



Facilitating biodiversity conservation by enhancing aquaculture policy, planning, management, and production

Part I: Project Information

GEF ID

10907

Project Type

MSP

Type of Trust Fund

GET

CBIT/NGI

CBIT No

NGI No

Project Title

Facilitating biodiversity conservation by enhancing aquaculture policy, planning, management, and production

Countries

Palau

Agency(ies)

UNEP

Other Executing Partner(s)

Government of Palau (Ministry of Agriculture, Fisheries and the Environment (MAFE))

Executing Partner Type

Government

GEF Focal Area

Biodiversity

Taxonomy

Focal Areas, Biodiversity, Protected Areas and Landscapes, Coastal and Marine Protected Areas, Community Based Natural Resource Mngt, Terrestrial Protected Areas, Mainstreaming, Fisheries, Certification - International Standards, Certification -National Standards, Financial and Accounting, Payment for Ecosystem Services, Species, Threatened Species, Wildlife for Sustainable Development, Biomes, Mangroves, Rivers, Wetlands, Grasslands, Lakes, Coral Reefs, Tropical Rain Forests, International Waters, Strategic Action Plan

Implementation, Freshwater, River Basin, Lake Basin, Learning, Pollution, Nutrient pollution from all sectors except wastewater, Nutrient pollution from Wastewater, Coastal, SIDS : Small Island Dev States, Marine Protected Area, Seagrasses, Mangrove, Ecosystem Approach, Sustainable Land Management, Land Degradation, Influencing models, Demonstrate innovative approach, Convene multi-stakeholder alliances, Transform policy and regulatory environments, Stakeholders, Communications, Public Campaigns, Awareness Raising, Education, Behavior change, Type of Engagement, Partnership, Information Dissemination, Consultation, Participation, Civil Society, Non-Governmental Organization, Community Based Organization, Academia, Private Sector, SMEs, Financial intermediaries and market facilitators, Individuals/Entrepreneurs, Local Communities, Indigenous Peoples, Gender Equality, Gender Mainstreaming, Gender-sensitive indicators, Sex-disaggregated indicators, Beneficiaries, Gender results areas, Participation and leadership, Knowledge Generation and Exchange, Access to benefits and services, Capacity Development, Capacity, Knowledge and Research, Theory of change, Indicators to measure change, Adaptive management, Enabling Activities, Knowledge Generation, Knowledge Exchange, Targeted Research, Innovation

Sector

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 1

Climate Change Adaptation

Climate Change Adaptation 1

Duration

48 In Months

Agency Fee(\$)

139,652.00

Submission Date

12/21/2021

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
BD-1-1	GET	1,470,021.00	8,400,000.00
Total Project Cost (\$)		1,470,021.00	8,400,000.00

B. Indicative Project description summary

Project Objective

To strengthen aquaculture policy, planning, management, and production to protect and enhance marine biodiversity in Palau through an ecosystem approach

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
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Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
1. Enabling a supporting policy environment for mainstreaming biodiversity considerations into aquaculture enterprise development and management in Palau	Technical Assistance	Strengthened legal and institutional frameworks that integrate biodiversity considerations into aquaculture enterprises	<p>1.1 Socio-economic analysis conducted with aquaculture enterprises in Palau</p> <p>1.2. Gap analysis of current policy and regulations conducted to facilitate sustainable aquaculture development through ecosystem-level management</p> <p>1.3. National plans, policies, and legislation updated to incorporate the aquaculture-biodiversity link</p> <p>1.4. A GIS survey and mapping of existing aquaculture farms</p> <p>1.5. Criteria developed for future aquaculture site selection</p>	GET	338,553.00	1,356,000.00
		<p>Indicators: National policies and regulations updated for sustainable aquaculture development</p> <p>Target: 1 National regulation, and 1 state strategy</p>				

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
2. Piloting new and innovative sustainable aquaculture methods	Technical Assistance	Strengthened practices to conserve marine biodiversity and critical habitat leading to an ecosystem approach in the aquaculture sector	<p>2.1 Ecosystem Approach to Aquaculture education and training programs developed and implemented for stakeholders</p> <p>2.2. Comprehensive environmental monitoring program developed and implemented to reduce negative impacts on the marine environment</p> <p>2.3. Infrastructure established with improved analytical capacity for monitoring performance of aquaculture farms (Additional equipment, laboratory facilities, and staff)</p> <p>2.4 Ecosystem Approach to Aquaculture farms developed</p> <p>2.5. Strategy</p>	GET	446,185.00	3,550,364.00
		<p>Indicators: National aquaculture programs developed, updated with extents of biodiversity and critical habitat conservation, and increased areas of marine environment managed through a ecosystem approach. Increase in number of species</p>				

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
3. Knowledge management, gender mainstreaming, and monitoring and evaluation	Technical Assistance	Effectively internalized knowledge and active communication lead to behavior change in favor of biodiversity-friendly aquaculture and its conservation	<p>3.1 Knowledge products on aquaculture developed for government staff and stakeholders</p> <p>3.2. Data information system developed and updated as a knowledge hub</p> <p>3.3. Communication plan updated among stakeholders in the aquaculture sector</p> <p>3.4. Integrated monitoring and evaluation system developed</p>	GET	551,645.00	2,730,000.00
		<p>Indicators: Improved attitudes and awareness of communities through KAP survey regarding the importance of biodiversity to aquaculture, measured using a monitoring and evaluation system</p> <p>Indicators, baselines, and targets to be confirmed during PPG</p>				

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
				Sub Total (\$)	1,336,383.00	7,636,364.00
Project Management Cost (PMC)						
		GET	133,638.00		763,636.00	
Sub Total(\$)			133,638.00		763,636.00	
Total Project Cost(\$)			1,470,021.00		8,400,000.00	

Please provide justification

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Recipient Country Government	Ministry of Agriculture, Fisheries and the Environment (MAFE)	In-kind	Recurrent expenditures	1,000,000.00
Recipient Country Government	Ministry of Agriculture, Fisheries and the Environment (MAFE)	Public Investment	Investment mobilized	1,000,000.00
Recipient Country Government	Ministry of Justice?Division of Fish and Wildlife Protection (DFWP)	Public Investment	Investment mobilized	1,500,000.00
Recipient Country Government	Environmental Quality Protection Board (EQPB)	In-kind	Recurrent expenditures	1,500,000.00
Recipient Country Government	Office of the Palau Automated Land and Resources Information System (PALARIS)	In-kind	Recurrent expenditures	1,500,000.00
Recipient Country Government	Protected Areas Network Office (PANO)	In-kind	Recurrent expenditures	1,000,000.00
Recipient Country Government	State Governments	In-kind	Recurrent expenditures	500,000.00
Private Sector	Aquaculture cooperatives and businesses	Grant	Investment mobilized	400,000.00
Total Project Cost(\$)				8,400,000.00

Describe how any "Investment Mobilized" was identified

The co-financing sources identified above are future expenditures specifically identified for complementary work or programs to be carried out in the project area and thus contribute to the delivery of project objectives and global environmental benefits. They have been identified as follows: ? Co-financing from the Ministry of Agriculture, Fisheries & the Environment (MAFE) will be in-kind referring to the operational costs for staff members of the Division of Aquaculture within the Bureau of Fisheries and for specific bilateral technical long-term assistance programs to the Division of Aquaculture. The public

investment co-financing represents procurement of infrastructure for the operation of two hatchery facilities. ? Co-financing from the Ministry of Justice (MOJ) will be public investments in marine surveillance, inspection and enforcement of the importation of marine species, including regulated species and aquaculture species. This also includes legal and policy assistance on developing aquaculture-specific policy and regulations. ? Co-financing from the Environmental Quality Protection Board (EQPB) will be investments in developing siting plans and streamlining permitting processes for pre-qualified locations and also assisting in developing of a standardized water quality monitoring protocols. ? Co-financing from the Office of the Palau Automated Land and Information System (PALARIS) will be investments in developing and validating an aquaculture developing siting tool, generating zonation maps and housing GIS data. ? Co-financing from the Protected Areas Network Office (PANO) will be investments in integrating aquaculture into protected area management, coordinating re-seeding activities into identified protected areas, and facilitating capacity building through the current the local network of PAN site managers and staff. ? Co-financing from the State Governments are investments in enhancing existing state efforts and resources currently being directed to complementary work to the activities of this project, including marine spatial planning initiatives through existing planning commissions or other state entities. ? Investment mobilized from the Private Sector will be their own private investments for their aquaculture businesses, aiming to comply with best practices, adhere to regulatory requirements, and integrate biodiversity safeguards into their business models.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	Palau	Biodiversity	BD STAR Allocation	1,470,021	139,652	1,609,673.00
Total GEF Resources(\$)					1,470,021.00	139,652.00	1,609,673.00

E. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount (\$)

50,000

PPG Agency Fee (\$)

4,750

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)	Total(\$)
UNEP	GET	Palau	Biodiversity	BD STAR Allocation	50,000	4,750	54,750.00
Total Project Costs(\$)					50,000.00	4,750.00	54,750.00

Core Indicators

Indicator 5 Area of marine habitat under improved practices to benefit biodiversity (excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
25,500.00			

Indicator 5.1 Number of fisheries that meet national or international third party certification that incorporates biodiversity considerations

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)

Type/name of the third-party certification

Indicator 5.2 Number of Large Marine Ecosystems (LMEs) with reduced pollutions and hypoxia

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (achieved at MTR)	Number (achieved at TE)
0	0	0	0

LME at PIF	LME at CEO Endorsement	LME at MTR	LME at TE

Indicator 5.3 Amount of Marine Litter Avoided

Metric Tons (expected at PIF)	Metric Tons (expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	120			
Male	240			
Total	360	0	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

5. Marine habitat under improved practices: The total nearshore marine areas around the main Palau archipelago is 0.28 million hectares. Subtracting the current PAN MPA coverage from above results in a non-PAN nearshore marine area of 0.17 million hectares. It is anticipated that at the end of this project, 15% of marine habitat (25,500 hectares) would have benefited due to better siting of aquaculture activities, strengthened policies, informed planning and better practices.

Part II. Project Justification

1a. Project Description

(1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed

The Republic of Palau is an archipelago in the Pacific Ocean, located approximately 800 km north of Papua New Guinea and 800 km east of the Philippines. The country has an exclusive economic zone (EEZ) of 3,120,000 km², and a total land area of 488 km². The thousands of small, isolated coral atolls and higher volcanic islands that characterize the country contribute substantially to the high diversity of species found today, with over 7,000 terrestrial and 10,000 marine species. Palau has the greatest terrestrial biodiversity in the Micronesia region, and one of the most biologically diverse underwater ecosystems globally. The rich biodiversity and unique environmental features of Palau grant this country global significance for top conservation and sustainability efforts in Palau. Palau has an abundance of coral reef habitat types, as well as complex marine habitats associated with mangroves, seagrass beds, deep algal beds, mud basins, current lagoon bottoms, and rich tidal channels([1]¹).

Marine biodiversity: Palau has numerous marine ecosystems, including mangrove forests, seagrass beds, fringing reefs, barrier reefs, and marine lakes, and Palau's coral reefs are considered one of the *Seven Underwater Wonders of the World*. Located in the north-eastern margin of the Coral Triangle, Palau's coral reefs have both high species diversity and high habitat diversity. Palau's reefs contain more than 350 species of hard corals, 200 species of soft corals, 1,300 species of reef fish, and endangered species such as the dugong, saltwater crocodile, sea turtle, and giant clam.

