

SOLOMON ISLANDS NATIONAL AQUACULTURE MANAGEMENT AND DEVELOPMENT PLAN 2018–2023



**Ministry of Fisheries and
Marine Resources
Honiara, Solomon Islands
September 2018**

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Marine Resources
Honiara, Solomon Islands**



**Pacific
Community**
**Communauté
du Pacifique**

Noumea, New Caledonia,
September 2018



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ABBREVIATIONS AND ACRONYMS

CBRM	Community-based Resource Management
DDA	Deputy Director Aquaculture
EU	European Union
FW	Freshwater
GIFT	Genetically Improved Farmed Tilapia
GIS	Geographic Information System
GPS	Global Positioning System
HACCP	Hazard Analysis and Critical Control Points
ICLARM	International Center for Living Aquatic Resources Management
ICT	Information and Communication Technology
IRA	Import Risk Assessment
MAL	Ministry of Agriculture and Livestock
MCILI	Ministry of Commerce, Industry, Labour and Immigration
MECDM	Ministry of Environment, Climate Change, Disaster Management and Meteorology
MEL	Monitoring, Evaluation and Learning
MFMR	Ministry of Fisheries and Marine Resources
MLHS	Ministry of Lands, Housing and Survey
MoFT	Ministry of Finance and Treasury
MPS	Ministry of Public Service
MSSIF	Mekem Strong Solomon Islands Fisheries
NDF	Non-detrimental Finding
NGOs	Non-government organisations
NZAP	New Zealand Government Aid Programme
OFCF	Overseas Fishery Cooperation Foundation of Japan
OIE	World Organization for Animal Health
PICTs	Pacific Island countries and territories
PL	Post-larvae
PS	Permanent Secretary
SBD	Solomon Islands Dollars
SIDCC	Solomon Islands Democratic Coalition for Change
SIG	Solomon Islands Government
SINAMD	Solomon Island National Aquaculture Management and Development Plan
SINU	Solomon Islands National University
SPC	Pacific Community
WF	WorldFish

FOREWORD

It gives me great pleasure as the Minister for Fisheries and Marine Resources (MFMR) to present to you the *Solomon Islands National Aquaculture Management and Development (SINAMD) Plan 2018–2023* (the Plan).

The Plan is a roadmap and sets out clear and comprehensive objectives that are supported by strategies for guiding MFMR, as well as its partners and stakeholders, towards sustainable management and development of the aquaculture sector in Solomon Islands.

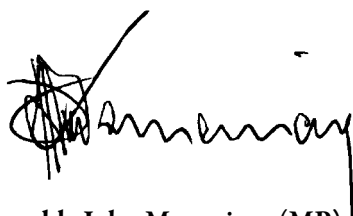
Aquaculture can play an important role in social and economic development, as well as food security and the livelihood of the people. In light of the many challenges faced in the wild capture fisheries that could potentially limit its contributions, especially in relation to food security and livelihood, aquaculture is seen as an alternative option. Solomon Islands' pristine environment offers a real opportunity for a prosperous and secure aquaculture sector.

The Plan is a result of reviewing the last plan (2009–2014) through a concerted effort led by MFMR in collaboration and consultation with line government agencies, communities, farmers, non-government organisations (NGOs) and regional partners. As such, it is not only a roadmap, but a statement of commitment to aquaculture sector development and an acknowledgement of its potential to contribute to the wellbeing of the communities of Solomon Islands.

I wish to acknowledge and convey my sincere words of appreciation and thank the New Zealand Aid Project (NZAP) for rendering financial support through the Mekem Strong Solomon Islands Fisheries (MSSIF) programme and technical support from MSSIF staff in the development of this plan. In addition, I wish to thank the Japanese government, through the Overseas Fishery Cooperation Foundation (OFCF) of Japan, for their ongoing support to aquaculture development in Solomon Islands. I also want to thank the Pacific Community (SPC) for their financial and technical inputs and guidance in drafting of the plan. Finally, I would like to give a big thank you to my hard working staff at the Ministry, stakeholders, development partners, NGOs, communities, private sector and aquaculturists for their commitment and desire to further heighten the development of aquaculture in Solomon Islands.

I am confident that this Plan will show a way forward and help drive the sustainable development of the sector in the next five years, and will continue to contribute to the shaping of the sector beyond this time period. I invite all with an interest in securing a prosperous aquaculture sector for Solomon Islands and its people to join MFMR and commit to this Plan.

Tagio tumas



Honourable John Maneniaru (MP)

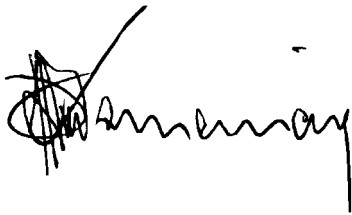
Minister of Fisheries and Marine Resources

APPROVAL

I, Honourable John Maneniaru, Minister for Fisheries and Marine Resources, by virtue of the powers conferred on me by Section 6(1)(a) and Section 17(2)(a) of the Fisheries Management Act 2015, and all other enabling powers vested in me, do hereby, officially approve the Solomon Islands National Aquaculture Management and Development Plan 2018- 2023 on this 24th Day of August 2018.

Commencement date

The plan is effective from the date of publication in the Gazette.

A handwritten signature in black ink, appearing to read 'John Maneniaru', with a large, stylized initial 'J'.

John MANENIARU (MP)

Minister for Fisheries and Marine Resources

EXECUTIVE SUMMARY

The *Fisheries Management Act 2015* (No. 2 of 2015) (the Act) requires that the Director may cause to prepare Fisheries Management Plans for any fisheries or aquaculture operations. This *National Aquaculture Management and Development Plan 2018–2023* (the Plan), is the vision for the aquaculture sector, which sets out in a clear and comprehensive manner, the management and development objectives and strategy for aquaculture development and management in Solomon Islands, for the next five years. This plan is aligned and draws from the *Ministry of Fisheries and Marine Resources Corporate Plan: 2015–18* and the Solomon Islands Democratic Coalition for Change (SIDCC) government policy 2018.

The Aquaculture Division of MFMR comprises three units; namely the Inland section, the Coastal section, and the Onshore Development, Investment and Marketing section. The Inland and Coastal sections mainly focus on livelihood needs. Commodities that are captured under these sections are tilapia, sea cucumber, corals and seaweed. The Onshore Development, Investment and Marketing section targets the commercial species that are prioritised within the development plan.

The Plan comprises eight Parts. Part 1 is the Preliminary Information section and contains the context and purpose, scope, vision and the background information on the institutional, legislative and policy framework. Part 2 is the key part and sets out the management and development objectives, strategies and actions to be implemented under the Plan. Part 3 outlines the management measures. Part 4 sets out the selection criteria that are used to select and prioritise the aquaculture commodities. Part 5 provides an overview of aquaculture development in Solomon Islands. Part 6 is the amendment and review, and Part 7 and Part 8 are on the implementation of the Plan and the monitoring, evaluation and learning of the Plan, respectively.

The Plan aims to develop and manage a sustainable aquaculture industry with robust legislative and policy framework, networking and collaboration, capacity building, innovative research, livelihood activities and empowerment of the private sector for the commercialisation and marketing of commercial aquaculture commodities. These goals are linked to the five objectives in Part 2 of the Plan that form the pillars for aquaculture development.

The development process of this Plan includes a review of the previous plan (2009–2014) in order to identify gaps and important lessons learnt, along with the undertaking of consultations with stakeholders. The above objectives are designed to address challenges and constraints, and respond to opportunities that exist within the sector that were identified during the review and the consultations.

PART I: Preliminary information

1.1 Context and purpose

Aquaculture was introduced to Solomon Islands in the late 1950s. It has since proved to be a viable option with the potential to support and contribute to food security and livelihood opportunities for the people of Solomon Islands.

Coastal fisheries has been a cornerstone source of food security and livelihoods opportunities for many Solomon Islands coastal communities. However, in light of the continuous pressure due to population growth and other natural and man-made impacts on coastal fisheries, the government has identified and prioritised aquaculture development to bridge future gaps to fish protein and economic returns at the national and community levels. Thus, the Solomon Islands Democratic Coalition for Change (SIDCC) government recognised aquaculture for its potential and the government intends to build and develop this sector by taking advantage of the country's natural clean environment.

This Plan is therefore developed as a roadmap to assist the government and its stakeholders to ensure a sustainable, vibrant, viable, responsible and secure aquaculture sector in Solomon Islands. The plan draws and builds on the *Solomon Islands Aquaculture development plan 2009–2014* and the *Solomon Islands Tilapia Aquaculture Action Plan 2010–2015* that has guided the development of aquaculture in the country in the past years. In addition, it requires that aquaculture development is guided by robust legislative and regulatory measures to ensure investment and environmental compliance. In so doing, the Plan sets out five Objectives supported by 18 strategies and activities.

1.2 Scope

The scope of this Plan covers 'aquaculture' as defined under Part 1 of the *Fisheries Management Act 2015* including 'artisanal aquaculture' and 'commercial aquaculture', and related activities.

1.3 Vision

'Establishing a sustainable and well-managed aquaculture sector and securing food security, livelihood and social and economic needs of the people, communities and provinces of Solomon Islands.'

1.4 Institutional, legislative and policy framework

MFMR is the mandated government agency responsible for the management and development of fisheries and aquaculture in Solomon Islands, in collaboration with its stakeholders.

The MFMR legal mandate is provided for under the *Fisheries Management Act 2015* (No. 2 of 2015). This Act is the primary legal instrument for facilitating, guiding and promoting management and development of aquaculture in Solomon Islands.

More specifically, section 17 of the Act provides for the preparation of a fishery management plan that covers aquaculture, hence this Plan. In addition, the Act allows for commercial aquaculture to be carried out only with a valid licence as stipulated under section 43. Furthermore, section 129 provides for the minister's power to make regulation pertaining to aquaculture management and development.

Other relevant legal instruments related to aquaculture management and development include the *Environmental Act* and the *Biosecurity Act*. The *Environment Act No.8 of 1998* provides for environmental considerations for granting approval of an existing or proposed development, and the *Biosecurity Act No. 3 of 2013* provides a biosecurity framework that is limited to terrestrial animals and plants, which leaves a gap in aquatic biosecurity. The entry of aquatic pathogens, diseases and invasive species into Solomon Islands can be minimised by MFMR through biosecurity surveillance measures at pre-border, border and post-border points, and is currently captured under its National Strategy on Aquatic Biosecurity.

The Plan is developed to align with higher government overarching policies. These include the *Solomon Islands Government National Development Strategy 2016–2035*, the Solomon Islands Democratic Coalition for Change (SIDCC) government policy 2018 and other MFMR policies and strategies such as the *MFMR Strategy 2017–2019*, the *MFMR Corporate Plan 2015–2018* and the *National Strategy on Aquatic Biosecurity for the Solomon Islands 2018–2023*. As such, the Plan will form the basis of operationalising aquaculture related objectives under those policies and strategies.

