at regional and national levels on health certification.	Short term (1–2 years) Intermediate (3–4 years)

Specific objectives	Expected outcomes	Indicators	Means of verification	Activities	Timeframe
2. Practices	2.3. Sub-national (on-farm), national and regional capacities on relevant disease diagnosis, surveillance and reporting are developed and maintained.	<ul style="list-style-type: none"> ⇒ Health of farmed aquatic stocks is well managed. ⇒ Production of farmed stocks is increased due to better health management. 	<ul style="list-style-type: none"> • National aquaculture data. • Overall farm survival rates. 	<ul style="list-style-type: none"> ⇒ Develop regional and national “notifiable” pathogen/pests lists. ⇒ Assess national needs on aquatic animal health diagnostics. ⇒ Conduct regular regional training courses on Level 1 disease diagnosis. ⇒ Conduct short-term training courses on Level 2 and Level 3 diagnostics techniques. ⇒ Conduct regular training courses on sampling and packaging procedures for disease testing. ⇒ Official designation of a regional/sub-regional laboratory for aquatic animal health. ⇒ Improve existing national aquatic animal health laboratories in PICTs. ⇒ Improve national capacity to comply with OIE World Aquatic Animal Health Information System (WAHIS) reporting (national and regional reporting and feedback system). ⇒ Design and implement a regional surveillance system for regional priority diseases. ⇒ Design and implement general and targeted surveillance systems at the national level. 	<ul style="list-style-type: none"> Short term (1–2 years) Short term (1–2 years) Intermediate (3–4 years) Intermediate (3–4 years) Intermediate (3–4 years) Long term (5–6 years) Intermediate (3–4 years) Short term (1–2 years) Intermediate (3–4 years) Short term (1–2 years) Intermediate (3–4 years)
	2.4. National and regional emergency response plans for aquatic pathogens are developed and regularly reviewed, and applied when needed.	<ul style="list-style-type: none"> ⇒ Emergency plans are shared and approved by national partners. 	<ul style="list-style-type: none"> • Emergency plans. 	<ul style="list-style-type: none"> ⇒ Develop emergency response plans for key farmed aquatic species and notifiable diseases. ⇒ Regularly review and update emergency response plans. 	<ul style="list-style-type: none"> Intermediate (3–4 years)
	2.5. National and regional capacities on risk analysis that are applied to aquaculture are developed and maintained.	<ul style="list-style-type: none"> ⇒ IRAs are developed for aquatic species/commodities introductions. ⇒ Aquatic risks at national and regional levels are minimised. 	<ul style="list-style-type: none"> • Risk analysis developed and implemented at the national level. 	<ul style="list-style-type: none"> ⇒ Review regional and national risk analysis capacity (survey). ⇒ Organise regional, sub-regional and national regular training courses on risk analysis that is applied to aquaculture. 	<ul style="list-style-type: none"> Intermediate (3–4 years) Long term (5–6 years)

Specific objectives	Expected outcomes	Indicators	Means of verification	Activities	Timeframe
3. Transfer of aquatic species To ensure responsible use and control of aquatic species translocations and introductions in the context of aquaculture activities, through the development and implementation of standardised import risk analysis procedures.	3.1. National and regional capacities on import risk analysis that are applied to aquaculture are developed and maintained.		<ul style="list-style-type: none"> National import risk analysis. 	<ul style="list-style-type: none"> Organise regional, sub-regional and national regular training courses on import risk analysis. 	Short term (1–2 years)
	3.2. Guidelines for the preparation of import risk analysis for the movement of live aquatic organisms are developed and adhered to.		<ul style="list-style-type: none"> Guidelines. Audit reports. 	<ul style="list-style-type: none"> Develop regional guidelines on import risk analysis for aquatic species introductions. Conduct audits to ensure the guidelines are being applied. 	Intermediate (3–4 years)
	3.3. National and regional capacities on quarantine for live aquatic organisms are developed and maintained.	<ul style="list-style-type: none"> Quarantine is implemented for aquatic species introductions. Complementary risk management measures are implemented for aquatic species introductions. 	<ul style="list-style-type: none"> Quarantine records. 	<ul style="list-style-type: none"> Conduct regional training courses at regional and national levels on quarantine protocols for aquatic animals. 	Immediate (year 1–2)
	3.4. National infrastructure and operations for quarantine of live aquatic organisms are improved and/or developed and maintained.		<ul style="list-style-type: none"> Quarantine infrastructure. Audit reports. 	<ul style="list-style-type: none"> Develop minimum recommended quarantine procedures, standards and operations for national and regional compliance. Conduct regular audits to ensure compliance. 	Short term (1–2 years)
	3.5. National and regional capacities on border control are developed and maintained	<ul style="list-style-type: none"> Border control is improved for aquatic species/products. Aquatic biosecurity powers at the border are allocated to specific government officers. 	<ul style="list-style-type: none"> Border control records/reports. 	<ul style="list-style-type: none"> Conduct training sessions at regional and national levels on border control procedures for live aquatic animals (import and export). Conduct regular audits to ensure border control procedures are maintained. 	Intermediate (3–4 years)

