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Summary/short description/key points:

This paper outlines key work priorities for 2021 for the Pacific Community (SPC) Fisheries, Aquaculture and Marine Ecosystems (FAME) Division. Longer-term strategic direction and emerging work areas are also identified. This paper also outlines fisheries and aquaculture elements of a recovery plan to address impacts of COVID-19 in the region. FAME notes that work programmes will continue to evolve with the dynamic COVID response and recovery around the region.

Recommendations:

Members are invited to:

- review these priorities and long-term strategic direction of emerging work areas,

- make suggestions where necessary, and

- endorse the priorities and long-term strategic direction of emerging work areas.

FAME priorities and future developments

Introduction

1. The implementation of the _Business Plan_ for the Fisheries, Aquaculture and Marine Ecosystems (FAME) continue*s* through the end of 2021 to support the recovery from the shocks of 2020, and in line with SPC-wide _Transition Plan_ for 2021 as approved at the 50th CRGA in November 2020. It sets out the higher-level outcomes expected from the Division's work, goals, objectives, and results for the period 2016–2021. FAME's overall goal is: *That the fisheries resources of the Pacific region are sustainably managed for economic growth, food security and environmental conservation*.

2. FAME works towards this goal through six Divisional objectives:

   1. Enhance data collection and provide data management services for fisheries and marine ecosystems;

   2. Provide analyses and advice for evidence-based fisheries management;

   3. Support the sustainable development of aquaculture;

   4. Identify diverse and sustainable marine-based livelihood options for fishing communities;

   5. Provide, and facilitate access to, fisheries information; and

   6. Support capacity development in fisheries and aquaculture among PICTs.

3. These objectives provide the framework for the development of work plans for the main organisational units of FAME, the Coastal Fisheries and Aquaculture Programme (CFAP) and the Oceanic Fisheries Programme (OFP), supported by the Information Section and Monitoring, Evaluation and Learning (MEL) units within the FAME Director's Office.

4. COVID-19 has resulted in substantial supply chain disruptions and the fisheries and aquaculture sectors have been seriously affected. Ensuring sustainable management of fisheries is essential in the region to ensure continuity of economic growth, livelihoods and food security. In coastal fisheries, de-urbanisation, and loss of income/jobs in the tourism sector, and a general economic downturn are putting additional stresses on already heavily exploited coastal fisheries resources (high demand, limited supply, limited management). The aquaculture sector is impacted through limited access to feed and fingerlings, and loss of income from high valued species such as giant clams for aquarium markets, pearls and shrimps with the collapse of tourist markets and limited export opportunities. Communities are relying more than ever on coastal fisheries and local aquaculture resources, with an increasing interest in small scale low value aquaculture fish such as tilapia and milkfish for food security and livelihoods.

5. The impact from COVID-19 in 2020 has contributed to significant shifts in how FAME delivers its work priorities to member countries. The shift was to adapt to a new norm while continuing to deliver to members' needs and priorities. Member needs and priorities also shifted when countries and territories imposed strict restrictions that affected economies and livelihoods of citizens. Member needs and priorities shifted some of FAMEs work priorities outlined in 2020 (HoF12 - WP2), in particular a significant shift to online delivery models. FAME will continue to deliver on the key priorities with a specific focus on COVID-19 recovery in 2021 and beyond.

Long-term strategic direction and emerging work areas

6. FAME has commenced framing the next five years of support to members through a new five-year *FAME Business Plan*, which will be informed by feedback from members, FAME's internal learning process, the SPC Strategic Plan 2021+, and the 2050 Strategy for Blue Pacific. The the business plan will be aligned with SPC's futures thinking process, in identifying key drivers of change and foresight thinking. Regional frameworks such as the Roadmap to Sustainable Fisheries and New Song for Coastal Fisheries will also guide the new business plan.
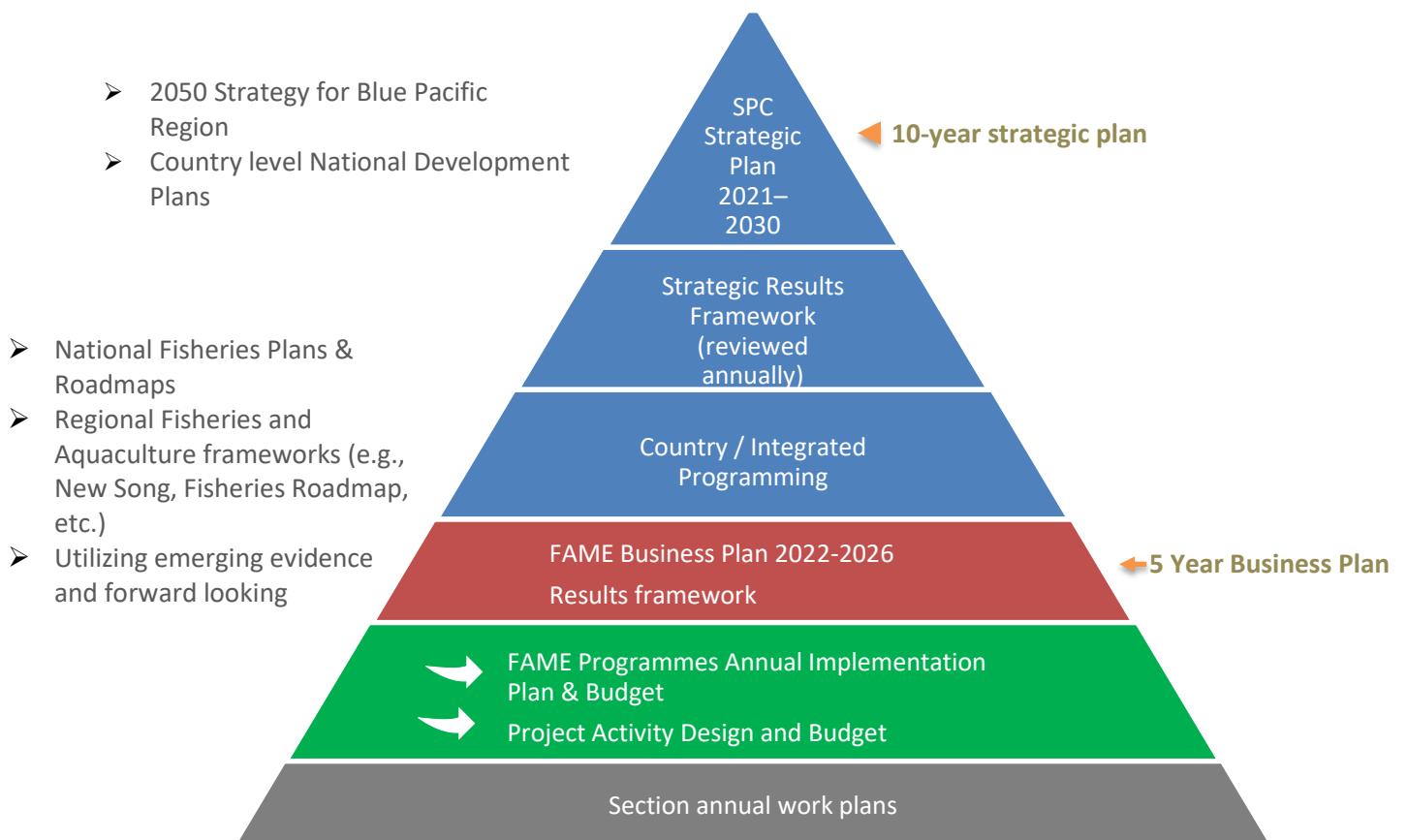
> ➢ 2050 Strategy for Blue Pacific Region
> ➢ Country level National Development Plans

