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AGENDA**

**CRFM Secretariat
2020**

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CRFM Fisheries and Aquaculture Activity and Research Planning Agenda

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CRFM Fisheries and Aquaculture Activity and Research Planning Agenda

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Acronyms and Abbreviations

CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community
CARISEC	Caribbean Community Secretariat
CARIFICO	Caribbean Fisheries Co-management project
CC4FISH	Climate Change Adaptation in the Eastern Caribbean Fisheries Sector
CCCFP	Caribbean Community Common Fisheries Policy
CCRIF-SPC	Caribbean Catastrophe Risk Insurance Facility-Segregated Portfolio Company
CDEMA	Caribbean Disaster Emergency Management Agency
CERMES	Centre for Resource Management and Environmental Studies
CFF	Caribbean Fisheries Forum
CFMC	Caribbean Fisheries Management Council
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLME	Caribbean Large Marine Ecosystem
CNFO	Caribbean Network of Fisherfolk Organizations
COAST	Caribbean Oceans and Aquaculture Sustainability Facility
CRFM	Caribbean Regional Fisheries Mechanism
CSWG	CRFM Continental Shelf and Slope Working Group
ECMMAN	Eastern Caribbean Marine Managed Area Network Project
EDF	European Development Fund
FAO	Food and Agriculture Organization of the United Nations
Fish4ACP	Fish4ACP Intra-ACP Blue Growth Programme for Sustainable Fisheries and Aquaculture Value Chains
IAS	Invasive Alien Species
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICM	Interim Coordination Mechanism
IFREMER	L'Institut Français de Recherche pour l'Exploitation de la Mer (French Research Institute for Exploitation of the Sea)
IGFA	International Game Fish Association
IUU fishing	Illegal, Unreported and Unregulated fishing
JICA	Japan International Cooperation Agency
mFAD	Moored Fish Aggregating Device
MAGDELESA	Moored fish AGgregating DEvice in the LESser Antilles
MARPLESCA	Caribbean Spiny Lobster Fishery Regional Management Plan
MCS	Monitoring, Control and Surveillance
NDFs	Non-Detrimental Findings
OSPESCA	Fisheries and Aquaculture Sector Organization of the Central American Isthmus
PPCR	Pilot Programme for Climate Resilience – Regional Track\
PWG	CRFM Pelagic Fisheries Working Group
REBYC	Reduction of Environmental Impact from Tropical Shrimp Trawling, through the Introduction of Bycatch Reduction Technologies and Change of Management
RSWG	Reef and Slope Fish Resource Working Group
StewardFish	Developing Organizational Capacity for Ecosystem Stewardship and Livelihoods in Caribbean Small-scale Fisheries Project
SPS	Sanitary and Phyto-Sanitary
UNU-FTP	United Nations University-Fisheries Training Programme
UWI	University of the West Indies
VMS	Vessel Monitoring System
WECAFC	Western Central Atlantic Fishery Commission
WGA	CRFM Working Group to Promote Sustainable Aquaculture Development

Executive Summary

The Research Agenda was adopted by the 14th Meeting of the Caribbean Fisheries Forum (CFF) with minor amendments as the final CRFM's Fisheries and Aquaculture Research Agenda for implementation in the biennial period 2016 to 2018. The process of updating the Research Agenda began in 2018 with the circulation of a questionnaire to Member States. In order to facilitate the updating process, the 16th Meeting of the CFF recommended the extension of the period of validity of the CRFM Fisheries and Aquaculture Research Agenda by one year. The 17th Meeting of the CFF noted that the Research Agenda was being updated and would remain valid until 31 March 2019. The preliminary results based on feedback from six countries were presented to the 17th CFF in 2019. The 13th Ministerial Council, 2019 was also informed of the progress made and agreed that given the importance of the Research Agenda, the questionnaire should be re-circulated with a new deadline of 31 July 2019. In total, responses from the following nine countries were received; Antigua and Barbuda, Belize, Dominica, Grenada, Guyana, Montserrat, St. Vincent and the Grenadines, Trinidad and Tobago and Turks and Caicos Islands. The Secretariat also agreed that the title of the Research Agenda would be updated to reflect the additional component involving the review of accomplishments related to research recommendations. The new title is Fisheries and Aquaculture Activity and Research Planning Agenda. The 18th Meeting of the CFF endorsed the Agenda and noted that the document is valid for the period 1 April 2020 – 31 March 2021. The 18th CFF also noted that the process of updating the recommendations and activities developed / undertaken during the period 2019 - 2020 will be repeated in 2020.

The subject areas for which existing research recommendations / activities were prioritized included: 1.) Climate change and natural hazards; 2.) Stock assessment and fisheries analyses; 3.) Reef and slope species, fisheries and ecosystems; 4.) Pelagic species, fisheries and ecosystems; 5.) Continental shelf species, fisheries and ecosystems; 6.) Invasive alien species; 7.) Under-or unutilized species; 8.) IUU Fishing; 9.) Aquaculture; 10.) Value Chain analysis. In order to update the priorities identified in 2015 - 2016 and prioritize the recommendations made during 2017 - 2018, priority scores were assigned by each responding Member State to the research recommendations / activities. The weighted average regional scores were rounded up to the nearest whole number and presented as the corresponding priority levels; High, Medium to High, and Medium. At the regional level the majority of the priority levels for the recommendations / activities were considered to be Medium to High. A literature review was also conducted to determine the accomplishments achieved by CRFM and supporting Projects / Partners in addressing the research recommendations / activities over the four-year period (April 2016 - March 2020). Various accomplishments have been achieved at the regional level including; tasks completed by the joint working groups, development of Management Plans, action plans and protocols, pilot projects, stock assessments, capacity building for technical staff both in the public and private sector, improved legislation for SPS measures, and development of a coordination mechanism for intersectoral ocean governance. In light of the recent impacts of COVID-19 on the fisheries sector, the 18th meeting of the CFF also recommended that it should be included in the current Agenda as a new high priority subject area.

The current review provides the opportunity for the following:

1. Strengthening the science-policy interface in fisheries and aquaculture in the region by facilitating the tracking of linkages between research recommendations and the development of appropriate policies and governance structures.
2. Facilitation of a more strategic and efficient deployment of the resources of the Mechanism by highlighting the areas for which specific recommendations and activities were made, and which remain to be addressed. For e.g. there is a need for a more focused approach on capturing the social and economic value of the regional fisheries sector. The document also provides a reference which countries can use to guide implementation of regional instruments at the national level.
3. Strengthening the linkages between the Mechanism and academic and research institutions at the national, regional and international levels. The identification of the various accomplishments sets

out a framework which can inform where synergies and overlaps exist and facilitate streamlining of current and future research activities.

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1. Background and Rationale

In 2015, with the approval of the 13th Meeting of the Caribbean Fisheries Forum (CFF), the CRFM embarked on an exercise to develop a regional Fisheries and Aquaculture Research Agenda (2015 - 2016) for implementation during 2016 - 2018 (CRFM, 2015a). This Research Agenda was intended to: (1) strengthen the science-policy interface in fisheries and aquaculture in the region; (2) facilitate more strategic and efficient deployment of the resources of the Mechanism; and (3) strengthen the linkages between the Mechanism and academic and research institutions at the national, regional and international levels. The process of development of the Research Agenda and associated details are documented in Mohammed (2015).

Due to the dynamic nature of fisheries and aquaculture, periodic update of the Research Agenda, to refine or consolidate recommendations, and to reprioritize the list of research activities so as to address emerging issues and keep current with new or updated policies, strategies and action plans is a necessity. As a consequence, the First Special Meeting of the Executive Committee, which was convened electronically on 14 September 2015, agreed that the final Research Agenda, once adopted by the CFF in 2016, would be subject to review and update biennially, or on the request of the CFF (as appropriate). The Research Agenda was adopted by the 14th Meeting of the CFF (CRFM, 2016a) with minor amendments as the final CRFM's Fisheries and Aquaculture Research Agenda for implementation in the biennial period 2016 to 2018. The 14th meeting of the CFF also agreed that the CRFM Fisheries and Aquaculture Research Agenda would be used to inform the preparations for CARICOM and other regional and international meetings, particularly those involving negotiations with international development partners.

