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Title:	Future priorities for Pacific aquaculture development
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Summary/short description/key points:

The Coastal Fisheries and Aquaculture Programme (CFAP) provides aquaculture technical and management support and assistance to members. Emerging issues and current constraints such as the global COVID-19 pandemic, have affected the way technical support is delivered to members. However, there has been an increase in members' capacity built in certain areas, such as setting national priorities on species with suitable traits for aquaculture, as well as government support to improve infrastructure. New technologies have opened new aquaculture options, innovations, and diversification. There is an increasing need for examining aquaculture priorities to be better positioned in the near future to be more resilient to climate change impacts and to adapt to the post-COVID world.

Recommendations:

Given the recent development in aquaculture, new emerging issues and constraints in a changing world, and new areas likely to be needing assistance to build resilience and capitalise on opportunities and trends, members are invited to discuss and then:

- a. **endorse** the approaches proposed in this paper for SPC to address members' on-going and immediate-term aquaculture sector needs and priorities as the region transitions to the post-COVID pandemic era;
- b. **determine** whether there is a need to develop a new regional strategy on aquaculture that can guide and support the aquaculture aspirations of members, building on the region's strengths and experiences; and
- c. subject to (b) above being affirmative:
 - i. **endorse** the proposed process to identify and prioritise the region's medium and longer-term (5–10 years) aquaculture needs and priorities in the post-COVID era; and
 - ii. **suggest** the broad topic areas that should be included in the Terms of Reference of a regional aquaculture review.

Future priorities for Pacific aquaculture development

Background

1. Aquaculture contributes to food security and income generation. Culturing of lower value fish for food security is gaining higher priority in the Pacific region. Species such as tilapia fish (*Oreochromis niloticus*) and milkfish (*Chanos chanos*) production are promoted as a means to help meet the projected supply gap for fish in some countries and territories. Pearls, seaweed, marine ornamentals, marine shrimps and finfish culture are successfully farmed as important cash crops, contributing significantly to improving livelihoods development in most Pacific Island Countries and Territories (PICTs).
2. Unique characteristics of PICT aquaculture up to the present time include:
 - a. Small production and value by global standards, despite large areas of quality habitat. This can be attributed in part to fragmented and isolated geographies, small domestic markets, and remote locations far from Pacific-rim export markets for aquaculture products, and
 - b. Despite being a region of high biodiversity, few indigenous species have been domesticated and it is a long process to do so. Successful commercial aquaculture in PICTs has instead relied heavily upon introductions and technology transfers from other regions of already domesticated species of shrimp, prawns, finfish, seaweed, etc., which are globally traded, and for which ready markets exist.
3. The COVID-19 global pandemic has disrupted markets and supply chains for almost all primary production among PICTs, including aquaculture. Enterprises are struggling to make sense of the changed industry conditions. National food security needs and priorities have also changed.
4. It is timely to take stock of where PICT aquaculture is now, and what directions it should take from here. We can either wait for the world to return to “normal”, or we can regard a world altered by the pandemic as the “new normal”. The whole world has changed, and not just its climate. What changes must aquaculture now take, to remain resilient and to meet the expectations of Pacific peoples?

Strategic assistance delivered through FAME

5. Provision of technical support and assistance by FAME to SPC members in the region is in line with Objective 3 of the FAME Business Plan “*Support the sustainable development of aquaculture*”, with the following sub-objectives:
 - Enhanced regional and national capacity in aquaculture policy and planning to establish clear priorities for aquaculture meeting current and future needs. This includes supporting members to develop and implement national aquaculture development and management and strengthen national aquaculture legislation.

- Provide technical and analytical support for aquaculture to support production and economic sustainability. This includes strengthening technical and capacity limitations to address constraints in feed, seed and broodstock management, support private sector engagements and improve socio-economic assessments in aquaculture.
- Enhance the management of aquatic biosecurity risks, through the implementation of the regional framework on aquatic biosecurity.