PART 2: Management and development objectives and strategies

This Plan contains five management and development objectives supported by 18 strategies that are listed in Table 1. These are derived from the needs, challenges and cross-cutting issues, which have collectively contributed to hindering development of aquaculture in Solomon Islands.

Table 1: Management and development objectives, strategies and activities

Objective 1: To build and strengthen capacity for sustainable aquaculture development and management in Solomon Islands	
<p>Institutional, human resource and infrastructure capacity is critical for any developmental progress. As an emerging sector, aquaculture needs appropriate and necessary capacity building for government, communities, farmers, institutions and private sector enterprises for sustainable development. To ensure that MFMR institutional capacity remains relevant to deliver necessary and appropriate services, institutional consideration should also be regularly conducted.</p>	
Strategy	Activities
1.1. Ensure appropriate training modules for government, farmers, institutions, communities and private sector enterprises are identified and provided	<ul style="list-style-type: none"> Identify and provide appropriate training programmes Develop training plans for institutions, communities, farmers and private sector
1.2. Ensure sustainability of the training programmes	<ul style="list-style-type: none"> Develop guideline on training and technology transfer
1.3. Strengthen MFMR institutional capacity for aquaculture	<ul style="list-style-type: none"> Carryout institutional strengthening review on MFMR with the aim to strengthen the Aquaculture Division Implement Training programmes under Solomon Island National University (SINU) and vocational training Institutions and national school curriculum
Objective 2: To promote good governance and best practice in sustainable aquaculture management and development	
<p>The plan promotes a holistic approach to sustainable aquaculture management and development for all facets from imports and export of live aquatic organisms to hatchery and farming, processing and marketing. To realise this, it is critical to have robust and updated aquaculture legislative and policy frameworks.</p>	
Strategy	Activities
2.1. Ensure robust and updated aquaculture legislation, regulations, policies, plans, guidelines or quality control	<ul style="list-style-type: none"> Review and update aquaculture legislation and regulation Review and update aquaculture policies and plans
2.2. Ensure effective biosecurity	<ul style="list-style-type: none"> Develop specific aquaculture commodity action plans for priority commodities
2.3. Ensure appropriate and necessary licensing and permitting systems are developed	<ul style="list-style-type: none"> Develop and implement aquaculture code of conduct or guidelines for best management practices Develop and implement aquaculture licensing and permitting systems Implement the <i>National Strategy on Aquatic Biosecurity for the Solomon Islands 2018–2023</i> across all provinces



Objective 3: To establish a conducive environment for aquaculture sector development and growth as an option for economic, livelihood and food security opportunities

Aquaculture is a new and emerging sector with the potential to attract interests from subsistence and commercial operations. To ensure facilitation of this growth, the government – through MFMR and its partners – shall facilitate key activities to promote the sector with domestic and foreign investors. These include zoning, infrastructure and awareness programmes.

Strategy	Activities
3.1. Ensure potential and existing aquaculture areas and farms are identified and mapped	<ul style="list-style-type: none"> ● In consultation with landowners, secure land for construction of demonstration farms
3.2. Ensure appropriate infrastructure for aquaculture development	<ul style="list-style-type: none"> ● Map out potential and existing aquaculture sites including farms ● Include aquaculture infrastructure development priorities under the national investment strategies
3.3. Promote and encourage foreign investment for aquaculture	<ul style="list-style-type: none"> ● Develop a national aquaculture centre and specific species hatcheries ● Identify key aquaculture priorities by provinces

Objective 4: To promote and improve aquaculture collaboration, partnerships and networking

Collaboration, partnerships and networking are the key elements that could contribute to fostering effective and coordinated development. For aquaculture as a new and emerging sector in Solomon Islands, it is important that this is embraced in order to ensure successful outcomes are forthcoming.

Strategy	Activities
4.1. Strengthen and improve collaboration, partnerships and networking	<ul style="list-style-type: none"> ● Develop and implement collaborative working arrangements such as Memorandum of Understanding (MOU) or Memorandum of Agreement (MOA) between stakeholders that could cover broad areas like information sharing, research and financing
4.2. Promote research into aquaculture technology and innovations	<ul style="list-style-type: none"> ● Establish joint committees to discuss matters critical to aquaculture management and development
4.3. Integrate national aquaculture database systems into existing fisheries database (FIMS) held at MFMR	<ul style="list-style-type: none"> ● Conduct 'look and learn' initiatives
4.4. Promote or strengthen awareness programme on aquaculture as an option for livelihood and food security	<ul style="list-style-type: none"> ● Develop national aquaculture database system ● Develop and implement awareness programme for priority commodities

Objective 5: To identify and establish sustainable financing and markets for aquaculture commodities

Sustainable financing and marketing are important aspects in the aquaculture development chain. Establishing sustainable financing is critical. In addition, identifying local and especially overseas markets is a key priority to ensure farmers have access to stable and competitive markets for their aquaculture products.

Strategy	Activities
5.1. Ensure adequate budget allocation to support aquaculture sector growth	<ul style="list-style-type: none"> ● Develop and submit budget paper to Solomon Islands Government (SIG) and donor partners
5.2. Ensure potentials markets are identified locally and overseas	<ul style="list-style-type: none"> ● Identify local and overseas markets and facilitate linking farmers to these markets
5.3. Understand the market requirements (demand and supply needs and standards)	<ul style="list-style-type: none"> ● Carryout market analysis survey ● Develop and implement aquaculture marketing strategy
5.4. Promote value-adding for aquaculture commodities	<ul style="list-style-type: none"> ● Implement value-adding training sessions
5.5. Promote microfinancing for aquaculture farmers	<ul style="list-style-type: none"> ● Conduct Hazard Analysis and Critical Control Point (HACCP) training sessions ● Review and assist farmers to access microfinancing including training on microfinance

PART 3: Management measures

3.1 Authorisation

3.1.1 Licensing

Section 43(1) (h) requires that all commercial aquaculture activities must be carried out with a valid applicable licence or authorisation. MFMR will apply an appropriate licence to applicants in accordance with the Act for commercial aquaculture.

3.1.2 Fees

MFMR will apply appropriate licence fees to those wishing to carryout commercial aquaculture operations.

3.2 Reporting

As a condition of a licence, MFMR will require all commercial aquaculture licence holders to submit data on production including hatchery production that covers survival and mortality rates.

The Director may also require Licencee to submit information on any aquatic biosecurity requirement including disease outbreaks or reporting requirements for the World Organization for Animal Health (OIE).

3.3 Environmental management

Proposed aquaculture operation must comply with existing national environmental legislations or policies in order to ensure that impacts on the environment are kept to a minimum. For instance, Part III of the Environment Act outlines the requirements for development control, environmental impact assessment, review and monitoring of any existing or proposed development impacts on the environment. As such, any proposed aquaculture development must comply with the relevant provisions of the Environment Act.



Sea cucumber hatchery technician, Catherine Tsatsia, feeding sea cucumber larvae - Photo: James Ngwaerobo



Typical tilapia backyard pond in Mbaelelea, Malaita Province - Photo: Billy Meu

PART 4: Criteria for selection of aquaculture commodities

Stakeholders drew up a list of aquaculture commodities that they viewed as having the most potential for development in Solomon Islands. The marine, freshwater and brackish aquaculture commodities were then assessed in terms of their technical feasibility and potential benefits for aquaculture development within Solomon Islands. Several general questions were used to guide the selection and prioritisation process for the commodities:

- Are the technical components of farming viable for development?
- Is there a domestic or international market available?
- Is the species present and in good number locally?
- What is the potential for interest in culturing the commodity in the private sector or rural communities?
- What capital costs are required?
- Is the introduction of exotic species feasible and within acceptable limits?

Marine species	Freshwater and brackish-water species
Seaweed (<i>Kappaphycus</i>)	Mozambique tilapia (<i>Oreochromis mossambicus</i>)
Pearl oyster (<i>Pinctada</i> spp.)	Nile tilapia (<i>Oreochromis niloticus</i>)
Marine ornamentals (corals plus giant clam)	Freshwater prawn <i>Macrobrachium rosenbergii</i>
Marine shrimp (monodon, vannamei)	Freshwater prawn (<i>Macrobrachium lar</i> – <i>ura</i>)
Sponge (<i>Coscinoderma mathewsi</i>)	Freshwater eel (<i>Anguilla</i> spp.)
Marine ornamental fish	Milkfish (<i>Chanos chanos</i>)
Trochus	Mountain mullet (<i>Cestraeus</i> spp.)
Sea cucumber (<i>Stichopus horrens</i> , <i>Holothuria scabra</i>)	Crocodile

FEASIBILITY – *What is the feasibility of successfully developing the commodity?*

- How easily can the technology to farm the commodity be accessed?
- How appropriate is the technology for Solomon Islands?
- How well can the commodity be grown or marketed?

POTENTIAL BENEFITS – *What is the potential of the commodity to make a positive impact?*

- How widespread would the benefits be?
- How will the commodity affect local culture, society, or the environment?

The priority rankings that emerged for Solomon Islands aquaculture commodities, expressed in terms of their feasibility and potential benefits, are shown in Figure 1. Because of differences in perspectives between artisanal-level aquaculture and commercial-level aquaculture for the same commodities, the priority rankings are shown in two separate tables.

ARTISANAL COMMODITIES				COMMERCIAL COMMODITIES				
FEASIBILITY	HIGH						<ul style="list-style-type: none"> Seaweed Nile tilapia Mozambique tilapia Mud crab 	
	MEDIUM	<ul style="list-style-type: none"> Sponge 	<ul style="list-style-type: none"> Trochus Pearl oyster 	<ul style="list-style-type: none"> Sea cucumber <i>M. rosenbergii</i> <i>M. lar</i> Marine ornamental commodities (Corals plus giant clams) 	<ul style="list-style-type: none"> Sponge Marine ornamental commodities (Corals plus giant clams) 	<ul style="list-style-type: none"> Pearl oyster Marine shrimp 	<ul style="list-style-type: none"> Sea cucumber <i>M. rosenbergii</i> <i>M. lar</i> Mozambique tilapia Mud crab 	
	LOW	<ul style="list-style-type: none"> Rabbit fish Mountain mullet 		<ul style="list-style-type: none"> FW Eels Milkfish Crocodile 	<ul style="list-style-type: none"> FW Eels Milkfish 			
		LOW	MEDIUM	HIGH				
POTENTIAL BENEFITS				POTENTIAL BENEFITS				

Figure 1: Artisanal and commercial commodity feasibility / benefits prioritisation

Four commodities are given the highest ranking for artisanal-level aquaculture (seaweed, Nile tilapia, Mozambique tilapia, mud crab) while two are given the highest ranking for commercial-level aquaculture in Solomon Islands (seaweed, Nile tilapia).

