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Marine Aquarium Fish Draft Management Plan - Review

REPORT FOR MFMRD



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Acronyms

MAF	Marine Aquarium Fisheries
MCIC	Ministry of Commerce, Tourism, Industry and Cooperatives
MCS	Monitoring, Control and Surveillance
MELAD	Ministry of Environment, Lands and Agricultural Development
MEP	MacAlister Elliott & Partners
MFMRD	Ministry of Fisheries and Marine Resources Development
MLPID	Ministry of Line and Phoenix Island Development
PICT	Pacific Island Countries and Territories
PROP	Pacific Islands Regional Oceanscape Program
SPC	Pacific Community

Executive summary

The global trade in live ornamental fish is estimated to be worth more than US$ 10 billion, with average annual growth of over 10 percent. Marine species contribute more than 15 percent of this value. Well-managed marine aquarium fisheries (MAF) provide amongst the highest value-added products that can be derived from a coral reef.

Kiritimati's MAF provides a critically important source of employment, income, and foreign exchange, contributing more than US$1 million to the economy annually. With a growing population and increasing competition for marine resources and space, effective management planning and implementation are essential to sustain these benefits. This report presents (i) a technical review of a draft Kiritimati Island Marine Aquarium Fishery Management Plan developed by MFMRD with support from development partners; (ii) an overview of the state of the fishery and stakeholder perceptions; and (iii) recommendations to support and accelerate improved management of the MAF.

MAF stakeholders reported that target populations have declined over the past five years, with the MAF fishery itself posing the greatest threat. While there is strong stakeholder support for improved management of Kiritimati's MAF, stakeholder awareness about the draft management plan is currently low. Both government and industry stakeholders prioritised similar management objectives for Kiritimati's MAF, including economic growth, job creation and the generation of government revenues. Conservation and research to inform decision were also identified as important objectives. Stakeholders identified quotas and logbooks as management measures that could provide benefits to the fishery while also being relatively easy to implement. Stakeholders also indicated support for zoning, with periodic closures of harvest zones to facilitate rebuilding and recovery.

The following priority actions are recommended to support implementation of Kiritimati's MAF management plan:

- Review and strengthen regulatory frameworks, with a particular focus on (i) the application of administrative sanctions and on-the-spot fines for non-compliance issues that may not warrant court proceedings; and (ii) administration of fishing quotas, including allocation, transferability and price setting;

- Implement licensing of MAF vessels, based on provisions that are already available under Kiribati's fisheries regulatory framework, to facilitate monitoring, control and surveillance of conservation and management measures during the harvest and landing phases of production;

- Expand licence conditions to strengthen reporting obligations, including the submission of catch, hand-over, and export records, to facilitate improved cross-checking and verification of records, enhance estimates of post-harvest mortality, and inform an area-based approach to fisheries management;

- Strengthen fishery control and enforcement strategies, including through the application of intelligence-led, risk-based enforcement (ILRBE) to inform efficient deployment of MCS resources;

- Enhance human resource capacity for MAF management, including through the development and delivery of training plans and programmes addressing, inter alia (i) management of MAF; (ii) reporting obligations, processes and procedures; (iii) monitoring and enforcement strategies, including ILRBE; (iv) data management, analysis and reporting; and (v) application of harvest control rules; and

- Improve data management and reporting systems, including via the scoping, specification, and development of a fishery information system suitable for use in Kiribati's MAF and, potentially, other coastal fisheries in Kiribati.

1. Introduction and outline of assignment

1.1 Global marine aquarium trade

The global retail trade in live ornamental fish is worth more than US$10 billion, with average annual growth of over 10 percent. It encompasses a wide variety of freshwater and marine organisms, including fish, invertebrates and plants. In 2014 exports generated US$347.5 million for source nations (Dey, 2016; Kirata et al., 2021). Singapore was the largest exporter (US$69 million) contributing almost 20 percent of total supply, in part due to its role as a hub where fish imported from other Asian nations are re-packed and exported mainly to the USA and European Union. The USA is the world's largest single market for ornamental fish, with aquarium keeping considered to be the nation's second most popular hobby. Twelve nations (USA, United Kingdom, Germany, Singapore, Japan, China, France, Netherlands, Italy Malaysia, Canada and Belgium) account for over 74 percent of global imports (Figure 1).

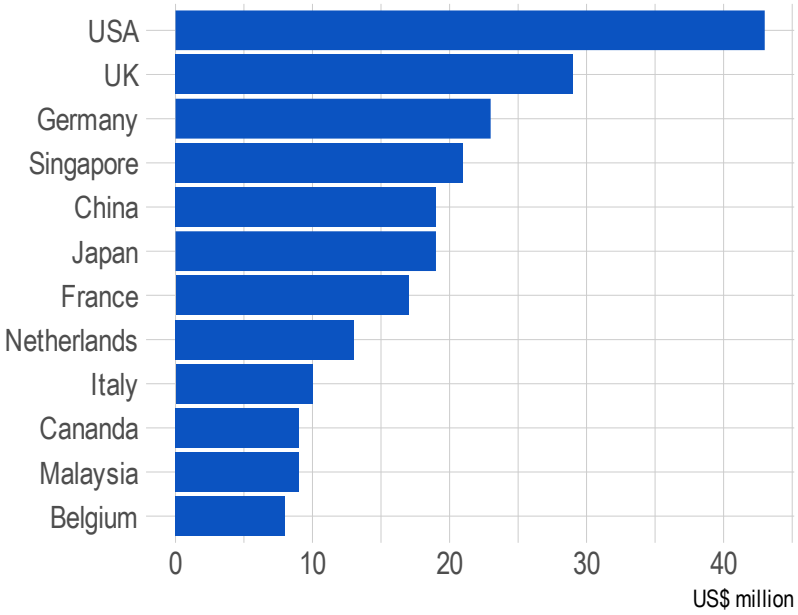

Figure 1: Value of annual ornamental fish imports for the top 12 importing nations. Source: Dey (2016)

Marine species contribute more than 15 percent of the total ornamental fish retail value. An estimated 20 to 24 million individual fish are traded annually, with approximately 98 percent collected from the wild and the remainder captive-bred. Damselfish (*Pomacentridae*) comprise almost 50 percent of global trade, with angelfish (*Pomacanthidae)*, surgeonfish (*Acanthuridae*), wrasses (*Labridae*), gobies (*Gobiidae*) and butterflyfish (*Chaetodontidae*) accounting for a further 25-30 percent (Wabnitz et al., 2003).

Well-managed Marine Aquarium Fisheries (MAF) provide amongst the highest value-added products that can be harvested from a coral reef. Aquarium fish may be as much as 83-times more valuable than the same weight of reef fish traded for food (Edwards, 1988; Holcombe et al., 2022). The trade contributes positively to job creation, economic development and stability in predominantly rural, low-income coastal communities, often in locations where other revenue generating options are limited (Rhyne et al., 2014). While the trade is considered to be high value but low volume, some environmental considerations do exist. These include harmful collection techniques (e.g., the use of cyanide to stun target fish or the destruction of reef habitats), over-harvesting of some species, and high levels of mortality associated with suboptimal handling and transport practices (Wabnitz et al., 2003). By addressing these issues through sound management, MAF have potential to deliver sustained, long-term benefits.

Pacific Island Countries and Territories (PICT) account for around 10-15 percent of the global marine aquarium trade, contributing annual revenues of US$30-40 million to their economies. At least 12 PICT are involved in the trade: Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Kiribati, Republic of the Marshall Islands, New Caledonia, Palau, Papua New Guinea, Solomon Islands, Tonga and Vanuatu. An estimated 34 companies export aquarium products from the region. Most are relatively small, directly employing fewer than 25 people (Gillett et al., 2020). Approximately 1,470 households are estimated to be involved in supply and facility operation activities throughout the region (Kinch & Teitelbaum, 2009).

1.2 Kiritimati's marine aquarium fishery

With rich blue economy resources, Kiritimati has potential to be an important centre of economic growth in Kiribati. It is the world's largest atoll (364 km^2), representing 44 percent of Kiribati's total land area but containing only 5 percent of its population (5,100 people). Located over 3,000 km from Tarawa and 2,000 km from Honolulu, the island's remoteness has presented historical challenges to economic development, including due to small economies of scale, limited transportation, and the high cost of consumables such as fuel, electricity and imported food. These constraints have contributed to Kiritimati experiencing less severe marine natural resource over-exploitation and deterioration than Kiribati's more populous islands (Graves et al., 2021). However, improvements in infrastructure and transportation, combined with increasing immigration from the Gilbert Islands, are contributing to growing unemployment, an increase in the number people involved in subsistence lifestyles reliant on reef and coastal fisheries, and growing competition for marine space.