In October 2015, the Palau National Marine Sanctuary (PNMS) was signed into law. The PNMS covers 80% of the EEZ, an area of approximately 500,000 km². Fisheries were reduced in this protected zone and a complete ban on commercial fishing activities was implemented in January 2020. The remaining 20% of the EEZ is set aside for domestic fishing, with all catches landed exclusively for the domestic market. In addition, Palau has placed over 45% of its nearshore waters under some form of protection. The government of Palau was instrumental in establishing the Micronesia Challenge—a regional

marine conservation initiative to protect more than 30% of the marine ecosystems of the region through the establishment of local protected area networks (PANs). Today, tourists visit Palau mainly to experience its unique marine ecosystems.

Terrestrial biodiversity: Palau has the highest terrestrial biodiversity among all countries in Micronesia, which includes nine types of primary forest, dominated by upland forest with Mangrove forest second in abundance. There are approximately 1,260 plant species and varieties in Palau, of which 830 species are native, and at least 194 species are endemic. The majority of the endemic plant species occur only on Babeldaob, the largest of Palau's islands. The terrestrial fauna of Palau includes approximately 5,000 insect species, 141 bird species (of which 11 species and 9 subspecies are endemic), at least 40 species of freshwater fishes (of which 4 are endemic), 46 species of terrestrial reptiles and amphibians, and 3 species of bat (of which 1 species and 1 subspecies are endemic).

Threats to biodiversity: As a fundamental property of ecosystems, biodiversity is of major importance to the economy of Palau, as for most Small Island Developing States (SIDS) and is particularly susceptible to ecological disturbances related to economic development and global climate change. Economic development enterprises that have the potential to negatively impact biodiversity include aquaculture.

With economic and cultural dependence on the natural environment, as in other Pacific countries, the population of Palau exerts ever increasing demands on the region's natural resources. Consequently, plant and animal species are becoming vulnerable to extinction because of climate change, competition from introduced (invasive) species, and human impacts such as habitat destruction, over-harvesting of species, and pollution. The 2019 State of the Environment Report (SOE) for Palau documented trends in the use of key natural resources and analyzed the most recent conditions in relation to local and global goals and standards. This report highlights the disturbing trend of increasing pressures on coral reefs, particularly the overfishing of reef fish and marine invertebrates, sea cucumbers, sea urchins, trochus, and giant clams. Therefore, it appears that most responses to local pressures on marine resources have been inadequate and should be improved.

Further threats to Palau's marine biodiversity are reflected in the local decline of globally endangered species. The majority of these species have some sort of local protection, in the form of laws, regulations, or Marine Protected Areas (MPAs); however, many are declining and need additional enforcement efforts for their protection (e.g., updated laws or regulations). According to the 2016 Country Data Dossier for Aichi Target 12: Reducing Risk of Extinction, of the 23 marine mammals identified from Palau, 3 are threatened (13%). In the 2019 Global International Union for Conservation

of Nature (IUCN) Red List^[2], some marine mammals, including dugong and sperm whale are listed as vulnerable, and the blue whale as endangered. Listed as vulnerable are several marine fishes, including bigeye tuna, kemedukl, square-tail coral grouper, and thorny, as well as the giant clam (a vulnerable invertebrate).

Given the threats to Palau's biodiversity, as described above, achieving long-term cultural, economic, and developmental sustainability will require a more strategic approach to managing Palau's nearshore fisheries than is currently in implementation. Unsustainable development practices, impacts of climate change, overharvesting of natural resources, and ongoing expansion of tourism represent significant threats to Palau's environmental quality and biodiversity, and many of the human-induced ecosystem changes currently occurring on and around these fragile islands are irreversible.

There is increasing recognition, both globally and within Palau, that aquaculture is an important source of aquatic food products under the current conditions of declining marine-capture fisheries resources and the growing demand for aquatic products. Within Palau, there is a small but expanding aquaculture sector which has future growth capacity, and the potential to contribute to food production, employment, export earnings, and economic growth. Even though aquaculture in Palau has been in operation for over 40 years, the aquaculture industry is still in its infancy and needs improved management systems.

Policy, Regulatory, and Institutional Context: A number of Pacific Island Countries (PICs) have enacted specific Acts stating policy and containing regulations. Most of these policies and strategies are focused on food security, poverty alleviation, environmental sustainability, and industrial or commercial development. Many of the PICs have only recently developed policy instruments specific to aquaculture, which could provide an alternative to ensure food security. These PICs now consider the development of sound and comprehensive aquaculture legislation as a high priority. A new Palau Fisheries and Marine Resources Act is being developed, with assistance from the Food and Agriculture Organization (FAO), and the priority provisions for aquaculture to be included in a National Aquaculture Strategy (NAS) document are:

- 1 Provisions prohibiting the release of unauthorized marine animals into natural waters and providing for the management of marine animal health in aquaculture facilities. The new regulation should complement the Plant and Animal Quarantine Regulations by strengthening domestic aquaculture health management.
 - 1 Expansion of the Palau Fisheries Advisory Committee competence and Terms of Reference to include aquaculture, and specifically *the formulation, establishment and implementation of a comprehensive*
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aquaculture policy, guidelines or codes for the sustainable development and management of aquaculture.

- 1 Clarified institutional arrangements for strategy development, monitoring of implementation, and updates.

To manage the local fisheries and conserve Palau's marine resources, the Marine Protection Act was established in 1994. Specific management tools described in this Act include: bans on the export of certain species (e.g., mangrove crabs and particular sea cucumber species); closed harvest seasons (e.g., for the rabbitfish (*Siganus fuscescens*) and the groupers: *Epinephelus* and *Plectropomus* spp.); size limits (for *Cheilinus*, *Bolbometopon*, crabs, and lobsters); mesh size limits for nets, and permit requirements for aquaculture and aquarium trade ventures. Legislative attempts to implement bans on certain species and extend moratoriums on endangered species have met with limited success. This Act is currently being revised with the aim of promoting sustainable coastal fishing practices by conserving Palau's marine resources, to ensure the livelihoods of Palauan fisherfolk now and for generations to come.

In line with principles and international standards set by the Code of Conduct for Responsible Fisheries (CCRF), a voluntary agreement established by the FAO, a NAS, has been developed to ensure the effective conservation, management, and development of living aquatic resources, with due respect for the marine ecosystem and biodiversity. The goal of NAS is to provide guidance to promote and develop national aquaculture, for both state-owned and private sector enterprises, in a responsible and environmentally sustainable manner, and it outlines actions necessary for future development of aquaculture in Palau, including responsibilities associated with aquaculture implementation.

Alongside the *Environmental Quality Protection Act* legislated in 1981, an Environmental Quality Protection Board (EQPB) was established. The EQPB is a semi-autonomous agency of the executive branch of the government of Palau, tasked with and responsible for the protection and proper conservation of the quality of the environment and its resources. The EQPB is currently implementing essential environmental protection programs that promote the quality of the environment and ensure proper conservation of resources. One of the major topics the EQPB is addressing is marine and freshwater quality.

Aquaculture and its Growth in Palau: Globally, coastal ecosystems face numerous complex and interconnected anthropogenic threats, such as nutrient pollution, loss of habitats, and the compounding impacts of climate change. These stressors can challenge or change the way in which ecosystems provide vital services, such as nutrient cycling or maintenance of fisheries and supply of seafood products, and the stress on these ecosystems is increasing. In the context of increasing global consumption of seafood, which has caused wild fishery harvests to plateau, aquaculture is one of the

fastest growing food production enterprises on the planet, expanding world-wide since the 1980s, and corresponding to a *blue revolution*([3]³). By 2030, aquaculture is expected to provide more than half of the global seafood supply([4]⁴) and by 2050 might produce nearly two-thirds of the fish consumed globally. During the past decades, aquaculture has expanded rapidly, and contributed 52% of global fish production in 2018.

Much of the aquaculture currently practiced across the world negatively impacts the environment and local communities causing local pollution, disease outbreaks, and coastal degradation in various parts of the world, in part due to improper operation of aquaculture farms. Poor spatial planning practices, particularly the location of the majority of aquaculture operations on an *ad hoc* basis, are primary contributing factors to the negative environmental and community impacts of aquaculture. Human-induced changes in the flow of nutrients also pose major threats to coastal and marine ecosystems worldwide.

However, when managed within a broader ecosystem framework and strategy, aquaculture has the potential to enhance ecosystems and provide increased benefits to humanity, with values potentially returned via a wide range of regulating, provisioning, habitat, and cultural ecosystem services. By actively designing aquaculture to deliver ecosystem services, it may be possible to achieve greater positive impacts on ecological, economic, and social needs through enhanced habitat restoration, increased employment, and increased food security, respectively.

Aquaculture has certain positive impacts on biodiversity, for example, cultured seafood can reduce pressure on overexploited wild stocks, stocked organisms may enhance depleted stocks, aquaculture often boosts natural production and species diversity, and employment in aquaculture may replace more destructive uses of marine resources([5]⁵). It is noteworthy that a growing body of scientific evidence indicates the potential for commercial cultivation of edible bivalves and seaweed to deliver valuable ecosystem goods and services, including the provision of new habitats for fish and mobile invertebrate species ([6]⁶). A study focused on understanding habitat-related interactions associated with bivalve and seaweed aquaculture found that sites associated with bivalve and seaweed farming systems are associated with higher abundance and species richness of wild, mobile macrofauna compared to similar sites without such farms. Of the different bivalve and seaweed aquaculture approaches, suspended or elevated mussel and oyster culture yields the largest increases in wild

macrofaunal abundance and species richness[7]⁷. Considering both the positive and negative aspects of aquaculture, this type of farming will most likely continue to grow at significant rates beyond 2025 and will remain the most rapidly increasing food production system globally.

The FAO and World Bank have developed a comprehensive approach to sustainable aquaculture termed the Ecosystem Approach to Aquaculture[8]⁸. The Ecosystem Approach to Aquaculture (EAA) states that aquaculture should be developed in context of ecosystem function and services with no degradation beyond resilience; to improve human well-being with equity for stakeholders and in context of other sectors; policies, goals, as appropriate. The EAA takes a stakeholder participatory approach and begins by reviewing the priorities for aquaculture and identifying the relevant stakeholders for consultation. The stakeholder process should include participants that have aquaculture political authority or legal standing, or are property owners, or information holders, as well as those that may not be supportive of aquaculture. This list could include, but should not be limited to, farmers, fisheries, government officials, environmental non-governmental organizations, scientists, local businesses, and other marine users. The stakeholder group should define the overall priorities for aquaculture development, collect baseline data, and set objectives, and the stakeholder process can include review of current policies, regulations, and laws that are both aquaculture-specific and affect aquaculture; identification of risks and opportunities; and determination of which aquaculture species and systems the group would like to pursue.

Aquaculture was introduced in Palau over 40 years ago. Since the 1970s, several species have been farmed during trials. Although an upward trend in aquaculture production is evident, the Palau aquaculture industry is still in its infancy (Figure 1). In Palau, success has been achieved with the aquaculture of clams, corals, mangrove crabs, and fish species (e.g., milkfish and grouper).