Another six commodities are given a mid-range ranking for artisanal-level aquaculture (sea cucumber, introduced freshwater prawn *Macrobrachium rosenbergii*, indigenous freshwater prawn *Macrobrachium lar*, marine ornamental corals plus giant clam, trochus, and pearl oyster). Either knowledge or experience with these species in Solomon Islands is still limited, or they are species with a biology and life cycle that render them more technically difficult for aquaculture and thereby requires higher levels of skill and investment.

For similar reasons, seven commodities are in the mid-range of priority for commercial-level aquaculture (sea cucumber, Mozambique tilapia, introduced freshwater prawn *Macrobrachium rosenbergii*, indigenous freshwater prawn *Macrobrachium lar*, mud crab, pearl oyster, and marine shrimp).



Hatchery technician, James Ngwaerobo, preparing settlement plates for sea cucumbers - Photo: Catherine Tsatsia



Young seaweed farmer from North Malaita showing newly planted seaweed plants - Photo: Sylvester Diake (Jr) (MFMR)

PART 5: Overview of aquaculture development in Solomon Islands

5.1 Brief history of aquaculture in Solomon Islands

Aquaculture in Solomon Islands is still in its infancy despite a long history since inception in the late 1950s. Since then, aquaculture activities have included tilapia (*Oreochromis mossambicus*) farming, pearl oyster farming, farming of *Macrobrachium rosenbergii*, clam farming and seaweed *Kappaphycus alvarezii* farming. These activities have been the result of government and private sector initiatives. The history of aquaculture development in Solomon Islands is represented in Figure 2 below.

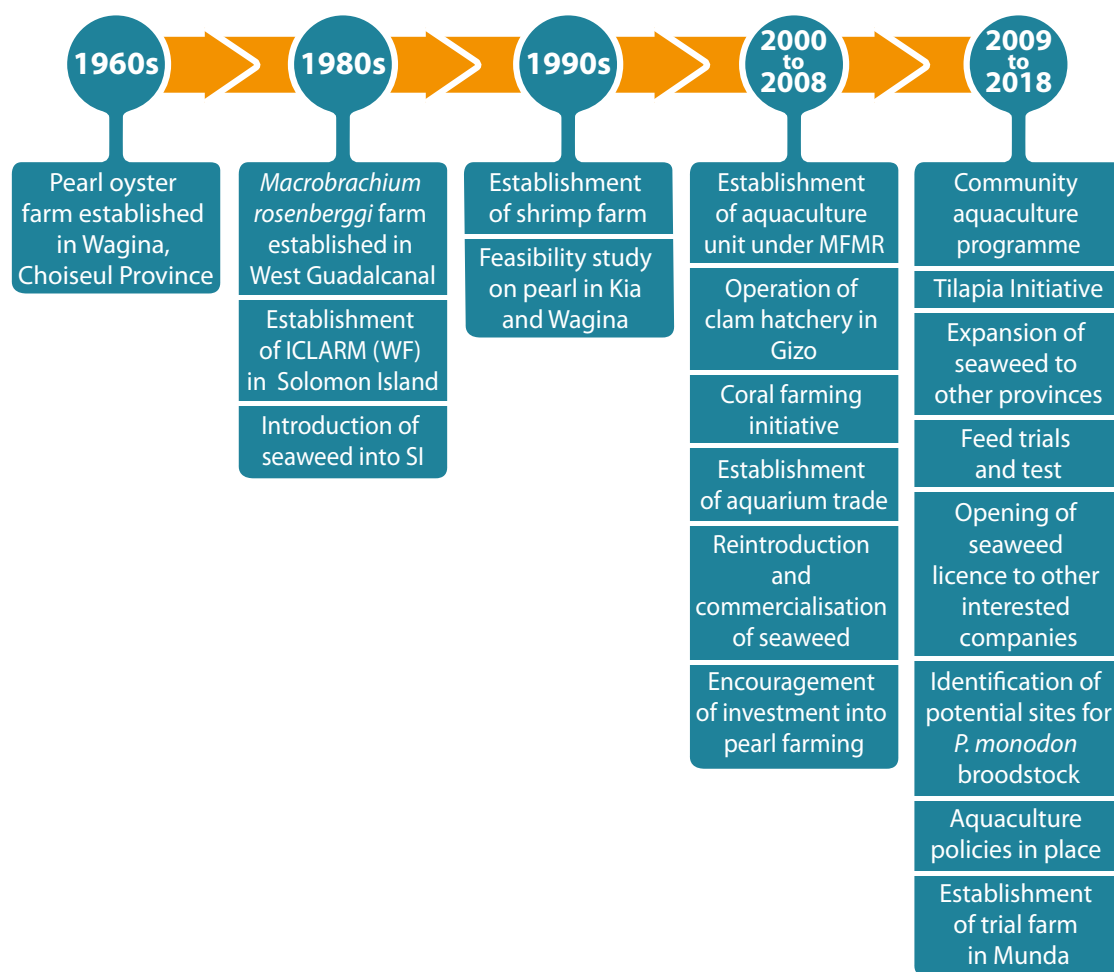


Figure 2: History of aquaculture development in Solomon Islands

5.2 Opportunities and constraints of aquaculture development in Solomon Islands

The following are the opportunities in Solomon Islands that could support aquaculture development.

Table 2: Opportunities and constraints

Opportunities	Constraints
Environment suitability	
<ul style="list-style-type: none"> • Large areas of pristine marine water, coastline and freshwater bodies with diverse environmental opportunities • Good quality water • Availability of land 	<ul style="list-style-type: none"> • Remote locations • Land and sea tenure systems not conducive for aquaculture investments
Access to seed, feed, equipment, skills, technology and credit	
<ul style="list-style-type: none"> • Accessibility to brood-stock of indigenous species • Availability of raw materials for local feed ingredients • Low labour costs compared with other Pacific Island countries and territories (PICTs) 	<ul style="list-style-type: none"> • No hatcheries to support commercial production and supply of seed • Limited number of skilled technical staff members • Limited aquaculture technical, business and management skills • Low government incentives to encourage private sector to invest • High credit risks for support offered by financial institutions
Market access	
<ul style="list-style-type: none"> • Existing market (local and overseas) 	<ul style="list-style-type: none"> • Infrequent shipping services • High domestic and international freight costs
Governance	
<ul style="list-style-type: none"> • Strong political will (SIDCC Government policy include aquaculture development) • Strong and appropriate legislative, regulatory and policy framework • Relevant institutions in place 	<ul style="list-style-type: none"> • Low private sector confidence due to unstable political climate

5.3 Sector review: High priority commodities

5.3.1 Key prioritised development commodities

5.3.1.1 Nile (GIFT) tilapia (*Oreochromis niloticus*)

Nile tilapia (*Oreochromis mossambicus*) has been selected as one of the key freshwater commodities with the potential for aquaculture development in Solomon Islands. Experience has demonstrated a significant role of this commodity in food security and livelihoods. Currently there is no *O. niloticus* tilapia (GIFT tilapia) in Solomon Islands and MFMR is planning to import and introduce the species, and promote it for aquaculture development. A risk assessment study was conducted in 2011 on the risks associated with importation of tilapia for aquaculture in Solomon Islands¹. The prioritisation process identified tilapia as a commercial commodity and ranked its FEASIBILITY as MEDIUM with HIGH POTENTIAL BENEFITS both for artisanal and commercial levels.

Table 3: Advantages and disadvantages of tilapia aquaculture

FEASIBILITY= HIGH / POTENTIAL BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Globally, third most important fish for aquaculture 	<ul style="list-style-type: none"> • Need training and awareness of farmers
<ul style="list-style-type: none"> • Relatively easy to farm 	<ul style="list-style-type: none"> • Need to put in place biosecurity guidelines for importation
<ul style="list-style-type: none"> • Disease resistant 	<ul style="list-style-type: none"> • Need of a quarantine / hatchery for mass production
<ul style="list-style-type: none"> • Reproduce easily and fast 	<ul style="list-style-type: none"> • Feed costs
<ul style="list-style-type: none"> • Eats a wide variety of food 	<ul style="list-style-type: none"> • Poor growth due to poor management
<ul style="list-style-type: none"> • Can tolerate poor water quality with low dissolved oxygen 	

¹ Risk Assessment for the importation of Genetically Improved Farm Tilapia (GIFT), *Oreochromis niloticus*, to the Solomon Islands for aquaculture by Lance Lloyd, 2011.

Table 4: Immediate, medium and long-term activities for tilapia

Priority target area: Nationwide with suitable geographical environment for farming sites.		
Priority target Provinces: Suitable nationwide with initial priority focus on Guadalcanal and Malaita.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> ● Review the Solomon Islands National Tilapia Action Plan 2010–2015 ● Feasibility study on propose hatchery / quarantine site for tilapia 	<ul style="list-style-type: none"> ● Establishment of an MFMR hatchery / quarantine facility for tilapia 	<ul style="list-style-type: none"> ● Development of appropriate hatchery systems and training to meet requirements of seed production and distribution if required to be driven by private sector
<ul style="list-style-type: none"> ● Assess viability of inland aquaculture for tilapia among provinces 	<ul style="list-style-type: none"> ● Importation and quarantine of Nile tilapia 	<ul style="list-style-type: none"> ● Training programmes and skills transfer for hatchery production and brood-stock management, if hatchery is required
<ul style="list-style-type: none"> ● Investigate, study, analyse and provide recommendations for the socio-economic benefits of the introduction of GIFT tilapia 	<ul style="list-style-type: none"> ● Establish grow-out at MFMR 	<ul style="list-style-type: none"> ● Increase skills transfer and training on production, marketing and management to farmers
<ul style="list-style-type: none"> ● Introduction of protocols for species establishment including issues with importation of non-endemic species 	<ul style="list-style-type: none"> ● Technical skills training for farmers on Nile tilapia culture methods suitable for this species 	<ul style="list-style-type: none"> ● Increase number of farmers in suitable areas by 50%
<ul style="list-style-type: none"> ● Complete next steps of Import Risk Analysis to finalise guidelines and policies for the importation of this species for culture 	<ul style="list-style-type: none"> ● Assist farmers to setup individual tilapia farms 	<ul style="list-style-type: none"> ● Research into the market chain to encourage private sector participation in tilapia farming
<ul style="list-style-type: none"> ● Assessment of farming sites and culture methods in selected provinces 	<ul style="list-style-type: none"> ● Assessment of local feed opportunities 	<ul style="list-style-type: none"> ● Increase tilapia culture and productivity by 50% ● Increase farming population by 50% ● Increase household production by 50%
<ul style="list-style-type: none"> ● Preliminary preparation and land acquisition for a quarantine and holding facility area 	<ul style="list-style-type: none"> ● Work in collaboration with rural communities and institutions with aquaculture interest to stimulate and increase number of small-scale tilapia farmers 	<ul style="list-style-type: none"> ● Development of mass hatchery seed production and distribution system ● Establishment of a mini-laboratory for disease screening
<ul style="list-style-type: none"> ● Prepare legal framework, policies, regulations, plans, protocols and guidelines for Nile tilapia 	<ul style="list-style-type: none"> ● Identify potential roles where partner agencies can support the development of tilapia aquaculture 	<ul style="list-style-type: none"> ● Training of trainers and technology transfer for Farmers and Investors
<ul style="list-style-type: none"> ● Promote and strengthen communication links with line ministries, stakeholders, private sectors, provincial governments, NGOs and communities 		<ul style="list-style-type: none"> ● Research into post-harvest processing and value-adding

5.3.1.2 Sea cucumber

The sea cucumber fishery is an important and one of the most valuable fisheries resources and trade commodities. In Solomon Islands, it has been a major contributor to the livelihoods of rural coastal communities. Figure 3 below shows the production over the last 16 years.