The process of updating the Research Agenda began in 2018 with the circulation of a questionnaire (*Appendix I*) to Member States. In order to facilitate the updating process, the 16th meeting of the CFF recommended the extension of the period of validity of the CRFM Fisheries and Aquaculture Research Agenda by one year (CRFM, 2018). The 17th meeting of the CFF noted that the Research Agenda was being updated for implementation in the biennial period 2019 / 2021 and also noted that the Fisheries and Aquaculture Research Agenda (2015 / 2016) would remain valid until 31 March 2019 (CRFM, 2019b). The preliminary results based on feedback from six countries were presented to the 17th CFF in 2019. The 13th Ministerial Council, 2019 was also informed of the progress made and agreed that given the importance of the Research Agenda, the questionnaire should be re-circulated with a new deadline of 31 July 2019.

In moving forward, the Secretariat agreed that the title of the CRFM Fisheries and Aquaculture Research Agenda should be changed to reflect that the document did not only identify priority research recommendations / areas. The new title is Fisheries and Aquaculture Activity and Research Planning Agenda. The updated title reflects its contents more accurately: all planning priorities, and as iterations are prepared, to incorporate and reflect an additional component which involved the review of accomplishments related to research recommendations. This updated document reflects this change and it is expected that it will be reviewed and amended to incorporate new priority recommendations, and to amend existing ones, based on the status of their implementation or a change in priority allocation.

The 18th Meeting of the CFF endorsed the Agenda and noted that the document is valid for the period 1 April 2020 – 31 March 2021. The 18th CFF also noted that the process of updating the recommendations and activities developed / undertaken during the period 2019 - 2020 will be repeated in 2020.

2: Identifying New Recommendations and Priority Levels, and Determination of Accomplishments of Regional Institutions in addressing Recommendations

Since the Research Agenda was adopted by the 14th CFF, additional priority recommendations have been developed by the various regional joint working groups, organizations and policies. In order to update the priorities identified in 2015 - 2016 and prioritize the recommendations made during 2017 - 2018 a questionnaire was developed and circulated to Member States on 2 August 2018. The recommendations / activities previously identified in the 2015 - 2016 Research Agenda were included in the questionnaire (*Appendix I*). A literature review of working group / project reports and regional policies was conducted to determine additional recommendations for the 2017 - 2018 period. The research recommendations / activities were presented in the questionnaire based on the two time periods of review i.e. 2015 - 2016 and 2017 - 2018.

The subject areas for which existing research recommendations / activities were prioritized included: 1.) Climate change and natural hazards; 2.) Stock assessment and fisheries analyses; 3.) Reef and slope species, fisheries and ecosystems; 4.) Pelagic species, fisheries and ecosystems; 5.) Continental shelf species, fisheries and ecosystems; 6.) Invasive alien species; 7.) Under-or unutilized species; 8.) IUU Fishing; 9.) Aquaculture; 10.) Value Chain analysis.

By 31 January 2019, responses were received from six countries; Belize, Dominica, Guyana, Montserrat, St. Vincent and the Grenadines and Trinidad and Tobago. After the extension of the deadline to 31 July 2019 at the request of the 13th Ministerial Council additional responses were received from three countries; these were Antigua and Barbuda, Grenada, and Turks and Caicos Islands. In total, responses from nine countries were received and these were used to determine the regional priority scores by subject area.

The Priority Levels provided in the questionnaire were: 1 = High; 2 = Medium to High; 3 = Medium; 4 = Low to Medium; 5 = Low; 0 = Not Applicable. The priority score assigned by each responding Member State to the research recommendations / activities was used to estimate a corresponding weighted average regional score. The weighted average regional scores were rounded up to the nearest whole number and presented as the corresponding priority levels (i.e. High; Medium to High; Medium).

A literature review was conducted to determine the accomplishments achieved by CRFM and supporting Projects / Partners over the four-year period (April 2016 - March 2020) in addressing the research recommendations/activities.

In light of the recent impacts of COVID-19 on fisheries production, fisherfolk livelihoods, food security and trade, the 18th meeting of the CFF recommended that it should be included in the current Agenda as a new high priority subject area.

3: Results and Discussion

3.1 Regional Priority Levels

A total of 66 research recommendations / activities were prioritized by the nine (9) Member States for the two time periods (2015 / 16) and (2017 / 18). The regional priority levels obtained for the 2015 / 16 research recommendations / activities remained the same when they were updated during this exercise. This indicates that the research recommendations / activities remained relevant over time. Of the 66 research recommendations/activities, 42 (64%) have been addressed by regional initiatives, and 24 (36%) remain to be addressed. It is recognized that priorities may vary at the national levels, however at the regional level the majority of the priority levels for the recommendations / activities currently being addressed by regional organizations were considered to be Medium to High (Figure 1). This trend was also observed for the

recommendations / activities which remain to be addressed (Figure 2). None of the regional priority levels were considered to be Low to Medium or Low.

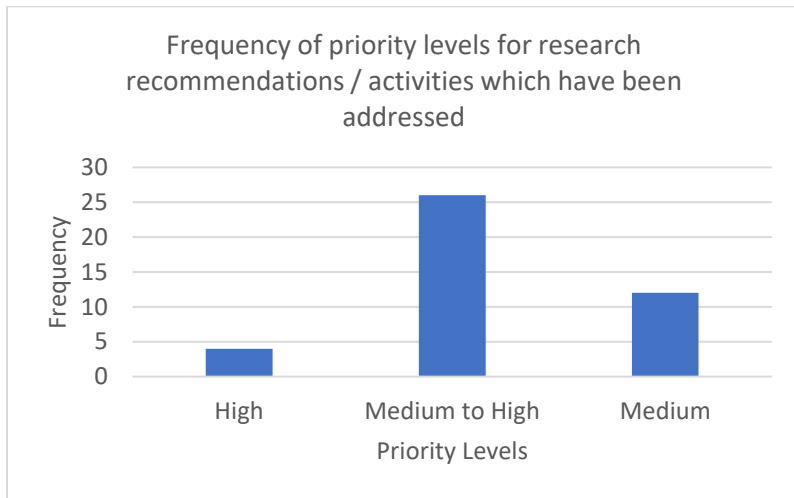


Figure 1: Frequency of priority levels for research recommendations / activities which have been addressed by regional organizations.

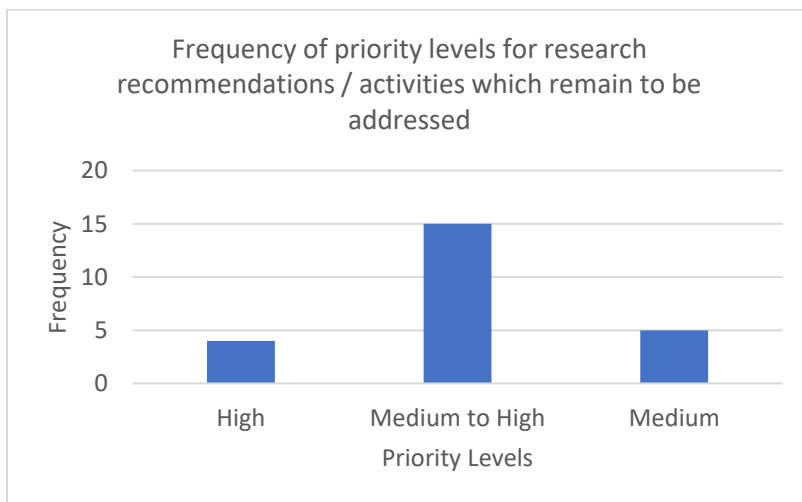


Figure 2: Frequency of priority levels for research recommendations/activities which remain to be addressed by regional organizations.

3.2 Research Recommendations / Activities by Research Area, Regional Priority Levels and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

The recommendations / activities, regional priority levels and projects or initiatives which have been conducted by CRFM and supporting partners are summarized by research area in the paragraphs and Tables below.