Main limitations and constraints faced by the region

6. A central premise of SPC's support and assistance, summarised above, has been to work mainly with the aquaculture commodities that members already have in production. Interventions are aimed at improving production practices, increasing business skills, and supporting responsible policies and planning, to take these existing aquaculture commodities up to the next level. The interventions target the challenges traditionally faced by the aquaculture sector in PICTs, of which the major ones are:
 - Transport limitations. Extremely high shipment costs in the Pacific add considerably to the cost of producing and exporting aquaculture products. Limited internal transport services restrict opportunities to grow perishable products in remote locations, and limited international air connections inhibit continuity of supply to export markets. Transport arrangements dictate that species cultured for export need to be of high value and low weight. Alternatively, the products must be non-perishable (dried products such as seaweeds) or frozen (blue shrimp) so that they can be shipped easily.
 - Availability of farm inputs (feed, seed, equipment) is a major constraint. Several PICTs rely heavily on imported seed and feed from commercial hatcheries and feed manufacturers in Asia, and expensively procure equipment from international suppliers because none operate locally.
 - Limited aquatic biosecurity capacity in aquatic disease surveillance and management, though this is improving in a few PICTs.
 - Limited access to finance for aquaculture investment, or to financial services such as insurance for infrastructure or crops, or (in remote locations) to any kind of banking services at all.
 - Limited domestic markets. Local markets for the fresh products of aquaculture in the Pacific are relatively small, except from a few exceptions (e.g., PNG, Fiji, Vanuatu, New Caledonia, and French Polynesia). For this reason, any large aquaculture developments in the Pacific catering to the trade in seafood with economies of scale will depend heavily on export markets.
 - Limited policies and regulatory frameworks to govern aquaculture, and unclear processes around marine and land tenure for aquaculture sites. Legal systems that never contemplated aquaculture need to be updated. Acquisition of new technologies to utilize offshore sites should be investigated.

New emerging issues and constraints

7. Adaption to the projected, and in some cases imminent, changes in climate are needed by our aquaculture sectors. Several are vulnerable to increased temperatures (seaweed, pearl, giant clam), ocean acidification (all organisms that form shell or bone), sea level rise (pond-based mariculture on coastal margins), and increased intensity of cyclones (all aquaculture facilities and infrastructure).
8. There will be some winners under climate change, particularly in freshwater aquaculture which will benefit from projected SW Pacific rainfall increases. Vulnerable forms of aquaculture, such as mariculture, can invest in strategies to increase their resilience to the projected climate change impacts. Some forms of aquaculture can themselves help to address climate change, such as species that sequester carbon (seaweeds, bivalve molluscs). Taken together, this is aquaculture that is “climate-smart” and worthy of further investigation.
9. The global COVID-19 pandemic has caused disruption of aquaculture markets and supply chains. Loss of tourist arrivals, and the downturn in export demand for “luxury” items, has forced many aquaculture enterprises to undergo a “COVID” pivot, characterised by increased domestic market focus and shortening of supply chains. Some of our region’s leading aquaculture enterprises are now barely hanging on. Pandemic control measures, like lockdowns, have created new food security concerns, but also opportunities such as renewed interest in urban food production. Technical assistance provided by SPC to members has also been severely affected. This includes restrictions on undertaking aquatic risk assessments and testing, face-to-face attachment training, on-farm aquatic biosecurity assistance, direct support to farm clusters and enterprises, difficulty to undertake due-diligence validation assessments on enterprises applying for project grants, limited on-farm research on feed and broodstock, hatchery and farm design and technology improvements affected due to travel restrictions.

What is the new aquaculture future for PICTs?

10. To ensure long term sustainability of PICT aquaculture, the following areas should continue to be addressed:
 - Aquatic biosecurity: Pacific States have very limited capacity to detect and manage aquatic diseases, therefore there is a strong need for responsible practices to ensure that Pacific biodiversity and health of animals and humans is protected.
 - Policy and governance: there are a need for clear policy direction to be developed at the national levels to ensure sustainability in aquaculture developments, and clarity in the pathways to establish aquaculture ventures.
 - Public private partnerships: the roles for public and private sector stakeholders in aquaculture needs to be clearly defined, in terms of direct involvement in aquaculture development, versus creating an enabling environment for private sector investment (recognizing that some PICTs have very weak private sectors) and managing to uphold the public interest in use of resources for aquaculture.