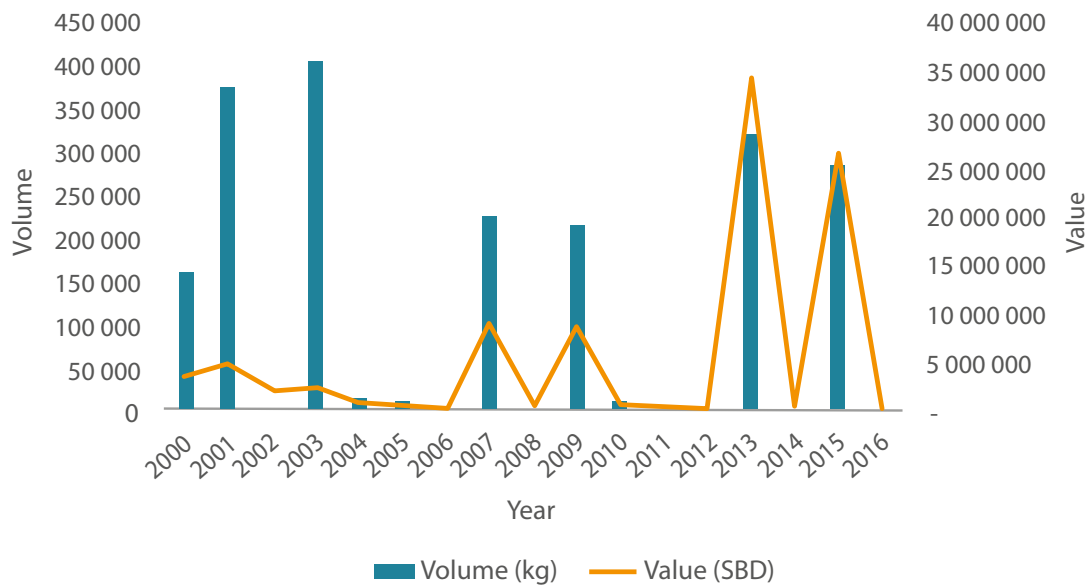


Figure 3: Solomon Island sea cucumber production from 2000 to 2016

Hatchery technology for sea cucumbers, particularly *Holothuria scabra*, is well established. Recently, MFMR through the Overseas Fishery Cooperation Foundation (OFCF) of Japan project established a marine hatchery to research the biology of sea cucumber species *Stichopus horrens*, commonly known as the peanut fish. Through this research, the life cycle has been successfully closed and juveniles are produced and used for restocking. The prioritisation process identified the sea cucumber as a commercial commodity and ranked its FEASIBILITY as MEDIUM with HIGH POTENTIAL BENEFITS. Figure 4 below demonstrates the production of the peanut fish.

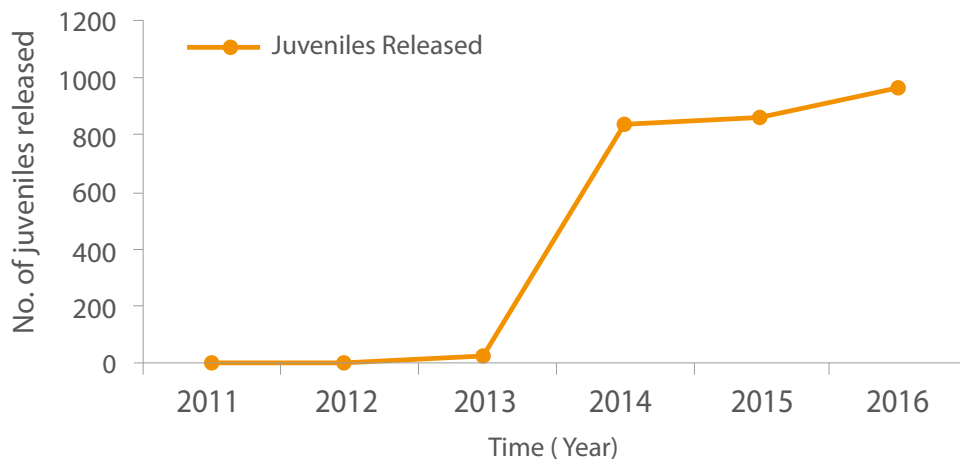


Figure 4: Hatchery raised *Stichopus horrens* juvenile released from 2011 to 2016

Table 5: Advantages and disadvantages of sea cucumber aquaculture

FEASIBILITY= MEDIUM / POTENTIAL BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> Two species, <i>Holothuria scabra</i> and <i>Stichopus horrens</i> can be farmed 	<ul style="list-style-type: none"> Limited awareness and training for release hatchery produced juveniles
<ul style="list-style-type: none"> Availability of brood-stock and suitable environment 	<ul style="list-style-type: none"> Uncertainty of survival / mortality of juveniles in hatchery and restocked reefs
<ul style="list-style-type: none"> Existing knowledge and technology for collection, processing and marketing 	<ul style="list-style-type: none"> High capital cost to maintain hatchery
<ul style="list-style-type: none"> High value product 	<ul style="list-style-type: none"> Challenge to attract private sector to farming
<ul style="list-style-type: none"> Legislation and policy in place 	<ul style="list-style-type: none"> High freight cost from remote areas to capital, Honiara
<ul style="list-style-type: none"> Longer lifespan for dried products 	

Table 6: Intermediate, medium and long-term activities for sea cucumber aquaculture

Priority target area: Nationwide with suitable geographical locations for farming sites. Priority Provinces: Guadalcanal and Central.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> Refine post-larvae management technique to increase the settlement rate of post-larvae 	<ul style="list-style-type: none"> Expansion of the hatchery and necessary facilities to increase juvenile production 	<ul style="list-style-type: none"> Review management regulations that govern harvest and restocking activities for culture product
<ul style="list-style-type: none"> Continue with the peanut fish research for hatchery production and trial release (grow-out) in the natural environment for restocking purposes 	<ul style="list-style-type: none"> MFMR hatchery staff upgrade programme on expertise, knowledge and technical skills Instigate hatchery, restocking and farming options for white teat and sand fish 	<ul style="list-style-type: none"> Expand restocking programme to include other provinces
<ul style="list-style-type: none"> Proper collection and storage of all research data 	<ul style="list-style-type: none"> Brood-stock management and growth skills training for MFMR PFOs and extension officers 	<ul style="list-style-type: none"> Investigate market opportunities and value chains to increase export potential by working with private sector
<ul style="list-style-type: none"> Secure alternative project location in close proximity to Honiara 	<ul style="list-style-type: none"> Research into market opportunities and value chains to increase export potential 	<ul style="list-style-type: none"> Collaborate with regional and technical institutions such the SPC, WF and other relevant NGOs to provide support to improve technical skills in restocking and ranching
<ul style="list-style-type: none"> Quantitative assessment of site and produce site suitability location maps, including GIS 	<ul style="list-style-type: none"> Increase juvenile production and distribution to communities Identify grow-out sites 	<ul style="list-style-type: none"> Encourage private sector investment for commercial-level production of sea cucumber seed and farming of sea cucumber
<ul style="list-style-type: none"> Community awareness consultation 	<ul style="list-style-type: none"> Up-skill MFMR staff to manage brood-stock and strengthen extension services to develop grow-out industry 	<ul style="list-style-type: none"> Investigate the viability of sea cucumber ranching as a management measure
<ul style="list-style-type: none"> Improve community participation and involvement in restocking efforts 	<ul style="list-style-type: none"> GPS mapping with integrated GIS component (inclusive of different layers with information) 	<ul style="list-style-type: none"> Expand restocking programmes to include other provinces

5.3.1.3 Seaweed (*Kappaphycus alvarezii*)

Seaweed (Cottoni) was ranked as one of the top three aquaculture commodities that are prioritised for Solomon

Islands. In 2005, there were about 430 seaweed farmers in the country, and in 2015 seven seaweed export licences were issued for the export of the dried seaweed product. In 2014, seaweed production peaks at 1.5 tonnes with an export value of SBD5.6 million. Figure 5 below shows the export production of seaweed from 2004–2016. Seaweed has HIGH FEASIBILITY and POTENTIAL BENEFITS for both artisanal and commercial levels.

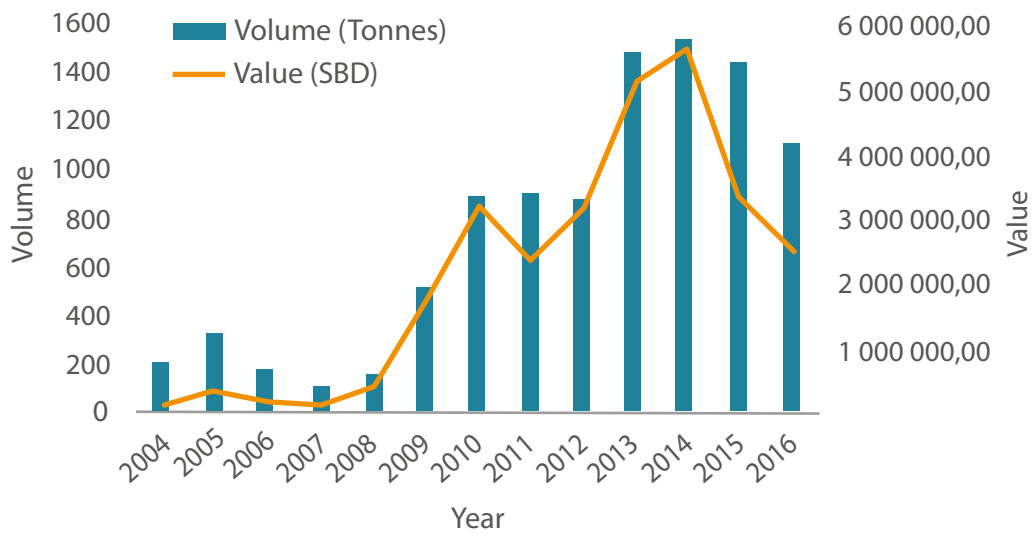


Figure 5: Solomon Island seaweed production from 2004 to 2016

Table 7: Advantages and disadvantages of seaweed aquaculture

FEASIBILITY= HIGH / POTENTIAL BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> Existing knowledge and experience 	<ul style="list-style-type: none"> Need appropriate warehouse
<ul style="list-style-type: none"> Existence of market and good communication network 	<ul style="list-style-type: none"> Need drying equipment and storage facility
<ul style="list-style-type: none"> Low operating cost 	<ul style="list-style-type: none"> High cost of transportation
<ul style="list-style-type: none"> Planting materials including farming materials that are available locally 	<ul style="list-style-type: none"> Need financial assistance for farmers
<ul style="list-style-type: none"> Suitable farming sites 	