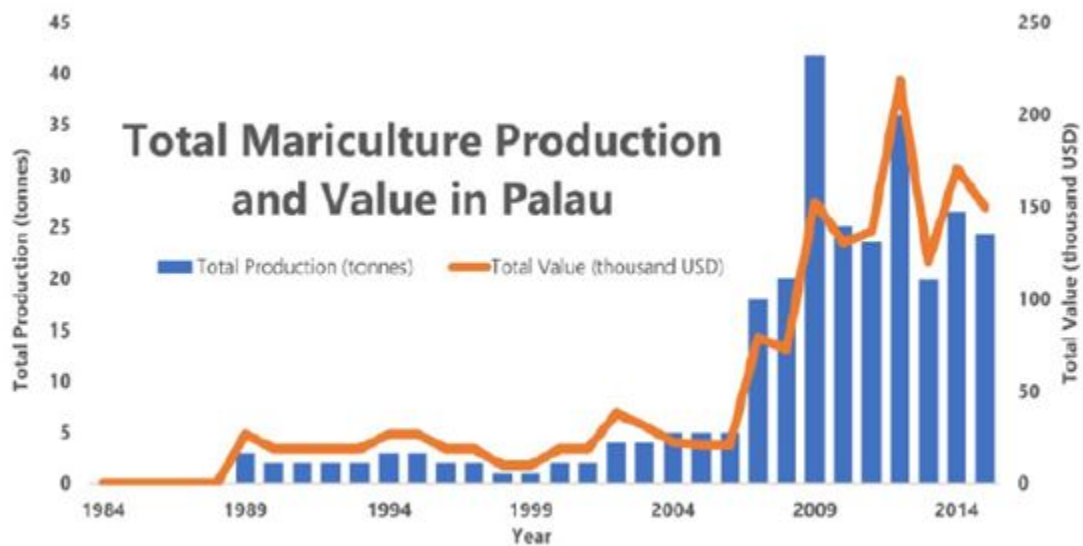


Figure 1. Trends in total mariculture production and value in Palau

Figure 1. Trends in total mariculture production and value in Palau

Palau was one of the first countries to succeed in the mass production of giant clams during the 1970s and now giant clams produced by the Bureau of Marine Resources (BMR) are planted out and farmed in coastal areas around the country. The clam species cultured include *Tridacna crocea*, *T. derasa*, *T. gigas*, *T. maxima*, *T. aquamosa*, *Hippopus hippopus*, and *H. porcellanus*, which are grown for local consumption and for export. A Palau Aquaculture Clam Association (PACA) was established to support the development of clam farming in Palau.

Milkfish farming is a long-standing tradition in some Palauan States and extensive milkfish farm ponds are found around the country. Milkfish farming using fry from the wild is an ongoing approach that has been used for several years by both private and State farm operators. The main operational milkfish farm at present is located in Ngatpang State, where a State government farm currently produces fish for local consumption. Grouper hatchery production has been successful, and two pilot cage farms are now in operation, producing the tiger grouper (*Epinephelus fuscoguttatus*), and *Plectropomus* species, with the vision of targeting live fish markets in East and Southeast Asia.

Crustacean farming in Palau includes some experience of pond culture of shrimp at Ngatpang, and pen culture of mangrove crabs in mangrove areas, producing products for domestic consumption. There

appear to be plans for further growth of shrimp farming using imported post-larvae white leg shrimp (*Litopenaeus vannamei*) from certified hatcheries in Guam.

The examples described above demonstrate that in Palau, aquaculture can be successful, responding to both local and export market demands, and providing a baseline of experiences for moving forward with further development of the sector. In Palau, there are a number of strengths, opportunities, weaknesses, and threats to the future development of aquaculture that need to be considered. The key strengths and weaknesses include:

Strengths:

- 1 Positive government support for aquaculture.
- 1 A generally clean environment and green image.
- 1 Apparent freedom from many marine animal diseases.

Weaknesses:

- 1 Lack of existing infrastructure and services for aquaculture.
- 1 Shortage of skills and high labor costs.
- 1 High production costs reduce the capacity to compete in large commodity markets (e.g., milkfish and shrimp).

In the current context of declining marine-capture fishery resources and the need to reduce negative influences on natural biodiversity, aquaculture could be an important system and tool to meet the growing demand for aquatic products in Palau. However, viable aquaculture approaches that minimize environmental impacts and ensure sustainability must be implemented.

Ensuring Environmental Sustainability: With 586 islands as well as lagoons and reefs, there are many opportunities for the development of marine aquaculture in Palau. Palau's marine resources include some of the world's best corals, and extensive mangrove forest cover. Given such valuable natural resources, the development of aquaculture must be well planned and implemented with due consideration for the natural environment, and other users of it. This approach conforms to the primary objective of the 2001 Presidential Management Action Plan (MAP) *to integrate environmental planning into developmental planning efforts*. The approach to aquaculture development, therefore, has to prioritize environmental management and sustainability. An environmentally sensitive approach will enable aquaculture in Palau to develop in harmony with other users, as well as with the many traditional uses of marine resources, in particular:

- 1 Palau is well positioned to capitalize on the image of *clean and green* aquaculture products.
- 1 Environmental management of the sector is a high priority and integration of aquaculture into the natural environment by careful siting and effective management will put the image of a clean and green industry into practice.
- 1 The economy of Palau relies heavily on the tourism sector and the maintenance of a high quality environment, therefore, careful aquaculture planning is essential to balance the use of resources between these sectors.

The aquaculture industry in Palau faces particular challenges with regard to integration into the coastal and marine ecosystems and economies. It also faces all the economic and capacity difficulties experienced by a SIDS; therefore, economic, market-led approaches well-tuned to the local environment, customs, and capacity are necessary.

A firm commitment to further build the environmental sustainability and integrity of the sector should underpin the aquaculture strategy. This is possible because aquaculture is one of a handful of natural resource industries that can offer truly environmentally sustainable economic growth. In addition, as aquaculture is based on renewable resources, and depends on pristine waters, aquaculture operators have a stewardship role to play in assisting with protection of the natural environment. The FAO CCRF emphasizes the need for advance evaluation of the effects of aquaculture on ecosystem integrity, as well as regular updating of aquaculture development strategies and plans to ensure that aquaculture is ecologically sustainable, and to allow rational development of resources shared by aquaculture and other activities.

Palau became a signatory to the Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES) in 2004. The aim of the convention is to ensure that international trade in wild animal and plant specimens does not threaten species survival. As one of Palau's obligations to the Convention, a permit is required for export of any species, whole or in part and dead or alive, listed in the CITES Appendix I or II. The majority of CITES permits issued in Palau are for the export of giant clams, with a smaller number of permits issued for hard corals and nautilus (*Nautilus belauensis*). In 2017, 177 CITES permits were approved and issued for species listed in the CITES Appendix III. CITES permits are processed at the BMR.

By consuming 67.7 kg of seafood per capita annually, Palauans eat more seafood than most other people in the world. Because of a limited amount of arable land and a high demand for non-marine

products, Palau imports 86% of its food resources. Palau's reliance on locally-caught wild seafood as a primary source of protein cannot be overstated. This demand is heightened by a growing and economically vital tourism economy that simultaneously relies on thriving coral reefs and marine biodiversity, as tourist attractions and sources of seafood, as well as exports.

Current aquaculture production in Palau is confined to milkfish and giant clams, the only two significant commercial aquaculture commodities produced in the country (Table 1)[9]⁹. Other aquaculture species that have been developed but are yet to be made commercially viable are: grouper, rabbitfish, and mangrove crab. The FAO, the Center for Tropical and Subtropical Aquaculture, the Secretariat of the Pacific Community, and the Micronesian Association for Sustainable Aquaculture have all provided technical assistance to Palau with respect to aquaculture. The primary government agency of Palau that manages the development of the aquaculture sector is the BMR. Although aquaculture is considered essential for national development, Palau has yet to implement any policy or appropriate legislation exclusively dedicated to aquaculture management and regulation. Applications for aquaculture operations are evaluated on a case by case basis with no formal process or guidelines in place. The big challenges currently being faced by the aquaculture industry are the lack of good quality seed and feed, technical marketing information, capital, and skilled human resources. A solution might be the creation of a single supportive government agency and a set of rules to guide the development and management of aquaculture in Palau.

Table 1. Palau's aquaculture at a glance in 2016

Total area for fish (km ²)	2963
Total area for bivalves (km ²)	0
Current production	24.2 tonnes & 343,800 pcs
Government investment	Low
Plan for expanding production	Low
Importance for food security	High
Large markets accessibility	Low
Technical capabilities	Low
Permitting and regulations	Low and limited

Km coast/km ² land	1,519 km/459 km ² = 3.3
Per capita fish consumption	67.7 kg

Aquaculture has been and is currently actively promoted in Palau in the small business sector with approximately 100 people working at the aquaculture sites, which range in size from 52 m² to 40,000 m². Currently, the production of finfish and shellfish dominates the aquaculture industry in Palau(6,[10]¹⁰) (Figure 2).

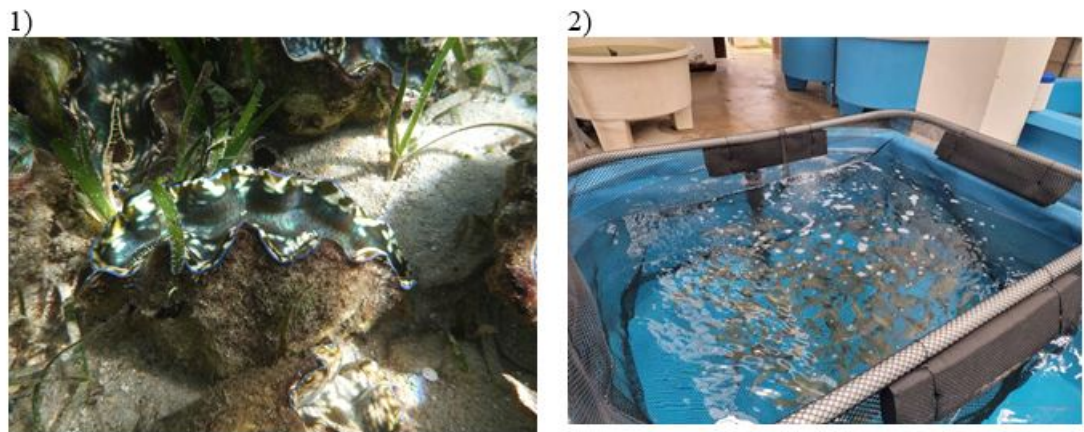


Figure 2. Giant clam (*Tridacna derasa*)¹ and rabbitfish (*Siganus fuscescens*)² under culture in Palau

Figure 2. Giant clam (*Tridacna derasa*)¹ and rabbitfish (*Siganus fuscescens*)² under culture in Palau

Although Palaun aquaculture production is increasing and management systems are improving, it is clear that all the complexities of intensive aquaculture systems must continue to be scrutinized to protect biodiversity as well as to promote food production. The proposed project will be implemented at the national level to guide the development of the aquaculture sector to complement, rather than work against, Palau's legacy of marine biodiversity conservation. The Government of Palau is seeking GEF assistance for the protection and enhancement of marine biodiversity by strengthening aquaculture policy, planning, and management. To achieve the objective of the project, three barriers must be overcome.

Barrier 1: Lack of policies and plans, which limits the integration of aquaculture with due respect for the marine ecosystem and biodiversity conservation at the national scale. Aquaculture plays an important role in supplying healthy and nutritious food to a growing global population and supports sustainable development in coastal communities. It contributes to food security, poverty alleviation, and socio-economic stability, and in some cases, provides services to marine ecosystems. Although competition for space and resources is a source of potential conflict for sectors such as tourism, aquaculture, and fisheries, ultimately all of them are dependent upon a healthy and well-managed marine ecosystem. Joint efforts to conserve vulnerable species and the marine environment, and support local economies are needed. The current regulatory framework for biodiversity conservation and management at the national level is deficient in regulations to make aquaculture operational and effective on the ground. There are gaps in the regulations in the Marine Protection Act (2020); consequently, this Act needs to be updated and enhanced by the inclusion of regulations that serve the mandate to manage local fisheries and reduce potential conflicts among various sectors, as well as to conserve marine habitats. Management tools addressed in the current Act do not incorporate aquaculture together with biodiversity conservation, and this deficit needs to be addressed as a national priority. To develop and manage the aquaculture sector in line with biodiversity conservation, cross-sector and multi-agency approaches are needed to address ecosystem-level management issues.