> ➢ National Fisheries Plans & Roadmaps
> ➢ Regional Fisheries and Aquaculture frameworks (e.g., New Song, Fisheries Roadmap, etc.)
> ➢ Utilizing emerging evidence and forward looking

SPC Strategic Plan 2021–2030 ◀ **10-year strategic plan**

Strategic Results Framework (reviewed annually)

Country / Integrated Programming

FAME Business Plan 2022-2026 ◀ **5 Year Business Plan**
Results framework

➡ **FAME Programmes Annual Implementation Plan & Budget**
➡ **Project Activity Design and Budget**

Section annual work plans

Figure 1: Roadmap of how FAME's work programmes fit into broader SPC, regional and member priorities

7. FAME serves member needs through generating science and knowledge, innovation, enhancing individual and institutional capacity, and building trusted relationships through culturally and contextually responsive ways to support sustainable management of regional and national fisheries and aquaculture resources.

8. The fisheries and aquaculture sector in the region is undergoing rapid changes due to both regional dynamics and global trends related to climate change, COVID-19, food security, population growth and shifting of the geopolitical landscape. These changes require FAME to have strategic foresight and to position itself to serve the needs of members and navigate these challenges in support of national priorities, regional frameworks and SPC's strategic plan.
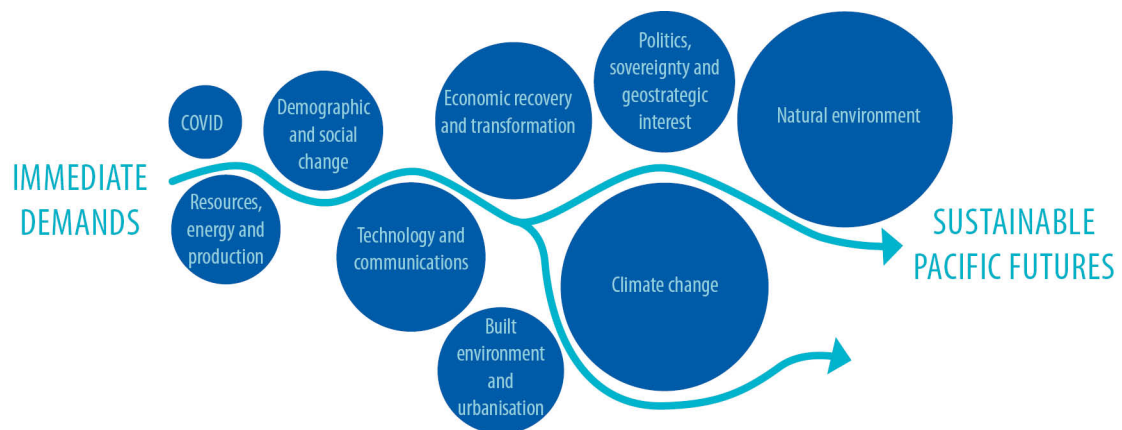

Figure 2: Navigating forces of change in the Pacific

9. FAME's long term strategic direction for the next 5 to 10 years will continue to adapt, develop and optimise its structure as a division, its work as a leader in research and innovation, capacity building and provision of science and technical advice to members and stakeholders. Some of the emerging work areas include:

- Development of **interactive web portals** and **data visualization tools** to enhance safe and secure access of fisheries and aquaculture information that will enable better science utilization by member countries and stakeholders.

- Continue to build the region's skills sets by scaling up **national science capacity building** efforts. Building on the Pacific Island Fisheries Professional programme with the examination of the feasibility of short-term placement and mentorship opportunities. Through the development of stronger links with regional Universities and partners, the aim would also be to develop options for studies that lead to formal qualifications and the development of new skills relevant to fisheries science.

- Investment in the development of **new tools**, **next generation software** and the application of **Artificial Intelligence (AI)** to further enhance the efficiency in acquiring fisheries data, quality control, analysis and advancement in stock assessments that meets specific needs of the region.

- **Plans for strategic scientific assets and infrastructure** to deliver the information needed by members across oceanic and coastal fisheries. This includes potential expansion of the marine specimen lab (see IP9) and consideration of an ocean science research vessel for the Pacific (see IP7), both of which will be presented during the HoF13 afternoon information session on Day 2. They will be discussed in HoF13 plenary as a component of FAME's work on climate change (see WP6) on Day 4.