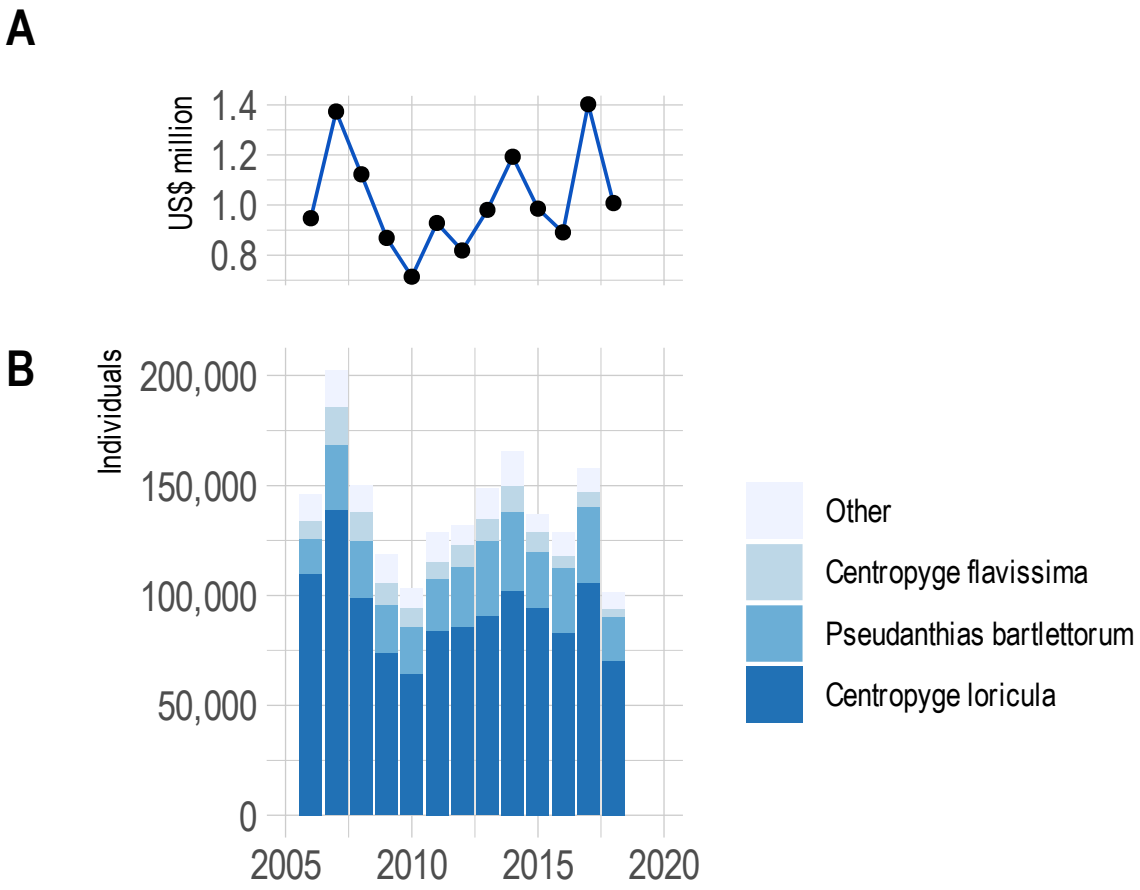

Figure 2: Kiritimati marine aquarium fish (A) export values; and (B) number of individuals, with the contribution of the three most common export species shown. Source: MFMRD

The MAF is a critically important source of employment and income in Kiritimati, contributing over US$1 million to the economy annually. While commercial marine operators target around 30 species of fish, more than 65 percent of exports consist of just species: the flame angelfish *Centropyge loriculus* (Figure 2). Kiribati's first MAF operator was established in the 1970s, and by the 1990s this had grown to only two companies. Collection and handling were well controlled, producing very high quality fish, and the industry was highly profitable. Kiritimati became known for producing flame angels with more striking colours than those collected from other Pacific locations, and with high demand operators were able to maintain an export price of US$25 per fish. In the 1990s the number of operators increased to 10. With more operators and limited regulation, strong competition drove an increase in export volumes, oversupply, and a steady decline in quality. Prices fell dramatically to US$1 per fish in 2005 (Yeeting, 2006), and have more recently stabilised at US$5-7 (Figure 4). After declining to six in the early 2000s, there are currently 13 operators exporting marine aquarium products (

Figure 3) with over 40 households and 200 people estimated to be directly or indirectly employed (Box 1).

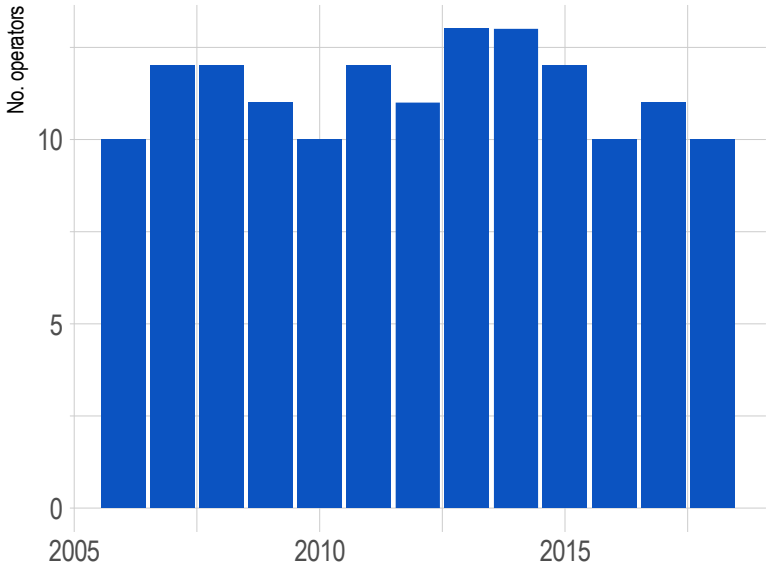

Figure 3: Number of marine aquarium fish operators operating per year between 2006 and 2019. Source: MFMRD

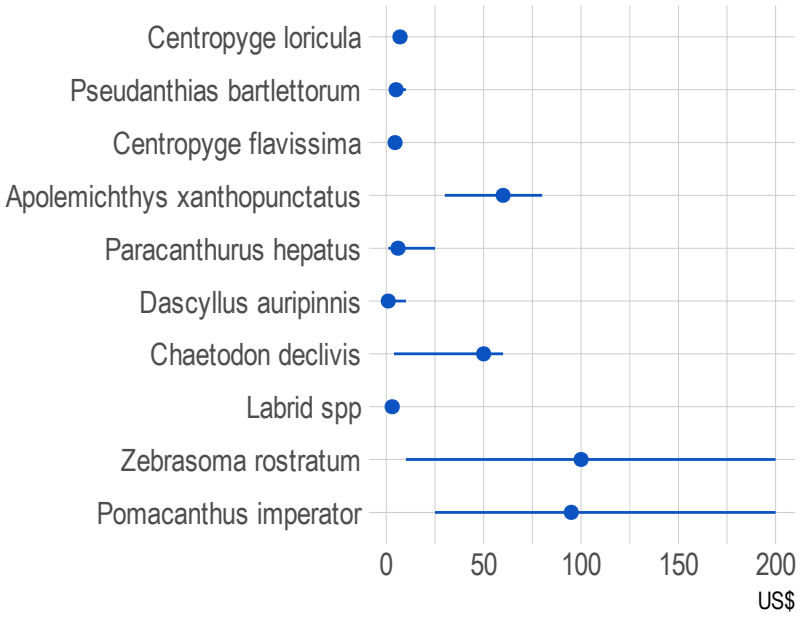

Figure 4: Export price for the top 10 exported species, ranked from greatest (top) to least (bottom) by volume. Points denote modal price, lines denote max/min range. Source: MFMRD

Effective management planning and implementation are essential to sustain the benefits delivered by Kiritimati's MAF. Over the past 10 years, operators have acknowledged localised declines in target species populations, bringing a corresponding increase in collection time and costs. Whether this is due to overexploitation or other factors remains unconfirmed. To date, cargo

capacity has been the primary factor constraining harvest and export volumes. While exports were once transported by air to both Hawaii and Fiji, following the introduction of costly biosecurity inspections in Fiji, operators now export exclusively to Hawaii using the single weekly flight. Available cargo space is shared equally, with each operator currently allocated five boxes per flight. Previously each operator was allocated seven boxes, but as the number of permitted MAF operators has increased, allocated cargo space, and hence economies of scale, have declined (Gillett et al., 2020). Export records indicate that at least 27 Hawaiian importers received aquarium fish from Kiritimati between 2015 and 2020, and it is likely that this demand would drive additional harvest and exports once improved transportation links remove the current cargo capacity constraints. In parallel, the effects of climate change and growing competition for blue economy resources and space present an increasing risk to MAF populations. There have long been calls for improved management, with the Pacific Community (SPC) and other development partners providing technical assistance since the early 2000s which has culminated in the preparation of a draft Kiritimati Island Marine Aquarium Trade Management Plan.

Box 1: Kiritimati's marine aquarium fishery value chain and actors

Collectors typically supply one MAF company. They are not considered to be employees, but rather are paid based on the number and type of fish collected. Collection occurs from small boats, typically with 2-4 collectors using SCUBA, hand nets and small herding nets to collect fish to order. Fish are placed in holding containers, which are kept in the ocean until packing.

Packers prepare the fish for export. They typically work only on the afternoon/ evening prior to each flight. The holding containers are brought to shore, and fish transferred into larger holding tanks prior to being individually bagged. Oxygen is injected into the bags to minimise mortality. Packers transport consignments to Cassidy Airport ready for check in and loading.

Owners are typically the only permanent employees of each MAF company. They have overall responsibility for all aspects of the business, including sales, production standards, employing personnel and compliance with relevant rules and regulations.

MFMRD fishery officers deploy to Cassidy Airport prior to each flight. They check MAF export manifests, inspect consignments, and maintain a record of the number of each species exported.

1.3 Objectives of this report

This report outlines a technical review of, and proposed implementation plan for, the draft Kiritimati Island Marine Aquarium Trade Management Plan. Under the Pacific Islands Regional Oceanscape Program (PROP), the Ministry of Fisheries and Marine Resources Development (MFMRD) has engaged MacAlister Elliott & Partners (MEP) to deliver a consultancy entitled “Kiritimati Island Ocean Resources & Fisheries Management Planning”. Task 3 of this

consultancy aims to support the implementation of the draft Kiritimati Island Marine Aquarium Trade Management Plan 2017 by (i) assessing the human resource and capacity needs to implement this plan; (ii) designing and implementing a training and capacity development program; and (iii) carrying out a legal and regulatory framework gap analysis to identify the pathway through which the management plan can be promulgated. In response to these aims, this report presents:

- A rapid review and proposed revisions to the draft Kiritimati Island Marine Aquarium Trade Management Plan 2017, with a specific focus on the economics of the fishery, market analysis, enforcement and the Monitoring, Control and Surveillance (MCS) regime;
- An assessment of the role of key stakeholders in managing the MAF, with a focus on realistic and practical options for strengthening local MCS capacity;
- A description of stakeholder workshops undertaken and inputs received during this assignment;
- An analysis of legislative and regulatory gaps relevant for implementing the draft management plan; and
- A proposed capacity development and implementation strategy for the draft management plan.