Barrier 2: The limited capability of the Bureau of Fisheries of the Ministry of Agriculture, Fisheries and the Environment (MAFE) to fully support communities fully in their response to protect coastal and marine ecosystems from aquaculture-related impacts. The lack of capacity of the MAFE's Bureau of Fisheries to assess and identify potential risks to marine ecosystems, which leads to limited support provided to communities, has been observed. To overcome this barrier, the capacity of state and local communities needs to be strengthened by support from the government sector and other relevant agency staff. This support could include assessing, planning, and identifying measures to reduce potential environmental risks derived from aquaculture and to conserve marine ecosystems. In addition, public-private partnerships need to be strengthened in close collaboration with state and local communities to deal with problems and work towards sustainable solutions.

Barrier 3: Lack of understanding in aquaculture-dependent communities about the issue of biodiversity conservation and its consequent effects on their livelihoods. The link between aquaculture and biodiversity should be understood in relation to conservation objectives, and there needs to be a strengthening of the knowledge and capacity to understand how to reconcile nature conservation and sustainable development of aquaculture. A lack of alignment in social views of unlimited, traditional supply of the past versus the current decline in natural resources has been observed, which is partially attributed to the lack of understanding of ecosystem responses in the aquaculture sector. To strengthen the capacity of state and local communities, the MAFE's Bureau of Fisheries and other relevant agency staff need to understand the benefits of biodiversity conservation on aquaculture practices for future generations of Palauans and their visitors.

Palau has the potential to support socio-economic growth among Pacific countries and to address global demand for seafood. Sustainable aquaculture requires the adoption of ecologically sound practices and deliberate attention to rigorous monitoring at the national and state levels, particularly for increasing production of the economically important giant clam species, and for finfish aquaculture. To overcome all the barriers being faced in Palau, it is necessary to adopt applications with improved aquaculture management. The proposed project will enable Palau to build an institutional framework for the development of the aquaculture sector by maintaining ecosystem sustainability and strengthening capacity through training, knowledge management, and by putting environmental monitoring systems in place.

(2) the Baseline scenario and any associated baseline projects

There is increasing recognition both globally, and within Palau and other Micronesian nations, that aquaculture is an important source of marine food under declining marine-capture fisheries resources and the current growing demand for marine products. Within Palau, there is a small but growing aquaculture sector which has the potential for future growth, and the possibility of contributing to food production, employment, and economic growth.

During the project period, the Government of Palau will implement parallel projects, both directly and indirectly in support of the proposed project. The projects include the development of water quality monitoring regimes for farmers, aquaculture siting tool and marine spatial planning. The estimated resources allocated from the government's budget to aquaculture related activities total US\$ 1.2 million, the majority of which is allocated annually through the MAFE, with some funds being channeled through the MOJ. The MAFE will continue to provide policy and legal and regulatory support to local aquaculture farmers in Palau, together with the Overseas Fisheries Cooperation Foundation (OFCF), Palau Aquaculture Alliance (PAA), Palau Aquaculture Cooperative Association (PACA), and Palau Community College's Cooperative Research & Extension (PCC-CRE) for technical support.

Policy, and legal and regulatory frameworks: The Palau Government has pursued the mainstreaming of biodiversity and aquaculture planning into national policies and mandates. The MAFE has mainstreamed and developed aquaculture activities since 2006 and the NAS was developed in a responsible and environmentally sustainable manner based on recommendations and consultations with State governments and stakeholders (communities) led by the BMR. The BMR is further mandated to work in five key areas: (1) Development of policy, institutional, and regulatory frameworks for

management of marine resources, (2) Management, research, and conservation of marine resources through national management and co-management with States, (3) Development and promotion of sustainable aquaculture opportunities, (4) Development of nearshore fisheries resources, and (5) Collection and analysis of all forms of marine resources and aquaculture data. The overall thrust of the plan the government of Palau is pursuing is to take an ecosystem-based approach to aquaculture management that has a broader focus than simply that on the sustainability of target species. Most of this budget is spent on recurrent expenditures for annual operating cost US\$ 240,000.

The Overseas Fisheries Cooperation Foundation (OFCF): The OFCF was launched in 1992, and the goal of this program is to maintain and enhance goodwill relations between the fisheries of Japan and Palau. This is accomplished by the extension of technical and economic cooperation for the development and promotion of coastal fisheries, and the development of artisanal, subsistence, commercial, and export fisheries. The OFCF has provided capital for six ice-making machines as well as several boats for State governments to assist fishing cooperatives. The program has also provided technical advisors who support infrastructure development, teach equipment operation skills, and introduce and promote various fishing, post-harvest, and aquaculture methods alongside resource management strategies. This program milestone represents the culmination of a collaboration between the donor and partners of the MAFE (or Bureau of Fisheries) and continue to implement with an annual budget of US\$ 250,000 during project period as an international and bilateral donor.

The Palau Mariculture Demonstration Center (PMDC): The PMDC supports giant clam farmers in 10 of the 16 States in Palau by providing training workshops, farm construction, repairs, and maintenance. The PMDC researchers investigated several kinds of farm and cage designs and a submersible pen, with dimensions of 6.1 m (w) ? 9.1 m (l) ? 0.6 m (h), has been adopted as a standard model. The PMDC assists with giant clam stock enhancement activities conducted by State governments, State ranger offices, conservation groups, NGOs, and others. In 2016, with bilateral assistance from the Government of Japan, the Palau expanded and renovated the Center for its clam hatchery with assistance of USD 6.6 million. Under guidance of MAFE, the Center will be further utilized by promoting education and training activities during project period with an annual budget of US\$ 100,000.

Palau National Aquaculture Center (PNAC): The PNAC was established in 2010, and has conducted research into the production of finfish, including grouper, rabbitfish, and clownfish, as well as shrimp, also known as tiger prawn. The PNAC also has the equipment and capability to produce live feed. In addition, the Center has collected rabbitfish brood stock since 2015, with the first batch of ~1,300 fry successfully produced in June 2015. Together with the PMDC, the PNAC will be in operation by promoting research into target species for sustainable aquaculture in Palau during the project period with approximate annual budget of US\$ 150,000.

The Micronesian Association for Sustainable Aquaculture (MASA): The MASA, as a new intergovernmental network organization, came into force in 2015 after having a meeting with high level officials of the founding member governments. The goal of the MASA is to develop strategies that will help strengthen the sustainability and success of aquaculture activities. The adoption of the MASA Agreement marked the transition of MASA as a project by the Food and Agriculture Organization (FAO) to an independent organization, owned and operated by its member governments with grant of USD 499,000 since 2015. During the project period, the MASA is expected to continue to promote capacity building activities in which lessons learned and experiences to be shared with an annual budget of US\$ 80,000.

(3) the proposed alternative scenario with a brief description of expected outcomes and components of the project

The proposed alternative scenario, in overview, is that the proposed project will, for the first time, systematically address sustainable use of Palau's marine resources to contribute to food security by enhancing aquaculture policy and regulations to support shared conservation objectives with the community. When developed responsibly, aquaculture represents a significant opportunity to simultaneously meet the three pillars of the UN Sustainable Development Goals: ending poverty and hunger and promoting prosperity, while protecting the planet from degradation[11]¹¹.

The aquaculture sector in Palau has suffered from limited planning, capacity, and coordination. This has often resulted in unintended ecosystem impacts, mismatch in seedling production, needs, and site for aquaculture farms. The proposed project aims to strengthen policies and institutions, promote engagement with the private sector, prioritize the establishment of environmentally sound best practices, and establish management frameworks that align with the seven strategic areas in Palau's National Biodiversity Strategy and Action Plan (NBSAP), including: (1) Protecting or managing areas, (2) Species protection, (3) Biosecurity, (4) Integrating biodiversity and ecosystem services, (5) Reducing direct pressures on biodiversity, (6) Ensuring food security, and (7) Mainstreaming conservation. The proposed project will be implemented with active participation of stakeholders in the aquaculture sector to support the building of a national development framework, based on an ecosystem perspective, that integrates innovative technologies and strengthens national capacity. Three components will be implemented to meet the key objectives of the proposed project.

Component 1: Enabling a supporting policy environment for mainstreaming biodiversity considerations into aquaculture enterprise development and management in Palau

This component will establish a framework of biodiversity-friendly aquaculture planning and management in Palau.

Outcome: Strengthened legal and institutional frameworks that integrate biodiversity considerations into aquaculture enterprises

In order to strengthen the legal and institutional frameworks for aquaculture, and to reduce the negative and increase the positive impacts of aquaculture on biodiversity and coastal or marine ecosystems, the Component 1 outcome will focus on gaining an understanding of the existing technical and socio-economic practices currently in operation in the aquaculture sector by means of surveys and assessments.

Output 1.1. Socio-economic analysis

Economics associated with the remote island location of Palau hamper the profitability of aquaculture operations due to high costs of importing feed and exporting production. Comparatively lower prices of wild-caught seafood also limit profitability of aquaculture production. The Palau Government should understand current status being faced for the development and implementation of aquaculture to avoid the pitfalls of unsustainable aquaculture development, such as environmental damage and negative socioeconomic impacts. To understand overall negative socio-economic impacts on aquaculture in Palau, a comprehensive analysis including gender issues will be conducted. Currently, production and value data of aquaculture products produced in Palau are very limited. The lack of data on standard production parameters makes it virtually difficult to evaluate the current market value, future potential for domestic and export markets, and profitability. It is essential to have data to determine how and when aquaculture should expand, particularly as this will have an impact on government services as well as prices in the existing markets. The data will be used to evaluate the potential for expansion, export, and costs of so doing, the impact on government and the support that government will need to extend. Unless this is available, further investment should be viewed as high risk and speculative. The proposed project will collate production and value data of aquaculture and standardize data as production parameters to evaluate both current and future market values in Palau to understand needs for potential extension

Output 1.2. Gap analysis

To further strengthen governance, gap analysis of institutional and legal frameworks, and policy and regulations in association with these frameworks, will be implemented in collaboration with the private sector to support sustainable aquaculture development. The BMR has identified Palau's environmental regulations as a challenge to aquaculture management, particularly in relation to the identification and permitting of suitable sites for aquaculture operations. This has also been repeatedly expressed as a key challenge by farmers. In addition, a lack of formal regulations specific to aquaculture policy and management has been identified.

Output 1.3. Updating national plans and policy

Using the gap analysis findings, national plans and policies dealing with aquaculture will be revised and updated with full inclusion of the biodiversity safeguards that need to be adopted. The foundational marine resources legislation in Palau is the Marine Protection Act of 1994. At present, there is no national legislation in place to call for the development of aquaculture as a sector. However, there are a number of national policy documents which recognize the potential of aquaculture and identify a strategic role for aquaculture in other national focal areas such as climate change and protection of biodiversity. The current Palau national plans and policies are the: (1) Marine Protection Act (1994), (2) Environmental Quality Protection Act, (3) Biosecurity Act (2014), (4) Palau National Biodiversity Strategic Action Plan, (5) CITES Implementation Act, (6) Act to ban all commercial sales of wild giant clams, (7) Chain of Custody Law-Certification of each level of production and sale, and (8) Revised Aquaculture Permitting Process, including permits and State agreements on abandonment and cleanup policy and procedures.