Drying seaweed on the ground in Wagina, Choiseul Province
Photo: Sylvester Diake (Jr) (MFMR)



Seaweed farmer, David Molia, with his seaweed harvest at Manaoba, Malaita province - Photo: Sylvester Diake (Jr) (MFMR)

Table 8: Intermediate, medium and long-term activities for seaweed aquaculture

Priority target area: Nationwide with suitable geographical locations for farming sites. Priority Provinces: Choiseul, Temotu, Western, Malaita, Isabel and Central.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> Maintain current production level of 1500 tonnes 	<ul style="list-style-type: none"> Increase production by 50% (2500 tonnes) 	<ul style="list-style-type: none"> Increase production to 5000 tonnes
<ul style="list-style-type: none"> Continue MFMR seaweed extension work to increase number of farms in the country to increase production tonnages by 50% 	<ul style="list-style-type: none"> Qualitative assessment of sites to increase number of farmers in existing areas and new farming areas 	<ul style="list-style-type: none"> Facilitate training on downstream processing to private sector and farmers
<ul style="list-style-type: none"> Provide training on of trainers and technology transfer 	<ul style="list-style-type: none"> Increase number of farmers with access to seaweed 	<ul style="list-style-type: none"> Increase production by 50% and access to all provinces
<ul style="list-style-type: none"> Build and maintain seaweed database Continue support farmers with planting materials and equipment. 	<ul style="list-style-type: none"> Develop seaweed action plan or policy, regulations, licensing protocols, and terms and conditions 	<ul style="list-style-type: none"> Introduce an improved strand
<ul style="list-style-type: none"> Assess and expand to potential sites in other provinces 	<ul style="list-style-type: none"> Global Positioning System (GPS) mapping and Geographic Information System (GIS) of seaweed farming and potential farming sites 	<ul style="list-style-type: none"> Facilitate and encourage private producers and private sector into value-adding
<ul style="list-style-type: none"> Conduct market analysis, marketing and investment promotion 	<ul style="list-style-type: none"> Research the viability and visibility of downstream processing 	<ul style="list-style-type: none"> Investigate and encourage private sector participation for downstream processing of the product and create new market opportunities
<ul style="list-style-type: none"> Facilitate farmers training on best farm management practices, quality assurance protocols and basic book-keeping skills 	<ul style="list-style-type: none"> Improve and maintain data collection and documentation of whole seaweed industry 	<ul style="list-style-type: none"> Strengthen skills for farm management and production, basic business and marketing
<ul style="list-style-type: none"> Develop and expand new farms, and ensure an increase in business training, skills and technology transfer is effective at all levels of farming to maintain sustainability of the industry 	<ul style="list-style-type: none"> Build a seaweed farming database to understand the dynamics of the commodity development and product export volume, and market chain and values 	
<ul style="list-style-type: none"> Station extension officers at all economical production locations 	<ul style="list-style-type: none"> Commercialised sites to be supported by commercial entity 	

5.3.1.4 Freshwater prawn (*Macrobrachium rosenbergii*) and Shrimp (*Penaeus monodon*)

The giant freshwater prawn, *Macrobrachium rosenbergii*, and the shrimp, *Penaeus monodon*, are popular commodities in Solomon Islands. Freshwater prawn is considered as a potential aquacultural commodity for both artisanal and commercial operations. It is ranked with MEDIUM FEASIBILITY and HIGH POTENTIAL BENEFITS. Shrimp is considered as a potential commercial commodity and ranked with HIGH POTENTIAL BENEFITS but with LOW FEASIBILITY.

Table 9: Advantages and disadvantages of prawn farming

FEASIBILITY= MEDIUM / BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> High value species with potential to attract investors 	<ul style="list-style-type: none"> Limited knowledge on abundance and breeding season
<ul style="list-style-type: none"> Existence of local and international markets 	<ul style="list-style-type: none"> Species not locally available
<ul style="list-style-type: none"> Commercial level of farming was once conducted and still has potential for re-establishment 	<ul style="list-style-type: none"> Need technical skills and specialised hatchery for breeding
<ul style="list-style-type: none"> Knowledge and experience in wild post-larvae collection and small pond farming 	<ul style="list-style-type: none"> High cost of feed
<ul style="list-style-type: none"> Interest in improving farming techniques 	<ul style="list-style-type: none"> Need biosecurity measures to guide importation of post-larvae
<ul style="list-style-type: none"> Existence of small-scale farming in regional countries 	<ul style="list-style-type: none"> Weak network links and collaboration

Table 10: Intermediate, medium and long-term activities for prawn farming

Priority target area: Nationwide with suitable geographical locations for farming sites. Priority Province: Guadalcanal.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> • Conduct baseline study on land availability and acquisition for large commercial scale investment operations • Explore marketing and promote investment 	<ul style="list-style-type: none"> • Conduct biosecurity and importation risk assessments of post-larvae • Facilitate reputable foreign investment opportunities • Develop an action plan and regulation 	<ul style="list-style-type: none"> • Privatised the prawn industry • Invite private investors to explore opportunities to invest in the country • Conduct market analysis, marketing and investment promotion

5.3.2 Potential development commodities

5.3.2.1 Mangrove or mud crab (*Scylla serrata*)

The mud crab (Alimango in Solomon Islands) is identified scientifically as *Scylla serrata*. This particular mud crab species has the potential to become an economically important commodity and is found in the estuaries, mangrove forests and sea grass flats in Solomon Islands. The prioritisation process identified the mud crab as a commercial commodity and ranked it FEASIBILITY as MEDIUM but with HIGH POTENTIAL BENEFITS

Table 11: Advantages and disadvantages of mangrove crab aquaculture

FEASIBILITY= MEDIUM / BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> • High local market demand • High value species in local market • Existence of low cost enclosed farms • Availability of species and suitable environment to farm • Potential of collecting juvenile crabs from the wild for farming 	<ul style="list-style-type: none"> • Limited information on local population dynamics and seasonality • Need hatchery • Limited capacity on hatchery technical skills • Need high protein feed • Requires low stocking density in ponds • Not sustainable in the long run



Tilapia pond constructed by local farmers without technical assistance - Photo: Billy Meu



Hatchery technician sampling bacteria culture
Photo: James Ngwaerobo

Table 12: Intermediate, medium and long-term activities for mangrove mud crab aquaculture

Priority target area: Nationwide with suitable geographical locations for farming sites. Priority Provinces: Malaita, Western, Choiseul, Isabel, Central and Makira-Ulawa.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> • Improve and strengthen working relationship with farmers • Explore and analyse national supplies, market and market chain 	<ul style="list-style-type: none"> • Integrate farming system with mangrove forest Community-Based Resource Management (CBRM) • Investigate economic potential for growing of wild caught juveniles and fattening to market size animals 	<ul style="list-style-type: none"> • Evaluate potential for hatcheries development or import and export of crablets • Transfer simple pen culture techniques to all provinces
<ul style="list-style-type: none"> • Establish local feed supply for pond culture system • Establish breeding seasonality, abundance, recruitment and standing population stocks 	<ul style="list-style-type: none"> • Importation and distribution of feed for trials • Research into bio-economical aspects of artisanal and commercial operations 	<ul style="list-style-type: none"> • Research into commercial production of feed locally • Facilitate establishment of semi-commercial and commercial farming
<ul style="list-style-type: none"> • Conduct market analysis, marketing and investment promotion • Emphasise community awareness on protection of mangrove forest 	<ul style="list-style-type: none"> • Research into wild seed abundance and sustainable quota supply • Assist setup of mini mangrove replanting trials in mangrove depleted areas 	<ul style="list-style-type: none"> • Dissemination of research, management and regulation of wild seed collection • Promote mangrove reforestation in communities
<ul style="list-style-type: none"> • Improve artisanal small-pen culture systems and technology for crablet collection 	<ul style="list-style-type: none"> • Expand pen cultures to increase pond production 	<ul style="list-style-type: none"> • Collaborate with CBRM to develop a community mud crab management plan

5.3.2.2 Milkfish

Milkfish (*Chanos chanos*) is native to Solomon Islands and is widely distributed. It is an important food source for coastal communities. The prioritisation process identified milkfish as a commercial commodity and ranked its FEASIBILITY as LOW but with HIGH POTENTIAL BENEFITS.

Table 13: Advantages and disadvantages of milkfish aquaculture

FEASIBILITY= LOW / BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Availability of species and suitable environment to farm • Potential for culture at different aquatic environments 	<ul style="list-style-type: none"> • Need investigation on seasonality, abundance, feed requirements and pond grow-out system • Population is determined by fluctuation of fry abundance between seasons
<ul style="list-style-type: none"> • Successful culture in other countries in the region • High interest to investigate potential 	<ul style="list-style-type: none"> • High cost of transportation • Need financial assistance for farmers
<ul style="list-style-type: none"> • Engagement with communities on fry identification and handling techniques 	<ul style="list-style-type: none"> • Culture is not viable due to high cost of transporting fries from collection sites



Different colour appearance of the kappaphycus seaweed
Photo: Sylvester Diake (Jr) (MFMR)



Boys from Manaoba showing seaweed plants from their farm before harvest - Photo: Sylvester Diake (Jr) (MFMR)

Table 14: Intermediate, medium and long-term activities for milkfish aquaculture

Priority target area: Nationwide with suitable geographical locations for farming sites. Priority Provinces: Malaita, Western and Guadalcanal.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> Establish seasonality and abundance of fry at selected communities 	<ul style="list-style-type: none"> Support farmers to upscale skills in farm management 	<ul style="list-style-type: none"> Explore opportunities to attract partnerships with commercial investors
<ul style="list-style-type: none"> Investigate feed formulation using local materials and ingredients 	<ul style="list-style-type: none"> Increase production 	<ul style="list-style-type: none"> Undertake market surveys and market value chain assessments, marketing and investment promotion
<ul style="list-style-type: none"> Improve small pen culture techniques and construct pond for artisanal farmers 	<ul style="list-style-type: none"> Explore and promote setup of semi-commercial farm trials 	<ul style="list-style-type: none"> Facilitate the establishment and operations of at least one semi-commercial farm
<ul style="list-style-type: none"> MFMR to continue collaboration with other partners to support and develop aquaculture work with communities 	<ul style="list-style-type: none"> Develop local market links within Honiara and provincial capitals 	<ul style="list-style-type: none"> Investigate value-adding options to improve the value chain on small-scale level

5.3.2.3 Freshwater prawn (*Macrobrachium lar*)

Freshwater prawn, *Macrobrachium lar* (locally known as Ura) is a popular commodity in Solomon Islands. The species is considered as a potential artisanal and commercial aquaculture commodity. It has been assessed and ranked as having **MEDIUM FEASIBILITY** and **HIGH POTENTIAL BENEFITS** for artisanal and commercial levels.