FAME priorities and future directions of FAME Director's Office

10.   The FAME Director's Office provides general oversight of the Division's work, supports regional and international cooperation and contributes on issues relating to FAME's work, develops funding and partnership opportunities, and ensures that FAME is integrated with the rest of SPC through involvement in oneSPC planning and decision making. In addition, the Office incorporates two functions that work across the Division's two substantive programmes – the Information Section, and the MEL Unit (including communication and programme planning).

Information Section

11.   The Information Section supports objective 5 of the FAME Business Plan. In summary, the Section develops information and knowledge products in collaboration with all other FAME sections, as well as with, and for, all members. It also collects, organises and disseminates relevant fisheries information, mainly to assist members achieving SDG 14: Conserve and sustainably use the oceans, seas and marine resources.

12.   The priority work being conducted by the Information Section includes:

- **The production of reference newsletters and information bulletins** that provide a current look at some of the most exciting research and case studies on marine-related topics of interest to the region: the tri-annual *SPC Fisheries Newsletter* and two yearly Information Bulletins (*Women in Fisheries* and *Beche-de-mer*).

- **The production of scientific and technical reports** to assist members and other FAME sections, as well as other paper-based information tools such as posters, brochures, leaflets and manuals.

- **The provision of fisheries-related information in response to specific needs** expressed by members or as a response to needs identified at the regional level, using all available media, including Internet, web applications, social media, etc.

- **The production of tailor-made information for communities**, in line with the New Song recommendations, using a wide range of materials combining print with more interactive tools, such as videos, animated films dubbed in local languages and social media.

- **The production of training videos** as pre-learning tools for online workshops aiming at reinforcing capacity of Pacific Island fisheries officers and associated networks.

- **The elaboration of national information strategies** in collaboration with member countries and territories to refine their communication strategies to enhance community engagement, elevate local voices, and support social and behaviour change efforts. The objective is to significantly increase the delivery of information on sustainable coastal fisheries management to communities. This approach has been undertaken in collaboration with the LMMA Network for the Melanesian countries.

13. In addition to the continuation of the above, possible key <u>new</u> directions for the Information Section include:

- **Facilitate the development and curation** of member country' and territory's fisheries-related scientific and technical knowledge products.

- **Organise training** for Pacific Island fisheries science students and fisheries officers to improve their communication skills, including training in science writing for the public as well as production of information tools.

Monitoring, Evaluation and Learning Unit

14. The FAME MEL Unit supports the FAME Division in MEL, donor and corporate reporting, project scoping and design, strategic foresight and planning, resource mobilization, facilitation of learning from within FAME and broader SPC through strategic planning and learning.

15. Priority work areas for FAME MEL unit in 2021 and beyond includes:

- **Internal MEL support** is provided to enhance evidence generation on FAME's work areas and communicate to members and stakeholders, while improving tools and systems, building MEL capability and capacity within FAME. This includes supporting FAME's plans in post-COVID recovery and emerging work areas.

- **Integrated MEL in One SPC:** The MEL Unit supports and works with the broader SPC MEL focal points led by the Strategic Planning and Learning section in delivering integrated MEL services.

- **Communication:** Priorities for communication include the implementation of a communication strategy for the Division, improved visibility and communication of FAME's work areas to members and partners, enhancing communication capacity of FAME staff and ongoing collaboration and network with CROP agencies, donors and stakeholders. As part of post-COVID recovery, this work also includes cohesive messaging on fisheries and aquaculture in the region.

- **Programme Planning:** In 2020, a programme planning expertise was added to FAME. Priorities of this work includes facilitation, coordination and oversight of high-level stakeholder engagements – such as the SPC Heads of Fisheries Meetings and the Regional Technical Meeting on Coastal Fisheries (RTMCF). This work also includes the development of FAME Business Plan and corresponding programme work plans.

- **Pacific Fisheries Leadership Programme** (PFLP): Ongoing programme management and MEL oversight for the PFLP.

Key priorities and future directions of the Coastal Fisheries and Aquaculture Programme (CFAP)

16.   The Coastal Fisheries and Aquaculture Programme (CFAP) provides science and technical support to Pacific Island Country and Territory (PICT) governments and administrations to enhance the management of coastal fisheries, and the sustainable development of aquaculture and nearshore livelihoods. CFAP supports all six of the FAME Business Plan objectives.

17.   CFAP assists governments and administrations to develop scientifically informed and socially achievable coastal fisheries management policies and procedures (national, sub-national and community-based). CFAP provides support for sustainable aquaculture, including planning, research and development, aquatic biosecurity and trade, for Pacific island governments, the private sector and other stakeholders. CFAP assists in developing sustainable nearshore fisheries in Pacific island countries and territories to provide for food security, sustainable livelihoods, promote economic growth, assist with climate change adaptation, and over the last year, assisting members with the rapidly evolving challenges to coastal fisheries and aquaculture due to the COVID-19 responses and constraints in the region.

18.   CFAP work priorities are guided by members' requests and the frameworks and strategies in the "New Song for Coastal Fisheries – Pathways to Change: The Noumea Strategy", the coastal fisheries component of the "Future of Fisheries: Regional Roadmap for Sustainable Pacific Fisheries" and the "Regional Framework on Aquatic Biosecurity"[1]. Activities are supported by key donors, including Australia, New Zealand, European Union, Sweden and the United States, and implementation is frequently in partnership with non-government organisations, civil society organisations, communities, universities and, increasingly since COVID-19 related restrictions, locally and regionally based consultants.

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[1] [Links: http://purl.org/spc/digilib/doc/b8hvs; https://fame1.spc.int/fr/publications/roadmap-a-report-cards; and http://purl.org/spc/digilib/doc/23nkb]

19.   CFAP works in partnership with other SPC Divisions (Human Rights and Social Development; Land Resources; Climate Change and Environmental Sustainability Programme (including PROTEGE); Statistics for Development; and Geoscience, Energy and Maritime), and collaborates with a wide range of universities, international, regional and local NGOs, and other CROP agencies (SPREP; FFA) to deliver the CFAP work programme in an integrated and collaborative manner.