Specific objectives	Expected outcomes	Indicators	Means of verification	Activities	Timeframe
4. Training and cooperation A coherent regional approach to capacity building, coordination and collaboration in aquatic animal health and biosecurity, with particular reference to diagnosis, surveillance, reporting, quarantine, border control and the prioritising of research and development activities.	4.1. Major regional research and education areas on aquatic biosecurity are identified, developed and supported.	⇨ Research and education programmes on aquatic biosecurity are running. ⇨ Key stakeholders, from government officers to farmers improve their knowledge on aquatic biosecurity.	<ul style="list-style-type: none"> Report on the assessment of research fields. 	⇨ Assess main research and education areas on aquatic biosecurity at regional and national levels. ⇨ Conduct aquatic animal health baseline surveys at the national level. ⇨ Formulate proposals on main research and education needs. ⇨ Implement the above-mentioned proposals.	Short term (1–2 years) Short term (1–2 years) Intermediate (3–4 years) Long term (5–6 years)
	4.2. Priority training needs at the regional and national levels are identified, developed and implemented.	⇨ Key stakeholders are capable of dealing with aquatic biological risks.	<ul style="list-style-type: none"> Assessment of national capacities. 	⇨ Assess main capacity needs on aquatic biosecurity at regional and national levels. ⇨ Formulate specific proposals on main capacity needs. ⇨ Implement the above-mentioned proposals.	Short term (1–2 years) Intermediate (3–4 years) Long term (5–6 years)
	4.3. Regional cooperation on aquatic biosecurity is promoted and supported.	⇨ Specific international agreements in the field of aquatic biosecurity are signed/established.	<ul style="list-style-type: none"> Regional agreements. 	⇨ Establish linkages and cooperation between regional and international competent authorities and aquatic animal health laboratories.	Long term (5–6 years)



12 Annexes

Annex 1. Background information and technical justification

Background information

Aquaculture is currently the fastest growing food-producing sector in the world and for two decades, it has contributed to nearly fifty per cent (50%) of the global food fish supply. Taking into consideration the increasing global population, aquaculture is expected to contribute further to meeting the increasing demand for fish in the coming decades. As an example, the annual value of the global seafood industry is about USD 100 billion. Furthermore, the world's demands for high-quality aquaculture products make control of biological risks – including diseases and pathogens that could affect humans, animals and plants – increasingly important. Good biosecurity measures are vital for maintaining healthy animals, reducing the risk of acquiring diseases in aquaculture facilities and harvesting high-quality good yield. Aquatic biosecurity could be described as a system of standardised protocols and measures that deal with biological risks in aquatic environments (such as the risk of diseases, genetic pollution and invasive species). Regarding the Pacific region, the main aims of aquatic biosecurity are to safeguard human health, the environment and national economies. Good biosecurity requires a holistic and an extremely proactive approach across nations and territories. The Pacific region – with many comparative advantages regarding fisheries and aquaculture, but unique, biodiverse aquatic environments – needs the establishment of a regional framework on biosecurity, which will support nations to develop their economies in a sustainable and environmentally friendly manner.

*It should be noted that in the specific case of this Regional Framework on Aquatic Biosecurity, the broad biosecurity concept is focused on two of its components: **aquatic animal health management and species introductions and translocations.***

Efficient aquatic animal health management and sustainable use and control of introduced aquatic species (both at national and regional levels) require strict border control measures; adequate quarantine protocols to prevent the introduction of pathogens, pests and invasive species; accurate knowledge about diseases and pathogens present in the Pacific region; suitable disease surveillance strategies in order to detect and control disease outbreaks; efficient contingency plans; and skilled extension services, among other things.

To conclude, Pacific Island countries and territories have an obligation to maintain biosecurity through their commitments to international agreements such as the World Trade Organization's *Agreement on the Application of Sanitary and Phytosanitary Measures* (SPS) and the United Nations' *Convention on Biological Diversity* (CBD).