- Input supply (feed, seed, and brood stock): these remain key challenges facing aquaculture in the region particularly in remote coastal and inland communities. For instance, shrimp hatcheries from Vanuatu and Fiji rely on post larvae from commercial hatcheries in Thailand and have been severely restricted during the current COVID-19 transport restrictions.
- Use of national capacity: in several members contracting national consultants, utilising national government staff and sub-regional SPC offices to support and deliver trainings in areas where such expertise exists nationally. This has been done as a COVID-19 travel-restriction response for delivery of SPC support in areas such as business literacy trainings, leadership and gender trainings, marketing studies, on-farm mentoring, and extension support. Alternative online approaches, such as virtual consultations via platforms like Zoom, video recorded demonstration trainings, have been explored and utilised to deliver capacity assistance to members.

Immediate aquaculture priorities

11. Based on consultations with members leading in to the 2021 RTMCF (now postponed until October 2021), common regional themes emerged from the stated national level needs. SPC can respond to these needs via the following proposals for immediate term aquaculture priorities.

Proposals for aquatic biosecurity:

12. Aquatic animal diseases are a significant threat to the sustainability and productivity of aquaculture. Potential threats for transboundary diseases spreading cannot be over-looked. PICTs have very limited capacity to detect and manage diseases of aquatic organisms. There are currently no formal aquatic biosecurity networks in place to enable timely detection of disease or do deal with outbreaks should they occur. Nationally, the centralisation process requires designation and upgrade of certain key infrastructure to undertake these roles. Main actions to be considered:
 - Identify members with the capacity to undertake the role as a sub-regional aquatic biosecurity hub to strengthen aquatic biosecurity capacity sub-regionally.
 - Construct/upgrade aquatic biosecurity infrastructure to support regional or sub-regional roles and to increase capacity in biosecurity.

Proposals for aquaculture inputs:

13. Regional collaborative approaches towards aquaculture inputs (seed, feed, broodstock) can achieve economies of scale through centralisation of brood stock maintenance, post-larvae production, and feed manufacture. Nationally, the centralisation process requires designation and upgrade of certain key infrastructure to undertake these roles, including improvement of their ability to support biosecurity roles. Main actions to be considered would be:
 - Establish central distribution centres (regional or sub-regional hubs) for brood stock, seed and feed among PICTs for selected priority species, to achieve economies of scale.

- Construct/upgrade aquaculture infrastructure to support regional or sub-regional roles and to increase capacity in biosecurity.
- Increase capacity in broodstock selection and maintenance of genetic quality and fry production.

Longer-term aquaculture priorities

14. New and potentially game-changing areas of PICT aquaculture that will need attention in SPC FAME's work over the next 5 to 10 years, about which the views and priorities of members need to be sought, include:
 - What major new PICT aquaculture potential could yet be unlocked, through monitoring and adoption of international trends and technologies, or by successfully addressing constraints that so far have restricted some forms of aquaculture (such as edible shellfish) to insignificant levels of production? New technologies may be able to open up new aquaculture environments, particularly by moving offshore to reduce environmental, marine tenure, or multiple coastal user issues. New partnerships can be formed to bring innovation and diversification to PICT aquaculture.
 - What PICT aquaculture commodities and practices can be deemed "climate-smart"? What are the priorities for adoption or adaptation of aquaculture that is climate change resilient, that may even benefit from projected climate changes, or are worthy of investment to help to combat climate change?
 - What should PICT aquaculture look like in a post-COVID-19 world? What are the new priorities for aquaculture, in food security and in livelihoods?

Proposal for longer-term priorities:

15. Undertake a review of the aquaculture sector needs in the region, over a medium- to long-term (5–10 year) horizon, with the aim to refresh and, if necessary, re-set the future priorities and direction of CFAP's aquaculture support to members.
16. The proposed process and timeline for this review of PICT aquaculture needs and priorities is to conduct the review during this year, 2021, with preliminary results to be discussed as an agenda item during RTMCF4 in October, to be finalised and reported to HoF14 next year (2022) for consideration.

Recommendations:

17. Given the recent development in aquaculture, new emerging issues and constraints in a changing world, and new areas likely to be needing assistance to build resilience and capitalise on opportunities and trends, members are invited to discuss and then:
 - a. **endorse** the approaches proposed in this paper for SPC to address members' on-going and immediate-term aquaculture sector needs and priorities as the region transitions to the post-COVID pandemic era;

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