Coastal Fisheries and Aquaculture Programme key priorities for 2021

20.   The Coastal Fisheries and Aquaculture Programme has continued to adapt our planning and implementation support to better respond to the changing circumstances in the region resulting from the impacts of COVID-19 constraints. In 2021 we have built on the lessons learned over the last year during the 'response phase' of the COVID-19 pandemic, and worked to identify appropriate and effective approaches and priorities as the region transitions to the 'recovery phase' during 2021 and beyond. The COVID-19 related travel restrictions, lockdowns, and other national actions to protect members from the coronavirus, have resulted in significant economic and social impacts which in turn have dramatically increased the dependence on coastal fisheries resources and aquaculture for food security, livelihoods and economic health. To support members, CFAP has shifted our core scientific, management and technical support to new online and video-based training courses, technical web/tablet modules and apps for data collection, and direct technical and management advice and mentoring by videoconferencing. CFAP will continue to regularly review, re-evaluate and modify our support to members by providing prompt, targeted and relevant support efficiently and effectively.

21.   The 4th Regional Technical Meeting on Coastal Fisheries (RTMCF4) was postponed from November 2019 to March 2021 due to COVID-19 travel restrictions in the region. Just prior to the rescheduled RTMCF4 in March 2021, a COVID-19 related full lockdown in New Caledonia required the virtual meeting to be postponed again. Due to the extremely full regional fisheries meetings calendar in 2021, the RTMCF4 had to be rescheduled to the 12th – 19th October 2021. This realigns it with the original October/November RTMCF timing. The overarching theme of RTMCF4 is to discuss and address some of the main technical issues affecting coastal fisheries and aquaculture in support of better science-based resource management and the equitable access to resources, by capturing lessons learned from the 'response phase' of the COVID-19 pandemic, and identifying approaches and priorities as the region transitions to the 'recovery phase' in 2021 and beyond. This is covered in more detail in HoF13 Working Paper 7 and Agenda session 16.

22.   As endorsed by HoF12 and the 1st Regional Fisheries Ministers Meeting in 2020, RTMCF4 will include the first two-day Community-Based Fisheries (CBF) Dialogue session convened by, and focused on, Civil Society Organisations (CSO) and Non-State Actor (NSA) participation. The purpose of the CBF Dialogue is to provide the CSO and NSA community with an opportunity to exchange and offer information, advice and key needs, through the RTMCF, to Heads of Fisheries, to assist with informing Leaders on priority issues and needs associated with the sustainable use of coastal

fisheries resources. It will also provide an opportunity to share experiences and lessons from community-based initiatives to strengthen efforts to maintain productive and healthy ecosystems and their associated fisheries resources that are critical to the wellbeing of coastal communities.

23. Organisationally, the work of the Coastal Fisheries and Aquaculture Programme currently falls under two sections: Aquaculture; and Coastal Fisheries Science, Management and Livelihoods (CFSML). These sections are supported by two cross-cutting areas: Coastal Information and Data – providing database and information service support and advice; and Coastal Fisheries Economics – providing economic advice, analysis and assessments of fisheries and aquaculture data and projects. In Q3 2021, the CFAP will be restructured into three sections: Aquaculture; Science; and Coastal Fisheries Management and Livelihoods.

24. In addition to the ongoing Australian and New Zealand governments' programme funding to FAME, and the coastal component of the current European Union/Sweden funded PEUMP Programme, in mid-2021 the next 5-year phase of the NZ Government funded activity for 'Food and Economic Security through Coastal Fisheries and Aquaculture' will commence, as will the 5-year USAID-funded 'Pacific Coastal Fisheries Management and Compliance' project. Linked to the NZ Government activity will be Australian Government funding to CFAP to assist with regional support for coordinating community-based fisheries. CFAP is working on the development of an interactive donor-project 'mapping' tool to clearly indicate what activities are actively supported by which donor(s), and to highlight where there are still gaps in support for priority activities.

Coastal Information and Data

25. The priority work being conducted by the Coastal Information and Data team includes a concerted effort and collaboration with the CFSML and Aquaculture sections to further develop the online/web tools and apps to facilitate remote support for members:

- Support to PICTS through developing formal online training courses; providing training on market/landings/socio-economic surveys using Ikasavea and web modules; training on the Monitoring, Control and Surveillance module; and on the Reef Fisheries Integrated Database (RFID) and other web-based modules. Responding to member requests for country specific database support and training, including addressing legacy databases and migrating and decommissioning old databases.

- Small-scale fisheries catch data collection through the use of photos and tablet applications (TAILS and Ikasavea). Further development is underway to facilitate the synchronisation of data between offline and online tools, and to provide access to outputs and results to participating members.

- Using artificial intelligence to analyse photos of fishes and invertebrates on a measuring board or on a mat to semi automatise data entry by predicting species, reading scales, and calibrating

images for length measurements. As more images are acquired and validated, models will be able to recognize a larger number of species and be tuned to various settings

- A web/tablet module is been further developed for invertebrate catch data specificities of invertebrate fisheries (seasonality and fishing habits; specific types of measurements). It will complement the online module for underwater surveys.

- PICT specific fisheries and aquaculture related documents have continued to be scanned and remote support provided to several member-managed knowledge bases to promote the accessibility of scientific knowledge to national fisheries staff.

- Current knowledge of the biology, exports and regulations of targeted species is being collated by experts and will be presented in an online database that is in development, along with tools derived from these parameters (such as, weight and length conversions between wet and processed product; suggested minimum size derived from species traits).

- In order to improve the mapping and monitoring of the benthic habitat in relation to coastal resources, large photographic underwater surveys have been conducted to complement classification from satellite imagery. Machine learning (AI) is being used for computer assisted image classification of both still and video images.