2. State of the fishery

2.1 Resource status

A paucity of data on resource status inhibits effective regulation and management of Kiritimati's MAF. A critical need for routine assessment of fish populations targeted by the MAF was identified at least as early as the turn of the century (Lovell, 2002). While some in-water surveys have been conducted by visiting experts, the majority have provided only partial coverage of spatial areas, depths, and target species. In 2019 SPC completed a whole-of-atoll in-water survey of fish species targeted by the MAF, at depths appropriate to the species being targeted. At the time of publication these data are still being analysed. Preliminary results suggest that densities of the main target species, *C. loricula*, remain relatively high but are closely correlated with distance from the main fishing port, and hence accessibility to collectors (A. Halford, pers. comm.).

2.2 Stakeholder perceptions

Stakeholders reported that resource status has declined. Stakeholder perceptions about Kiritimati's MAF were obtained via questionnaires and semi-structured interviews during a field mission conducted in August 2023 (see Annex 1). While most government respondents felt that the resource status had improved over the last five years, in contrast the majority of MAF industry stakeholders reported that resource status had declined (Figure 5). Anecdotal reports suggest that some recent increase in target species abundance may have occurred, particularly on shallow reefs near to London, and is thought to be a consequence of the three-year cessation of MAF exports resulting from the Covid19 pandemic and associated transport and trade restrictions. Industry stakeholders felt that the MAF itself posed the greatest threat to target populations, with pollution also presenting a potential risk (Figure 6). When considering the future, industry stakeholders were most concerned about the availability of productive fishing grounds, the health of target populations (i.e., abundance and size of target species), and the availability of human resources with the required skills and training to operate the fishery.

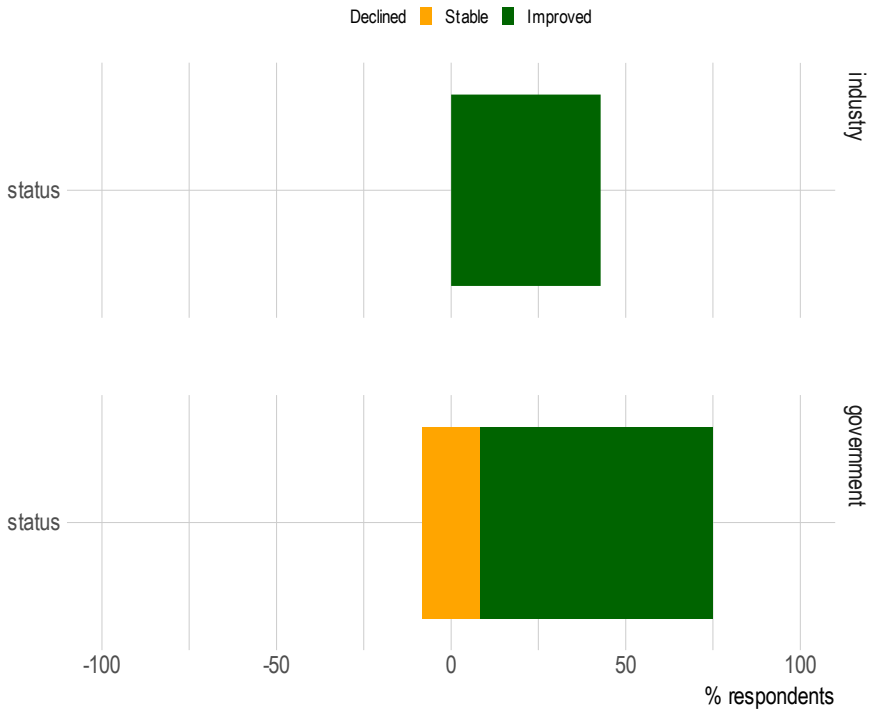

Figure 5: Industry and government perceptions about the status of Kiritimati's marine aquarium resources over the past five years.

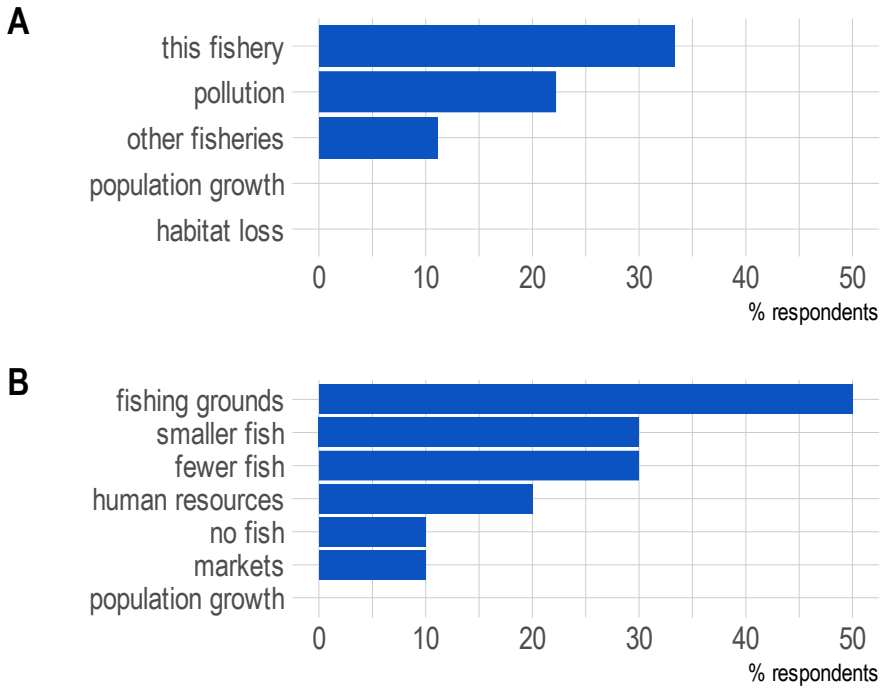

Figure 6: Industry stakeholder perceptions about (A) the main threats to Kiritimati's marine aquarium resources; and (B) concerns about the future of Kiritimati's marine aquarium fishery.

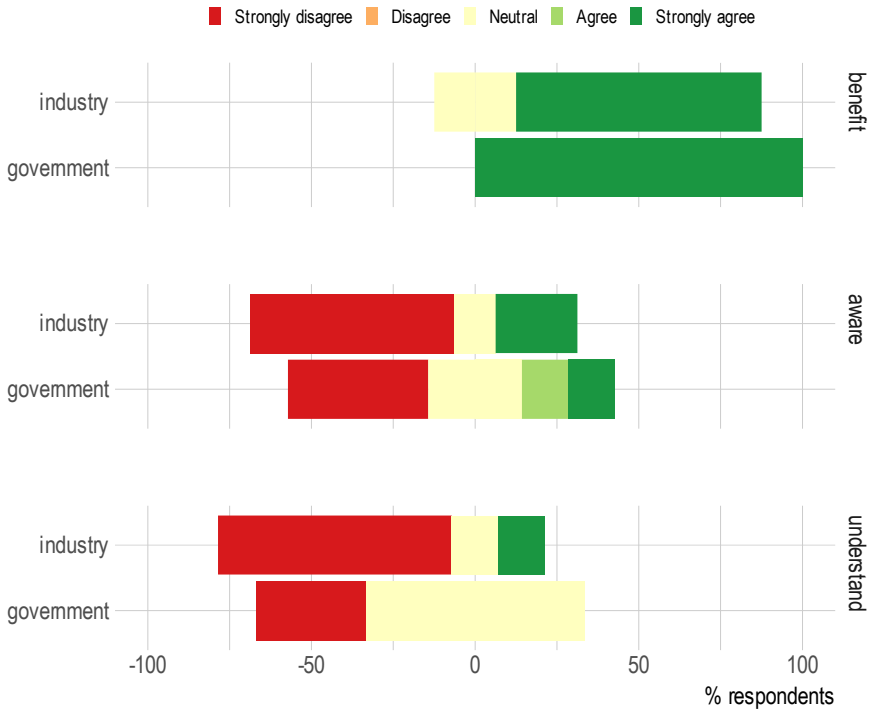

Figure 7: Industry and government stakeholder perceptions about (A) whether implementation of a management plan would be beneficial to Kiritimati's marine aquarium resources; (B) awareness about the draft management plan; and (C) understanding of roles, responsibilities and management measures defined in the draft management plan.

There is strong stakeholder support for improved management of Kiribati's MAF, with 100 percent of government and 75 percent of industry respondents strongly agreeing that implementation of a management plan would benefit the fishery (Figure 7). Despite a draft management plan having been in development for several years, stakeholders indicated low awareness about the existence of this draft and, correspondingly, limited understanding of the implications of this plan on their roles and responsibilities. It should, however, be noted that this survey was conducted immediately following a three-year period during which very little fishery development and technical assistance activities have been carried out in Kiritimati due to the Covid19 pandemic, and this may have contributed to the low awareness observed. Both industry and government stakeholders prioritised similar management objectives for the fishery, with a focus on economic growth, job creation and generation of government revenue. Whereas government stakeholders prioritised conservation objectives, industry stakeholders emphasised data and research amongst their top four management objectives (Figure 8). Both government and industry stakeholders identified quotas and logbooks as the management measures providing the best combination of benefits to the fishery and ease of implementation (Figure 9, Figure 10). There appears to be support for developing and strengthening the role of an industry association. Based on stakeholder responses, there appears to also be support for managing the fishery via

a zoned approach with periodic closures to allow for stock rebuilding and recovery, although stakeholders recognised that implementation may prove challenging.