Output 1.4. Use of a geographic information system (GIS)

The location of aquaculture operations is a major determinant of the environmental and social impacts of the sector. When situated in unsuitable locations, for example, over sensitive habitats such as coral reefs or within important fishing areas, aquaculture can have negative impacts on the environment and create conflicts with other ocean users. Areas suitable for the development of aquaculture should be chosen using a GIS with maximum thresholds for suitability identified by analyzing factors such as: bathymetry, water quality, and proximity to shipping lanes, processing facilities and markets, infrastructure, and existing aquaculture. A GIS map of aquaculture sites will be developed for use as a planning tool that integrates assessment and mapping of several indicators reflecting environmental risks and impacts and proposed aquaculture systems in coastal and marine environments. This tool will be an open-source product and will build in the prospective use of open-source datasets. Tool outputs will be comprised of detailed reports and graphics enabling key stakeholders such as planners or licensing authorities to evaluate and communicate alternative planning scenarios and to make more informed decisions, in particular, on the selection of aquaculture sites in Palau. This tool will also indicate potential site areas that fulfill the discharge criteria for future aquaculture development to ensure these sites are located in areas with the least negative impacts, as well as to maximize the positive impacts of aquaculture ventures on the immediate environment.

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Output 1.5. Development of site criteria for aquaculture farms

It is proposed that site choice should be based on the requirements of the specific culture system to be used. There are a variety of culture systems that can be developed in open waters, where the stocking and management of open waters themselves is a major occupation (e.g., extensive stocking of man-made reservoirs and lakes). In the larger freshwater bodies and coastal areas, cage and pen culture can be developed. Sites for these culture systems must be carefully selected, based on the requirements of the species to be cultured and the structures needed to support the culture operation, as the success of an aquaculture project depends to a large extent on the proper selection of the site to be developed (e.g., into a fish or clam farm or hatchery). In order to select a suitable site for aquaculture, certain key factors must be considered, these being: ecological, biological, operational, economic, and social factors. By subsequent implementation of GIS-based models, the most suitable and sustainable locations for aquaculture sites can be identified. In addition, the use of GIS-based models facilitates the resolution of issues relating to competing demands on coastal space, the minimizing of undesirable impacts, and the maximizing of the profitability and sustainability of aquaculture operations by rational use of the coastal space.

Site and sizing criteria will be developed to provide prospective farmers with a first indication of the general locations on the coastline that are acceptable to coastal management authorities, before application procedures are begun. The development of these criteria will involve exchanges of information about a proposed farm location based on various resources and consultation with planning agencies. This process will require input from land administrators and agencies concerned with navigation, water quality, fisheries management, and conservation, as well as from economic development officers and public interest groups.

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Output 1.6. Aquaculture permitting

As a means of protection from unsustainable fishing practices and to encourage proper management of aquaculture, the application of robust rules and regulations will be facilitated by updating aquaculture permitting procedures, and instituting a licensing and certification system for cultured species. As previously mentioned, the BMR has identified Palau's environmental regulations as a challenge to aquaculture management, particularly in relation to the identification and permitting of suitable sites for aquaculture operations. This has also been repeatedly expressed as a key challenge by farmers. A long-term environmental monitoring plan should be developed during the permitting process that allows for adaptive management (e.g., changes to stocking density and maximum allowable biomass). The type of permit required should be determined by the specific types of aquaculture operations that enable protection of the State's natural resources from disease, gene mixing, and over competition. Various types of permits required for specific aquaculture activities will be developed and provided as an output of the proposed project.

Output 1.7. Training of aquaculture permitting facilitators

A designated permit facilitator will provide a potential aquaculturist with such information, services, and assistance as may be necessary, including, but not limited to: (1) assistance in obtaining all permits required to operate an aquaculture operation from the various permitting agencies, (2) technical assistance from the various State and private agencies and institutions involved in aquaculture research, (3) assistance throughout the entire permit process and information concerning changes to regulations which may affect the outcome of a permit application or change the permitting process.

Component 2: Piloting new and innovative sustainable aquaculture methods

Outcome: Strengthened aquaculture practices to conserve marine biodiversity and critical habitat leading to an ecosystem approach in the aquaculture sector

Output 2.1. Development of education and training programs

Based on an understanding of the current status of aquaculture in Palau derived from the gap analysis (Project Output 1.2), basic and practical knowledge to support the sustainable aquaculture and biodiversity sectors through the EAA will be provided to relevant stakeholders. In addition, both education and training programs will be facilitated for state and local stakeholders engaged in the aquaculture sector. In particular, both programs will be developed based on an EAA framework for sustainable aquaculture and fisheries, and a well-functioning fisheries governance system (including surveillance, control, and enforcement). The *EAA training modules* will be developed as one of the training programs about mainstreaming biodiversity conservation and sustainable aquaculture at various levels and will encourage peer-to-peer learning among fishers and fish farmers.

Output 2.2. Development of a comprehensive monitoring program

The environmental monitoring program for sustainable aquaculture is closely linked to the factors considered in site selection, in particular, ecological factors including water supply, water quality, climate, and hydrological characteristics. An assured water supply of sufficient quantity and adequate quality is the most important factor that should be monitored on a regular basis in close collaboration with the relevant water authority in Palau. As for water quality, physical properties (temperature, color, odor, turbidity, transparency, and suspended solids), chemical properties (pH, dissolved oxygen,

biochemical oxygen demand, alkalinity, salinity, dissolved solids, ammonia and all other properties that may reflect useful or toxic levels of chemicals), biological properties (quality and density of plankton), and micro-biological properties (species and quantity of parasites) should be monitored regularly. Important climatological factors (temperature, rainfall, evaporation, humidity, sunshine, and wind speed and direction) should be monitored on a monthly basis with assistance from the meteorological station nearest to the site. Lastly, hydrological parameters such as discharge, floods, and water elevation of existing water resources (including rivers, irrigation channels, and reservoirs) need to be monitored with assistance from the water authority.

Output 2.3. Establishment of infrastructure with improved analytical capacity for monitoring the performance of aquaculture farms

Fresh and marine waters on small Pacific islands are especially vulnerable to water quality degradation from pollution sources. Excessive nutrient loads (nitrogen and phosphorus) and disease can disrupt the complex ecological balance on coral reefs. Reef health and water quality are essential for recreation, tourism, artisanal harvesting, and overall community quality of life. Most aquaculture operations are confined animal facilities that produce concentrated waste products and establish conditions that can increase the likelihood of disease. Water from aquaculture ponds should receive treatment before being discharged into rivers, lagoons, or onto reefs. Treatment should be adequate to substantially reduce or eliminate pollution loads in accordance with selected water quality parameters. Selected parameters and minimum/maximum concentrations should follow the Palau Water Quality Standards. Currently, aquaculture operations in Palau do not have treatment facilities in place and their owners or operators claim that discharges have no impact on river or reef waters. An investigation was undertaken to determine if aquaculture pond water is in compliance with PNC 2401-11 Marine and Fresh Water Quality regulations. Currently, nitrogen (N) and phosphorus (P) concentrations are measured as the principal contaminants of concern for the investigation of water quality in aquaculture pond water; however, which parameters are used to monitor the quality of discharge from aquaculture farms should be re-evaluated in comparison with international guidelines that define the parameters that best indicate water quality. If necessary, analytical capacity should be improved as soon as possible to deal with effluents discharged from farms to prevent their negative impacts on coastal and marine ecosystems. Because of the lack of financial and technical resources for aquaculture owners and operators, aquaculture is not currently an environmentally viable business in Palau. Aquaculture should not be permitted in Palau unless adequate wastewater treatment facilities are incorporated into the design and operations of the farms. Owners and operators should be held to regular and stringent water quality monitoring and reporting to ensure that pond water discharges do not result in excessive pollution loads in river or reef waters, and that Palau water quality standards are met.

Output 2.4. Ecosystem Approach to Aquaculture

The management program for aquaculture farms will be designed for use as a set of guidelines for the Bureau of Fisheries and future stakeholders. With a view to achieving environmentally sustainable

management, the program should identify areas sensitive to aquaculture development and potential risks to aquaculture operations, as well as recommend appropriate species, production methods, intensity of production, and management. Additionally, to impose consistency in performance among facilities in different regions and to engage the industry as a whole in a process of continuous improvement, the management program should be science-based and should include continuously improved global performance standards for the aquaculture supply chain that assure healthful foods produced by environmentally and socially responsible means.

Also, the program should apply to all aquaculture hatchery and nursery facilities that produce eggs and juvenile marine animals for live transfer to other aquaculture facilities. Globally, the Best Aquaculture Practices (BAP) certification standards and Seafood Processing Standard developed by the Global Seafood Alliance (GSA)[12]¹², a leading standard-setting organization for aquaculture, are widely in use and will be applied in the proposed project. Considering that the BAP is an aquaculture certification program encompassing the entire production chain, including the processing plant, farm, hatchery, and feed mill, use of the BAP will ensure that the management program for aquaculture farms in Palau is designed in a comprehensive manner, and meets the BAP certification standards.

Output 2.5. Development of a strategy for the production output of hatcheries

Aquatic animal seed, feed, fertilizers, materials, and other input supplies are required in sufficient quantity and quality for aquaculture development in Palau. Aquatic animal seed availability for aquaculture in Palau is insufficient to meet current requirements, and projected future demands. Present sources are imported seed, wild sources, and a limited supply from the local PMDC hatchery. There is a need to increase the capacity for quality fish seed production from local hatcheries in Palau to support future development of brackish water and marine fish farming by improving the existing PMDC hatchery for groupers. The BMR also needs to continue to support and improve its hatchery for production of marine fish grouper fry, using locally caught brood stock, to avoid dependence on foreign sources. Efforts should be made to engage the private sector in development of the hatchery operation.

To support fish seed production, improved awareness of disease issues is needed, together with better procedures for importation. Palau should move away from reliance on the import of fish seed and establishment of local hatcheries must be considered. Risk analysis should be conducted and practical risk management measures identified to enable responsible and low-risk importation, where necessary, to support growth of the aquaculture industry in the short term. The private sector should be encouraged to contribute to the development of fish seed production in Palau (as investors, suppliers,

importers, and farming or hatchery operators) but with regulatory oversight and technical advice from the BMR, the EQPB (seed imports), and State governments.

Taking stock of the knowledge and experiences gained, as well as involving and linking with research and training institutions, a national strategy for the production output of hatcheries and hatchery infrastructure will be developed by targeting public and private decision makers, institutions, fishers and aquaculture representatives, and academics. The proposed activities, including the development of a management program, a strategy for production output of hatcheries, and hatchery infrastructure will fully funded by co-funding.

Component 3: Knowledge management, gender mainstreaming, and monitoring and evaluation

This component will ensure that project implementation is based on adaptive and results-based management, that a project monitoring system is put in place, and that mid-term and terminal evaluations are carried out. The monitoring and evaluation (M&E) system will collate lessons learned from project activities. The proposed project will support established processes by furthering cross-sectoral communication and outreach activities. Lessons learned will be made widely available and shared via relevant technical and policy level decision-making debates and forums managed by the MAFE, as well as via newsletters, established websites, and other forums.

Outcome: Effectively internalized knowledge and active communication lead to behavior change in favor of biodiversity-friendly aquaculture

Knowledge products will be prepared from the findings of the proposed project and will include compiled data and lessons learned from the practices applied. Also, a knowledge, Attitude and Practices (KAP) survey[13]¹³ as a tool to reveal misconceptions or misunderstandings that may represent obstacles to the implementation of the project will be conducted.