- A Monitoring, Control and Surveillance (MCS) online module to record infringements has been developed rolled out and is currently being trialed. With the increase in coastal fisheries activities in the region due to COVID-19 related restrictions, the ongoing development of this module is a high priority.

- Online training (data acquisition, entry and analysis) tools and access to the latest information continues to be developed on a fishery-by-fishery basis, to provide web-based self-service tools for the various stakeholders.

- An online module is in development to assist planning and deployment of anchored Fish Aggregating Devices (a-FADs), to complement the SPC manual on anchored FADs released in 2020.

Aquaculture

26. The priority work being conducted by the Aquaculture Section includes:

- Enhancing regional and national capacity in aquaculture policy, planning, MCS and legislation to facilitate the establishment of clear priorities for aquaculture to meet current and future needs, especially related to the COVID-19 impacts. This includes: providing expertise and technical support to members on the development of new and review of existing national aquaculture development and management plans; providing technical support to members on the development and/or review of commodity specific policy and action plans; and providing technical support to members in the area of aquaculture and aquatic biosecurity legislation.

- Providing direct (in Fiji and New Caledonia) and remote technical and analytical support for aquaculture to facilitate production and economic sustainability, including:

  - Strengthening members' capacity and technical constraints in the area of feed, seed and broodstock management, including further developing the 'cluster approach' to support small operators better manage coronavirus impacts on aquaculture.

  - Providing technical support to improve aquaculture infrastructure.

  - Supporting private sector development through capacity-building and technology transfer to increase efficiency of enterprises and up-scale their production.

  - Improving remote networking and collaboration, technology, research, skills transfer and technical advice.

  - Strengthening business skills, knowledge and information on aquaculture operations through mentoring and training.

  - Strengthening economic and market assessments for viable aquaculture commodities and products, including identifying and facilitating the shift to domestic markets to compensate for COVID-19 trade impacts.

- Enhancing the management of aquatic biosecurity risks, including: supporting the application of the Regional Framework on Aquatic Biosecurity; supporting members to strengthen risk analysis capacity and assess their aquatic biosecurity needs and practices, especially as impacted by the COVID-19 related travel, trade and isolation restrictions; supporting members to improve aquatic biosecurity disease diagnosis, surveillance and reporting practices; strengthening national capacities of quarantine of live aquatic organisms; and supporting members to improve national infrastructure and operations for quarantine of live aquatic organisms.

Coastal Fisheries Science, Management and Livelihood

27. The priority work being conducted by the CFSML Section includes:

- Working remotely with members to assess and manage finfish and invertebrate resources and their associated habitats to inform management through resource assessments, data analysis, interpretation, training, mentoring and advice.

- Assisting members to strengthen coastal fisheries and aquaculture management arrangements, through remote support on reviewing and drafting policies, management plans, legislation and regulations, and training national fisheries officers and communities in Monitoring, Control, Surveillance and Enforcement activities.

- Increasing support for community-based fisheries management, in particular by holding virtual subregional and regional CBFM scaling-up workshops in early 2021, that involved

national fisheries agencies, community representatives, local non-government organisations and civil society organisations to produce the draft "Pacific Framework for Action on Scaling-up Community-based Fisheries Management" for consideration by HoF13 (see Working Paper 4); on request, providing on-going support for reviewing and advising on CBFM programmes and projects; and providing oversight of the implementation of the PEUMP Programme LMMA Network CBFM activities in Melanesia.

- Supporting members with sustainable livelihoods opportunities, through strengthening national FAD programmes and providing virtual anchored FAD training workshops; capacity enhancement and support in safe, sustainable fishing methods; and developing non-extractive uses of coastal fisheries resources.

- Capacity enhancement support to members to conduct fisheries independent (in water surveys) and fisheries independent (market and creel surveys) assessments, through developing online learning software and conducting virtual training for members' fisheries staff.

CFAP long-term strategic direction and emerging work areas

28. As a result of the accelerated shift to online and web-based training and support to members stemming from COVID-19 travel restriction impacts, the Coastal Fisheries and Aquaculture Programme will continue to **accelerate the development and expansion of the range and accessibility of multimedia resources available online**. As resources permit, we will increase the number of **interactive web-portals** from the currently planned CBFM and anchored-FAD portals, to other high priority coastal fisheries and aquaculture resources and topics.

29. The recent increase in the **development of digital survey and analysis tools and apps** in support of evidence-based management will continue, with CFAP developing and trialing emerging technologies on behalf of members. Appropriate and relevant tools and applications will then be provided and supported with training in the region.

30. The two key areas within CFAP that are in need of increased support to meet members' needs and requests are Sustainable Livelihoods and Science, especially as the region emerges from the impacts of COVID-19:

- We propose **developing the Sustainable Livelihoods Unit to include more integrated development projects** (such as integrated food systems; partnerships with development agencies), and the **roll out of proven alternative and supplementary livelihood opportunities**, such as promoting and facilitating (e.g. through fishing techniques training videos) fishing for near-shore pelagic fish and underutilised species, increased support for eco-tourism and fish preservation, postharvest and value adding, and safety at sea.

- We will continue to work towards **expanding the capacity and scope of work of the new Science Section** to better meet the increasing requests from members for coastal fisheries science advice, guidance and training on data collection, analysis, reporting and application to evidence-based management. There is a need to better understand and advise members on the impacts of climate change on the region's coastal fisheries and aquaculture resources and habitats.

31. Key new emerging work areas for the Coastal Information and Data team include:

- An emphasis on the **development of web modules for quality control, predefined and customised queries and statistical analyses** to ease data flow between members and SPC, as well as the assessment and cleaning of data and accessibility to scientific outputs (self-service and expert advice).

- **Tools and methodologies for to traceability of commercial products** will be explored to improve the monitoring of levels of exploitation and allow enforcement of coastal fisheries-related quotas at a local scale. Processed sea cucumber species images will be used to produce training/support tools for enforcement officers in identifying processed product species.

- The trialing of **underwater video for deeper sea cucumber species stock assessments, assisted by computer vision analysis** of the videos.