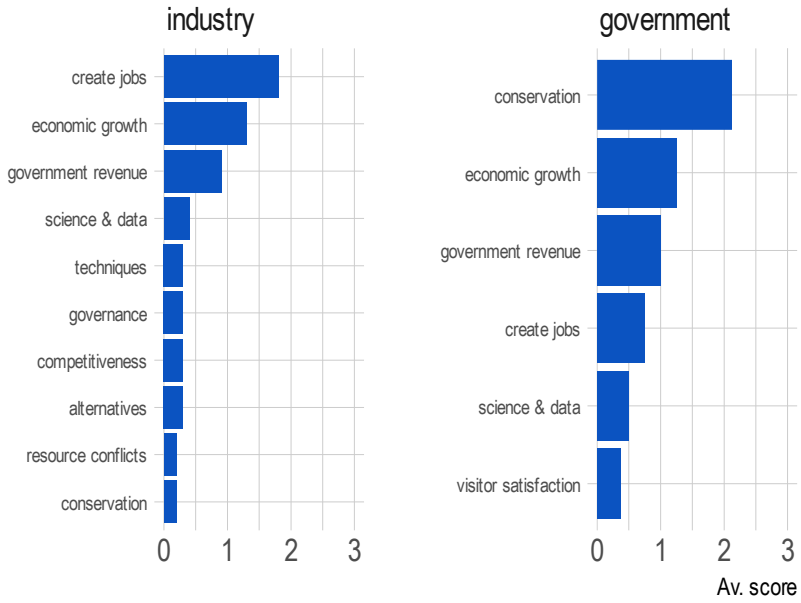

Figure 8: Mean scores for the top three management objectives selected by industry and government stakeholders, from 3 = most important to 1 = least important.

Figure 9: Industry and government stakeholder perceptions about whether various management measures would be beneficial to Kiritimati's marine aquarium fishery.

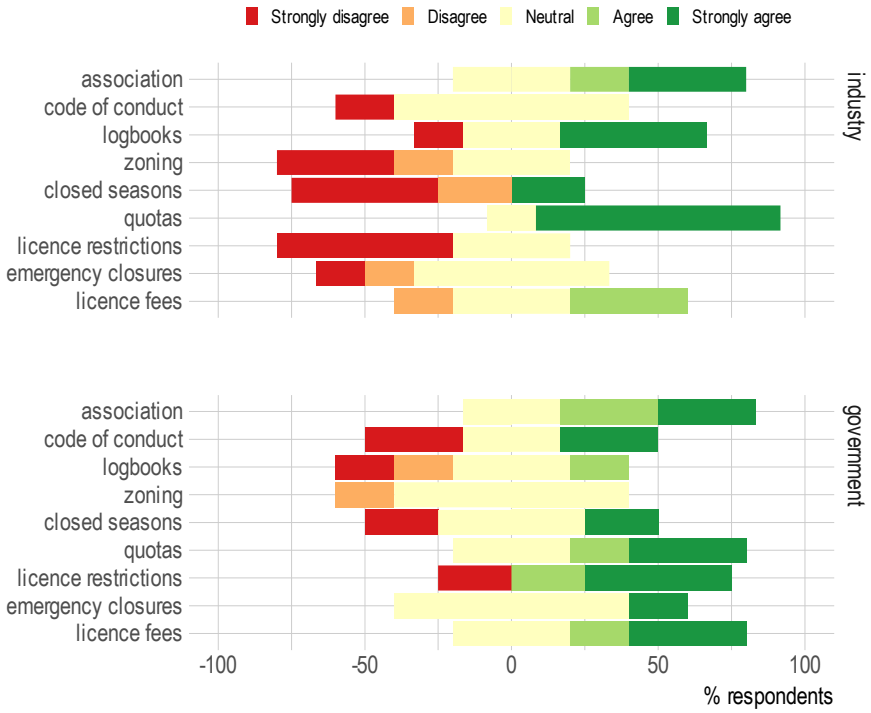

Figure 10: Industry and government stakeholder perceptions about whether various management measures would be easy to implement within Kiritimati's marine aquarium fishery.

Distance is the main factor currently influencing collection intensity. Industry stakeholders indicated that collection effort is focussed on Kiritimati's outer reefs just outside the lagoon entrance (Figure 11). These locations are easily accessible from London, where the majority of operators have their holding and packing facilities. Some collection effort occurs around Banana, and the proposed development of new holding facilities at Cassidy Airport may aid in redistributing some collection effort from westward outer reefs. Due to high transport costs, much of the remainder of Kiritimati's outer reefs appear to be subject to only limited collection effort at this time.

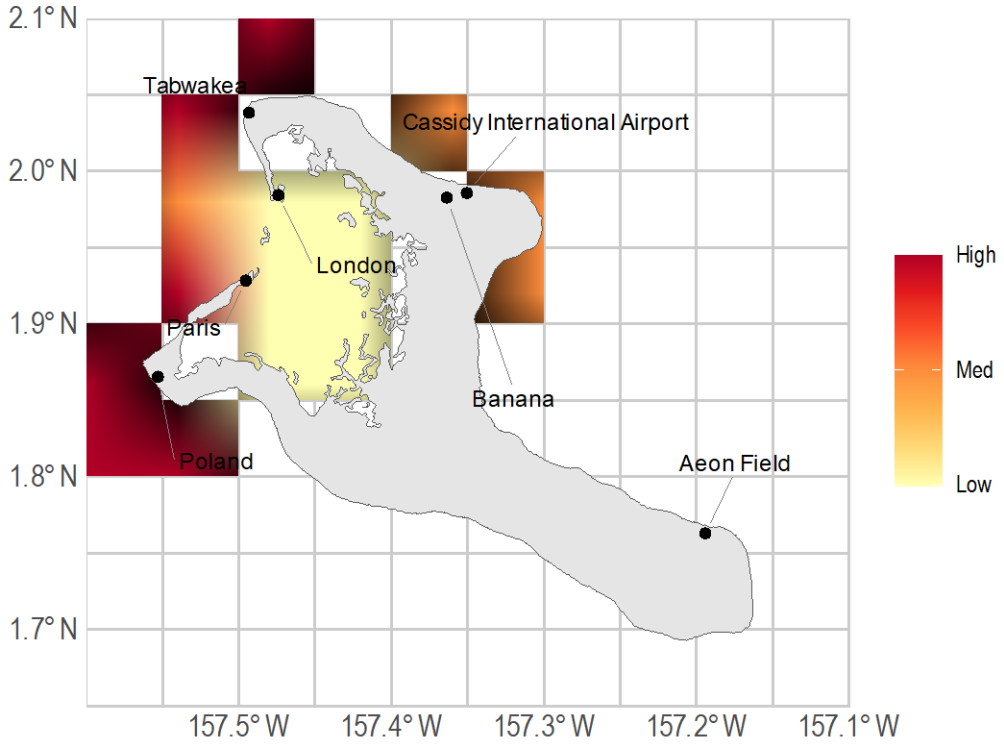

Figure 11: Indicative distribution of marine aquarium fishery collection effort in Kiritimati based on industry stakeholder responses (dark red = high, yellow = low).

2.3 Wider ocean resource landscape

An integrated approach to ocean resource planning would contribute to a thriving MAF. While this report focusses on Kiritimati's marine aquarium fishery, during the field mission a number of wider ocean resource issues were observed and identified. These issues are beyond the scope of a marine aquarium fishery management plan, however they do have relevance and potential implications for the plan's successful implementation, as well as for wider blue economy development and ocean resource planning in Kiritimati.

Deteriorating water quality is a potential risk to Kiritimati's blue economy development. The tropical waters surrounding oceanic atolls are typically low-nutrient oligotrophic environments (Gove et al., 2016). However, an unusually high abundance of fleshy macroalgae was observed along the shoreline surrounding London. While no detailed assessment was made, *Ulva* and *Turbinaria* spp. appeared to dominate. The proximity to human settlement suggests this may signify eutrophication resulting from waste water discharge or seepage. Coral reefs thrive in low nutrient systems. Any increase in nutrient concentrations can result in a rapid phase shift from coral-dominated to algal-dominated reefs, bringing detrimental impacts to fisheries, tourism and other marine activities. Caribbean reefs are a widely cited case study (Hughes, 1994), but other global examples exist, including Tarawa lagoon. While deteriorating water quality is likely to have the most significant impacts within confined lagoonal waters rather than the more exposed outer reefs that support the MAF, it nonetheless highlights the importance of maintaining the quality of the habitats and ecosystem that support this fishery. The development and implementation of a

water quality and benthic habitat monitoring plan would enable baselines to be established, long-term trends detected, and mitigating actions taken if required. This may benefit from a joint agency approach that reflects the mandates of relevant agencies such as MFMRD and Ministry of Environment, Lands and Agricultural Development (MELAD).

Marine spatial planning has potential to minimise natural resource conflicts while also contributing to sustainability objectives. Kiritimati's population is growing rapidly (15% between 2015 and 2020 [NSO, 2021]), bringing increasing demand for coastal space and resources. While Kiribati has undertaken some preliminary marine spatial planning exercises, these have focussed primarily on large-scale ocean (Gassner et al., 2019) or inner lagoon planning (PPM Ltd, 2019), with limited consideration of the seaward-facing outer reefs that represent the main MAF collection areas. Without adequate spatial planning, conflict between the marine aquarium and other sectors, including tourism, is likely to increase as these sectors continue to expand (see Section 3.8). Furthermore, the current absence of spatial planning inhibits any spatial approaches to fishery management from being applied (see Section 3.5).

3. Review of the draft management plan.

A draft Kiritimati Island Marine Aquarium Trade Management Plan (hereafter referred to as the draft management plan) has been developed by MFMRD with support from SPC. This chapter presents a critical review of the draft management plan, and aims to identify opportunities to strengthen the plan, streamline implementation, and ensure successful delivery of management outcomes. Where appropriate, this review has been guided by global standards and best practices (e.g., FAO, 1997); FAO, 1995).