Output 3.1. Development of aquaculture knowledge products

User-friendly knowledge products that contain information specific to the needs of the target audience will be developed. Aquaculture development status and experiences of PICs will be included in the knowledge products, supplemented by a comprehensive historical review of aquaculture in the Pacific especially in Palau. Identification of technical assistance that would further promote aquaculture

development will also be covered. This will be accomplished by identifying issues related to the success of aquaculture enterprises, focusing on factors that contributed to success and factors that led to abandonment or termination of aquaculture operations.

Output 3.2. Development of a data information system as a knowledge hub

To further promote aquaculture development and to support facilities and institutions in their responses to the emerging impacts of changes in environmental factors, *data information systems* will be developed as knowledge hubs for sharing information on production, economics, socio-economics, marine animal diseases, and water quality monitoring as a reflection of environmental conditions. In particular, water quality monitoring data, obtained via Project Output 2.2., will be maintained and updated on an annual basis. The information systems will be developed using flexible and open source technology to provide easy access to information to support all relevant stakeholders in aquaculture communities.

Output 3.3. Development of an efficient communication system among stakeholders in the aquaculture sector

To improve the current state of communication and outreach activities, regular meetings, including annual technical and policy workshops, will be organized and participation of national and state government officers and stakeholders, including capture fishers, aquaculture representatives, aquaculture associations, and academics will be encouraged. Communication products based on agreement reached at such meetings and workshops will be developed, and will be widely shared and disseminated via leaflets, newsletters, a website, and other means appropriate to the context.

Output 3.4. Development of an integrated monitoring and evaluation system

The proposed project will develop a M&E system via a joint collaborative effort between the sectoral and national focal persons.

(4) Alignment with GEF focal area and/or Impact Program strategies

The proposed project is aligned with a GEF Focal Area in Biodiversity. In working towards achieving the overall objectives, the project will contribute to the Biodiversity Strategic Objective 1: *Mainstream*

biodiversity across sectors as well as landscapes and seascapes through biodiversity mainstreaming in priority sectors. The three project components will support the integration and mainstreaming of biodiversity into aquaculture sector planning and development.

The Republic of Palau has consistently been at the forefront of innovative conservation by implementing the Palau PAN and by fostering marine protected areas suitable to local socio-cultural-economic conditions. The Republic of Palau is a world leader in marine conservation. In 2015, the island nation passed the Palau National Marine Sanctuary Act, establishing one of the world largest protected marine areas in the world. The legislation banned all exploitation activities in 80% of Palau's EEZ.

The proposed project will catalyse the development and adoption of effective and coherent regulatory measures and the institutional frameworks needed for biodiversity conservation and sustainable use of coastal and marine ecosystems in Palau, by implementing an enhanced ecosystem approach to aquaculture.

(5) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing

Without GEF TF: The country has a number of policies and strategies that are in line with food security, poverty alleviation, environmental sustainability, and industrial or commercial development; however, not many of the policy instruments are specific to aquaculture, which could be a viable means to ensure food security. Recent trends imply that the development of a sound and comprehensive aquaculture legislation is considered a high priority. The new Palau Fisheries and Marine Resources Act, still in draft form, needs to include biodiversity conservation in the context of the aquaculture sector in Palau. The existing policies must be implemented, and there should be a number of new activities to address aquaculture, one of a handful of natural resource industries that can offer truly environmentally sustainable economic growth. Aquaculture research and the extension of research findings into practice are the most important steps that should be started without delay.

With GEF TF: The GEF support of the proposed project will enable the baseline study on aquaculture policy, planning, management, and production to be conducted, thus assisting the country to bridge a gap and be better able to protect and enhance marine biodiversity at the national level. The baseline study will help to develop maps, site selection criteria, and environmental monitoring programs, which

will lead to policy and institutional updates and the capacity and awareness to develop programs for the stakeholders.

Aquaculture is one of a few natural resource industries that can offer truly environmentally sustainable economic growth[14]¹⁴. Based on renewable resources, the existence of aquaculture depends on the availability of pristine water; therefore, those involved in the aquaculture sector have a stewardship role to play in assisting with protection of the natural environment. The FAO CCRF emphasizes the need for advance evaluation of the effects of aquaculture on ecosystem integrity, and for regular updates of aquaculture development strategies and plans, to ensure that aquaculture is ecologically sustainable and to facilitate rational development of resources shared by aquaculture and other activities.

The proposed project will build directly on the current NAS by increasing the capability of the country to transfer information into a better understanding of biodiversity conservation in relation to aquaculture activities and vulnerabilities. The current version of the NAS was developed to provide guidance to promote and develop national aquaculture in a responsible and sustainable manner. The proposed project will improve the capacity of local communities and relevant stakeholders to deal with environmental factors influencing coastal and marine ecosystems by means of proper aquaculture practices.

In Palau, both fisheries and aquaculture provide livelihoods for many people who are engaged in aquafarming and processing of resources as well as in numerous service and support activities. Most local communities involved or associated with aquaculture have very limited guidance and technical support. The States that give out marine leases are ill-equipped to assess the suitability of marine areas for aquaculture and the leases are selected out of convenience rather than because of suitable biophysical and environmental conditions. Therefore, the negative impacts of aquaculture are often unintended and extend beyond the sites. The proposed project aims to initiate a more deliberate and cautionary approach to aquaculture development that engages and empowers farmers and other key stakeholders, builds institutional capacity within relevant government agencies and institutions, improves coordination and communication amongst the various stakeholders, and achieves biodiversity conservation and livelihood outcomes. The lessons that emerge from the implementation of the proposed project may be extended or scaled up, not only in Palau but also in other similar island countries.

(6) Global environmental benefits (GEFTF) and/or adaptation benefits (LDCE/SCCF)

Several of the globally endangered marine species that occur in Palau are also declining locally. The majority of these species have some form of local protection, by way of laws, regulations, or MPAs; however, many are declining and need additional law enforcement efforts or updated protections (e.g., updated laws or regulations). In the 2019 Global IUCN Red List^[15], giant clams are listed as vulnerable.

Global environmental benefits of the vulnerable listing of giant clams include protection, restoration, and rejuvenation of habitats for endemic and native flora and fauna, as well as the improvement of coastal and marine ecosystem conservation in Palau. Protection of the threatened giant clams will improve management and reduce pressures on a World Heritage Site, a Biosphere Reserve, and a Ramsar Site. Understanding the link between aquaculture and biodiversity conservation will help to determine the vulnerability of local communities, and through their participation and empowerment it will be possible to create timely and adaptive capacity to conserve biodiversity within these communities.

The proposed project will include several approaches to the use of technology for conservation purposes that could potentially be expanded to other islands or small countries, including: 1. a national-level coordination model for streamlining and aligning environmental activities in the aquaculture sector; 2. incorporation of robust management systems as an integral part of conservation projects, not as add-ons at the end of such projects; and 3. a holistic approach to achieving a wide variety of biodiversity goals using an environmentally friendly approach to aquaculture together with local actions and big-picture national planning, Acts, and coordination.

(7) Innovation, sustainability and potential for scaling up

Innovation: As a developing island country with a small population, rich marine biodiversity, progressive environmental conservation policies, and a growing tourism economy, Palau provides suitable conditions for developing a replicable aquaculture planning and management model that can be applied to other SIDS. If this approach is successful in Palau, the Palauan aquaculture model could be replicated across island nations—all of which face similar issues at the nexus of biodiversity conservation, fisheries development, and human well-being. This project is innovative in addressing development in a resource-use sector to achieve win-win approaches, as improved planning,

management, and production in the aquaculture sector will contribute to improved management of natural resources, food security, and sustained livelihoods and economies.

Innovative aquaculture operations, achieved by increasing production, surveillance, enforcement, and an ecosystem approach, together with dissemination and application of better practices, will be carried out and tested within local communities. This approach should encourage community ownership of aquaculture operations and increase the potential for replication of the model beyond the time period and geographic scope of the proposed project, as well as creating alternative livelihood opportunities for other sectors. The proposed project also provides an opportunity to deploy innovative new technologies, particularly in relation to locating potential aquaculture sites by aggregating various environmental factors that may have future direct applications and contributions to wider marine spatial planning efforts.

Sustainability: The proposed project is designed to engage various stakeholders, with particular emphasis on local communities and the private sector. Improving coordination among different government agencies will also be a priority and will further ensure sustainability. The outcomes of the proposed project will create a basis for long-term sustainable aquaculture management and production as they are linked to the use of marine resources and production systems in the country. Sustainable aquaculture requires the adoption of ecologically sound practices and deliberate attention to rigorous monitoring at national and state levels. The proposed project will enable Palau to build institutional frameworks for the development of the aquaculture sector by maintaining ecosystem sustainability and strengthening capacity through training, knowledge management, and the use of environmental monitoring systems.

Scaling up: All outputs of the proposed project will be developed based on their lifespan beyond the duration of the project. This includes systems, programs, involvement of the private sector in sustainable aquaculture and stimulating access to finance in the future. In addition, the ecosystem approach to aquaculture developed in Palau can potentially be replicated in other countries and regions, supported by the strong technical capacity of Palau's university and research institutes, and lessons learned from the proposed project can be transferred to other less developed countries in other regions.

[1] The State of Coral Reef Ecosystems of the Republic of Palau

[2] Global IUCN Red List Status as of March 2019. www.redlist.org.

[3] FAO, 2010. Aquaculture Department (2010) The state of world fisheries and aquaculture. Food and Agriculture Organization of the United Nations, Rome

- [4] FAO, 2010. The state of world fisheries and aquaculture. In: Contributing to Food Security and Nutrition for All. Rome. 200 Food and Agriculture Organization of the United Nations, Rome
- [5] Diana, J.S., Aquaculture production and biodiversity conservation, *Bioscience* 59(1): 27-38
- [6] The Fish Site: <https://thefishsite.com/articles/restorative-aquaculture-shows-we-can-have-more-habitat-and-eat-it-too>
- [7] Theuerkauf S.J. et al., Habitat value of bivalve shellfish and seaweed aquaculture for fish and invertebrates: Pathways, synthesis and next steps, *Reviews in Aquaculture*, 00: 1-19, 2021
- [8] FAO, 2021. Ecosystem Approach to Aquaculture Management: Handbook, Yangon, Myanmar, <https://www.fao.org/documents/card/en/c/ca7972en>
- [9] Barfield, et.al (2017). Global analysis of offshore mariculture. UCLA Institute of the Environment and Sustainability
- [10] FAO. 2014. Linking farmers to markets: Realizing opportunities for locally produced food on domestic and tourist markets in Palau
- [11] UN SDGs: <https://sdgs.un.org/goals>
- [12] Best Aquaculture Practice: <https://bapcertification.org/standards>
- [13] Knowledge, Attitudes and Practices for Risk Education: how to implement KAP surveys, Fabienne Goutille for Handicap International, 2009
- [14] Diana, J.S., Aquaculture production and biodiversity conservation, *Bioscience* 59(1): 27-38
- [15] Global IUCN Red List Status as of March 2019. www.redlist.org.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