3.2.1 Climate Change and Natural Hazards

The regional priority levels for the five (5) identified Research Recommendations / Activities for Climate Change and Natural Hazards were Medium to High (Table 1). CRFM and supporting projects/partner accomplishments for the period April 2016 - March 2020 included the parametric insurance for the fisheries and aquaculture sector (COAST), the updated Climate Change Adaptation and Disaster Risk Management in Fisheries and Aquaculture for the CARICOM Regional Strategy and Action Plan 2020 - 2030, pilot projects to strengthen the capacity of fisheries-related state agencies to support ecosystem stewardship by fisherfolk, training in alternative livelihoods, the Protocol integrating Climate Change Adaptation and Disaster Risk Management in Fisheries and Aquaculture into the CCCFP, and three assessments of (1) climate risks and ecological impacts for Caribbean marine fish stocks, (2) the economic consequences of ecosystem shifts and of increased tropical cyclone activity and (3) fisheries viability and resilience through the lens of value chains.

Table 1: Research Recommendations / Activities for Climate Change and Natural Hazards, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendations / Activities for Climate Change & Natural Hazards	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors (CRFM-OSPESCA, 2012).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> • Development of Parametric insurance for the fisheries and Aquaculture sector (COAST) which was piloted in a few countries and available through CCRIF-SPC. COAST is an innovative climate risk insurance mechanism to promote: food security; livelihoods of fisherfolk; resilient fisheries; sustainable management of coastal infrastructure; and disaster risk reduction in the Caribbean. • Risk assessment and risk mapping actions are set out in the Climate Change Adaptation and Disaster Risk Management in Fisheries & Aquaculture in the CARICOM Regional Strategy and Action Plan 2020 - 2030 developed through the Regional Track of Pilot Programme for Climate Resilience (PPCR).
(A) Identify, and where possible develop, alternative livelihood opportunities for fisherfolk and other vulnerable groups in the coastal zone; (B) Collaboration with a range of other sector agencies to implement systematic approaches to livelihood diversification for poor fishing and aquaculture communities in ways that build their resilience and reduce their vulnerability (CRFM-OSPESCA, 2012; CRFM, 2013a).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> • Development of pilot projects in seven countries to strengthen the capacity of fisheries-related state agencies to support ecosystem stewardship by fisherfolk under the StewardFish Project. • Training provided to fisherfolk in alternative livelihoods and support for development of specific activity proposals for small grants under the ECMANN project
Assess the vulnerability and risks associated with changing climate (CRFM, 2013a).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> • Framework for assessing vulnerability and risks set out in the Protocol integrating Climate Change Adaptation and Disaster Risk Management in fisheries and Aquaculture into the Caribbean Community Common Fisheries Policy developed under the CC4FISH project which seeks

Research Recommendations / Activities for Climate Change & Natural Hazards	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
		increase resilience and reduce vulnerability to climate change impacts in fisheries.
Research development of models to forecast changes in distribution, abundance and production of commercially important fisheries and the social and economic impacts based on different climate scenarios to facilitate planning, decision-making and disaster risk management (CRFM, 2013a).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> Completion of three assessments of (1) climate risks and ecological impacts for Caribbean marine fish stocks, (2) the economic consequences of ecosystem shifts and of increased tropical cyclone activity and (3) fisheries viability and resilience through the lens of value chains under the Fishery-Related Ecological and Socio-Economic Impact Assessments and Development of an Associated Monitoring System Project under PPCR.
Conduct ecosystem assessment studies to improve knowledge of climate change impacts and options for climate-smart fisheries development and management (CRFM, 2016b).	Medium to High (2017/18)	

3.2.2 Stock assessment and fisheries analyses

The regional priority levels for the three (3) stock assessment and fisheries recommendations / activities were high (1) and medium to high (2) (Table 2). CRFM and Supporting Projects/Partner Accomplishments during the period from April 2016 - March 2020 included ICCAT tuna status updates informed by PWG evaluations, assessments of Atlantic Seabob fisheries and the second CRFM-OSPESCA Joint Plan of Action.

Table 2: Research Recommendations / Activities for Stock Assessment and Fisheries, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendations / Activities for Stock Assessment and Fisheries	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Conduct research in order to ascertain the status of fish stocks.	High ((2015/16) & (2017/18)	<ul style="list-style-type: none"> ICCAT tuna status updates informed by PWG evaluations. Review completed of Scientific Assessments of Atlantic Seabob fisheries of Guyana and Suriname; and National Management Plans for Atlantic Seabob Fisheries by CRFM Continental Shelf Fisheries Working Group (CRFM-CSWG).
Collaboration with OSPESCA on regional research concerning species/fisheries of interest such as the spiny lobster, large pelagic fisheries, queen conch and lionfish - biology, ecology and management (CRFM-OSPESCA, 2012).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> Second CRFM-OSPESCA Joint Plan of Action (2019) provides a framework to build on the foundation established by the First Joint Plan of Action aimed at harmonizing and integrating the fisheries and aquaculture management efforts. The Plan establishes a regional arrangement for

Research Recommendations / Activities for Stock Assessment and Fisheries	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
		coordinated planning and implementation of programmes, projects and activities.
Strengthen evidence-based decision-making marine resource management through research and capacity building of Caribbean Countries through the Nansen Programme which aims to develop and utilise models of the ocean for all relevant trophic levels and interactions (CRFM, 2017).	Medium to High (2017/18)	<ul style="list-style-type: none"> Other alternatives being considered in collaboration with FAO since the Nansen vessel is commissioned until 2021 - 2022.

3.2.3 Reef and slope species, fisheries and ecosystems

The regional priority levels for the six (6) reef and slope species, fisheries and ecosystems recommendations / activities were medium to high (3) and medium (3) (Table 3). CRFM and supporting Projects/Partner Accomplishments during the period from April 2016 - March 2020 included the development of the Caribbean Marine Climate Change Report Card, development of national and regional queen conch conversion factors, improved templates for completing non-detrimental findings (NDFs) for CITES, training in methods to conduct queen conch surveys and stock assessments, a review of the implementation status of the Regional Queen Conch Fisheries Management and Conservation Plan, development of a draft Regional Management Plan for Spiny Lobster fisheries and review of spiny lobster fishery production trends.

Table 3: Research Recommendations / Activities for Reef and Slope Species, Fisheries and Ecosystems, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendations / Activities for Reef and Slope Species, Fisheries & Ecosystems	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments (Australia Caribbean Coral Reef Collaboration, 2014).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> Collaboration with the Commonwealth Marine Economies Programme to develop the Caribbean Marine Climate Change Report Card 2017 which summarizes the status of marine and coastal climate change impacts on Caribbean Small Island Developing States, and explores some of the actions that are needed to respond to these impacts.
Adjustment of queen conch historical time series catch data from processed weight to live weight and reporting future catch statistics in live weight (FAO, 2016a, 2016c).	Medium to High (2017/18)	<ul style="list-style-type: none"> Development of a regional average conversion factor (CF) for the purpose of reconstructing FAO fishery statistics from average “dirty” weight statistics to live weight (i.e. dirty weight + shell weight) by the Scientific and Statistical Sub-Group of the CFMC / OSPESCA / WECAFC / CRFM / CITES Working Group on Queen Conch.
Application of the guidelines for Non-Detriment Findings (NDFs) in support of well-informed decision-making processes at the national and regional levels, for the sustainable trade in, and the effective conservation and	Medium to High (2017/18)	<ul style="list-style-type: none"> Development of a user friendly NDF template by the CFMC / OSPESCA / WECAFC / CRFM / CITES Working Group on Queen Conch.