3.1 Scope

Define the scope of the management plan. Clearly and precisely defining the management plan scope—sometimes referred to as the fishery management unit—is essential to avoid ambiguity and legal challenge. Scope includes factors such as the area of competence, affected stakeholders, target species, and harvest gears and methods addressed by the management plan. While the draft management plan does include some of this information, it is not prominently presented and is often implicit rather than explicit. For example, while Section 1.2 indicates that the draft management plan applies to the Northern Line Islands, other sections (e.g., Section 6.1.c) appear to be specific to Kiritimati. Similarly, Section 1.2. indicates that the draft management plan applies to marine aquarium *fish*, yet Section 4.2 outlines restrictions on corals and clams. In the opening paragraphs of the management plan, in line with provisions under the Fisheries Act 2010 Article 6, MFMRD could consider explicitly identifying the fishery addressed by the management plan, including by defining the area of competence (e.g., via reference to a map), species (e.g., via reference to the species list currently included in Annex 1), and collection methods. Given the urgent need to implement a management regime, MFMRD could consider initially focussing on Kiritimati, where both available data and collection effort are greatest, before expanding the management plan to encompass other islands in the Line group during future revisions of the management plans.

Distinguish fishery management from fishery development objectives. Fishery management is the pursuit of certain objectives through the direct or indirect control of fishing effort, whereas fishery development is the process towards achieving the full potential of the sector through growth and improvement (FAO, 1997). Both are important processes, but typically rely on different approaches and resourcing, and may have competing objectives. Moreover, while fishery management plans are typically long-term regulatory instruments that remain in effect for many years (albeit with periodic revision), fishery development plans tend to be shorter term action plans that are guided by the fishery management framework. The draft management plan currently addresses both fishery management and fishery development issues (e.g., the actions relating to cost, profitability, safety standards and awareness presented in Section 2). Given their different purposes and timescales, MFMRD could consider making a clearer separation between fishery management and fishery development, possibly through the creation of a separate MAF Fishery Development Action Plan.

3.2 Guiding principles

Evidence-based decision making and the precautionary principle. The draft management plan outlines four guiding principles informing its development and implementation: economic viability, ecosystem approach to fisheries management, social acceptability, and inclusiveness. These are commendable guiding principles and align with provisions in key policy documents such as the Kiribati Development Plan 2020-2030. However, MFMRD could consider further expanding these guiding principles. For example, an **evidence-based approach to decision making** is implicit in many aspects of the draft management plan, including its objective to "allow for the collection of information to assist decision making". Furthermore, due to uncertainty arising from the data poor nature of Kiritimati's MAF, some aspects of the draft management plan (e.g., quota setting) have applied the **precautionary principle** that is a central tenet of international fisheries management best practice (e.g., FAO, 1995). Accurately identifying and specifying these guiding principles will provide an important point of reference when elements of the management plan are revised and/or disputed.

3.3 Objectives

Align management objectives and stakeholder priorities. Stakeholder priorities include those identified via consultation (see Section 2.2), as well as the government's strategic priorities outlined in key policy documents such as the Kiribati Development Plan 2020-2030, National Coastal Fisheries Roadmap 2019-2036 and Line and Phoenix Islands Integrated Development Strategy 2016-2036. These strategic priorities include, *inter alia*, growing the economy and incomes, creating work opportunities and jobs, increasing government income and revenues, and conserving and sustaining natural resources. The draft management plan currently specifies four objectives: enhance participatory management, establish an ecologically sustainable industry, allow for the collection of information, and collaboration and information dissemination. MFMRD could consider reviewing these objectives to ensure that they are fully aligned with and contributing to stakeholder priorities. Where appropriate, consideration could be given to framing objectives in such a way that the benefits can be readily perceived by all stakeholders, helping to enhance buy-in and support. For example, rather than "establish an ecologically sustainable industry", an alternative could be "maintain catch per unit effort above an agreed level" —an objective that has similar intent but is expressed in a way that reflects the industry's interest in minimising harvest time and cost.

Distinguish between outcome and process objectives and ensure objectives can be readily monitored and evaluated. Outcome objectives are the ultimate results that the management plan aims to achieve, whereas process objectives are the things that must be achieved to fulfil the outcome objectives. For example, the draft management plan targets "allow for the collection of information". This raises the question, is the fishery managed to deliver information, or is information required to manage the fishery towards its objectives (i.e., is information collection a process objective)? Equally as important is the need to consider how progress towards each objective will be monitored and evaluated, this includes defining how objectives such as "improve awareness" will be measured and what indicators may be appropriate.

Prioritise objectives. Many management objectives are mutually incompatible and cannot be simultaneously achieved. For example, maximising economic returns from the fishery may not be compatible with maximising job creation and work opportunities. By prioritising objectives, the management plan can provide clear guidance to fishery managers and decision makers in the event that compromise between conflicting objectives is required. The following provides an example of how objectives could be prioritised to support sustainability outcomes: (i) minimise negative impacts in target populations and their ecosystem; (ii) maximise compliance; (ii) maximise economic growth; (iv) maximise job creation; and (v) maximise government revenues.

3.4 Indicators and harvest control rules

Define specific, measurable, achievable, relevant, and time-bound (SMART) indicators with which to assess effective implementation of the management plan. While objectives define the broad goals of the management plan, indicators enable progress towards those goals to be tracked. For example, if the objective is "an ecologically sustainable industry", an appropriate indicator could be a species-specific measure of catch-per-unit-effort (i.e., the number of days/ hours required to collect a particular species). The draft management plan currently does not define any indicators with which to assess the plan's implementation and effectiveness.

Define triggers and harvest control rules. A harvest control rule is a well-defined, pre-agreed management action that describes how the harvest is managed based on the state of a specified indicator. Triggers, or reference points, are the pre-agreed indicator values that initiate the harvest control rule. For example, a management plan might specify that if catch-per-unit effort declines below a certain threshold value, quotas should be reduced by a specified amount to allow for stock rebuilding and recovery. Similarly, the management plan might define the conditions under which quotas are increased. The draft management plan currently does not define any harvest control rules or reference points.

3.5 Conservation and management measures

Restrictions and prohibitions are clearly defined and robust. The draft management plan outlines several restrictions and prohibitions, including relating to prohibited target species, closed areas, and gears. Most of these are well defined and appear to have a sound legal basis via instruments such as the Fisheries Act 2010 (and its amendments) and the Fisheries (Conservation and Management of Coastal Marine Resources) Regulations 2019. MFMRD could consider confirming that adequate regulatory instruments are in place, including under the jurisdiction of other line ministries, to support the requirement that "recreational dive areas are registered with respective Island Councils" (see Section 3.8).

Strengthen the regulatory framework and rationale for export quotas. The draft management plan specifies export quotas as the primary mechanism via which MAF harvests are controlled in response to changes in resource status. An initial export quota of 1,500 *C. loricula* and 800 other fish species is set. To support early dissemination and implementation of the management plan, consideration could be given to elaborating the rationale for setting the quota at this level (e.g., whether based on historical catches, estimated stock potential, or other considerations—noting

that Article 4.3.a provides for this rationale to eventually be further strengthened through improved stock assessment). The existing regulatory framework (including the Fisheries Act 2010, Article 13 and the Fisheries [Conservation and Management of Coastal Marine Resources] Regulations 2019, Article 16) provides for export quotas to be applied to individual operators as a licence condition. However, consideration could be given to significantly strengthening the regulatory framework for fishing quotas, including to address issues such as quota allocation, quota transferability, and separation of licence and quota fees. Well-designed quota regulations could contribute to rationalising MAF harvest capacity and minimising inefficient structuring of the sub-sector (e.g., under the current implementation proposal, quota fees are linked to the trade licence, creating an incentive for the government to maximise the number of trade permits issued so as to maximise revenues). Similarly, well-designed quota regulations can assist the government to maximise non-tax revenues and set quota prices efficiently via, for example, quota auctions. Special attention should be given to the fact that neither the draft management nor the supporting regulatory framework currently define a maximum quota or maximum number of MAF export permits. With only a per-operator quota defined, there appears to be nothing preventing new businesses from being created to secure additional quota.

3.6 Monitoring, Control and Surveillance

Clearly define control points. The draft management plan provides a high-level overview of the MCS requirements with respect to the current content. The MCS components of the draft plan require an element of data submission and acknowledges the need for inspection procedures however, there is limited detail regarding the specifics. MCS is currently focussed on the point of export, with MFMRD staff deployed to Cassidy Airport to visually inspect consignments of aquarium fish due for export. Little or no checks at the point of harvest, storage or packing take place under the current control and enforcement system. The conservation and management measures outlined in the draft management plan include restrictions and prohibitions related to target species, closed areas, and gears, as well as the application of export quotas. The recommended control points to support these measures at the point of harvest, the point of handover from harvester to operator and at the point of export is presented in Table 2. This increased level of control will allow for more effective MCS and enforcement, triangulation and verification of data, and improved evidence-based fisheries management.

Specify reporting requirements and processes. The draft management plan requires catch records to be submitted every fortnight. However, this would inhibit the ability to carry out real time inspection and enforcement cross checks prior to exports taking place. A more regular submission deadline (e.g., within seven days) that mirrors the storage and export process is necessary to ensure fisheries data can be cross checked and verified, including before export occurs, when practical. Regular reporting across the full MAF process would support enhanced traceability and monitoring for compliance purposes, while also facilitating improved estimates of mortality and hence harvest rates. The format for catch, takeover and export submissions should be standardised and defined by MFMRD and provided to the harvesters and operators by MFMRD. Consideration will need to be given to the required content, some of which can be found below in Table 2. The use of licence conditions to mandate fisheries data submission provides

flexibility as variations can be issued administratively and do not require ministerial intervention. Several licence requirements exist across different legislation which could be used to attach conditions relating to the MAF (Table 1). Notably, it appears that vessel licences are not currently applied in the fishery.

Table 1: Existing licence types and their legal basis.