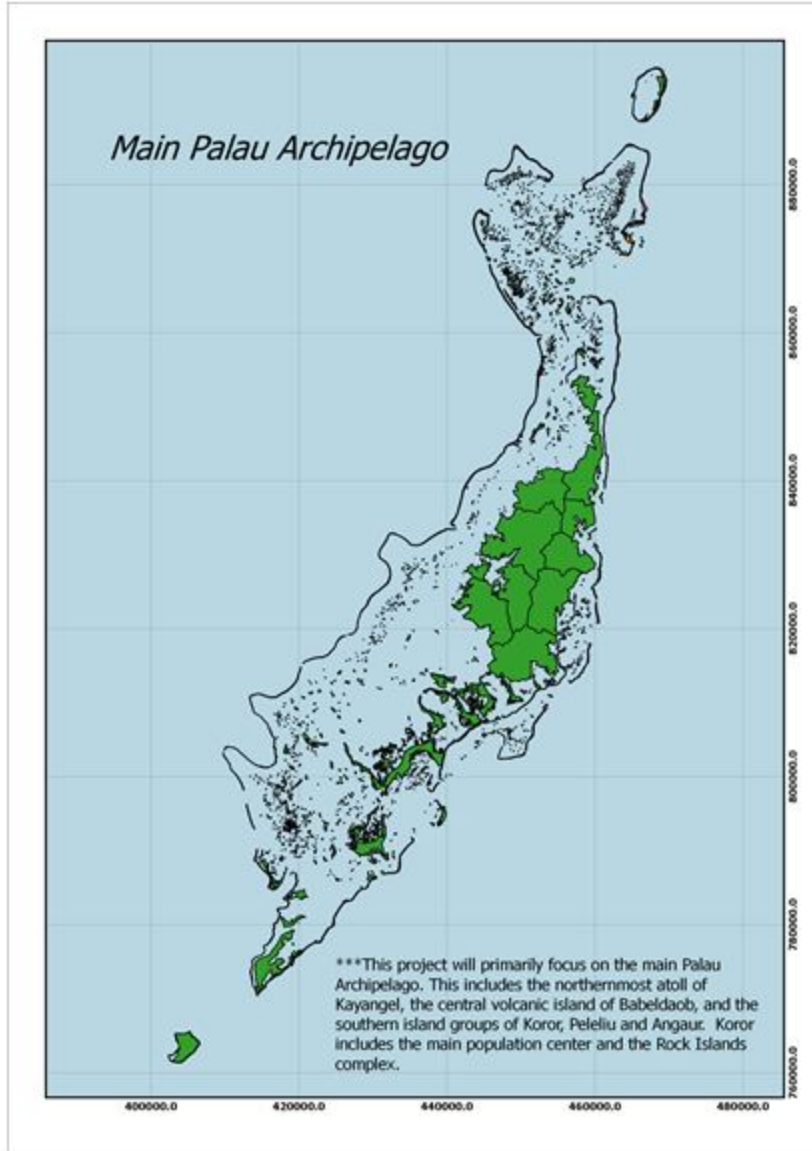


Figure 3. Map of Palau showing the location of the project interventions (Coordinates: 7°30'53.9280"N, -134°34'57.0720"E)

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities Yes

Civil Society Organizations Yes

Private Sector Entities Yes

If none of the above, please explain why:

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement

To support the achievement of the outcomes, the proposed project will adopt a partnership involving government agencies, NGOs, the private sector, and research and training organizations in the coordinated delivery of project activities. The project will be implemented in local communities where aquaculture facilities are located and detailed planning will be conducted with relevant stakeholders identified during the preparation phase. All activities proposed, including education and training, will be guided by design experts at the university or research institutes in Palau. The key stakeholders and their respective contributions to the project are summarized in Table 2. However, a more detailed description of stakeholder participation will be submitted at the time of CEO endorsement.

The MAFE, which has been part of the development of the concept, has had initial consultations with the main stakeholders involved in the aquaculture sector in local communities, civil society, and the private sector. Joint discussion with the aquaculture farmers in local communities was also facilitated to share ideas, not only on technical issue but also legislative issues and the need for scientific research, a data depository system, facilities supported by government, CITES certificates, a license system, and a comprehensive aquaculture legislation system to be implemented during the project period.

Table 2. List of stakeholders and their roles and involvement

Stakeholder	Role and Involvement in the Project
Ministry of Agriculture, Fisheries and the Environment (MAFE)	The MAFE is the government ministry with the mandate to manage agriculture, fisheries, and environment-related initiatives, programs, and projects. It houses three bureaus: the Bureau of Fisheries (BOF), the Bureau of Agriculture (BOA), and the Bureau of the Environment (BOE). The BOF will be the main implementer of the project but will work in close collaboration with the other two bureaus.
Environmental Quality Protection Board (EQPB)	The EQPB is the main environmental regulatory agency. It regulates all development activities both on land and in water. Specifically, it provides the permitting conditions for all aquaculture projects and will guide the BOF in developing aquaculture best practices and assist in the development of monitoring protocols for aquaculture sites.
Bureau of Public Safety	The BPS will provide overall maritime security and management of fish & wildlife protection in Palau

Ministry of Justice: Division of Fish and Wildlife Protection (DFWP)	The DFWP is the primary enforcement authority of environmental laws in Palau, and it also plays a key role in community relations and education, and in encouraging compliance. The DFWP will contribute to the project by assisting with community engagement and awareness of other fisheries and aquaculture-related laws and regulations.
Office of the Palau Automated Land and Resources Information System (PALARIS)	PALARIS is a government agency that provides mapping services that support environmental and resource use planning. It will play a key role in the proposed project by assisting in the mapping of potential aquaculture zones and digitizing other resource information that may be useful for locating aquaculture sites.
Division of Gender, Bureau of Ageing, Disability and Gender (BADG), Ministry of Community and Cultural Affairs	BADG will contribute to the project by producing sex-disaggregated data to identify gender gaps to inform policy making and support tyo improve gender mainstreaming capacity
Protected Areas Network Office (PANO)	The PANO manages a program within the BOE that is responsible for overseeing the management of Palau's protected areas network to ensure biodiversity conservation. The PANO will support the proposed project by informing reseeding efforts and will facilitate discussion about what types of aquaculture can occur at sites within the PAN.
Palau Community College?Cooperative Research & Extension (PCC-CRE)	The PCC-CRE is the BOF's main partner in environmentally sustainable development of aquaculture in Palau. The PCC-CRE has a hatchery facility and houses technical expertise. As a contribution to the project, the PCC-CRE will assist the BOF in developing breeding strategies, implementing best practices at selected sites, and planning aquaculture zonations.
Palau Aquaculture Alliance (PAA)	The PAA is an organized group (NGO) of aquaculture operators who are keen to develop environmentally sustainable aquaculture in Palau. The PAA will be instrumental in this project by implementing best practices, managing reseeding efforts on impacted reefs, and informing aquaculture siting.
Palau Mariculture Demonstration Center (PMDC)	The PMDC is facility serving as a regional mariculture training center and a marine science research laboratory in Palau. The PMDC will play a pivotal role on education and training program in the proposed project.
State Governments	Palau has a total of 16 states and corresponding State governments. State governments have jurisdiction on land and in the sea up to 12 miles from the high water mark. The State governments issue leases for aquaculture but with very limited guidance. Project implementers will work with these State governments to better inform the location of aquaculture sites and to clarify a process for issuing leases that will minimize impact to biodiversity and the environment.

Small Business Development Center (SBDC)	The SBDC will provide high quality training and counseling to existing and prospective small businesses including aquaculture sector.
Local Communities	Local communities will be the key beneficiaries of the outcomes of the proposed project.
Community-based Organizations	Community-based organizations provide community level support and guidance on resource management initiatives. Some of them directly implement some of these activities, including aquaculture.
Research Institutions	Research institutions provide scientific and technical guidance. The Palau International Coral Reef Center and the Coral Reef Research Foundation (and the PCC-CRE) will contribute to the project by providing scientific advice.
Regional Organizations	Regional organizations play a valuable role in facilitating the sharing of lessons amongst countries tackling similar issues. Relevant regional organizations will be engaged by project implementers to contribute to specific components or activities.

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

The project will be gender mainstreamed throughout implementation and impact evaluation by following the GEF and UNEP's Gender Policy. To fully reflect gender mainstreaming, the project will be implemented in ensuring gender equity and social inclusion. The project incorporates several measures to promote social inclusion and in particular, to enhance gender equality and women's empowerment. Special mechanisms are envisaged to promote the role of women in various project activities. Women are becoming major stakeholders in the aquaculture sector, especially in farming, management and ownership, value chain, marketing, and post-harvest processing. Women are key contributors to the successful upscaling of results and have a significant role to play in food security and development. Stakeholder identification will specifically target appropriate representation of women, particularly in the areas of training and dissemination. It is expected that women represent at least 30% of trained people at state and local levels and it is also expected that the national aquaculture policies will properly address women's active engagement .

The project will develop comprehensive gender analysis and strategy during the project design phase. With a goal to overview gender issues in Palau, the Gender Analysis will be conducted with focus on gender situation including roles of women and youth in their communities, and to come up with a strategy for implementing gender sensitive interventions throughout the implementation of the project. Monitoring will be taken to ensure that women and youth are involved in organizing/owning the project implementation at state and local levels and will receive the training and capacity development required to empower them to act in their roles.

The Strategy will be then operationalized in a Gender Action Plan, which contains specific activities for implementation, monitoring and evaluation along with associated timelines, responsibilities and budgets allocated. These factors with specific gender indicators will be replicated in relevant project design components (e.g., logframe) to be presented in the Project Document. It will also collect disaggregated information with respect to gender in its reporting and ensure that project implementation considers gender equality.

During the development of policy document, the Project Steering Committee (PSC) will ensure that any TORs for agencies involved (e.g., BADG) recognize gender right as a requirement. Gender considerations will also be integrated into policy development.

To mainstream gender issues into the proposed project, the plans or policies to be established will engage gender issues to seek for improved participation. Data collection and management, with establishment of a feedback loop between facility performance and monitoring will be established and will support reflection on the policymaking process. Key stakeholders for capacity building will be the public and private agencies responsible for collecting data where the role of women needs to be enhanced.

One of the aims of the project is to promote social inclusion, gender equality, and women's empowerment through the following actions (Outcomes 1 and 2):

- ? Prioritize gender equality and women's empowerment through capacity building, outreach, communication, and enhanced influence in decision making.
- ? Collaborate with the Palau Gender Division to align project activities with Palau's gender policy.
- ? Apply gender issues to all project outputs during the implementation of projects.
- ? Enhance the participation of women in education or training programs including workshops on tools and techniques by setting sex disaggregated targets.
- ? Promote adequate representation and active participation of women in project events.
- ? Implement outreach activities to include a specific gender focus and ensure that every meeting, plan, and activity is gender and socially inclusive by utilizing dedicated budgets.

? Ensure that both women and men are offered equal training opportunities supported by this investment, and that the coordination mechanisms and platforms established have representation of both men and women.

The knowledge management and sharing information put in place through Component 3 will include sex disaggregated data on women and men's participation in project activities and outputs. To ensure formally recording lessons learned and to provide a qualitative assessment, the monitoring review and terminal evaluation will include specific questions related to gender integration. Lessons learned and recommendations from evaluation reports and other reporting will be widely disseminated to assist future work in this area.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources; Yes

improving women's participation and decision-making; and/or Yes

generating socio-economic benefits or services for women. Yes

Will the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

Private sector engagement in aquaculture is crucial to the conservation, restoration, and improvement of biodiversity and to the promotion of aquaculture for sustainable use. Currently, farmers are the only ones carrying out conservation by culturing species, giant clams for example, from seed to mature adults that can be planted on reefs. Private sector participation in the proposed project will help to identify: (1) ways to improve water quality that lead to healthy coastal and marine ecosystem conditions, (2) benefits of innovative aquaculture practices that can be implemented sustainably, and (3) synergies between conservation of natural habitats and sustainability goals. Engagement with the private sector in Palau has the potential to contribute significantly to the wider outcomes of the proposed project for the duration of project implementation.