Research Recommendations / Activities for Reef and Slope Species, Fisheries & Ecosystems	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
management of Queen Conch (FAO, 2016a, 2016c).		
Determine and adopt national-level conversion factors for the standard reporting of queen conch landings as nominal weight (FAO, 2016a, 2016c).	Medium (2017/18)	<ul style="list-style-type: none"> • Development of a new CF for “processed weight” to “dirty weight” from various % processing weights for select countries by the Scientific and Statistical Sub-Group of the CFMC / OSPESCA / WECAFC / CRFM / CITES Working Group on Queen Conch.
Standardization of methodologies for assessing conch resources and fisheries (FAO, 2016a, 2016c).	Medium (2017/18)	<ul style="list-style-type: none"> • Training in methods to conduct queen conch density surveys, data analysis for recommendations exploitation quota, and ways to improve scientific collaboration by the Scientific and Statistical Sub-Group of the CFMC / OSPESCA / WECAFC / CRFM / CITES Working Group on Queen Conch. • Review of implementation status of the Regional Queen Conch Fisheries Management and Conservation plan in CRFM Member States and management measures or standardized assessment methodologies completed by the CRFM Reef and Slope Fisheries Working Group.
Standardization of data and information collection and reporting methods, and assessment methodologies and involvement of private sector in data collection for the spiny lobster resource and fisheries (FAO, 2015b, 2016c).	Medium (2017/18)	<ul style="list-style-type: none"> • Standardized data collections forms developed and framework for data and information collection and reporting set out in the Caribbean Spiny Lobster Fishery Regional Management Plan (MARPLESCA Plan) developed by OSPESCA / WECAFC / CRFM / CFMC Working Group on Caribbean Spiny Lobster. • A review of lobster fishery production trends in CRFM Member States completed by the CRFM Reef and Slope Fisheries Working Group.

3.2.4 Pelagic Species, Fisheries and Ecosystems

The regional priority levels for the eight (8) pelagic species, fisheries and ecosystems recommendations / activities were medium to high (7) and medium (1) (Table 4). CRFM and supporting projects/partner accomplishments during the period from April 2016 – March 2020 included development of a proposal to reduce the vulnerability of coastal and marine social-ecological systems to Sargassum, a fact-finding survey regarding the impacts of Sargassum, improved co-management in FAD fisheries, endorsement of the Sub-regional Management Plan for FAD fisheries; development of the Caribbean Billfish Management and Conservation Plan, and development of a Draft Regional Plan of Action for the Conservation and Management of Sharks and Rays in the WECAFC Area.

Table 4: Research Recommendations / Activities for Pelagic Species, Fisheries and Ecosystems, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendations / Activities for Pelagic Species, Fisheries and Ecosystems	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Determine spatial distribution for commercial pelagic species; impacts of Sargassum and other environmental conditions (CRFM, 2013b).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> Proposal for reducing the vulnerability of coastal and marine social-ecological systems to Sargassum influxes in CARICOM Member States prepared by CRFM and submitted to CARISEC for approval.
Conduct studies to assess the impact of Sargassum on pelagics, especially dolphinfish and wahoo (CRFM, 2014b).	Medium to High (2015/16) & (2017/18)	
Assess the long-term and immediate impacts of Sargassum on regional fisheries (CRFM, 2016b).	Medium to High (2017/18)	<ul style="list-style-type: none"> Fact-finding survey regarding the influx and impacts of Sargassum completed by CRFM and JICA.
Research aimed at strengthening the moored FAD fishery including: the social and economic status of fishers and other stakeholders; the governance structures facilitating sustainable fisheries; the contribution to food security/nutrition and to poverty alleviation; the factors influencing fishing strategies (private versus public FADs); the factors contributing to the variability in profitability; the indirect effects of the fishery on the nearshore/reef resources; the selectivity of fishing techniques; the effect that handling large fishes on small vessels has on product quality and safety at sea; and the technological aspects influencing FAD lifespan (CRFM, 2015b).	Medium to High (2017/18)	<ul style="list-style-type: none"> Establishment and strengthening of several stakeholder groups and for improved co-management of FAD fisheries under the CARIFICO project. Elements for research, co-management, governance, and sustainable fishing methods are covered in the Sub-regional Management Plan for FAD Fisheries in the Eastern Caribbean endorsed by the Forum and Ministerial Council. Review of the CRFM Sub-Regional Management Plan for FAD Fisheries in the Eastern Caribbean completed by the CRFM / WECAFC / JICA / IFREMER Working Group on Fisheries using mFADs for adaptation to a wider regional context.
Regional FAD research plan with clearly defined objectives to understand the impacts of FAD fishing and build regional knowledge into the management decision-making (FAO, 2014, 2018c).	Medium to High (2017/18)	
Collect, generate and share data and information on billfish resources and their fisheries on an annual basis (FAO, 2018a, 2018c).	Medium (2017/18)	<ul style="list-style-type: none"> Framework for collecting and sharing information on billfish resources and fisheries is set out in the Caribbean Billfish Management and Conservation Plan developed by the Caribbean Billfish Project and in collaboration with the WECAFC / OSPESCA / CRFM / CFMC Working Group on Recreational Fisheries. Strengthening of regional billfish management and conservation planning and development of business plans for pilot investments in sustainable management and conservation of billfish through the Caribbean Billfish Project and the WECAFC / OSPESCA / CRFM / CFMC Working Group on Recreational Fisheries.

Research Recommendations / Activities for Pelagic Species, Fisheries and Ecosystems	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Conduct research on key biological / ecological parameters, life history and behavioural traits, migration patterns, as well as on the identification of potential mating, pupping and nursery grounds of the most common shark species in the WECAFC area (FAO, 2018b, 2018c).	Medium to High (2017/18)	<ul style="list-style-type: none"> Incorporation of regional collaboration on shark research, data collection and sharing, capacity building, harmonized management and conservation measures, enforcement and monitoring, and public awareness in the Draft Regional Plan of Action for the Conservation and Management of Sharks and Rays in the WECAFC Area prepared by WECAFC / OSPESCA / CRFM / CITES / CFMC Working Group on Shark Conservation and Management.
Collection of catch and effort data and information on sharks and rays (FAO, 2018b, 2018c).	Medium to High (2017/18)	<ul style="list-style-type: none"> Collection and sharing of appropriate catch and effort data for sharks and rays population assessment use in the Wider Caribbean Region facilitated through the WECAFC / OSPESCA / CRFM / CITES / CFMC Working Group on Shark Conservation and Management.

3.2.5 Continental shelf species, Fisheries and Ecosystems

The regional priority levels for the two (2) continental shelf species, fisheries and ecosystems recommendations / activities were medium (Table 5). CRFM and supporting projects / partner accomplishments during the period from April 2016 – March 2020 included development of a draft Sub-Regional Management Plan on Shrimp and Groundfish, development of a regional strategy to manage bycatch and discards in bottom trawl fisheries, and a review of scientific assessments of the Atlantic Seabob fisheries in Guyana and Suriname.

Table 5: Research Recommendations/Activities for Continental Shelf Species, Fisheries and Ecosystems, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects/Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendation / Activity for Continental Shelf Species, Fisheries & Ecosystems	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Development of appropriate methodologies for shrimp and groundfish data collection, management and use, including the sharing of the relevant information on catch, catch composition (i.e. species and sizes) and fishing effort (fleet specific, gear specific) (FAO, 2016b, 2016c).	Medium (2017/18)	<ul style="list-style-type: none"> Framework for the use of appropriate methodologies for catch and effort data collection covered in the draft Sub-Regional Management Plan on Shrimp and Groundfish developed by the WECAFC / CRFM / IFREMER Working Group on Shrimp and Groundfish of the North Brazil-Guianas Shelf.
Development of appropriate methodologies for multispecies shrimp and	Medium (2017/18)	<ul style="list-style-type: none"> Development of Regional Strategy on the Management of bycatch and discards in Latin American and Caribbean [WECAFC] bottom trawl [shrimp and groundfish] fisheries by

Research Recommendation / Activity for Continental Shelf Species, Fisheries & Ecosystems	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
groundfish stock assessments in the sub-region taking in consideration environmental variables (FAO, 2016b, 2016c).		<p>REBYC-II LAC and the WECAFC / CRFM / IFREMER Working Group on Shrimp and Groundfish in the North Brazil-Guianas Shelf.</p> <ul style="list-style-type: none"> Review of Status and development of national plans for shrimp and groundfish fisheries by the WECAFC / CRFM / IFREMER Working Group on Shrimp and Groundfish of the North Brazil-Guianas Shelf. Review completed of Scientific Assessments for Atlantic Seabob fisheries in Guyana and Suriname; and National Management Plans for Atlantic Seabob Fisheries by CRFM Continental Shelf Fisheries Working Group.