Licence/Permit Type	Competent Authority	Legislation
Vessel Licence	MFMRD	Fisheries Act 2010, Fisheries (Conservation and Management of Coastal Marine Resources) Regulations 2019, and Shipping Act 1990
Trade Permit	MFMRD	Fisheries Act 2010 and Fisheries (Conservation and Management of Coastal Marine Resources) Regulations 2019
Fisher Licensing	MFMRD	Fisheries Act 2010 (customary rights provision applies)
Business Licence	Local Island Council	Local Government Act 1984/byelaws
Environment Licence	MELAD	Environment Act 2021

Expand available sanctions and penalties. MFMRD could consider introducing administrative penalties (on the spot fines). The only sanction that currently exists at MFMRD level are formal warnings, which then progress straight to court proceeding that may take months or even years to be heard. The ability of MFMRD enforcement officers to issue administrative penalties and to compound offences will create a more proportionate approach to non-compliant activity, while also reducing burden on court systems.

Ensure MCS activities are consistent with available mandates and regulatory frameworks. The draft plan recommends that MFMRD should consider carrying out checks at the place of import. This would require staff to travel to the consignment destination. In addition to the jurisdictional and diplomatic considerations, this is likely to be disproportionately expensive, time consuming and necessitate increased licence fees to recover costs. MFMRD could consider the feasibility, practicality, and cost of MCS activities.

Table 2: Recommended MCS measures to support implementation of the draft Kiritimati marine aquarium fishery management plan.

Control Measure	Legal Route	Applicability	Requirement	Enforcement and MCS
Specified and prohibited gears.	National Legislation, licence conditions, carriage order	Collectors	Prohibited to possess certain gears. Specify gears which can be used for the collection of fish destined for the aquarium market	Inspections at sea and shore based. Vehicle inspections. Premises inspections.
Species prohibited from harvest and trade	National Legislation, licence conditions, carriage order	Collectors	Prohibited to possess certain species or their derivative products. Specify prohibited and/or protected species in the managed plan and/or legislation	Inspections at sea and shore based. Vehicle inspections. Premises inspections.
Catch record for collectors. Take over declarations. Export data submissions	Licence condition (provides flexibility and ability to amend quota quickly if necessary)	Collectors	Submission to MFMRD of a catch record to MFMRD on a formal template to be provided by MFMRD. The record should show species, numbers, catch location, date of capture and name of collector. Catch record to be submitted to the authorities weekly, prior to the fish being sent for export or upon request made by MFMRD - whichever is soonest.	Real time Catch records can be requested by MFMRD enforcement officers at any time in the execution of their duties in the field. These are to be cross checked with the catch present to verify. Retrospective Office based checks can be conducted across the catch record, the takeover declaration, and the export data to check for inconsistencies.
		Operators	Submission to MFMRD of either a sales note or take over declaration to MFMRD on a formal template to be provided by MFMRD. This shows the number and species, which have been provided by individual collectors to the operators and which include the date of take over. Take over declaration to be submitted to MFMRD no more than 24 hours after the fish has been received by the operator. The take-over declaration should note if the fish is to be exported straight away or stored.	Real time Takeover declarations can be requested by MFMRD enforcement officers at any time in the execution of their duties in the field. These can be cross checked with the catch record present to verify. Retrospective Office based checks can be conducted across the catch record, the takeover

				declaration and the export data to check for inconsistencies.
		Operators	Submission to MFMRD of export data to MFMRD on a formal template to be provided by MFMRD. Export data should include the species, number, value, methods of export, exporter and/or operator details, flight number, destination, and receiver information. Catch and takeover declaration data should be cross checked and verified before an export permit can be issued. Other requirements such as CITES can also be used to verify and validate.	<u>Real time</u> Export data can be requested by MFMRD enforcement officers at any time in the execution of their duties in the field. These can be cross checked with the catch record present to verify. <u>Retrospective</u> Office based checks can be conducted across the catch record, the takeover declaration, and the export data to check for inconsistencies.

3.7 Non-tax revenues and cost recovery

Opportunities exist to recover some management costs from the industry. However, mechanisms should be well-defined, based on sound economic analysis, and with consideration given to the potential for perverse incentives to be created. For example, setting quota prices appropriately is often a challenging task, requiring comprehensive and costly analysis to enable government to accurately predict industry's perceived value of the quota. Auctions can provide a more efficient alternative and address the challenge of both price setting and quota allocation. Clearly separating licence fees and quota fees would enable such mechanisms to be applied, and MFMRD could consider reviewing and strengthening the legal framework surrounding fishery quotas to support this process.

Strategic application of fees and levies can support the government's fishery development objectives. Fishery development requires investment. In many cases the industry has capacity to make these investments, if sufficiently incentivised. One example is the dive safety standards and training that are often identified as an area of concern for Kiritimati's MAF. The traditional approach to addressing this has been through the delivery of trainings financed by the government or development partners. MFMRD could consider discounting licence fees for operators that demonstrate certain operational standards (e.g., safety) have been met. This would create an incentive for industry investment to address these issues, while simultaneously minimising cost to state budget.

3.8 Cross-sectoral considerations

Ensure that other resource uses are well managed and regulated. Conflicting resource uses may undermine Kiritimati's MAF management objectives. One example is the 200 m harvest exclusion zone around dive sites specified in the draft management plan. While this will help to minimise resource conflict, it raises questions about where dive sites are located, what is the process by which dive sites are designated, and what is to prevent exclusion of the MAF via strategic positioning of dive sites by the tourism industry. The management plan states that "recreational dive areas are to be registered with the Island Council". MFMRD could consider confirming that adequate regulatory instruments are already in place to support this requirement and engaging with relevant agencies to support the development of these regulations where necessary.

4. Capacity assessment and resourcing needs

Current management capacity was assessed, and the resources required to implement the MAF management plan were evaluated. Priority issues are those that are required prerequisites to implementing the draft management plan in its current form and based on precautionary principles. Secondary issues are those that, once addressed, would contribute to further optimising the management plan's implementation and the delivery of management objectives.

4.1 Priority issues

Strengthen regulatory frameworks. A reasonably robust regulatory framework is already in place to support most aspects of the draft management plan. Relevant instruments include the Fisheries Act 2010 (and its amendments) and the Fisheries (Conservation and Management of Coastal Marine Resources) Regulations 2019. However, two critical issues would benefit from further attention and strengthened regulation:

(a) *Administrative sanctions*. The current legal framework provides for warnings to be issued, and cases to be prosecuted through the courts. The ability to issue administrative sanctions and on-the-spot fines would create additional deterrent to non-compliant activities, while providing MFMRD officers with a more streamlined and proportionate approach to dealing with repeat offenders. The current legal framework should be reviewed, including with reference to the Fisheries Act 2010 Article 41 and a draft Fisheries (Penalty Notice) Regulation 2020 that is reported to be in development. Following this review (i) regulations should be drafted and/or amended to address any deficiencies identified; (ii) processes and procedures for issuing administrative sanctions should be established; and (iii) related training programs and standards should be developed and delivered to MFMRD officers.

(b) *Quota administration*. The current regulatory framework provides for quotas to be applied to individual operators as a condition of vessel or trade licence. However, these regulations do not currently outline any provisions related to the allocation, transferability, or pricing of quotas. Incorporating quota fees into licence fees, as is currently proposed, is likely to be economically inefficient from the perspective of both sector performance and government revenue generation. The current legal framework should be reviewed, and the costs and benefits of various quota administration strategies evaluated. Consideration should be given to the development of a coastal fisheries quota regulation, or to amending the Fisheries (Conservation and Management of Coastal Marine Resources) Regulations 2019 to include relevant provisions.

Implement vessel licencing. While the Fisheries Act 2010 (and its amendments) and the Fisheries (Conservation and Management of Coastal Marine Resources) Regulations 2019 include provision for issuing vessel licences, these do not appear to currently be applied within Kiritimati's MF. Not only does this represent a potential loss of government non-tax revenue, but it also inhibits the ability to apply conservation and management measures and implement MCS

during harvest and landing phases. Experiences and lessons learned from the application of vessel licences within coastal fisheries are available from other areas of Kiribati (e.g., Tarawa). Processes should be established to ensure that all traders and vessels are appropriately licensed, in accordance with prevailing regulations.

Design and implement reporting requirements and processes. Recommended reporting consists of catch records, hand-over declarations, and export records. Template reporting forms should be developed, and adequate socialisation and training provided to MAF operators and collectors. To facilitate reporting of harvest locations, a fisheries statistical grid should be developed for Kiritimati (or Kiribati in its entirety, to enable application to other fisheries). Catch records should include species, numbers, catch location, date of capture and unique identifier of the licensed vessel. Take-over declarations should include species, number, unique identifier of source vessel, and unique identifier of the licensed trader. Export records should include species, number, value, unique identifier of the trader, method of export, flight number, destination, and receiver information. In line with provisions under the Fisheries Act 2010 Article 6.7, licence conditions should be updated to ensure that reporting obligations are clearly specified.

Establish a MAF control and enforcement strategy. Observations in country highlighted a lack of a formal strategy which is used to direct and focus compliance inspections at critical points and plan resource needs in advance. A control and enforcement strategy outlines the processes, procedures and resourcing for control and enforcement. Where feasible, Intelligence Led, Risk Based Enforcement (ILRBE) should be applied. The ILRBE approach assists marine enforcement professionals to assess threats to compliance with the regulatory framework. It ensures that enforcement is effective, targeted and directed, and assists officers to understand which MCS activities are likely to have the most impact. These activities will have been identified using an intelligence grading process to ensure that activity is carried out using best available evidence and is proportionate. Currently the only control point that is established within the MAF is the inspection of consignments immediately prior to export, which takes place just outside the doorway to the departure hall at Cassidy Airport. As a priority, export inspection processes and procedures should be reviewed to minimise potential stress to aquarium fish due to opening, inspecting and repacking in often hot and noisy environments at Cassidy Airport. In addition, the development of a control and enforcement strategy would aid in identifying the required number of enforcement personnel.