The Government of Palau has experience in engaging with the private sector on environmental issues, including biodiversity conservation, PANs, and sustainable tourism. The proposed project will build and expand on such partnerships to support the up-scaling and sustainability of results by extending mainstreaming biodiversity engagement into the private sector and ensuring awareness across multiple sectors. The project will identify win-win scenarios where private sector entities are able to achieve financial gains and help advance the project objective.

Supported by the Government of Palau, policy frameworks will be improved in favor of benefits in the form of service delivery and support for economic development and improved livelihoods. Aquaculture industries are key stakeholders and collaboration with them will ensure their participation to offset negative impacts and prevent further degradation of coastal and marine ecosystems because their activities will be modified by sustainable ecological biodiversity management. It will require political will, a clear implementation plan and fully resourced and capable agency to lead a collaborative effort in partnership with all stakeholders.

5. Risks to Achieving Project Objectives

Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)

Risk	Level of Risk	Mitigation
Lack of political and social will (rules and regulations for revision and support to relevant stakeholders)	Medium	Actively coordinate with the Government of Palau from the project initiation stage. Invite policy makers to engage in capacity building initiatives to improve interest in the ecosystem approach to aquaculture.
Lack of interest from the private sector and local stakeholders.	Low	Run a dissemination campaign during the entire project cycle including the Project Preparation Grant (PPG) phase to explain the project outcomes and outputs.

Gender mainstreaming may be undermined without a proper plan	Low	Gender mainstreamed from the project design phase, through the implementation, and impact evaluation. Gender strategy and action plan will be developed to ensure that the project truly gender-sensitive and minimize any potential gender risks.
Weak coordination between relevant government agencies at national, state, and local levels.	Medium	Appoint focal or contact points as communication channels for the exchange of views and decision making.
Project implementation affected by the COVID-19 pandemic, especially stakeholder engagement and consultations, and impacts on timely delivery.	High	Unpredictable during the phase of development of the project concept. Capacity building including training workshops will be held virtually if the current situation persists. Stakeholder consultations for activities will be implemented without funds.
Increased disaster risks and marine pollution including oil spills in coastal and marine areas.	Low	Use an early warning system. Activities unlikely to be affected will proceed.
Risks related to climate change, including increased climate change threats in coastal areas in the form of storm surges and increased climate variability.	High	Give priority to the strengthening of national monitoring and early warning systems in Component 1 and Component 2 activities.

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

The MAFE is the government ministry with the mandate to manage agriculture, fisheries, and environment-related initiatives, programs, and projects. It houses three bureaus: the Bureau of Fisheries (BOF), the Bureau of Agriculture (BOA), and the Bureau of the Environment (BOE). The BOF will be the main implementer of the project but will work in close collaboration with the other two bureaus. The project will also rely on a high level of coordination between private sector and communities, and UNEP will act as an implementing agency.

The proposed project will be well coordinated with the ongoing projects funded by the GEF and other donors, as well as with projects implemented by UNEP.

The proposed project will coordinate, draw on, and build upon experience gained from implementation of a number of projects conducted by Ministries in different sectors, including fisheries and biodiversity conservation, particularly in the target areas described below:

? ***The Bureau of Fisheries of the Ministry of Agriculture, Fisheries and the Environment (MAFE)*** is tasked with exploring and conducting activities proposed for the sustainable development of fisheries resources with the goal of developing economically and socially viable marine resource production opportunities in collaboration with partners and stakeholders. The BOF is mandated to facilitate the development of sustainable and economically viable fishery cooperatives and associations in Palau. The BOF will be the main implementer of the proposed project and will work in close collaboration with the other two bureaus, the BOA and the BOE.

? ***The Environmental Quality Protection Board (EQPB)*** is the main environmental regulatory agency regulating all development activities both on land and in water, specifically providing permits for all aquaculture projects and guiding the BOF in developing aquaculture best practices, as well as assisting in the development of monitoring protocols for aquaculture sites. The EQPB will play a pivotal role in the proposed project, especially Component 2, in relation to water quality testing.

? ***The Ministry of Justice?Division of Fish and Wildlife Protection (DFWP)*** will also play a key role in community relations and education, and in encouraging compliance. The DFWP will contribute to the project by assisting with community engagement and awareness of other fisheries and aquaculture-related laws and regulations. It will contribute to Components 1 and 3, together with the MAFE.

? ***The Office of the Palau Automated Land and Resources Information System (PALARIS)*** is a government agency that provides mapping services to support environmental and resource use planning. It will play a key role in the proposed project by assisting in the mapping of potential aquaculture zones and digitizing other resource information that may be useful for siting aquaculture projects (Components 1 and 2).

During the project development phase opportunities for coordination will be thoroughly explored with a view to maximize the use of resources from the project and avoid duplication of efforts. In addition, the proposed project will coordinate closely with the following projects concerning biodiversity conservation being implemented by UNEP:

GEF-5 Project: Advancing sustainable resource management to improve livelihoods and protect biodiversity in Palau (2017-2022). This project is fully aligned with the NBSAP, and various strategies and plans associated with management of sustainable land (including land degradation) and protected areas with the goal to achieve completion of establishing administrative mechanisms across the country. During the project period, Component 3 of the proposed project will ensure mainstreaming of cross-sector issues into PAN and Sustainable land Management (SLM), and biodiversity values into national level development plans.

GEF-6 Project: Integrating biodiversity safeguards and conservation into planning and development (2017-2023). This project is also in line with the national plan and strategy on land and seascapes to conserve biodiversity in Palau by enhancing the national institutional framework and integrating biodiversity conservation into the land and seascapes.

GEF-6 project: Strengthening National and Regional Capacities to Reduce the Impact of Invasive Alien Species (IAS) on Globally Significant Biodiversity in the Pacific (2019-2024). This project aims to reduce the threats from Invasive Alien Species (IAS) to terrestrial, fresh-water, and marine biodiversity in the Pacific by developing and implementing comprehensive national and regional IAS management frameworks. The project is being executed by Secretariat of the Pacific Regional Environment Programme (SPREP) in partnership with the governments of Marshall Islands, Niue, Tonga and Tuvalu. This project will support the proposed project by enhancing cooperation among community and stakeholder consultations and shared learning materials and lessons learned especially on biodiversity surveys being conducted in Palau.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assessments under relevant conventions?

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

- National Action Plan for Adaptation (NAPA) under LDCF/UNFCCC

- National Action Program (NAP) under UNCCD

- ASGM NAP (Artisanal and Small-scale Gold Mining) under Mercury
- Minamata Initial Assessment (MIA) under Minamata Convention
- National Biodiversity Strategies and Action Plan (NBSAP) under UN CBD
- National Communications (NC) under UNFCCC
- Technology Needs Assessment (TNA) under UNFCCC
- National Capacity Self-Assessment (NCSA) under UNCBD, UNFCCC, UNCCD
- National Implementation Plan (NIP) under POPs
- Poverty Reduction Strategy Paper (PRSP)
- National Portfolio Formulation Exercise (NPFE) under GEFSEC
- Biennial Update Report (BUR) under UNFCCC
- Others

This project will facilitate the implementation of Palau's NBSAP 2015-2025, currently under revision by the BMR of the MAFE. In addition, the proposed project will build on the current NAS by improving the capacity of the country to transfer information into an improved understanding of ecosystem conservation on aquaculture activities and vulnerabilities. The NAS is consistent with and builds on the international legislation and agreements described below. The proposed project will explore and implement pilot studies on the use of innovative technologies or approaches from the ecosystem approach measures for sustainable aquaculture that are being produced under the umbrella of the developing NAP.

Palau became a signatory to the UN Convention on Biological Diversity (CBD) in 1992 and ratified in 1999. As a CBD signatory, the Republic of Palau is committed to taking action to protect its rich biological resources. This project clearly supports the Government of Palau's national development frameworks and national policies on biodiversity conservation and aquaculture. As considered above, Palau's NBSAP is a framework that enables people in Palau to use natural resources and biodiversity to meet their needs while safeguarding the natural environment for future generations. With particular emphasis on supporting the Cartagena and Nagoya Protocols, and identifying Palau-specific objectives in alignment with the Aichi Targets, this framework facilitates actions that strengthen the Palau PANs, ensure food security through measures in coastal resource management, promote sustainable use of fragile ecosystems in the delivery of economic enterprises, and advance the integration of traditional ecological knowledge with science to drive decision making in support of biodiversity conservation

and its sustainable use. With the overall goal of the NBSAP being to protect biodiversity, it does so by addressing a wide range of issues, in alignment with the broad objectives set forth by Agenda 21 and the CBD.

With respect to the commitments of the Government of Palau to the CBD, the proposed project is in line with all seven national strategic areas which include: (1) Protected or managed areas, (2) Species protection, (3) Biosecurity, (4) Integrating biodiversity and ecosystem services, (5) Reducing direct pressures on biodiversity, (6) Ensuring food security, and (7) Mainstreaming conservation. The project also aligns with CBD Gender Plan of Action 2015-2020 to demonstrate the benefits of gender mainstreaming in measures towards biodiversity conservation.

8. Knowledge Management

Outline the knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

The proposed project will produce knowledge products to support the implementation process and improvement of its performance. To ensure a robust information exchange to increase awareness and engagement on the topics of aquaculture The products produced will be disseminated to policy makers as well as relevant stakeholders to share knowledge and ideas among countries in the Pacific, in particular the SIDS. Products including strategies and plans will be updated within the aquaculture sector, together with training modules, guidelines, and protocols for both private and public sectors at both national and local levels.

Core to this project objective will be the development of a knowledge management plan for the project that ensures a robust information exchange to increase awareness and engagement on the topics of facilitating biodiversity conservation by enhancing aquaculture policy, planning, management, and production. This will be ensured through the creation of a knowledge management platform to disseminate lessons learned from the project, promoting best practices and for advancing sustainable aquaculture in Palau.

The documentation for sustainable use of aquaculture and conservation of biodiversity will support a variety of stakeholders such as local communities, NGOs, and universities in replicating the best practices and tools used in Palau. Data management tools will also be developed for sustainable use of aquaculture technology. The knowledge materials to be developed and opportunities to enhance knowledge sharing among neighboring countries will be defined during the PPG phase.

9. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification *

PIF	CEO Endorsement/Approval	MTR	TE
Low			

Measures to address identified risks and impacts

Provide preliminary information on the types and levels of risk classifications/ratings of any identified environmental and social risks and potential impacts associated with the project (considering the GEF ESS Minimum Standards) and describe measures to address these risks during the project design.

This is a low-risk project. However, UNEP ESSF guiding principles-- resilience and sustainability; human rights, gender equality and women empowerment, accountability and leave no one behind--are still applicable for low-risk projects.

Supporting Documents

Upload available ESS supporting documents.

Title	Submitted
GEF7_Palau-SRIF_SL_19Dec	

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And GEF Agency(ies)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Charlene Mersai	National Environment Coordinator	Bureau of budget and planning, Ministry of finance	12/20/2021

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

Based on the GIS map of aquaculture sites in the main Palau Archipelago (Output 1.2), the project map and geographic coordinates will be developed and provided for use as a planning tool that integrates assessment and mapping of several indicators reflecting environmental risks and impacts and proposed aquaculture systems in coastal and marine environments. This includes the northernmost atoll of Kayangel, the central volcanic island of Babeldaob, and the southern island groups of Koror, Peleliu, and Angaur. Koror includes the main population center and the Rock Islands complex.