Table 15: Advantages and disadvantages of freshwater prawn aquaculture

FEASIBILITY= MEDIUM / BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> Availability of species 	<ul style="list-style-type: none"> Limited knowledge on abundance and breeding season
<ul style="list-style-type: none"> High value species with potential to attract investors 	<ul style="list-style-type: none"> Limited government support
<ul style="list-style-type: none"> Existence of local and international markets 	<ul style="list-style-type: none"> Limited access and information
<ul style="list-style-type: none"> High interest to investigate potential. 	<ul style="list-style-type: none"> Limited support from government and politicians
<ul style="list-style-type: none"> Knowledge and experience in wild post-larvae collection and small pond farming 	<ul style="list-style-type: none"> Inaccessible or limited access to information and sharing of successful and applicable technologies
<ul style="list-style-type: none"> Interest to improve farming techniques 	<ul style="list-style-type: none"> Limited capacity to farming technologies
<ul style="list-style-type: none"> Existence of small-scale farming in regional countries 	<ul style="list-style-type: none"> Information about success not shared or accessible

Table 16: Intermediate, medium and long-term activities for freshwater prawn farming

Priority target area: Nationwide with suitable geographical locations for farming sites. Priority Province: Guadalcanal.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> Conduct baseline study to gather information on land availability and acquisition for large commercial scale operations for investors 	<ul style="list-style-type: none"> Conduct biosecurity and importation risk assessments of post-larvae Research on local species 	<ul style="list-style-type: none"> Explore opportunities to attract partnerships with commercial investors
<ul style="list-style-type: none"> Explore marketing and promote investment 	<ul style="list-style-type: none"> Invite private investors to come to the country to explore opportunities to invest 	<ul style="list-style-type: none"> Conduct market analysis, marketing and investment promotion

5.3.2.4 Marine ornamental commodities: Hard and soft coral and sponge

Faced with limited livelihood options, the culturing of corals for the lucrative aquarium trade market provides another viable opportunity for coastal communities. The marine ornamental trade is considered as both an artisanal and commercial commodity. The harvesting of wild corals for the marine ornamental trade started in the 1980s. However, in 2005, cultured corals were introduced into the marine ornamental trade. Corals and other marine ornamental commodities have been ranked as having **MEDIUM FEASIBILITY POTENTIAL BENEFITS** for artisanal and commercial levels but **LOW FEASIBILITY with LOW POTENTIAL BENEFITS** for the commercial level. Figure 6 below shows the export production levels from 2000–2016.

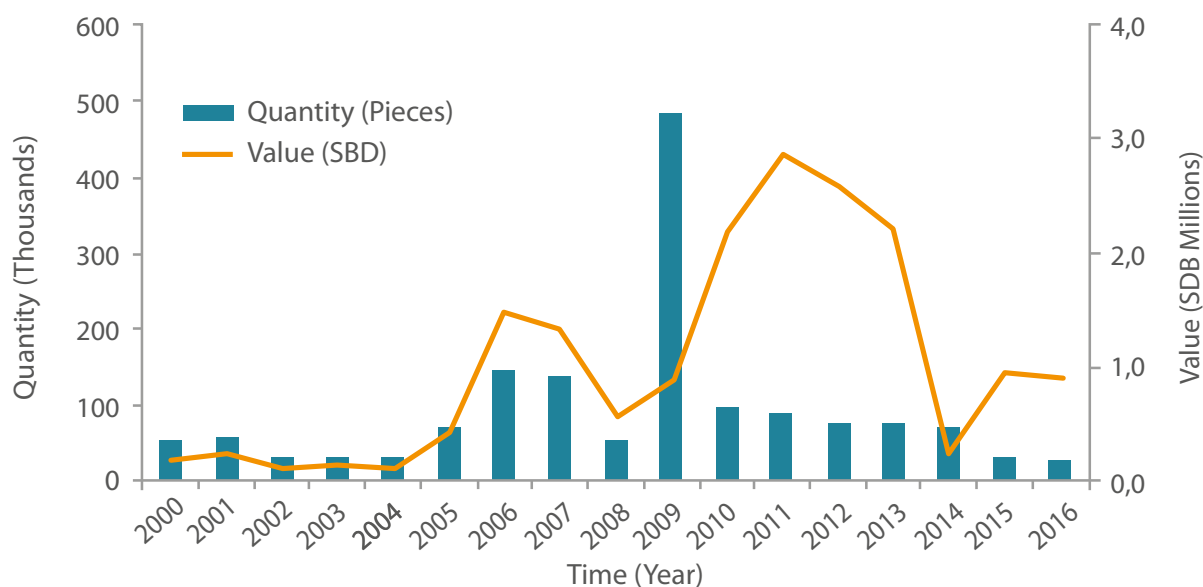


Figure 6: Marine ornamental production from 2000 to 2016

Table 17: Advantages and disadvantages of marine ornamental aquaculture

FEASIBILITY= MEDIUM / BENEFIT= MEDIUM	
Advantages	Disadvantages
<ul style="list-style-type: none"> Regulation in place to control wild harvest Brood-stock locally available High survival rate for coral fragments Culture method economically viable Existence of market Experience and knowledge in farming Suitable farming sites and farming materials locally available 	<ul style="list-style-type: none"> Export of dead corals threatens wild brood-stock Need to improve culture techniques Lack of processing facilities High cost for culture materials and equipment High domestic freight cost for shipment to Honiara Exporters' fluctuation between being active and inactive puts break in culture processes and exports Lack of refresher training for experienced farmers Land and reef tenure system

Table 18: Intermediate, medium and long-term activities for marine ornamental aquaculture

Priority target area: Nationwide with suitable geographical locations for farming sites.

Priority provinces: Guadalcanal, Central and Western.

Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> • Research into the market demand and value of coral aquaculture 	<ul style="list-style-type: none"> • Increase number of coral farms 	<ul style="list-style-type: none"> • Increase number of farmers, production and diversify of species
<ul style="list-style-type: none"> • Coral replanting and reef rehabilitation 	<ul style="list-style-type: none"> • Improve quality and quantity of coral products 	<ul style="list-style-type: none"> • Develop land and sea policy regulation
<ul style="list-style-type: none"> • Consultation with stakeholders and farmers about the development issues and way forward 	<ul style="list-style-type: none"> • Produce coral farm management and best practice guidelines and information sheets 	<ul style="list-style-type: none"> • Strengthen, encourage and promote private sector involvement and investment in the ornamental trade
<ul style="list-style-type: none"> • Independent Assessment report on the status of coral aquaculture 	<ul style="list-style-type: none"> • Conduct market survey analysis, value chain investigations, and marketing and investment promotions 	<ul style="list-style-type: none"> • Specialise in three of the most resilient and valuable corals
<ul style="list-style-type: none"> • Identify new potential sites for farming 	<ul style="list-style-type: none"> • Develop a coral aquaculture action plan 	<ul style="list-style-type: none"> • Focus development on viable and operational locations
<ul style="list-style-type: none"> • Resurrect dormant farming sites 	<ul style="list-style-type: none"> • Provide practical training and guidelines to improve farming 	<ul style="list-style-type: none"> • Explore direct marketing options

5.4.1.5 Mozambique tilapia (*Oreochromis mossambicus*)

Mozambique tilapia (*O. mossambicus*) was introduced into the freshwater system in Solomon Islands in the 1950s. It is a popular freshwater fish with wide geographical distribution and high acceptance as food fish in Solomon Islands. Like Nile tilapia, it is easy to farm and is spreading rapidly in two provinces, Malaita and Guadalcanal, and plays an important role in food security and livelihoods. The prioritisation process identified the Mozambique tilapia as a potential commodity and ranked its FEASIBILITY as MEDIUM to with HIGH POTENTIAL BENEFITS for both artisanal and commercial levels.

Table 19: Advantages and disadvantages of Mozambique tilapia aquaculture

FEASIBILITY= HIGH / BENEFIT= HIGH	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Available locally and existing farm technology and skills 	<ul style="list-style-type: none"> • Slow growth
<ul style="list-style-type: none"> • Brood-stock locally available 	<ul style="list-style-type: none"> • Invasiveness character
<ul style="list-style-type: none"> • Market already exists 	<ul style="list-style-type: none"> • Not economically viable
<ul style="list-style-type: none"> • Suitable farming sites and farming materials locally available 	<ul style="list-style-type: none"> • Local land tenure system issues and high cost of start-up materials and equipment
<ul style="list-style-type: none"> • Eat wide variety of food 	<ul style="list-style-type: none"> • Threat to biodiversity, food security and nutrition



Newly established seaweed farm site at Kia, Isabel Province
Photo: Sylvester Diake (Jr) (MFMR)



Sea cucumber hatchery technicians checking for post larvae on settlement plates - Photo: Sylvester Diake (Jr) (MFMR)

Table 20: Intermediate, medium and long-term activities for Mozambique tilapia aquaculture

Priority target area: Nationwide with suitable geographical locations for farming sites.		
Priority provinces: Guadalcanal and Malaita.		
Intermediate (1 year)	Medium Term (2–3 years)	Long Term (4–5 years)
<ul style="list-style-type: none"> Continue extension services; improve pond construction, feeding regimes and farm management; and increase production Farmer training on sex separation for mono sex culture Increase farm production 	<ul style="list-style-type: none"> Training of lead farmers in communities to become trainers to other farmers Promotion of tilapia as food throughout the nation Increase number of farmers and household production by 50% 	<ul style="list-style-type: none"> Establish farmer communication network Promote access to markets and investment Utilise farmed fish as protein source for feed production

PART 6: Amendment and review

This Plan has a lifespan of five (5) years (2018–2023). Any amendments to or reviews of the Plan should be carried out after this period. However, should there be any major changes in the Ministry’s policy direction or in the operating environment, parts or the whole document can be reviewed and amended.

PART 7: Implementation plan

An implementation plan is a roadmap that describes the details of how you are going to do what you set out to do. It entails answering the ‘who, what, why, where and when’ questions. It provides an effective means of implementing the Plan. The Implementation Plan is attached in Appendix I.