Technical justification

On the one hand, the aquaculture sector contributes greatly to improving food and nutrition security and increasing livelihoods within the Pacific region – but it should be noted that most aquatic animals that are successfully cultured in the region are introduced species (e.g. Nile tilapia, common carp and blue shrimp), and new species introductions are being pursued for further aquaculture development.

On the other hand, aquatic animal diseases are a significant threat to the sustainability and productivity of aquaculture in the Pacific region. The potential threat of spreading trans-boundary diseases cannot be overlooked. The geographical isolation of countries, the limited availability of specialist expertise and resources, and narrow prospects for development of specialist capabilities across multiple disciplines are some of the significant challenges that PICTs face in the attempts to implement sustainable aquaculture development and effective biosecurity governance programmes.

Both the relevance of aquatic biosecurity for PICTs and the feasibility of approaches to develop a regional pathway to deal with aquatic risks have been addressed at a number of regional meetings as listed below:

1. At the 2007 Regional Workshop on Implementing Ecosystem Approach to Coastal Fisheries and Aquaculture, organised by SPC and supported by FAO, where political leaders were introduced to the concept of risk analysis and its application to aquaculture.
2. During the sixth SPC Heads of Fisheries (HOF) meeting in 2009, leaders endorsed the concept of a regional aquatic biosecurity programme.
3. In June 2010 and June 2012, SPC organised regional workshops to train appropriate fisheries, quarantine and animal health staff members in the use of the OIE information system for animal health reporting procedures, including non-detrimental findings.
4. During the fifth FAO COFI Sub-Committee on Aquaculture, members of PICTs expressed their strong interests in strengthening aquatic biosecurity frameworks at national and regional levels.

5. At the 2011, joint SPC/FAO Regional Aquaculture Scoping Workshop, aquatic biosecurity was considered as a key aspect for future aquaculture development.
6. At the ninth SPC Heads of Fisheries (HOF) meeting in 2015, when delegates requested that SPC develop a regional strategy on aquatic biosecurity to encourage the development and harmonisation of aquatic biosecurity standards within the region.
7. At the second and third SPC Regional Technical Meeting on Coastal Fisheries (RTMCF) conducted in 2018 and 2019, respectively, where delegates of PICTs highlighted the importance of strengthening capacities and infrastructure on a aquatic biosecurity.

In October 2012, SPC and FAO jointly held a regional workshop specifically on “aquatic biosecurity”, where regional and national needs and expectations on aquatic animal health and aquatic species introductions were addressed. Thirty-five participants representing 17 PICTs attended the workshop. Prior to the workshop, detailed questionnaires covering aquatic animal health and aquatic species introductions were sent to each PICT member in order to assess the major needs of countries in relation to these topics. The synthesis of these needs assessments has defined the main components of the *Regional Framework on Aquatic Biosecurity*. Major constraints regarding aquatic biosecurity in the Pacific region were identified as a lack of: (1) dedicated funding, (2) specific policy, (3) dedicated infrastructure, (4) capacity, (5) appropriate legislation, (6) enforcement, (7) public awareness, and (8) coordination between agencies. Detailed information on the strengths, weaknesses, opportunities and threats (SWOT) analysis that was carried out by delegates during the 2012 regional workshop is provided in Annex 3 of the present regional framework.

The *Regional Framework on Aquatic Biosecurity* has been based on major outcomes derived from the following sources of information:

- SPC/FAO regional workshop on the Development of a Pacific Aquaculture Regional Cooperative Programme, held in Nadi, Fiji in 2011.
- SPC/FAO regional workshop on Pacific Aquatic Biosecurity and Aquaculture Statistics, held in Nadi, Fiji in 2012.
- The Pacific Island countries and territories Regional Aquatic Animal Health Capacity and Performance Survey.

Annex 2. Results of the Pacific Island countries and territories (PICTs) Regional Aquatic Animal Health Capacity and Performance Survey conducted between December 2016 and July 2017

The purpose of this survey was to obtain information regarding national capacities of the agencies that were mandated to implement aquatic biosecurity programmes in Pacific Island countries and territories. The survey also collected relevant information that is essential for supporting the development of the aquaculture sector through healthy aquatic production. Furthermore, the survey obtained national opinions on the components and activities to be included in the present *Regional Framework on Aquatic Biosecurity*.