3.2.6 Invasive Alien Species

The regional priority levels for the five (5) invasive alien species research recommendations / activities were medium to high (4) and medium (1) (Table 6). CRFM and supporting project / partner accomplishments during the period from April 2016 – March 2020 included support for implementation of the Regional Strategy for Control of Lionfish and implementation reports.

Table 6: Research Recommendations / Activities for Invasive Alien Species, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendations / Activities for Invasive Alien Species	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Assess and develop safe lionfish harvesting strategies for seafood markets (Gomez-Lozano et al., 2013).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> Support provided to countries for implementation of the Regional Strategy for the Control of the Invasive Lionfish. Objectives of the Strategy include provision of coordination mechanisms, coordinated research and monitoring, encouragement of control legislation and policies, control using regionally coordinated effective methods and education and outreach to foster stewardship. Implementation Report (2013 - 2015): Regional Strategy for the Control of the Invasive Lionfish (2016) prepared by the CRFM Reef and Slope Fisheries Working Group. Update on the Implementation Status of the Regional Lionfish Strategy for the Control of the Invasive Lionfish in CRFM Member States- 2017 -2018 prepared by the CRFM Reef and Slope Fisheries Working Group.
Comprehensive overview of current understanding and knowledge of the biology and ecology of lionfish, of its impacts on the fishing industries of the Caribbean region and of best management control practices (CRFM-OSPESCA, 2012).	Medium to High (2015/16) & (2017/18)	
Develop new control technologies for lionfish (where relevant) (Gomez-Lozano et al., 2013).	Medium to High (2015/16) & (2017/18)	
Support scientific research on invasive species such as lionfish to consider the current and long-term impacts on the regional fisheries (CRFM, 2014d).	Medium to High (2015/16) & (2017/18)	
Record and assess existing technologies to control lionfish invasion and identify most	Medium (2015/16)	

Research Recommendations / Activities for Invasive Alien Species	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
successful ones (Gomez-Lozano et al., 2013).	& (2017/18)	

3.2.7 Policy, Governance and Management

The regional priority levels for the three (3) policy, governance and management research recommendations / activities were high (1) and medium to high (2) (Table 7). CRFM and supporting project / partner accomplishments during the period from April 2016 – March 2020 included coordination of research through the Interim Coordination Mechanism for Integrated Ocean Governance and development of an MOU for the establishment of a Coordination Mechanism to facilitate Integrated Ocean Governance over the long-term, development and implementation of SPS legislations and policies, and the conduct of a flyingfish fishery census.

Table 7: Research Recommendations/Activities for Policy, Governance & Management, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects/Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendation / Activity for Policy, Governance & Management	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Develop and coordinate integrated and sectoral research strategies in support of the implementation of broader ocean governance in the region, with a short and medium-term focus on Shared Large MR management (CLME Project, 2013).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> • Coordination of intersectoral research strategies through the Interim Coordination Mechanism (ICM) for Integrated Ocean Governance in the Wider Caribbean Region through the CLME + Project. • Development of Draft Memorandum of Understanding Enabling the Establishing of a Coordination Mechanism for Integrated Ocean Governance in the Wider Caribbean Region over the long-term by the CLME + Project.
Development and implementation of the SPS policies and measures to improve national and regional systems for fish and seafood quality and safety in the region (CRFM, 2016c).	High (2017/18)	<ul style="list-style-type: none"> • Technical support to promote the adoption of comprehensive model legislation, protocols, guidelines for health and food safety related to fisheries and aquaculture in CARICOM Member States under the 10th EDF Sanitary and Phytosanitary (SPS) Measures Project.
Promote the use of fisheries sector censuses, or agriculture censuses with a fisheries/ aquaculture module, to gain information on the participation of people in fisheries and aquaculture (FAO, 2018c).	Medium to High (2017/18)	<ul style="list-style-type: none"> • Implementation of management/stress reduction measures in the Eastern Caribbean Flyingfish fishery including a census of fishers under the CLME+- CRFM Component Flyingfish Project.

3.2.8 IUU Fishing

The regional priority levels for the two (2) IUU fishing research recommendations / activities were high (Table 8). CRFM and supporting project / partner accomplishments during the period from April 2016 – March 2020 included development of the Regional Plan of Action-IUU Fishing and the development of the Regional Queen Conch Fishery Management and Conservation Plan.

Table 8: Research Recommendations/Activities for IUU Fishing, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects/Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendations / Activities for IUU Fishing	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Assessment and management of overcapacity and IUU fishing which affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their capacity to contribute to poverty alleviation (CRFM, 2012).	High (2015/16) & (2017/18)	<ul style="list-style-type: none"> Improvement of data capture, management and analysis for estimating the magnitude and impact of IUU fishing in the Wider Caribbean following FAO guidelines provided for in the Regional Plan of Action-IUU Fishing developed by the Regional Working Group on IUU Fishing.
Assessment of IUU fishing levels especially for queen conch, which may be unsustainable and detrimental to regional conch population (CRFM, 2016c).	High (2017/18)	<ul style="list-style-type: none"> Framework for assessment of IUU fishing are covered by specific measures set out in the Regional Queen Conch Fishery Management and Conservation Plan prepared by the CFMC / OSPESCA / WECAFC / CRFM / CITES Working Group on Queen Conch. Measures include organized patrolling, use of VMS systems for boats over 10 metres in length, traceability of queen conch throughout the value chain and licensing of fishers, processors and exporters.

3.2.9 Aquaculture

The regional priority levels for the seven (7) aquaculture research recommendations / activities were medium to high (2) and medium (5) (Table 9). CRFM and supporting project / partner accomplishments during the period from April 2016 – March 2020 included updating of an Aquaculture Action Plan and assessment of its implementation.

Table 9: Research Recommendations / Activities for Aquaculture, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendations / Activities for Aquaculture	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Industry research on local feed material substitution in small-scale fish farming (CRFM, 2014c).	Medium to High (2015/16) & (2017/18)	<ul style="list-style-type: none"> Action plan updated for the next 5 years (2018-2023) by the Working Group to Promote Sustainable Aquaculture Development (WGA). Objectives and thematic areas of the workplan

Research Recommendations / Activities for Aquaculture	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
National GIS-based surveys of biophysical, infrastructural and institutional factors to assess aquaculture potentials of country or region within country (CRFM, 2012; CRFM 2014c).	Medium (2015/16) & (2017/18)	<p>include: strengthening governance frameworks, capacity building, strengthening data management and knowledge sharing systems, aquaculture sustainability surveys, market support, research and development and adaptation to climate change.</p> <ul style="list-style-type: none"> • Ongoing assessment of the national efforts regarding implementation of the Action Plan through the development and circulation of an Evaluation Survey.
Preliminary scoping study and pilot project in 2 countries on renewable energy development in aquaculture (CRFM, 2014c).	Medium (2015/16) & (2017/18)	
Market and technical feasibility assessments of ornamental fish culture (CRFM, 2014c).	Medium (2015/16) & (2017/18)	
Promotion of market and value-added product research to facilitate improved marketing and trade of fish and fish products from the aquaculture sector (CRFM, 2016b).	Medium to High (2017/18)	
Development of aquaculture technologies of native sea cucumber species applying a precautionary approach (FAO, 2016c).	Medium (2017/18)	
Development of catch documentation and traceability systems to combat praedial larceny in the aquaculture sector (CRFM, 2016c).	Medium (2017/18)	

3.2.10 Value Chain Analysis

The regional priority levels for the one (1) value chain analysis research recommendation was medium to high (Table 10). CRFM and supporting project / partner accomplishments during the period from April 2016 – March 2020 included provision of capacity building for value chain management and development of pilot projects.

Table 10: Research Recommendations / Activities for Value Chain Analysis, Regional Priority Levels Assigned by Time Period and CRFM and Supporting Projects / Partner Accomplishments for the period April 2016 - March 2020.