PART 8: Monitoring, evaluation and learning

Monitoring, Evaluation and Learning (MEL) is an important component in the development process of any plan but most importantly, it plays a significant role in the implementation stages. Monitoring is concerned with answering the question of ‘are we doing things right?’ and evaluation seeks to answer the question ‘are we doing the right things?’ From these questions, adjustments and allocations of resources can be made to ensure the Plan is achieving what it needs to achieve. This is the learning part.

The MEL plan is attached in Appendix II.



Sea cucumber lab technician observing sea cucumber post larvae under microscope - Photo: Sylvester Diake (Jr) (MFMR)



A semi commercial seaweed farm setup at Tan, Russell Islands, Central Islands Province - Photo: Sylvester Diake (Jr) (MFMR)

APPENDICES



APPENDIX I: Implementation Plan for the SI Aquaculture Management and Development Plan 2018–2023

Objectives/ strategy	Implementation steps	Responsibilities (Who will do it?)	Resources (How, cost/ timing / people/ material)	Timeframe (When will this be completed? Day / Month / Year)	Funding (Where is source of funding? Budget / other?)	Risks
Administration	Final copy of the Plan with minister's signature	PS and DDA	Salary	October 2018	Recurrent budget	Draft Management and Development Plan is not approved
	Layout and printing	DDA		October 2018	SPC	
	Upload to website	MFMR Communication Officer		November 2018	Recurrent budget	
	Make copy available to all staff members	Aquaculture team		January 2019	Recurrent budget	
	Public announcement / launching / media release	DDA and MFMR Communication Officer		January 2019	Recurrent budget	
Objective 1: To build and strengthen capacity for sustainable aquaculture development and management in Solomon Islands						
1.1. Ensure appropriate training modules for government, farmers, institutions, communities and private sector enterprises are identified and provided	<ul style="list-style-type: none"> Identify and provide appropriate training 	<ul style="list-style-type: none"> MFMR Provincial governments Communities Farmers Institutions NGOs Regional organisations 	<ul style="list-style-type: none"> Salaries Training materials 	On-going	Recurrent budget Development budget Donor assistance	Budget constraints
1.2. Ensure sustainability of the training programmes	<ul style="list-style-type: none"> Develop training plans for institutions, communities, farmers and private sector Develop guideline on training and technology transfer 	<ul style="list-style-type: none"> MFMR Ministry of Education and Human Resources (MEHR) Institutions Donors NGOs Regional organisations 	<ul style="list-style-type: none"> Salaries Training and educational materials 	On-going	Recurrent budget Development budget Donor assistance	
1.3. Strengthen MFMR institutional capacity for aquaculture	<ul style="list-style-type: none"> Carryout institutional strengthening review on MFMR with the aim to strengthen the Aquaculture Division Implement training programmes under SINU and vocational training institutions and national school curriculum 	<ul style="list-style-type: none"> MFMR Ministry of Education and Human Resources (MEHR) Institutions Donors NGOs Regional organisations 	<ul style="list-style-type: none"> Salaries Training and educational materials 	On-going	Recurrent budget Development budget Donor assistance	

Objectives/ strategy	Implementation steps	Responsibilities (Who will do it?)	Resources (How, cost / timing / people / material)	Timeframe (When will this be completed? Day / Month / Year)	Funding (Where is source of funding? Budget / other?)	Risks
Objective 2: To promote good governance and best practice in sustainable aquaculture management and development						
2.1. Ensure robust and updated aquaculture legislation, regulations, policies, plans, guidelines or quality control	<ul style="list-style-type: none"> Review and update legislation and regulation Review and update aquaculture policies and plans Develop specific aquaculture commodity action plans for priority commodities 	<ul style="list-style-type: none"> MFMR Attorney General's Chambers Provincial governments Communities Private sector NGOs Regional organisations 	Salaries	On-going	Recurrent budget	Legal framework not approved
2.2. Ensure effective aquatic biosecurity	<ul style="list-style-type: none"> Implement the <i>National Strategy on Aquatic Biosecurity for the Solomon Islands 2018–2023</i> across all provinces Develop and implement aquaculture code of conduct or guideline for best management practices 	<ul style="list-style-type: none"> MFMR Ministry of Agriculture and Livestock (MAL) Regional organisations Provincial government MECDM NGOs Institutions 	Salaries	October 2018 January–March 2019	Recurrent budget Donor assistance	<ul style="list-style-type: none"> No implementation of aquatic Biosecurity plan Tilapia action plan not approved
2.3. Ensure appropriate and necessary licensing and permitting systems are developed	<ul style="list-style-type: none"> Develop and implement aquaculture licensing and permitting systems 	<ul style="list-style-type: none"> MFMR Attorney General's Chambers Private sector 	Salaries	On-going	Recurrent budget	Aquaculture licensing and permitting systems not developed



Objectives/ strategy	Implementation steps	Responsibilities (Who will do it?)	Resources (How, cost/ timing / people / material)	Timeframe (When will this be completed? Day / Month / Year)	Funding (Where is source of funding? Budget / other?)	Risks
Objective 3: To establish a conducive environment for aquaculture sector development and growth as an option for economic, livelihood and food security opportunities						
3.1. Ensure potential aquaculture areas and farms are identified and mapped	<ul style="list-style-type: none"> Map out potential and existing aquaculture sites including farms 	<ul style="list-style-type: none"> MFMR Ministry of Lands Housing and Survey (MLHS) Communities 	<ul style="list-style-type: none"> Salaries Survey materials and equipment 	On-going	<ul style="list-style-type: none"> Recurrent budget Development budget 	
3.2. Ensure appropriate infrastructure for aquaculture development	<ul style="list-style-type: none"> Develop a national aquaculture centre and specific species hatcheries In consultation with landowners, secure land for construction of demonstration farms 	<ul style="list-style-type: none"> MFMR MLHS Provincial governments Resource owners Communities Private sector Regional organisations 	<ul style="list-style-type: none"> Salaries Land acquisition Construction 	On-going	<ul style="list-style-type: none"> Recurrent budget Development budget Donor assistance 	<ul style="list-style-type: none"> Budget constraints Land disputes
3.3. Promote and encourage foreign investment for aquaculture	<ul style="list-style-type: none"> Include aquaculture infrastructure development priorities under the national investment strategies Identify key aquaculture priorities by provinces 	<ul style="list-style-type: none"> MFMR Ministry of Commerce, Industry, Labour and Immigration (MCIL) 	Salaries	On-going	Recurrent budget	Political instability
Objective 4: To promote and improve aquaculture collaboration, partnerships and networking						
4.1. Strengthen and improve collaboration, partnerships and networking	<ul style="list-style-type: none"> Develop and implement collaborative working arrangements such as MOUs / MOAs between stakeholders that could cover broad areas like information sharing, research and financing Establish joint committees to discuss matters critical to aquaculture management and development Conduct 'look and learn' initiatives 	<ul style="list-style-type: none"> MFMR Provincial governments Private sector NGOs Regional organisations Institution (SINU) 	Salaries	On-going	Recurrent budget	<ul style="list-style-type: none"> Lack of coordination and collaboration
4.2. Promote research into aquaculture technology and innovations	<ul style="list-style-type: none"> Develop national aquaculture database system 	<ul style="list-style-type: none"> MFMR MoFT Regional Organisations 	<ul style="list-style-type: none"> Salaries ICT equipment 		<ul style="list-style-type: none"> Recurrent budget Development budget Donor assistance 	<ul style="list-style-type: none"> Budget constraints Political instability
4.3. Integrate national aquaculture database systems into existing fisheries database (FIMS) held at MFMR						<ul style="list-style-type: none"> Budget constraints Database not developed

Objectives/ strategy	Implementation steps	Responsibilities (Who will do it?)	Resources (How, cost / timing / people / material)	Timeframe (When will this be completed? Day / Month / Year)	Funding (Where is source of funding? Budget / other?)	Risks
4.3. Promote or strengthen awareness programme on aquaculture as an option for livelihood and food security	<ul style="list-style-type: none"> Develop and implement awareness programme for priority commodities 	<ul style="list-style-type: none"> MFMR Provincial governments Communities NGOs Media Regional organisations 	<ul style="list-style-type: none"> Awareness materials Media coverage 	On-going	<ul style="list-style-type: none"> Recurrent budget Development budget Donor assistance 	Budget constraints
Objective 5: To identify and establish sustainable financing and markets for aquaculture commodities						
5.1. Ensure adequate budget allocation to support aquaculture sector growth	<ul style="list-style-type: none"> Develop and submit budget paper to SIG and donor partners 	<ul style="list-style-type: none"> MFMR Ministry of Finance and Treasury (MoFT) 	Salaries	On-going	<ul style="list-style-type: none"> Recurrent budget Development budget 	<ul style="list-style-type: none"> Budget constraints Political instability
5.2. Ensure potential markets are identified locally and overseas	<ul style="list-style-type: none"> Identify local and overseas market and facilitate linking farmers to these markets 	<ul style="list-style-type: none"> MFMR Regional organisations MCILI Private sector 	Salaries	On-going	Recurrent budget	<ul style="list-style-type: none"> Budget constraints Markets are not identified
5.3. Understand the market requirements (demand and supply needs and standards)	<ul style="list-style-type: none"> Carryout market analysis survey Develop and implement aquaculture marketing strategy 	<ul style="list-style-type: none"> MFMR Exporters Regional organisations Institutions 	<ul style="list-style-type: none"> Salaries Training materials and equipment 	On-going	<ul style="list-style-type: none"> Recurrent budget Development budget Donor Assistance 	<ul style="list-style-type: none"> Budget constraints No markets
5.4. Promote value-adding for aquaculture commodities	<ul style="list-style-type: none"> Implement value-adding training 	<ul style="list-style-type: none"> MFMR Ministry of Finance and Treasury (MoFT) 	Salaries	On-going	<ul style="list-style-type: none"> Recurrent budget Development budget Donor Assistance 	Budget constraints
5.5. Promote microfinancing for aquaculture farmers	<ul style="list-style-type: none"> Review and assist farmers to access micro-financing including training on microfinance 	<ul style="list-style-type: none"> MFMR Ministry of Finance and Treasury (MoFT) 	Salaries	On-going	<ul style="list-style-type: none"> Recurrent budget Development budget Donor Assistance 	Budget constraints



APPENDIX II: MEL Plan for the SI Aquaculture Management and Development Plan 2018–2023