32. Key new emerging work areas for the Aquaculture Section include:

- Developing **online tools, training and support for improved governance** in terms of policies, legislation, development and management plans. Absence of good governance and/or clarity on tenure slows development in aquaculture.

- Promote game-changing **innovation and diversification in members' aquaculture production sectors** by facilitating the acquisition of appropriate new technology and investments.

- Identify and **foster aquaculture that is "climate-smart"**, by virtue of either being resilient to climate change or by helping to address climate change (such as by carbon sequestration).

- **Expand current the 'cluster approach'** to include supporting industry associations reach a critical mass through better information exchange, more efficient procurements, and coordinated marketing.

- **Strengthen gender and social inclusion assessments** to better understand family farming, especially the roles of women and youth in aquaculture.

- Provide support to members on **web-based data applications to strengthen on-farm data collection and management**.

- Improve engagement in **aquaculture in the area of monitoring, control and surveillance**, as well as **capacity building in occupational health and safety in aquaculture** farming operations.

- Strengthen **leadership skills in commercial aquaculture farming** operations.

- Target future work to support **hatcheries for key commodities** and low cost/low technology farming systems for livelihood aquaculture.

33.   Key new and emerging work areas for the CFSML Section include:

- Developing and maintaining an **anchored-FAD web portal** to improve members' access to up-to-date anchored FAD design, development, deployment, monitoring and management information, tools and training materials.

- Developing a **series of "marine resource status" reports**, similar to the recent "Trochus in the Pacific Islands: a review of the fisheries, management and trade" and "Aquarium products in the Pacific Islands: a review of the fisheries, management and trade", that can be maintained as easily-updatable web-based reports.

- **Expanding current MCS training, capacity building and support** activities at the national level to enable national fisheries MCS officers to train and support their counterparts in communities located on outer islands or in remote locations.

- Providing regular **online training and mentoring on legislative drafting for coastal fisheries and aquaculture**, aimed at members' fisheries policy and legal officers.

- Developing and maintaining a **Community-based Fisheries Management (CBFM) web portal** to serve as an inclusive e-platform about CBFM in the region.

- Expand the CFAP ability to coordinate and support members and partners in implementing effective **CBFM scaling-up approaches** within national contexts.

Key priorities and future directions of the Oceanic Fisheries Programme (OFP)

34.   The OFP supports objectives 1, 2, 5 and 6 of the FAME Business Plan. To summarise, OFP provides scientific advice on the status of stocks and impacts of fisheries and the environment on both target and non-target species and the pelagic ecosystem, conducts research on the biology and ecology of tuna and tuna-like species, provides technical support in the collection and management of data from fisheries, and provides capacity building opportunities to members across these fields of work.

35.   OFP delivers its work to members both at the national level and through the various regional and sub-regional fisheries organisations of which they are members, including the Western and Central Pacific Fisheries Commission (WCPFC), the Pacific Islands Forum Fisheries Agency (FFA) and the Parties to the Nauru Agreement (PNA). In doing so, there is extensive collaboration with the Secretariats of these organisations, as well as with many NGOs, universities and government fishery agencies.

36.   Providing scientific advice to help maintain healthy oceanic resources and ecosystems continues to be a key OFP role, to ensure that both short-term and long-term options are informed by the best available scientific information. Following the COVID-19 outbreak, OFP has continued to reach out to its partners and worked collaboratively to identify emerging issues and deliver scientific advice to improve understanding and help develop effective mitigation strategies. In addition to being responsive to addressing emerging COVID-19 issues, OFP also continues to pursue work that will support sustainable management of tuna fisheries to help ensure longer-term benefits can be maintained. In turn, progressing work that will contribute to a better understanding of food security options, such as estimation of potential bycatch levels, further research into non-target species biology and data reporting tools (e.g. TAILS), aims to help provide scientific information to support decision making that may mitigate some ongoing COVID-19 impacts.

37.   Organisationally, the work of the Programme falls into three sections – the Fisheries & Ecosystems Monitoring & Assessment (FEMA) section, the Data Management (DM) section and the Stock Assessment & Modelling (SAM) section – however, there is considerable integration across these areas in order to provide comprehensive services and support in oceanic fisheries to members.

38.   The key priorities and directions of each of the above work areas are summarised in the following sections. These provide some highlights of the work of each OFP section, particularly for the priority work, since space is not available to cover the breadth of activities being undertaken.

OFP long-term strategic direction and emerging work areas

39.   The OFP has been structured over time to ensure the efficient and effective delivery of scientific support to members and in its role as the scientific and data management services provider to the WCPFC. As such, OFP's core activities are unlikely to change drastically in the near future. However, developments in technology and emerging areas of policy relevance have been identified that lead to OFP's expansion into new areas of science to ensure effective advice for management decision making. These are discussed for each of the OFP Sections below.

40.   One area that cuts across all sections in OFP is:

- **National science capacity building** to continue to build the region's skill sets. Internally, OFP aims build on the Pacific Island Fisheries Professional programme with the examination of the feasibility of short-term placement opportunities and FAME mentorship activities. Through the development of stronger links with regional Universities and partners, the aim would also be to develop options for studies that lead to formal qualifications and the development of new skills and opportunities to fill gaps in curricula areas that foster specific skills of direct relevance to fisheries science (e.g. statistics, stock assessment, etc.).

Fisheries and Ecosystem Monitoring and Analysis (FEMA)

41.   The priority work being conducted by the FEMA section includes:

- **Providing important biological inputs** for stock assessments and related scientific advice. This includes work on tuna age and growth, reproduction, movements, diet and trophic ecology. Key programmes in support of this work are:

  a)   the Pacific Tuna Tagging Programme, with annual tag release cruises and the regional tag recovery effort now funded substantially through the WCPFC;

  b)   trophic ecology research voyages and associated laboratory analyses; and

  c)   PIRFO, the Pacific Islands Regional Fisheries Observer programme, coordinated collaboratively with FFA to provide training and accreditation of tuna fisheries observers in the region.