Research Recommendation / Activity for Value Chain Analysis	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
Develop a pilot project to promote the use of locally produced fish and seafood by integrated production, post-harvest handling, product development, and marketing of locally produced fish and seafood to the tourist market (CRFM, 2017).	Medium to High (2017/18)	<ul style="list-style-type: none"> • Capacity building for the execution of pilot projects provided through training workshops in value chain management for the government and the private sector conducted by CRFM / UNU-FTP / UWI and support for the implementation of the 10th EDF Sanitary and Phytosanitary (SPS) Measures Project outputs. • Facilitation of the Fish4ACP Regional Value Chain Selection and Prioritization Workshop by FAO and CRFM for development of pilots under the Fish4ACP Intra-ACP Blue Growth

Research Recommendation / Activity for Value Chain Analysis	Regional Priority Levels	CRFM and Supporting Projects / Partner Accomplishments (April 2016 - March 2020)
		Programme for Sustainable Fisheries and Aquaculture Value Chains - 2019.

3.3 Research Recommendations / Activities and Regional Priority Levels to be Addressed

Research recommendations / activities which are currently not being addressed by regional institutions are presented in Tables 11-19. Various areas remain to be addressed and these gaps highlight the need for social and economic valuation of resources in the fisheries sector among others. The priority levels and gaps are summarized by research area in the paragraphs below. No gaps were identified for research recommendations / activities related to Policy, Governance and Management and Aquaculture.

3.3.1 Climate change and natural hazards

The regional priority levels for the three (3) climate change and natural hazards research recommendations / activities were all medium to high (Table 11). Gaps included economic valuation of fisheries and aquaculture resources, mapping and valuation of coastal ecosystems and habitats, research regarding invasive species and climate change.

Table 11: Research Recommendations / Activities for Climate Change and Natural Hazards, and Regional Priority Levels Assigned by Time Periods.

Research Recommendations / Activities for Climate Change and Natural Hazards	Regional Priority Levels
Economic valuation of fisheries and aquaculture resources (CRFM, 2013a).	Medium to High (2015/16) & (2017/18)
Mapping and valuation of coastal ecosystems and habitats, including coral reefs, sea-grass beds, mangrove systems, to document location, state of health and contribution to economic development (CRFM, 2013a).	Medium to High ((2015/16) & (2017/18)
Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica] (CRFM, 2014d).	Medium to High (2015/16) & (2017/18)

3.3.2 Stock assessment and fisheries analyses

The regional priority levels for the two (2) stock assessment and fisheries analyses research recommendations / activities were both high (Table 12). Gaps included evaluation of the social and economic performance of fisheries and valuation of the fisheries sector.

Table 12: Research Recommendations / Activities for Stock Assessment and Fisheries Analyses and Regional Priority Levels Assigned by Time Periods.

Research Recommendations / Activities for Stock Assessment and Fisheries Analyses	Regional Priority Levels
Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture (CRFM, 2011).	High (2015/16) & (2017/18)
Valuation of the fisheries sector and related activities (CRFM, 2014a).	High (2015/16) & (2017/18)

3.3.3 Reef and slope species, fisheries and ecosystems

The regional priority levels for the one (1) reef and slope species, fisheries and ecosystems research recommendation / activity was medium to high (Table 13). The gap was a need for valuation of these resources and communication to policy makers and stakeholders.

Table 13: Research Recommendations / Activities for Reef and Slope Species, Fisheries and Ecosystems and Regional Priority Levels Assigned by Time Periods.

Research Recommendations/Activities for Reef and Slope Species, Fisheries and Ecosystems	Regional Priority Levels
Valuation of resources and communicate results to policy makers, decision makers and stakeholders (Australia Caribbean Coral Reef Collaboration, 2014).	Medium to High (2015/16) & (2017/18)

3.3.4 Pelagic species, fisheries and ecosystems

The regional priority levels for the three (3) pelagic species, fisheries and ecosystems research recommendations / activities were medium to high (1) and medium (2) (Table 14). The gaps included a survey to quantify the social and economic importance of small coastal pelagic fisheries, development of independent indices of abundance for targeted species around FADs, and assessment of the social, economic and ecological viability of deep-sea fisheries in the High Seas.

Table 14: Research Recommendations / Activities for Pelagic species, Fisheries and Ecosystems and Regional Priority Levels Assigned by Time Periods.

Research Recommendations / Activities for Pelagic species, Fisheries and Ecosystems	Regional Priority Levels
Undertake a survey to quantify the social and economic importance of small coastal pelagic fisheries. Such a survey should be designed to provide information on the contribution of these fisheries to food security on local and national scales, employment, and the relationship of the supply of fresh fish with the consumption of other non-local sources of animal protein (CRFM, 2008).	Medium (2015/16) & (2017/18)
FAD pilot monitoring efforts for development of independent indices of abundance for targeted species using acoustic signals from buoys and provision of detailed statistics on the fish retained and as well as discarded from gears utilized for capture in FADs selected for monitoring to allow validation of acoustic signal data (FAO, 2014, 2018c).	Medium to High (2017/18)
Develop data and information collection programmes and research projects, as appropriate, to assess current practice and scope for socially and economically viable and ecologically sustainable investments in Deep Sea Fisheries in the High Seas (FAO, 2015a, 2016d).	Medium (2017/18)

3.3.5 Continental shelf species, fisheries and ecosystems

The regional priority levels for the three (3) continental shelf species, fisheries and ecosystems research recommendations / activities were all medium to high (Table 15). The gaps included research regarding the biology of sea cucumbers, uses of sea cucumber, markets and trade.

Table 15: Research Recommendations / Activities for Continental Shelf Species, Fisheries and Ecosystems and Regional Priority Levels Assigned by Time Periods

Research Recommendations / Activities for Continental Shelf Species, Fisheries and Ecosystems	Regional Priority Levels
Biological research on the life cycle characteristics and the reproductive biology of the commercially interesting sea cucumber species, including size at sexual maturity, longevity, recruitment and growth rate (FAO, 2016c).	Medium to High (2017/18)
Research on the development of new products, including pharmaceutical uses, and the utilization of by-products from the sea cucumber (FAO, 2016c).	Medium to High (2017/18)
Marketing research and monitoring of international sea cucumber trade dynamics (FAO, 2016c).	Medium to High (2017/18)

3.3.6 Invasive alien species

The regional priority levels for the five (5) invasive alien species research recommendations / activities were all medium to high (Table 16). The gaps included protocols for rehabilitation or restoration of IAS impacted sites, creation of baseline status of species, reference lists of invasive species, development and implementation of national monitoring plans, and identification of impacted priority habitats for restoration.

Table 16: Research Recommendations / Activities for Invasive Alien Species and Regional Priority Levels Assigned by Time Periods

Research Recommendations / Activities for Invasive Alien Species	Regional Priority Levels
Adopt or develop protocols for rehabilitation or restoration of IAS impacted sites (CABI, 2011).	Medium to High (2015/16) & (2017/18)
Refer to existing data, historical records and institutional knowledge to create baseline status of species (CABI, 2011).	Medium to High (2015/16) & (2017/18)
Develop reference list of invasive species (CABI, 2011).	Medium (2015/16) & (2017/18)
Promote and provide assistance for the development and implementation of National monitoring plans for IAS (CABI, 2011).	Medium to High (2015/16) & (2017/18)
Identify priority habitats or ecosystems severely impacted by IAS for rehabilitation or restoration (CABI, 2011).	Medium to High (2015/16) & (2017/18)

3.3.7 Under-or unutilized species

The regional priority level for the one (1) under-or unutilized species research recommendation/activity was high (1) (Table 17). The gap included research for the development potential of underutilized and unutilized fisheries resources.

Table 17: Research Recommendations / Activities for Under-or Unutilized species and Regional Priority Levels Assigned by Time Periods

Research Recommendations / Activities for Under-or Unutilized species	Regional Priority Levels
Conduct research in order to determine the development potential of underutilized and unutilized fisheries resources (CCCFP).	High (2015/16) & (2017/18)

3.3.8 IUU Fishing

The regional priority levels for the three (3) IUU Fishing research recommendations / activities were high (1), medium to high (1) and medium (1) (Table 18). The gaps included assessment of the nature and extent of IUU fishing in the WECAFC area verification of fisheries production data to exclude catches from IUU

fishing before submission to FAO, and monitoring and combating IUU fishing and trade in the sea cucumber fisheries.