Objectives	Indicators	Baseline (What is the current situation?)	Target (What is the target situation?)	Data Source (How will it be measured?)	Frequency (How often will it be measured?)	Responsible (Who will measure it?)	Reporting (Where will it be reported?)
Objective 1: To build and strengthen capacity for sustainable aquaculture development and management in Solomon Islands	<ul style="list-style-type: none"> • Training needs identified and delivered 	No training needs identified	Training needs documented and implemented	<ul style="list-style-type: none"> • The training needs document approved • Number of training programmes delivered • Number of people trained 	On-going	<ul style="list-style-type: none"> • MFMR • Provincial governments • Communities • Farmers • Institutions • NGOs • Regional organisations 	MFMR Annual Report
	<ul style="list-style-type: none"> • Training plan developed and implemented 	No training and development plan	Training and development plan developed for institutions, communities, farmers and private sector	<ul style="list-style-type: none"> • Training and development plan approved • Number of institutions • Number of trainees 	On-going	<ul style="list-style-type: none"> • MFMR • Institutions • Private sector • Farmers • Regional organisations 	
	<ul style="list-style-type: none"> • Guide on training and technology transfer developed 	No guides or protocols on transfer of technology	Training and technology transfer guide in place	<ul style="list-style-type: none"> • Training and technology guideline approved • Number of guide distributed • Number of people with specialised skills • Number of training programmes on technology transfer 	On-going	<ul style="list-style-type: none"> • MFMR • Regional organisations • Institutions 	
	<ul style="list-style-type: none"> • Aquaculture division strengthened 	Institutional strengthening programme is in place	Strengthen the programme	<ul style="list-style-type: none"> • Increase in number of staff members by 50% • Number of aquaculture facilities • Increase in budget by 50% 	2021	<ul style="list-style-type: none"> • MFMR • Ministry of Public Service (MPS) • Ministry of Finance and Treasury (MoFT) • Ministry of Development Planning and Aid Coordination 	MFMR / MPS annual reports
<ul style="list-style-type: none"> • SINU and vocational schools offered aquaculture programmes 	No training aquaculture programmes in place	Aquaculture training programmes are offered at SINU and vocational schools	<ul style="list-style-type: none"> • Number of training programmes • Number of students • Number of institutions 	On-going	<ul style="list-style-type: none"> • MFMR • MEHR • Provincial governments • SINU • Vocational schools • Regional organisations 	MFMR / MEHR annual reports	

Objectives	Indicators	Baseline (What is the current situation?)	Target (What is the target situation)	Data Source (How will it be measured?)	Frequency (How often will it be measured?)	Responsible (Who will measure it?)	Reporting (Where will it be reported?)
Objective 2: To promote good governance and best practice in sustainable aquaculture management and development	<ul style="list-style-type: none"> • Aquaculture legislation and regulations reviewed and updated 	Regulations and legislation in place but has gaps	Specific legislations and regulations in place for aquaculture	<ul style="list-style-type: none"> • Aquaculture act and regulation in place 	2022	<ul style="list-style-type: none"> • MFMR • MECDM • Attorney General's Chambers • Private sector • Exporters • NGOs • Regional organisations 	MFMR / MECDM annual reports
	<ul style="list-style-type: none"> • Aquaculture policy and plan reviewed and updated 	Aquaculture plan in place but needs to be reviewed	An updated plan	<ul style="list-style-type: none"> • Updated plan approved 	2018	<ul style="list-style-type: none"> • MFMR • Private sector • Exporters • Institutions • Regional organisations 	MFMR Annual Report
	<ul style="list-style-type: none"> • Specific commodity action plans developed 	<ul style="list-style-type: none"> • Tilapia action plan in place but needs to be reviewed. • No specific action plans for other commodities 	Priority commodities have action plans	<ul style="list-style-type: none"> • Number of action plans developed and approved 	<ul style="list-style-type: none"> • 2019 (for tilapia and seaweed action plan) • Others: On-going 	<ul style="list-style-type: none"> • MFMR • Private sector • NGOs • Exporters • Institutions • Regional organisations 	
	<ul style="list-style-type: none"> • Low risk of aquatic disease 	Aquatic biosecurity document in draft	Number of diseases report	<ul style="list-style-type: none"> • Quarantine protocols enforced • Number of aquatic biosecurity incidences reported 	On-going	<ul style="list-style-type: none"> • MFMR • MECDM • Ministry of Agriculture and Livestock (MAL) • Provincial governments 	
	<ul style="list-style-type: none"> • Guides on best practices developed and implemented 	No Guides on best practice in place	Guides in place that are simple and easy to understand	<ul style="list-style-type: none"> • Guide is approved • Number of people using the guide 	2020	<ul style="list-style-type: none"> • MFMR • Communities • NGOs • Regional organisations • MECDM • MAL 	
	<ul style="list-style-type: none"> • Separate licensing system for aquaculture developed 	Licensing system in place for inshore, offshore and aquaculture culture	Separate aquaculture licensing system	<ul style="list-style-type: none"> • Aquaculture licences and permit documents in place • Number of licences and permits issued 	2022	<ul style="list-style-type: none"> • MFMR • Attorney General's Chambers • MECDM • Provincial governments • Private sector • Institutions • Regional organisations 	

Objectives	Indicators	Baseline (What is the current situation?)	Target (What is the target situation?)	Data Source (How will it be measured?)	Frequency (How often will it be measured?)	Responsible (Who will measure it?)	Reporting (Where will it be reported?)
Objective 3: To establish a conducive environment for aquaculture sector development and growth as an option for economic, livelihood and food security opportunities	<ul style="list-style-type: none"> A map of aquaculture development sites produced 	No map of aquaculture sites	All aquaculture sites are mapped	<ul style="list-style-type: none"> Number of aquaculture sites mapped 	On-going	<ul style="list-style-type: none"> MFMR MLHS Provincial governments Resource owners Communities Private sector 	
	<ul style="list-style-type: none"> Land acquired for demonstration purposes 	No land acquired for demonstration	Land acquired and ready for development	<ul style="list-style-type: none"> Number of lease agreements or lease registration documents 	On-going		
	<ul style="list-style-type: none"> National aquaculture centre and hatcheries operational 	No national aquaculture centre and one sea cucumber hatchery at MFMR compound. Constructions of a quarantine and hatchery facility in progress	A national aquaculture centre for information sharing with hatchery and quarantine facilities	<ul style="list-style-type: none"> A national aquaculture centre completed and operational Number of hatcheries built and operational 	On-going	<ul style="list-style-type: none"> MFMR MDPAC Regional organisations Donor partners Institutions 	
	<ul style="list-style-type: none"> National Development Strategy (NDS) prioritises development of aquaculture facilities 	No prioritisation in the NDS	Aquaculture infrastructure component is represented in the NDS	<ul style="list-style-type: none"> Number of investments 	On-going	<ul style="list-style-type: none"> MFMR Ministry of Development and Planning and Aid Coordination (MDPAC) 	MFMR / MDPAC annual reports
<ul style="list-style-type: none"> National list of commodities by provinces produced 	No list of commodities by provinces	A list of commodities by province exist	<ul style="list-style-type: none"> Commodities are farmed as per the list 	On-going	<ul style="list-style-type: none"> MFMR Provincial governments Communities Private sector 	MFMR Annual Report	

Objectives	Indicators	Baseline (What is the current situation?)	Target (What is the target situation)	Data Source (How will it be measure?)	Frequency (How often will it be measured?)	Responsible (Who will measure it?)	Reporting (Where will it be reported?)
Objective 4: To promote and improve aquaculture collaboration, partnerships and networking	<ul style="list-style-type: none"> Improved coordination and collaboration 	Collaboration, partnership and coordination need to be strengthened	Effective networking, partnership and collaboration between MFMR and partners	<ul style="list-style-type: none"> Number of agreements signed Number of meetings 	On-going	<ul style="list-style-type: none"> MFMR All stakeholders Regional organisations 	
	<ul style="list-style-type: none"> An aquaculture development committee is established 	No development committee	Development committee established and functioning	<ul style="list-style-type: none"> A committee formed with members Number of developments undertaken Number of meetings 	On-going	<ul style="list-style-type: none"> MFMR All stakeholders 	
	<ul style="list-style-type: none"> Look and learn programmes developed 	No look and learn activities	Look and learn programme in place and implemented	<ul style="list-style-type: none"> Number of exchanges Number of farmers 	On-going	<ul style="list-style-type: none"> MFMR Farmers Private sector 	
	<ul style="list-style-type: none"> Aquaculture database established and operational 	A database for MFMR is in place	Specific database for aquaculture linked with MFMR main databases	<ul style="list-style-type: none"> Databased in place Data collected, entered and stored 	On-going	<ul style="list-style-type: none"> MFMR MoFT Regional organisations 	
	<ul style="list-style-type: none"> Awareness programme on prioritised commodities developed and implemented 	Awareness on ad hoc basis	Awareness programmes in place	<ul style="list-style-type: none"> Number of programmes Number of communities and attendees Number of provinces Number of awareness materials 	On-going	<ul style="list-style-type: none"> MFMR Communities Media Regional organisations 	



Objectives	Indicators	Baseline (What is the current situation?)	Target (What is the target situation)	Data Source (How will it be measured?)	Frequency (How often will it be measured?)	Responsible (Who will measure it?)	Reporting (Where will it be reported?)
Objective 5: To identify and establish markets for aquaculture commodities	<ul style="list-style-type: none"> Increase budget 	There is a budget, but it is not sufficient	Sufficient budget allocation	<ul style="list-style-type: none"> Increase in budget from current level 	On-going	<ul style="list-style-type: none"> MFMR MoFT Donor partners 	
	<ul style="list-style-type: none"> Market links established by MFMR 	No markets identified and linked	Farmers take benefit from local and international markets	<ul style="list-style-type: none"> Number of markets identified Number of farmers linked to markets Number of exports Increase in exports 	On-going	<ul style="list-style-type: none"> MFMR Ministry of Commerce, Industry, Labour and Immigration (MICLI) 	
	<ul style="list-style-type: none"> Market analysis survey carried out 	No survey	Market survey analysis document produced	<ul style="list-style-type: none"> Market analysis survey report approved 	On-going	<ul style="list-style-type: none"> MFMR Regional organisations Private sector Institutions 	
	<ul style="list-style-type: none"> Aquaculture marketing strategy developed 	No marketing strategy	Marketing strategy document in place	<ul style="list-style-type: none"> Marketing strategy approved and implemented 	On-going	<ul style="list-style-type: none"> MFMR All stakeholders 	
	<ul style="list-style-type: none"> Value-adding training provided 	No training on value-adding	Value-added training in place	<ul style="list-style-type: none"> Number of training programmes provided Number of staff members trained 	On-going	<ul style="list-style-type: none"> MFMR Regional organisations Institutions 	
	<ul style="list-style-type: none"> Microfinancing and training in place 	No microfinance and training	Farmers have access to microfinance support and training	<ul style="list-style-type: none"> Number of microfinance cases facilitated and number of training programmes provided 	On-going	<ul style="list-style-type: none"> MFMR MoFT Donor partners 	