Survey sections

The survey contains 18 sections pertaining to the following:

1. International trade in live aquatic animals and national border controls
2. Control of domestic movement of live aquatic animals and other domestic activities that may spread pathogens
3. Policy and planning
4. Legislation
5. Disease surveillance/and monitoring
6. Disease diagnostics
7. Emergency preparedness and contingency planning
8. Extension services
9. Compliance/enforcement
10. Research
11. Training
12. Expertise
13. Infrastructure
14. Linkages and cooperation
15. Funding support
16. Current challenges
17. Constraints
18. Additional information

Participation

The following countries have participated in the survey: American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Republic of the Marshall Islands, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Wallis and Futuna.

Process

The survey was based on previous FAO Aquatic Animal Health Capacity and Performance surveys that were conducted in other regions that were jointly developed by the FAO Aquaculture Service and the SPC Aquaculture Section, and were modified to reflect the Pacific region's situation. National competent authorities and/or other senior government officers have completed the survey with the assistance of national aquaculture experts and concerned laboratory personnel.

Main conclusions of the survey

- International trade in live aquatic animals and national border controls

1. Most Pacific Island countries and territories have strong international memberships (e.g. SPC, FAO, OIE and WTO); however, international obligations to the OIE and the WTO on trading standards for live aquatic animals are not always met. Therefore, we should note that there is limited compliance with international obligations and international standards in general.
2. Regarding current legislation on aquatic biosecurity and aquatic animal health, it should be mentioned that most PICTs have some type of legal framework for dealing with these issues, but legislation is extremely variable, quite messy, not accurate, and updating and enforcement is relatively limited.

3. Regarding trade in aquatic animals and use of health certification, see the following points below.

⇒ Exports:

- Exports of aquaculture product are focused on a few commodities; some examples as follows:
 - Export of live aquatic animals for the aquarium market.
 - Export of blue shrimp from New Caledonia to various countries.
 - Export of dry seaweed from various PICTs to various countries.
- Accurate and complete export data should be systematically collected and stored.

⇒ Health certification:

- Health certificate templates are used in most countries and some countries are able to certify based on OIE standards.
- Other countries certify on general health (based on gross clinical signs), which has limited value.

⇒ Imports:

- Live aquatic animal importations are relatively important in certain countries (e.g. some recent species imported to PICTs are white-leg shrimp, blue shrimp, seaweeds, sandfish, tilapia, etc.).
- These species are imported from extremely variable sources within and outside the Pacific region.
- Health guarantees during importations range from excellent to non-existent.
- PICTs should request that export countries (and their facilities) have health certificates based on OIE standards.
- More data collection and record keeping is needed; there is no historical data in PICTs.
- Application of Import Risk Analysis (IRA) methodologies for the introduction of live aquatic species is relatively recent.
- Countries apply, to some extent, risk management measures, such as border control, quarantine, veterinary inspection, Specific Pathogen Free (SPF) stocks, use of authorised species, etc.
- IRAs should be promoted prior to any importation, and contain pathogen-related risks, as well as environmental, ecological and socio-economic risks.

- Control of domestic movement of live aquatic animals and other domestic activities that may spread pathogens

These movements are not regulated in most PICTs, although they are relatively important (between different country zones, outer islands and mainland, etc.). There is neither current control of pathogens nor existence of contingency plans for domestic movements.

- Policy and planning

In most PICTs, various agencies deal with aquatic animal health. Distribution of roles and responsibilities is unclear. There are no national plans on aquatic animal health management or aquatic biosecurity. Aquatic animal health is considered under different legal frameworks and policies depending on the country. Enforcement is extremely limited due to inadequate resources at all levels. Country priorities for policy planning are:

1. infrastructure
2. human resources
3. legislation
4. biosecurity
5. diagnosis and survey
6. awareness and communication strategies
7. budget

A clear and simple legislation on aquatic animal health would be desirable.

- Legislation

Most PICTs have legal frameworks that deal with aquatic animal health, but these frameworks are not specific, and they are in urgent need of major reviews – they are not updated, not complete and complicated.

- Disease surveillance and monitoring

Disease surveillance strategies and/or programmes – as well as general or passive surveillance – are generally absent or very poor. In the case where there are some strategies in place, these do not meet OIE criteria. In countries where passive or general surveillance is implemented by field or fisheries officers, reporting and communication mechanisms should be improved in order to be more efficient when there is suspicion of a relevant disease.