  These programmes are undertaken with substantial collaboration and assistance from member fisheries offices, in particular national observer programmes. In addition to providing critical data for stock assessments, modelling the impacts of environmental variation and other management advice, they also provide opportunities for member fisheries scientists to enhance their capacity and skills through direct participation.

- **Modelling the impacts of environment variation, including climate change,** on tuna and the pelagic ecosystem. OFP pioneered the development of the SEAPODYM model, a key platform for understanding the interaction of environment and tuna, in the late 1990s, and we continue to collaborate with the French organisation Collecte Localisation Satellites (CLS) in this work. SEAPODYM integrates a variety of fisheries, biological and environmental data at a fine spatial scale, and it can be used to assess questions such as the efficacy of spatial management measures and the impact of environmental variation such as ENSO and climate change.

- **Monitoring the impacts of tuna fisheries on bycatch** and the pelagic ecosystem more broadly. FEMA conducts analyses of observer data to produce estimates of important bycatch species, including species of special interest such as marine turtles and sea birds, and are reported periodically as regional- and national-level analyses. This information is increasingly important for the certification of fisheries by bodies such as the Marine Stewardship Council.

- **The application of new technology** to monitoring of fisheries. FEMA provides assistance to members in the development and implementation of video-based electronic tools for monitoring catch and effort by longliners, as well as rolling out electronic reporting tools, such as the longline e-log *OnBoard*, port sampling app *OnShore* and the *Tails* app for collecting small-scale fisheries data, all developed by the OFP Data Management Section.

- **Maintaining the Pacific Community Specimen Tissue Bank** that includes samples collected for the WCPFC Tissue Bank. It supports existing science programmes that support tuna stock assessments and biological material for developing new directions in tuna trophic ecology,

methyl mercury, micro/nano-plastics and building the region's capacity in marine ecosystem science generally. Increasingly, the facility combines specimens for both coastal and oceanic science.

41. In addition to the continuation of the above, key new directions for FEMA include:

- **Fisheries genomics and molecular ecology.** Following HoF12, FEMA has increased its in-house capacity in the field of fisheries genetics, as well as strengthened its partnerships with key expertise within the Pacific region to support genetic work on tuna stock structure. Sampling protocols and techniques to improve the quality of samples underpinning analyses have been put in place. Current work is focusing on the potential application of close-kin mark recapture for estimating absolute abundance of each tuna stock and the application of genetic metabarcoding as a means for rapid identification of species from tissue and water samples to monitor ecosystem status. The methodological developments associated with this work is likely to have spin-off benefits for traceability monitoring and tuna provenance.

- **Enhanced climate change monitoring.** While the ongoing enhancements to SEAPODYM will further our understanding of the potential impacts of climate change futures on stocks at a variety of spatial and temporal scales, there is a need to develop indicators of climate change that allow us to identify which pathway the Pacific is on toward those potential climate-impacted futures. The development of those indicators and their provision to managers in readily accessible formats, including online dashboards for national reporting, and regional report cards, is underway.

- **Investigating wahoo and mahi mahi ecology,** as key species of importance to nearshore fisheries and critical to the success of the nearshore anchored FAD fisheries in the coming decades. Currently, there is limited information on their biology and ecology in the Western and Central Pacific. Age and growth, migratory patterns, and how these species may be impacted by climate change are key questions. This work would need to occur across OFP and CFP. Work has commenced to document the growth chronologies of mahi mahi through time, to understand the environmental drivers that influence productivity of this species.

- **Investigating the impact of methyl mercury and micro/nano-plastic** contamination of tuna and other fish stocks, including the health implications for Pacific Island human populations. Micro and nano-plastic contamination of fish and the oceans generally is emerging as a new and serious threat for fisheries and human health. Sample collection has commenced in PNG and New Caledonia with a focus on skipjack and yellowfin tuna. Laboratory analyses are expected to be completed by December 2022.

Data Management

42. The priority work being conducted by the DM section includes:

    - **Enhancements and support for *TUFMAN 2* and *DORADO*,** which enable member countries to manage/report on their integrated tuna fishery data. These systems now integrate all major tuna-fishery data types (including logbook, VMS, observer, port sampling, and unloadings data) and work will continue to focus on how to enhance capacity so that member countries have more control on processing, managing, reporting and analysing their data, through these systems. SPC will also continue its focus on using the *Slack* helpdesk to provide live support to members, noting that this system now has over 440 users, who have exchanged more than 550,000 messages since inception in 2016.

    - **Enhancing E-Reporting (ER) tools** developed by SPC in response to member country requests. The Data Management section has developed several E-reporting tools in response to member country requests: the longline e-log *OnBoard* and the *TAILS* app for collecting small-scale fisheries data are now well-established systems and implemented in several member countries. The port sampling app *OnShore* is increasingly being used by member countries and presents considerable potential for the future of port monitoring. SPC has also trialled an ER system to acquire longline observer data at sea, in response to requests from several member countries (*OLLO*). All E-Reporting systems developed by SPC are fully integrated into the *TUFMAN 2* and *DORADO* systems. SPC remains attentive to future requests from member countries for new ER tools.

    - **Data Management support to the WCPFC**, which also covers the direct support to member countries in satisfying their WCPFC reporting obligations, but also building capacity (through mechanisms such as the Regional Tuna Data Workshop) to enhance the ability of member countries to respond directly to WCPFC reporting obligations without SPC assistance.

    - **Data standards, monitoring and auditing for regional tuna fisheries** continue to be enhanced and now extend beyond the requirements for science to include the requirements for Monitoring, Control and Surveillance (MCS), Economics and E-Monitoring process standards. SPC continues to have a key role through the SPC/FFA/PNAO Data Collection Committee (DCC) in coordinating meetings that review and update regional data standards (with other regional and sub-regional organisations, and member countries). As the region transitions to increasingly efficient data collection approaches, the DM Section will refocus on data auditing approaches, assisting members to ensure the quality of data collected from their fisheries is as high as possible.