Table 18: Research Recommendations / Activities for IUU Fishing and Regional Priority Levels Assigned by Time Periods.

Research Recommendations / Activities for IUU Fishing	Regional Priority Levels
Design and carry out a review study to assess the nature and extent of IUU fishing in the WECAFC region (CRFM, 2016b).	High (2017/18)
Verification of fisheries production data before submission to FAO in order to exclude catches taken by IUU fishing (CRFM, 2016c).	Medium to High (2017/18)
Monitoring of sea cucumber fisheries and combating of illegal fishing and trade (FAO, 2016d).	Medium (2017/18)

3.3.9 Value Chain Analysis

The regional priority levels for the three (3) value chain analysis research recommendations / activities were medium to high (1) and medium (2) (Table 19). The gaps included adoption of the 2017 Harmonized System of Tariff Nomenclature for fish and seafood, information on the socio-economic aspects of the sea cucumber value chain; and methodologies for vessel and engine depreciation and value-additions in the fish processing sector.

Table 19: Research Recommendations / Activities for Value Chain Analysis and Regional Priority Levels Assigned by Time Periods.

Research Recommendations/Activities for Value Chain Analysis	Regional Priority Levels
Adoption of the 2017 Harmonized System (HS) of Tariff Nomenclature for fish and seafood with respect to the Common External Tariff (CRFM, 2017).	Medium to High (2017/18)
Study the socio-economic aspects of the fishing communities and the stakeholders in the sea cucumber value chain (FAO, 2016c).	Medium (2017/18)
Development of appropriate methodologies for ascribing depreciation of vessels and engines to capital costs, as well as value addition and / or cost in the fish processing subsector, utilizing comparative data from other sources to assist in devising valuations and costs (CRFM, 2017).	Medium (2017/18)

3.3.10 COVID-19 Impacts on the Fisheries Sector

In light of the recent impacts of COVID-19 on fisheries production, fisherfolk livelihoods, food security and trade, a new high priority subject area was identified during the 18th CFF (2020). The 18th CFF agreed that all fisheries management and development initiatives / activities should take into account the effects of COVID-19 on the fisheries sector and seek to minimize its impacts at the regional and national levels.

Table 20: Research Recommendations / Activities for COVID-19 Impacts on the Fisheries Sector and Regional Priority Levels Assigned by Time Period.

Research Recommendations / Activities for COVID-19 Impacts on the Fisheries Sector	Regional Priority Levels
All fisheries management and development initiatives / activities should take into account the effects of COVID-19 on the fisheries sector and seek to minimize its impacts at the regional and national levels (CRFM, 2020)	High (2020/21)

4. Conclusion

This review addresses specific recommendations / activities which were identified in the literature and does not seek to cover all research areas or initiatives that have been undertaken by regional organizations during the two time periods (2015 / 16) and (2017 / 18). This exercise will be repeated for recommendations made during the 2019 / 20 period. The updated exercise will facilitate the incorporation of new research areas, new priority recommendations, amendment of existing ones based on the relevant initiatives/projects completed, or a change in priority allocation. Responses were received from nine (9) Member States, and it is recommended that for the next exercise, an increased number of countries should complete the questionnaire to ensure that the priority levels are reflective of the regional position.

This review provides the opportunity for the following:

1. Strengthening the science-policy interface in fisheries and aquaculture in the region. The document identifies the various accomplishments which have been achieved at the regional level including; the tasks completed by the joint working groups, development of Management Plans, action plans and protocols, development of pilot projects, stock assessments, capacity building for technical staff both in the public and private sector, improved legislation, and development of a coordination mechanism for intersectoral ocean governance. The compilation of these initiatives can be used to track the linkages between research recommendations and the development of appropriate policies and governance structures.
2. Facilitation of a more strategic and efficient deployment of the resources of the Mechanism. The review highlights the areas for which specific recommendations and activities were made, and which remain to be addressed. The majority of these recommendations have social and economic components and this highlights the need for a more focused approach on capturing the social and economic value of the regional fisheries sector. The document also provides a reference which countries can use to guide the implementation of regional instruments at the national level.
3. Strengthening the linkages between the Mechanism and academic and research institutions at the national, regional and international levels. The identification of the various accomplishments sets out a framework which could be used by organizations to determine where there are synergies and overlaps and could also facilitate streamlining of current and future research activities.

Finally, this document will support implementation of the CRFM 2020 - 2022 biennial work programme and the CCCFP. The document will also contribute to the monitoring of the objectives included in the CRFM's Second Strategic Plan (2013 - 2021).

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Appendix 1: Survey Instrument for prioritization of research activities and update of CRFM Fisheries & Aquaculture Research Agenda (2015-2018)

Name and Post of respondent:

Email:

Country:

Organization / Institution:

Date:

Table 1: Research activities by subject area for prioritization and update of the CRFM Fisheries and Aquaculture Research Agenda (2015-2018).

Priority Levels: 1 = High; 2 = Medium to High; 3 = Medium; 4 = Low to Medium; 5 = Low; 0 = Not Applicable

Subject Area	Period	Research Recommendation / Activity	Priority
Climate change and natural hazards	2015-2016	Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors (CRFM - OSPESCA, 2012).	
		Economic valuation of fisheries and aquaculture resources (CRFM, 2013a).	
		(A) Identify, and where possible develop, alternative livelihood opportunities for fisherfolk and other vulnerable groups in the coastal zone; (B) Collaboration with a range of other sector agencies to implement systematic approaches to livelihood diversification for poor fishing and aquaculture communities in ways that build their resilience and reduce their vulnerability (CRFM - OSPESCA, 2012; CRFM, 2013a).	
		Research development of models to forecast changes in distribution, abundance and production of commercially important fisheries and the social and economic impacts based on different climate scenarios to facilitate planning, decision-making and disaster risk management (CRFM, 2013a).	
		Mapping and valuation of coastal ecosystems and habitats, including coral reefs, sea-grass beds, mangrove systems, to document location, state of health and contribution to economic development (CRFM, 2013a).	
		Assess the vulnerability and risks associated with changing climate (CRFM, 2013a).	
		Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica] (CRFM, 2014d).	
	2017-2018	Conduct ecosystem assessment studies to improve knowledge of climate change impacts and options for	

Subject Area	Period	Research Recommendation / Activity	Priority
		climate-smart fisheries development and management (CRFM, 2016a).	
		Investigate livelihood options in the context of climate change impacts on coral reefs and their services (CRFM, 2016a).	
Stock assessment and fisheries analyses	2015-2016	Conduct research in order to ascertain the status of fish stocks	
		Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture (CRFM, 2011).	
		Valuation of the fisheries sector and related activities (CRFM, 2014a).	
		Collaboration with OSPESCA on regional research concerning species / fisheries of interest such as the spiny lobster, large pelagic fisheries, queen conch and lionfish - biology, ecology and management (CRFM-OSPESCA, 2012).	
	2017-2018	Strengthen evidence-based decision-making marine resource management through research and capacity building of Caribbean Countries through the Nansen Programme which aims to develop and utilize models of the ocean for all relevant trophic levels and interactions (CRFM, 2017).	
Reef and slope species, fisheries and ecosystems	2015-2016	Valuation of resources and communicate results to policy makers, decision makers and stakeholders (Australia Caribbean Coral Reef Collaboration, 2014).	
		Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments (Australia Caribbean Coral Reef Collaboration, 2014).	
	2017-2018	Determine and adopt national-level conversion factors for the standard reporting of queen conch landings as nominal weight (FAO, 2016a, 2016c).	
		Adjustment of historical time series catch data from processed weight to live weight and reporting future catch statistics in live weight (FAO, 2016a, 2016c).	
		Application of the guidelines for Non-Detriment Findings (NDFs) in support of well-informed decision-making processes at the national and regional levels, for the sustainable trade in, and the effective conservation and management of Queen Conch (FAO, 2016a, 2016c).	
		Standardization of methodologies for assessing conch resources and fisheries (FAO, 2016a, 2016c).	
		Standardization of data and information collection and reporting methods, and assessment methodologies and involvement of private sector in data collection for the spiny lobster resource and fisheries (FAO, 2015b, 2016c).	