- Disease diagnostics

There are very few countries with the capacity to diagnose aquatic animal diseases – even OIE-listed diseases. There is very limited infrastructure and capacity at all levels (limited knowledge and skills on disease diagnosis).

There are no accredited laboratories, and only one of the countries within the Pacific region has a list of relevant diseases – a national pathogen list in New Caledonia, where the list has been adapted from the OIE list. A national pathogen list should be based on OIE criteria, such as presence or absence of the disease or pathogen in the importing country; pathogenicity; infectious aetiology; and adverse socio-economic, public health or ecological impacts. A regional laboratory for aquatic animal health could be a possible solution, since most countries have the occasional need for diagnostic services. Alternatively, expert laboratories from abroad could be used. To conclude, a regional pathogen list and a regional laboratory of reference for aquatic animal health should be considered.

- Emergency preparedness and contingency planning

Contingency planning for aquatic animal disease outbreaks has not been considered in any country within the Pacific region. Individual PICTs with significant aquaculture industries should develop a plan for key cultured species and diseases.

- Extension services

Most PICTs have fisheries/aquaculture officers who are based in rural areas/outer islands and who play the role of extension services, but the roles and responsibilities concerning aquatic animal health and aquatic biosecurity of these officers is not clear in most cases. It has been noted that the aquaculture sector should have its own extension services and that these services should monitor basic health conditions of farmed stocks and provide information for passive disease surveillance.

- Compliance/enforcement

Most PICTs have compliance services that monitor and enforce international and domestic trade in live aquatic animals, including aquatic animal health regulations. Border control is relatively developed in most countries for export and import of live aquatic animals. Enforcement of domestic regulations on aquatic animal health is relatively limited (regarding use of veterinary drugs, control of domestic movements, etc.). Development of best management practices for certain species by aquaculture producer groups can be an efficient mechanism for self-enforcement.

- Research

Limited research is conducted within the Pacific region on aquatic animal health, and information on existing research programmes is scattered and limited. Targeted and basic research should be strongly promoted and developed. Currently, the Pacific region relies on other nations and experts from abroad to carry out scientific research. A regional approach should be considered (laboratories, universities and research centres could be shared among nations within the region).

- Training

Post-graduate and formal non-degree training in aquatic animal health is only available in Fiji. There are very limited opportunities in this respect.

- Expertise

Currently, the Pacific region relies on other nations and experts from abroad to carry out scientific research. A regional approach should be considered (laboratories, universities and research centres could be shared among nations within the region).

- Infrastructure

Infrastructure that is devoted to aquaculture development exists in most countries, but there is very limited infrastructure that is devoted to aquatic animal health or aquatic biosecurity. Sharing facilities, research centres, laboratories, etc., between countries within the Pacific region (also with neighbouring countries outside the region) could be a feasible option to improve aquatic animal health management. On the other hand, sharing facilities and laboratories with “other” services at the national level – such as veterinary services, university, extension services, food safety services, etc. – could be an option.

- Linkages and cooperation

International linkages and cooperation are relatively limited, apart from the linkages with the OIE, SPC, or the WTO. There are no strong domestic linkages either. International linkages have great potential for cooperation in many areas, such as developing standardised procedures for the import and export of live aquatic animals, harmonising legislation, developing shared communication structures (websites, newsletters, etc.), developing a regional aquatic animal health information system (pathogen database, regional disease diagnostic and extension manuals), linking experts (expert database), and developing cooperative research programmes.

- Funding support

National domestic funding is limited, inadequate or non-existent in most cases. There is no devoted budget for aquatic animal health in most PICTs.

- Current challenges

Regarding the prevention of exotic pathogen entry and spread, these challenges include the following:

- Limited human capacities (e.g. diagnostics, quarantine);
- Limited infrastructures;
- Limited national instruments related to aquatic biosecurity;
- Limited quarantine facilities and procedures;
- No baseline information on aquatic animal health status; and
- Limited financial resources.

Regarding the prevention of domestic pathogen spread, these challenges include the following:

- Limited epidemiological surveillance programmes;
- No baseline information on aquatic animal health status;
- Limited human capacities (e.g. diagnostics, quarantine, etc.);
- Limited enforcement;
- Limited awareness;
- Outdated regulatory national instruments on biosecurity; and
- Limited financial resources.

Regarding meeting international and trading-partner standards for health certification, these challenges include the following:

- Limited human capacities (training, diagnostics, etc.);
- Limited infrastructure (e.g. quarantine, laboratory, research);
- Non-observance of standard health certification;
- Outdated or non-existent legislation; and
- Limited financial resources.