    - **Acquisition of E-Reporting and E-Monitoring data from third-party systems**, covers situations where member countries choose to adopt ER and EM systems developed and maintained by third-party technical service providers. SPC continues to work with member countries and their service providers, providing advice on data quality control and other standards so that the data flow seamlessly into regional systems (e.g. the member country's *TUFMAN 2* database

instance). SPC has a key technical role in the establishment of ER and EM standards in the region (through both the DCC and the WCPFC ER & EM Working Group), which have continued to progress in the past year with the agreement of a regional EM Policy and draft regional longline EM minimum data fields.

- **Support for new management systems required by member countries**, for example, Catch Documentation Systems (CDS) and Catch Management Systems (CMS). Most data already collected and managed through the *TUFMAN 2* and other national/regional systems, are fundamental input into proposed regional and national CDS and CMS systems. SPC will continue to have a key role in the provision of technical advice and support to the sub-regional agencies (e.g. FFA and PNA) overseeing these initiatives and to the individual members in the future.

43. In addition to the continuation of the above, key new directions for DM include:

- **Data visualisation, analysis and reporting including alerts**, is an area with considerable potential for tuna fishery data in the near future. The development of these 'business intelligence' systems could allow senior managers to access data 'dashboards' of for example year-to-date, cumulative data for their EEZ, or for their national fleet, through an app. Alerts are features of business intelligence systems (the 'push' philosophy, rather than the 'pull' philosophy of reporting systems) and there is significant scope to introduce this concept into the systems supported by SPC to provide additional functionality; for example, alerts to highlight particular data gaps and/or when approaching certain catch levels. This development area would cut across all OFP Sections.

- **Independent validation of at-sea longline transhipments** has been identified as a major data gap and SPC has initiated work in this area through a collaborative fact-finding study in collaboration with FFA in late 2019, with a follow-up study scheduled for late 2021. SPC will continue to advance this collaborative work and have a key role in the provision of technical advice in establishing an adequate, independent data collection system for at-sea longline transhipments, in collaboration with other sub-regional and regional agencies and interested members.

- The use of **artificial intelligence (AI) in electronic monitoring** has also been identified as a potential tool to enhance the efficiency in acquiring fisheries data but also remove any potential for errors related to the challenges humans have in collecting the data. SPC are investigating several areas where AI in electronic monitoring have clear benefits in acquiring fisheries data, and will continue to collaborate with member countries, regional agencies, NGOs and third-party service providers.

Stock Assessment and Modelling (SAM)

44. The priority work being conducted by the SAM section includes:

- **Regional stock assessments of tuna, billfish and sharks** to inform scientific advice on current stock status and fishery sustainability within the western and central Pacific Ocean. These assessments will continue to provide the basis of analyses examining the potential effectiveness of candidate regional management approaches to achieve fishery objectives of profitability and sustainability. The results also currently feed into the Future of Fisheries Report Card for offshore fisheries.

- **Harvest strategy work** for key tuna stocks and fisheries. Following adoption of the harvest strategy approach by WCPFC members, the SAM section continues to develop the modelling and simulation framework to undertake this work. They will be working with members to identify candidate harvest strategies, including harvest control rules, that best meet their objectives for the fishery in the face of uncertainties in our knowledge and information. A continued focus for the coming year is the delivery of national harvest strategy workshops and information products to enhance understanding of the concepts and process for national stakeholders. On the technical side, further development of a multispecies approach for testing harvest strategies will be a strong focus, along with model refinements and stakeholder input on candidate harvest control rules.

- **National-level advice** based upon scientific analyses to address specific national requests and issues. These activities include the development of new 'Issue-Specific National Reports' to address emerging issues of national importance, and on-going bio-economic evaluations of national fisheries undertaken in partnership with FFA. The analyses are supported by the frequently updated secure online national webpage for each member. Remaining responsive to national requests remains a critical component of the SAM section's activities. With more certainty around the travel restrictions present in 2021, capacity building will receive a renewed focus this year, through the provision of an online Stock Assessment training Workshop (SAW). This will be the first online SAW, with close to 100 people currently registered to attend. Work will also target a redevelopment and modernisation of the Country Web Pages – an online data summary and reporting tool for individual PICTs – with the goal to transform this tool into a modern interactive dashboard for country specific oceanic fisheries data.

- **FAD tracking, FAD acoustics and national FAD data collection** to increase our understanding of this fishing approach and support decision-making on FAD related issues. Work assisting the PNA FAD tracking programme will continue to increase our understanding of the potential impacts and trends in use of this fishing gear. The expanding use of acoustic buoys on FADs provides a potential new source of information, and the SAM section will continue to work with key partners to examine the potential to use these data to address current data gaps and support stock assessments. Finally, SAM section will continue to support national initiatives encouraging public-led data gathering on FAD beaching events, and to curate the resulting

information, including the recent employment of a FADs Focal Officer based in SPC's FSM regional office. This approach will increase the information available on beaching events and ground-truth the outputs of analyses. Finally, we will start work on a new project to develop and trial non-entangling and biodegradable FADs

- **Novel use of Purse Seine CPUE data** to inform stock assessments. The SAM section continues to analyse catch rate data from the purse seine fishery with the aim of addressing emerging data challenges for the region's stock assessments and provide scientific information on the potential for effort creep within the region's most valuable fishery. Our work on catch rate analysis is expanding to consider the longline fishery and will make a greater contribution to our stock assessment work.

45. In addition to the continuation of the above, a key new direction for SAM includes:

- **Development of new stock assessment tools** to ensure that regional WCPO assessments remain at the forefront of international best practice. Continuous improvement of the MULTIFAN-CL software will continue, while the SAM section is also engaging with international partners to ensure plans for the next generation of stock assessment software will be appropriate to meet the specific needs and data types of the WCPO region. We will be enhancing our internal computing resources and exploring external scientific computing resources to ensure or stock assessment advances are not limited by computing power.