Enhance human resource capacity. MFMRD's Kiritimati sub-division currently has one senior fisheries officer, one fisheries assistant, and one fisheries technician who are responsible for all of the island's coastal fisheries and marine resources. Given MFMRDs extensive remit, it would be necessary to increase the human resource capacity to ensure effective enforcement and increase compliance. The development of a control and enforcement strategy would aid in identifying the optimal number of personnel. Enforcement officers will be required to implement and monitor catch records, takeover declarations, and export data, and to assess and enforce quota compliance. In addition, administrative personnel will be required to issue licences annually, collect fees and manage updates and licence variations throughout the licence period. Competency standards and training plans should be developed where required, addressing topics

such as (i) introduction to the MAF fisheries management plan; (ii) report submission, verification, and cross-checking procedures; (iii) monitoring and enforcement strategy, including ILRBE; (iv) data management and reporting; and (v) application of harvest control rules.

Improve data management and reporting systems. Currently export records provide the primary source of MAF data available to MFMRD officers. Data are recorded on paper, and subsequently transferred to an Excel spreadsheet stored on a desktop computer at MFMRD's office. The draft management plan significantly expands on the types and volumes of data recorded. This brings an increased risk of data entry and transcription errors, as well as more significant impacts if data are lost as a result of inadequate data management and backup procedures. Improved data management procedures should be established. In the first instance, this may be as simple as moving Excel databases onto cloud-based storage. Not only would this facilitate improved data access and sharing amongst MFMRD officers, but most cloud storage providers also provide some level of data backup and versioning. In the longer term, specifications should be developed, and a fishery information system procured or developed. If well specified and designed, this system does not necessarily need to be specific to the MAF and could be applied to other coastal fisheries in Kiritimati or throughout Kiribati more widely. Opportunities to adopt or adapt existing fishery information systems, such as those developed by SPC, should be explored.

Submit the management plan for Ministerial approval. The Fisheries Act 2010 Article 6 outlines the process for preparing and operationalising a fishery management plan. It requires that, following consultation with appropriate government ministries and departments, fishermen, local authorities and other affected persons, the fishery management plan is submitted to the Minister and comes into operation following the Minister's approval. MFMRD could consider seeking Ministerial approval to enable the management plan to be operationalised. While some aspects of the plan and its enabling framework could be strengthened, including those issues described above, the draft management plan already includes a well-defined schedule and process for revisions to be incorporated. Consequently, these issues need not necessarily present an obstacle to operationalising the management plan, with a view to improving the plan incrementally over time.

4.2 Secondary issues

Register and mark MAF fishing vessels. The Fisheries (Amendment) Act 2015, Article 15 and the Fisheries (Conservation and Management of Coastal Marine Resources) Regulations 2019, Article 17 outline the requirement for a record of licensed vessels to be maintained and includes provisions relating to vessel marking and unique vessel identifiers. The absence of vessel marking, and a vessel registry inhibits the ability of MFMRD officers to identify vessels suspected of non-compliance, and to pursue post hoc investigations with owners or operators. To support the process of licensing vessels and ensuring compliance with licence conditions, efforts should be made to identify, mark and register all vessels operating within Kiritimati's MAF (Table 3).

Undertake marine spatial planning and establish harvest zones. As population growth and economic development trends continue, Kiritimati is likely to face increasing competition for

marine space and resources. Marine spatial planning provides a systematic process for managing resource competition and conflict. While the wider benefits of spatial planning may take several years to be fully realised in Kiritimati, the MAF provides an opportunity for immediate impact. Clearly defined harvest zones could be opened and closed in response to changes in exploitation and stock status. In this way MFMRD can maintain the status of target populations above agreed thresholds, ensure productive collection areas remain accessible, and assist the industry to minimise the operational costs associated with travelling to distant collection sites and searching for species that are in high demand. As a first step, a rapid survey of Kiritimati's outer coastline should be undertaken to identify topographic and physical features that could serve to demarcate harvest zone boundaries. In parallel, a consultative process should be undertaken with operators to identify suitable harvest zone locations and define appropriate indicators and reference points that can inform a harvest control rule for opening or closing harvest zones.

Improve assessment of target population status. The current paucity of resource data inhibits evidence-based management of Kiritimati's MAF. While some in-water surveys have been conducted by visiting experts, these have employed a variety of methodologies and sampling strategies. MAF operators currently maintain records on species collected and traded, but this data remains underutilised for fishery management. The improved reporting systems described above—including catch records, take-over declarations, and export records—will help to ensure these data are available to fishery managers. However, processes, procedures and training programs should be developed to support effective management, analysis, reporting and use of this data for fisheries management and decision making. In parallel, a long-term monitoring plan should be developed for in situ assessment of resource status, to standardise methodologies and sampling strategies. The current practice of in situ resource assessments being undertaken by visiting experts is likely to be an optimal implementation strategy for MFMRD, as it both ensures technical expertise and provides independent assessment. However, terms of reference should be developed to support the process of routinely engaging and deploying these experts according to schedules defined in the long-term monitoring plan, and consideration given to costs and sources of finance needed to support these assessments. Relevant training programs should be developed for MFMRD officers to enable them to effectively participate in and coordinate these assessments, even if technical aspects are devolved to the experts engaged.

Strengthen MCS capacity. MFMRD currently have use of one patrol vessel which is a fibre glass boat with a single 40 hp outboard engine, and a maximum carrying capacity of six persons. While the vessel is not suitable for rough seas, which can reduce inspectors' ability to effectively enforce in MAF harvesting locations. Procurement of a second patrol vessel should be considered, providing a backup in case of mechanical issues, and allowing MFMRD officers to deploy multiple types of fishery patrol at the same time. Monitoring, Control and Surveillance.

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Table 3: Recommended monitoring, control, and surveillance measures to optimise Kiritimati's marine aquarium fishery management plan.

Technical Measure	Control Measure	Legal Route	Applicability	Requirement	Enforcement and MCS
Fleet formalisation	Vessel registration	Maritime Act of 2017, Merchant Shipping Act 1983 (definitions) and Fisheries Act 2010	Vessel owners (collectors or operators)	All Kiritimati vessels which are used for the purpose of fishing in Kiritimati waters should be registered. Consideration around the exclusion of subsistence fishers from this requirement is required however this may create a loophole and be difficult to enforce. Vessels only need to be registered once and are only de-registered if they are no longer fishing or have been sold/changed hands. if the vessel is sold or has changed hands, a new vessel registration application should be made by the new owner. The vessel registration documents are to be carried on the boat at all times during fishing operations to include transit from port to fishing site, searching, fishing and transportation of catch. The document should be laminated to prevent water damage and fraud.	This is already a requirement under the Fisheries (amendment) Act 2021 as read with the Fisheries Act 2010. It is not currently being enforced. A period of education and awareness raising should be carried out in a targeted campaign allowing fishers to register and mark vessels accordingly. Enforcement activity regarding registration and marking should carried out as part of the routine inspection process.
	Marking of vessels		Vessel owners (collectors or operators)	All registered vessels are required to mark their vessels with a unique vessel identifier (UVI) which is provided at the point of first registration. This number does not change if the vessel is sold or changes hands.	

Zoning	Declaration of area fished on catch records	To be identified through the Ocean Resources Master Plan – licence conditions to be used for closures based on stock status	Collectors	Area fished to be declared on catch records (draft plan recommend a grid system to be provided by MFMRD)	Cross check declared area fished with inspections and sightings (see vessel registration and marking below to support this)
Permanently / temporarily closed areas	Declaration of area fished on catch records	Licence conditions	Collectors	Area fished to be declared on the catch record for each separate species caught and submitted as per the catch record requirements (see below)	Cross check declared area fished with inspections and sightings of vessels (see vessel registration and marking below to support this)

5. Action plan

Based on the assessment of current capacity and resourcing needs, an action plan (Table 4**Error! Reference source not found.**) has been developed to support implementation of the draft management plan. The action plan addresses priority issues that are required prerequisites for implementing the management plan in its current form. This action plan does not address actions and resources required for routine implementation of the plan, as this information will be developed through the delivery of these recommended actions. Costs are based on estimates only and included as a guide to support in annual workplans and budgeting, noting that these are likely to vary according to competitive bidding processes.

Table 4: Recommended actions to address the priority issues that have been identified as required perquisites to implementation of the Kiritimati marine aquarium fishery management plan.

		Est. cost (US$)	Est. duration	Comments
Deliver training on topics that may include but are not limited to (i) introduction to the MAF fisheries management plan; (ii) reporting obligations, processes and procedures; (iii) monitoring and enforcement strategies, including ILRBE; (iv) data management, analysis and reporting; and (v) application of harvest control rules.	Consultant services	-	-	To be delivered by MEP under the current contract
Design reporting templates, processes, and procedures; deliver training and socialisation to industry stakeholders; revise licence conditions to include reporting obligations.	Consultant services	200,000	6 months	
Design control and enforcement strategy (with consideration to secondary issues of fleet formalisation and zoning not currently addressed in the management plan), including intelligence gathering and evaluation, ILBRE, evaluation of technology solutions, and identification of resourcing needs (incl. specification of assets, human resources, and budgets).	Consultant services	500,000	12 months	
Design improved infrastructure for export inspection at Cassidy Airport	Consultant services			Could be addressed via the PROP consultancy on fishery value chains of the Line Islands

		Est. cost (US$)	Est. duration	Comments
Develop comprehensive MCS training plan and programme for MFMRD, with consideration also given to joint-agency approaches (e.g., MELAD, Island Council Wardens, Police)	Consultant services			Could be incorporated into the above "**Design control and enforcement strategy" activity**
Undertake regulatory analysis and legal drafting, particularly on the issues of: (i) application of administrative sanctions; and (ii) administration of fishing quotas.	Consultant services	200,000	6 months	
Design long-term monitoring plan for in situ assessment of target populations and their ecosystem, including standardised methodologies, sampling strategies, data formats and reporting, and identification of resourcing needs (incl. specification of assets, human resources, and budgets)	Consultant services	300,000	12 months	
Develop specifications for a fishery information system, including required operation and maintenance resources (e.g., IT infrastructure, human resources, training standards, budgets).	Consultant services	250,000	6 months	
Procure MCS assets based on specifications developed above	Procurement	500,000	-	
Procure fishery information system based on specifications developed above	Procurement	500,000	-	

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Annex 1: Methodology

Literature review

This review of the draft Kiritimati Island Marine Aquarium Trade Management Plan 2017 was informed by detailed literature review, including peer-reviewed articles, grey literature, relevant strategic and policy documents (Table 5) and relevant regulations (Annex 2). A detailed assessment of relevant strategic and policy documents in presented in the report titled National Strategy and International Agreements Review submitted as Deliverable 2 under this assignment.