Regarding the controlling of mortalities and losses due to pathogens in aquaculture facilities, these challenges include the following:

- Limited human capacities (qualified staff, risk assessment, diagnostics, baseline knowledge, etc.);
- Non-existence of emergency preparedness and disease control plans for aquatics;
- Limited on-farm biosecurity plans in place;
- Limited infrastructure (e.g. quarantine, laboratory, research); and
- Limited financial resources.

Regarding serious challenges that are likely to arise in the next six years, these include the following:

- Low-level of awareness on the importance of biosecurity at both farm and regulatory government levels;
- Limited training (e.g. qualified veterinarians for certification, diagnostics, etc.);
- Limited infrastructure (e.g. quarantine);
- Limited financial support; and
- A lack of interest, support, commitment and initiatives to establish an aquatic animal health programme.

Current challenges to improving aquatic animal health capacity in PICTs touch on almost all major areas of a national aquatic animal health framework and these include the need for the following:

- Improved policy and planning;
- Improved specialist expertise;

- Specialised infrastructure for diagnostics and quarantine;
- Better monitoring and control;
- Improved diagnostics techniques;
- Improved legislation; and
- Better extension programmes.

- Constraints

- Limited financial resources;
- Limited specific policy;
- No dedicated infrastructure;
- Limited capacities;
- Limited enforcement;
- Limited public awareness; and
- Limited communication and coordination between agencies.

Annex 3. Regional strengths, weaknesses, opportunities and threats (SWOT) analysis on aquatic biosecurity

Data provided in the table presented below was provided by country delegates during the SPC/FAO Regional Workshop on aquatic biosecurity and aquaculture statistics held in Nadi (Fiji) in October 2012.

STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Basic legal framework in place regarding aquatic animal health management and aquatic species introductions and translocations. • High-health status (absence of major animal diseases), mainly due to reasons such as isolation, geographic location, etc. • Membership with international and regional organisations (e.g. SPC, FAO, OIE, WTO, WHO, etc.). • High biodiversity and presence of certain high-value species. • Pristine environment. • Certain strong institutions on capacity building and training on aquaculture and fisheries, such as USP, FNU, etc. • Strong partnerships with certain donor Agencies, such as GIZ, JICA, USAID, etc. • Most policy makers and governments are strongly committed with the sustainable development of the aquaculture sector. • Private sector (including association of small-scale farmers) relatively strong and well organised. • Research capacity, although limited in certain countries, could be considered as relatively strong in others (French and American territories, Fiji, etc.). 	<ul style="list-style-type: none"> • Limited facilities devoted to aquatic biosecurity (e.g. laboratories, quarantine units, research centres). • Limited technical capacities at all levels (e.g. aquatic animal health management, disease diagnosis, disease prevention/treatment, disease surveillance, risk analysis, border control, quarantine protocols, etc.). • Limited financial resources at national and regional levels, and limited interest by donors on the topic. • Legal framework on aquatic biosecurity is unclear and not coherent in certain aspects and countries. • Enforcement of existing legal frameworks is limited. • Presence of relevant/notifiable aquatic animal diseases in the region, mostly due to unregulated introduction of exotic species. • Limited coordination between relevant agencies at national and regional levels. • Certification processes for aquaculture products are unclear. • Limited compliance with international standards. • No contingency/emergency plans in place. 	<ul style="list-style-type: none"> • Strong support from certain intergovernmental organisations (SPC, FAO, etc.) and donors. • Presence of native and local species of high potential for aquaculture development. • Presence of high-value species (mostly for exports) with a high demand in local and export markets. • Strong collaboration approaches between neighbouring countries within the region. • Presence of certain institutions that are devoted to training, education, research and capacity building on aquaculture and aquatic biosecurity. • High-health status and presence of SPF sources. • Pristine environment and isolation. • Growing local population leading to a strong increase in the local demand for aquaculture products. 	<ul style="list-style-type: none"> • Economic instability. • Introduction of relevant pathogens and diseases, and spread within the region. • Changes in relevant legal frameworks. • Changes in importing policies and international standards (EU, New Zealand, USA, etc.). • Market access restrictions to regional products. • Decrease in donor support. • Illegal trafficking of aquatic species. • Problems regarding ballast water control and management. • Increase in mining and logging industries by foreign companies (mostly in Solomon Islands and PNG). • Natural disasters and risks. • Climate change challenges.



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