Subject Area	Period	Research Recommendation / Activity	Priority
Pelagic species, fisheries and ecosystems	2015-2016	Determine spatial distribution for commercial pelagic species; impacts of Sargassum and other environmental conditions (CRFM, 2013b).	
		Undertake a survey to quantify the social and economic importance of small coastal pelagic fisheries. Such a survey should be designed to provide information on the contribution of these fisheries to food security on local and national scales, employment, and the relationship of the supply of fresh fish with the consumption of other non-local sources of animal protein (CRFM, 2008).	
		Conduct studies to assess the impact of Sargassum on pelagics, especially dolphinfish and wahoo (CRFM, 2014b).	
	2017-2018	Develop data and information collection programmes and research projects, as appropriate, to assess current practice and scope for socially and economically viable and ecologically sustainable investments in Deep Sea Fisheries in the High Seas (FAO, 2015a, 2016d).	
		Assess the long-term and immediate impacts of Sargassum on regional fisheries (CRFM, 2016a).	
		Collect, generate and share data and information on billfish resources and their fisheries on an annual basis (FAO, 2018a, 2018c).	
		Research aimed at strengthening the moored FAD fishery including: the social and economic status of fishers and other stakeholders; the governance structures facilitating sustainable fisheries; the contribution to food security / nutrition and to poverty alleviation; the factors influencing fishing strategies (private versus public FADs); the factors contributing to the variability in profitability; the indirect effects of the fishery on the nearshore / reef resources; the selectivity of fishing techniques; the effect that handling large fishes on small vessels has on product quality and safety at sea; and the technological aspects influencing FAD lifespan (CRFM, 2015b).	
		FAD pilot monitoring efforts for development of independent indices of abundance for targeted species using acoustic signals from buoys and provision of detailed statistics on the fish retained and as well as discarded from gears utilized for capture in FADs selected for monitoring to allow validation of acoustic signal data (FAO, 2014, 2018c).	
		Regional FAD research plan with clearly defined objectives to understand the impacts of FAD fishing and build regional knowledge into the management decision-making (FAO, 2014, 2018c).	
Pelagic species, fisheries and	2017-2018	Conduct research on key biological/ ecological parameters, life history and behavioural traits, migration	

Subject Area	Period	Research Recommendation / Activity	Priority
ecosystems; Reef and slope species, fisheries and ecosystems		patterns, as well as on the identification of potential mating, pupping and nursery grounds of the most common sharks species in the WECAFC area (FAO, 2018b, 2018c).	
		Collection of catch and effort data and information on sharks and rays (FAO, 2018b, 2018c).	
Continental shelf species, fisheries and ecosystems	2017-2018	Development of appropriate methodologies for shrimp and groundfish data collection, management and use, including the sharing of the relevant information on catch, catch composition (i.e. species and sizes) and fishing effort (fleet specific, gear specific) (FAO, 2016b, 2016c).	
		Development of appropriate methodologies for multispecies shrimp and groundfish stock assessments in the sub-region taking in consideration environmental variables (FAO, 2016b, 2016c).	
		Biological research on the life cycle characteristics and the reproductive biology of the commercially interesting sea cucumber species, including size at sexual maturity, longevity, recruitment and growth rate (FAO, 2016c).	
		Research on the development of new products, including pharmaceutical uses, and the utilization of by-products from the sea cucumber (FAO, 2016c).	
		Marketing research and monitoring of international sea cucumber trade dynamics (FAO, 2016c).	
Invasive alien species	2015-2016	Promote and provide assistance for the development and implementation of National monitoring plans for IAS (CABI, 2011).	
		Identify priority habitats or ecosystems severely impacted by IAS for rehabilitation or restoration (CABI, 2011).	
		Adopt or develop protocols for rehabilitation or restoration of IAS impacted sites (CABI, 2011).	
		Assess and develop safe lionfish harvesting strategies for seafood markets (Gomez-Lozano et al., 2013).	
		Record and assess existing technologies to control lionfish invasion and identify most successful ones (Gomez-Lozano et al., 2013).	
		Comprehensive overview of current understanding and knowledge of the biology and ecology of lionfish, of its impacts on the fishing industries of the Caribbean region and of best management control practices (CRFM-OSPESCA, 2012).	
		Develop new control technologies for lionfish (where relevant) (Gomez-Lozano et al., 2013).	
		Refer to existing data, historical records and institutional knowledge to create baseline status of species (CABI, 2011).	
		Develop reference list of invasive species (CABI, 2011).	

Subject Area	Period	Research Recommendation / Activity	Priority
		Support scientific research on invasive species such as lionfish to consider the current and long-term impacts on the regional fisheries (CRFM, 2014d).	
Under-or unutilized species	2015-2016	Conduct research in order to determine the development potential of underutilized and unutilized fisheries resources (CCCFP).	
Policy, Governance & Management	2015-2016	Develop and coordinate integrated and sectoral research strategies in support of the implementation of broader ocean governance in the region, with a short and medium-term focus on Shared Large MR management (CLME Project, 2013).	
	2017-2018	Development and implementation of the SPS policies and measures to improve national and regional systems for fish and seafood quality and safety in the region (CRFM, 2016b).	
		Promote the use of fisheries sector censuses, or agriculture censuses with a fisheries / aquaculture module, to gain information on the participation of people in fisheries and aquaculture (FAO, 2018c).	
IUU Fishing	2015-2016	Assessment and management of overcapacity and IUU fishing which affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their capacity to contribute to poverty alleviation (CRFM, 2012).	
	2017-2018	Design and carry out a review study to assess the nature and extent of IUU fishing in the WECAFC region (CRFM, 2016a).	
		Assessment of IUU fishing levels especially for queen conch, which may be unsustainable and detrimental to regional conch population (CRFM, 2016b).	
		Verification of fisheries production data before submission to FAO in order to exclude catches taken by IUU fishing (CRFM, 2016b).	
		Monitoring of sea cucumber fisheries and combating of illegal fishing and trade (FAO, 2016d).	
Aquaculture	2015-2016	Industry research on local feed material substitution in small-scale fish farming (CRFM, 2014c).	
		National GIS-based surveys of biophysical, infrastructural and institutional factors to assess aquaculture potentials of country or region within country (CRFM, 2012; CRFM 2014c).	
		Preliminary scoping study and pilot project in 2 countries on renewable energy development in aquaculture (CRFM, 2014c).	
		Market and technical feasibility assessments of ornamental fish culture (CRFM, 2014c).	
	2017-2018	Development of catch documentation and traceability systems to combat praedial larceny in the aquaculture sector (CRFM, 2016b).	

Subject Area	Period	Research Recommendation / Activity	Priority
		Promotion of market and value-added product research to facilitate improved marketing and trade of fish and fish products from the aquaculture sector (CRFM, 2016a).	
		Development of aquaculture technologies of native sea cucumber species applying a precautionary approach (FAO, 2016c).	
Value Chain Analysis	2017-2018	Development of appropriate methodologies for ascribing depreciation of vessels and engines to capital costs, as well as value addition and / or cost in the fish processing subsector, utilizing comparative data from other sources to assist in devising valuations and costs (CRFM, 2017).	
		Develop a pilot project to promote the use of locally produced fish and seafood by integrated production, post-harvest handling, product development, and marketing of locally produced fish and seafood to the tourist market (CRFM, 2017).	
		Adoption of the 2017 Harmonized System (HS) of Tariff Nomenclature for fish and seafood with respect to the Common External Tariff (CRFM, 2017).	
		Study the socio-economic aspects of the fishing communities and the stakeholders in the sea cucumber value chain (FAO, 2016c).	

The CRFM is an inter-governmental organization whose mission is to “Promote and facilitate the responsible utilization of the region’s fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region”. The CRFM consists of three bodies – the Ministerial Council, the Caribbean Fisheries Forum and the CRFM Secretariat.

CRFM members are Anguilla, Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago and the Turks and Caicos Islands.

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