Table 5: Key strategic and policy documents reviewed under this assignment.

Level	Title
International	UN Sustainable Development Goals
	FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication
	UN Convention on Biological Diversity
Regional	Regional Roadmap for Sustainable Pacific Fisheries
	WCPFC Conservation and Management Measures
	Parties to the Nauru agreement strategic plan 2019-2025
	The Noumea strategy: A new song for coastal fisheries - Pathways to change. 2015
	Kiribati National Coastal Fisheries Roadmap 2019-2036
	Kiribati National Biodiversity Strategies and Action Plan 2016 - 2020
	The Kiribati Gender Equality and Women's Development (GEWD Policy) 2019-2022
Subnational	Line and Phoenix Islands Integrated Development Strategy 2016-2036
	The Phoenix Islands Protected Area Management Plan 2015-2020

Field mission

A field mission was undertaken to Kiritimati and Tarawa from 15-28 August 2023. Workshops and semi-structured interviews were conducted with a wide range of stakeholders spanning all sectors, including MFMRD, MELAD, Ministry of Line and Phoenix Island Development (MLPID), Ministry of Commerce, Tourism, Industry and Cooperatives (MCIC), police, Island Council, Tourism Authority of Kiribati, MAF exporters and collectors, other fishers and community members. Questionnaires were distributed to stakeholders to gauge perceptions about statements relating to various aspects of the status of the fishery and its management, using a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). A detailed description of the stakeholder consultations undertaken during this mission is presented in the report titled Stakeholder Engagement Report submitted as Deliverable 3 under this assignment.

In parallel, the MEP team visited and observed all stages of the aquarium fish production cycle, from landing through holding and packaging facilities, to export.

Annex 2: Summary of relevant legal and regulatory instruments

Title	Summary
Fisheries Act 2010	• Promotes sustainable management of the fisheries of Kiribati, the development and use of fisheries resources for the benefit of Kiribati (including the recovery of fees that reflect the value of the resource), and protection of fish stocks and the marine environment. • A Defines “fishery” as a stock of fish or fishery operations that can be treated as a unit for purposes of sustainable development and management, taking into account cultural, geographical, scientific, technical, recreational, economic and other relevant characteristics. • Sets out provisions for the development of fishery management plans, licensing requirements, powers of MCS, penalties, data and information reporting, etc. • Sets out provisions for “designated fisheries” that (a) are important to the national interest; and (b) require management and development measures for effective conservation and optimum utilisation. • Provides a definition of “fishing vessel” exempts “sailing boat or paddling canoe of native design” and “boat, punt or barge having an overall length of less than 7 metres, whether powered by an engine or not”. • Part 5 outlines licence requirements. While penalties are clearly presented for “local fishing vessel”, “foreign fishing vessel”, “fish processing establishment”, and “aquaculture”, no penalties appear to be defined for fishing in the absence of a licence by shore fishes or by local fishing vessels meeting the exemption criteria above
Fisheries (Amendment) Act 2015	• Repeals the Fisheries Act 2010 • Largely focussed on improving definitions and clarity, with few substantive changes. • Of potential relevance to Kiritimati’s MAF is the addition of Section 14.A “General Prohibitions” which introduces penalties for fishing within a designated marine protected area or reserve.
Fisheries (Amendment) Act 2017	• Repeals Fisheries (Amendment) Act 2015 • Changes are largely applicable to RFMO fishing, with minor exceptions. • Adds a definition of “unreported fishing” which encompass small-scale fishing and is hence applicable to Kiritimati’s MAF. • Adds a definition of “serious fishing violation” which includes (a) fishing without a valid licence, authorisation or permit by Kiribati; (d) failing to maintain accurate records of catch and catch-related data as required by Kiribati; (g) fishing in a closed area, fishing during a closed season, or fishing with, or after attainment of a quota established by Kiribati. • The Amendment enhances the Minister’s powers to manage fisheries, including via Article 4. (2) The Minister is responsible for the management, conservation and development of all fisheries (i.e., not only designated fisheries) within the jurisdiction of Kiribati; and (3) The Minister, may declare, from time to time, either a total allowable catch or total allowable effort, or both, for fisheries in Kiribati waters.
Fisheries (Amendment) Act 2021	• Repeals Fisheries Amendment Act 2017 • Introduces several new definitions and strengthens provisions for sustainable development and community-based fisheries management. • Introduces definition for "small scale fishing vessel" meaning a vessel of less than 7 meters that are operated by motorised engines and are built purposely for fishing, supporting bigger fishing vessels or fish carriers. • Introduces definition for "sustainable development" meaning a process for finding a balance between development, ecological well-being and human well-being that is based on maximum sustainable yield and the carrying capacity of any marine ecosystem, that avoids overprotection of

Title	Summary
	the resources that will lead to an inefficient resource turnover, prevent rational development and promote optimum utilisation of the marine resources. • Introduces definition for "sustainable use" which means (i) maintaining the potential of marine or fisheries resources to meet the reasonably foreseeable needs of the current and future generation; (ii) avoiding, remedying or mitigating any adverse effect of fishing and harvesting of other marine resources; or (iii) conserving, using, enhancing and developing marine and fisheries resources to provide for I-Kiribati people, social, economic and cultural wellbeing. • Enforces powers of the Minister to (Article 4.2.n) collect and share, in a timely manner, complete and accurate data concerning fishing activities on, inter alia, vessel position, catch of target and non-target species and fishing effort. • Establishes precautionary principles in Kiribati's fisheries legislation, including Article 4.3.b "A lack of full scientific certainty regarding the extent of adverse effects or a threat or damage to fisheries and marine resources existing in Kiribati is not to be used to prevent or avoid a decision being made to minimise the potential adverse effects or risks of that threat or damage". • Introduces new Article 11A on "Requirements for small-scale fishing vessel engaged in fishing" which includes licensing requirements and penalties.
Local Government Act 1984	• Outlines provisions for establishment, operation and functions of Local Government Councils. • The Fisheries Act protects Customary Rights. When fishers are members of Community Groups (as defined under Article 7.18.1 of the Fisheries Act), management plans may need to be promulgated via bylaws established by Local Government Council. No stakeholders of Kiritimati's MAF appear to meet this definition.
Local Government (Amendment) Act 2013	• Repeals Local Government Act 1984 • Amendments do not appear to be substantively relevant to this project.
Coastal Fisheries Regulation 2019	• Establishes for coastal fisheries: (i) non-compliance penalties, (ii) licensing and permit provisions; (iii) provisions for size limits; (iv) provisions for the establishment of community-based fishery management plans.
Notice of Designated Fishery 2021	• Lists those designated fisheries that have been identified as is important to the national interest, and hence are subject to management control by the Minister. • Includes several marine aquarium fish spp. (including *C. loriculus*). • As a consequence, strengthens authority of MFMRD to develop and enact a management plan for Kiritimati's MAF.
Fisheries (Processing and Export) Regulations 1981	• Outlines provisions for quality standards and for export licences and fees • Applies to processed products, but does not appear to apply to live exports.
Fish Export Regulations 2012	• Establishes Competent Authority for fish processing and export. • Applies to fish products intended for human consumption (Article 3)
Environment (Amendment) Act 2007	• Outlines provisions for Environmental Impact Assessment and licence fees for Environmentally Significant Activities. • Defines activities using significant natural resources, including the "collection of fish to be used as pet fish".
Closing Lines Regulations 2014	• Establishes coordinates for closing lines (i.e., archipelagic waters dividing line as per UNCLOS Articles 9–11 & 50) • Provides the coordinates relevant to Marine Zones Act 2011

Title	Summary
Marine Zones (Declaration) Act 2011	• Establishes maritime zones and boundaries (i.e., territorial sea, archipelagic waters, EEZ, etc) • Establishes that any law in force in Kiribati, including the common law, shall apply in its archipelagic waters, regardless of their depth or distance from the coast.
Domestic Fishing Zone Limit Regulations 2015	• Defines maritime zones for domestic fishing. • Applies to "domestic fishing vessels" as defined by the Fisheries Act (i.e., Kiribati flagged purse seine or longline landing catches in Kiribati)
Contiguous Zone Outer Limits Regulations 2014	• Establishes coordinates for contiguous zone (i.e., 24nm from the baseline). • Beyond the near-shore areas that are targeted by the MAF, but relevant as marks the seaward extend of relevant regulations (e.g., Domestic Fishing Zone Limit Regulations 2015).
Shark Sanctuary Regulations 2015	• Prohibits all catching, possessing and trading of sharks or their derivative products for all *Hexanchiformes, Squaliformes, Pristiophoriformes, Squatiniformes, Heterodontiformes, Orectolobiformes, Lamniformes and Carcharhiniformes*.
Phoenix Islands Protected Area (Amendment) Regulations 2008	• Establishes coordinates/ boundaries of Phoenix Islands Protected Area based on legal authority provided by Article 43(1) and 86(1) of the Environment Act 1999. • Applies only to the Phoenix Island group, and not to Kiritimati/ Line Islands.
Phoenix Islands Protected Area (Amendment) Regulations 2014	• Repeals Phoenix Islands Protected Area (Amendment) Regulations 2008
Phoenix Islands Protected Area (Amendment) Regulations 2017	• Repeals Phoenix Islands Protected Area (Amendment) Regulations 2008
Seabed Minerals Acts 2017	• Addresses seabed mineral exploration and extraction • Potential relevant to the MAF in two main areas: (i) spatial planning and avoidance of mineral licences being granted for coastal areas that are fishing areas or designated protected areas; (ii) mitigation, clean up and compensation associated with any incidents (e.g., ship groundings, mineral spills, environmental impacts, etc.)