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**THE CRFM'S  
FISHERIES AND AQUACULTURE  
RESEARCH AGENDA  
(PROVISIONAL)**

CRFM Secretariat  
2015

# **THE CRFM'S FISHERIES AND AQUACULTURE RESEARCH AGENDA (PROVISIONAL)**

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CRFM Secretariat  
Belize, 2015

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## ACRONYMS AND ABBREVIATIONS

ACP	African, Caribbean and Pacific states
AES	Agricultural Experimental Station
AFG	Aquaculture and Fisheries Group (Wageningen University)
ANCORS	Australian National Centre for Ocean Resources and Security
ASM	Annual Scientific Meeting
BIOPAMA	Biodiversity and Protected Areas Management
CANARI	Caribbean Natural Resources Institute
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CARIFICO	Caribbean Fisheries Co-management project
CARIFORUM	Caribbean Forum of ACP states
CARPHA	Caribbean Public Health Agency
CATS	Caribbean Aqua-Terrestrial Solutions
CC4FISH	Climate Change Adaptation in the Eastern Caribbean Fisheries Sector
CCA	Climate Change Adaptation
CCCCC	Caribbean Community Climate Change Centre
CCCFP	Caribbean Community Common Fisheries Policy
CCRF	Caribbean Catastrophe Risk Insurance Facility
CDB	Caribbean Development Bank
CDEMA	Caribbean Disaster Emergency Management Agency
CERMES	Centre for Resource Management and Environmental Studies
CFTDI	Caribbean Fisheries Training and Development Institute
CLME	Caribbean Large Marine Ecosystem
CNFO	Caribbean Network of Fisherfolk Organizations
COFI	Committee on Fisheries (FAO)
COTED	Council for Trade and Economic Development
CRFM	Caribbean Regional Fisheries Mechanism
CTA	Technical Centre for Agricultural and Rural Cooperation
DFATD	Department of Foreign Affairs, Trade and Development (Canada)
DFID	Department for International Development (UK)
DREAL	Direction Régionale de l'Environnement, de l'Aménagement et du Logement
DRM	Disaster Risk Management
EAF	Ecosystem Approach to Fisheries
EC	Eastern Caribbean
EDF	European Development Fund
EU	European Union
FAD	Fish Aggregating Device
FAO	Food and Agriculture Organization of the United Nations
FC	The Fisheries Centre (University of British Columbia)
FIRMS	Fisheries and Resources Monitoring System
FMP	Fisheries Management Plan

FORCE	Future of Reefs in a Changing Environment
FSG	Florida Sea Grant
FTP	Fisheries Training Programme
GCCA	Global Climate Change Alliance
GCF	Green Climate Fund
GCFI	Gulf and Caribbean Fisheries Institute
GEF	Global Environmental Facility
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GPS	Global Positioning System
IAS	Invasive Alien Species
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICT	Information and Communications Technology
IDB	International Development Bank
IFREMER	French Research Institute for Exploitation of the Sea
ILVO	Fisheries Department, Institute of Agricultural and Fisheries Research (Belgium)
IMA	Institute for Marine Affairs
IUU	Illegal, Unreported and Unregulated fishing
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
M&E	Monitoring and Evaluation
MAGDELESA	<u>M</u> oored fish <u>A</u> Ggregating <u>D</u> Evice in the <u>L</u> ESSer <u>A</u> ntilles
MCS	Monitoring, Control and Surveillance
MFAP	Marine Affairs Program (Dalhousie University, International Ocean Institute)
MLS	Melbourne Law School (University of Melbourne)
MSC	Marine Stewardship Certification
MTIASCIC	Mitigating the Threats of Invasive Alien Species in the Insular Caribbean
NCML	Network of Cooperating Marine Laboratories (University of South Florida)
NOAA	National Oceanic and Atmospheric Association
OAS	Organization of American States
OECS	Organization of Eastern Caribbean States
OSPESCA	Fisheries and Aquaculture Sector Organization of the Central American Isthmus
PA	Precautionary Approach
PoA	Plan of Action
PPCR	Pilot Programme for Climate Resilience – Regional Track
PY	Programme Year
REBYC	Reduction of Environmental Impact from Tropical Shrimp Trawling, through the Introduction of Bycatch Reduction Technologies and Change of Management
RFB	Regional Fisheries Body
SAP	Strategic Action Programme
SCPWG	Small Coastal Pelagic Fish Resource Working Group
sLMR	Shared Large Marine Resources
SME	Small and Medium Enterprises

SPS	Sanitary and Phyto-Sanitary
TNC	The Nature Conservancy
UG	University of Ghent
UK	United Kingdom
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
USM	University of South Mississippi
UWI	University of the West Indies
VIMS	Virginia Institute of Marine Science
VMS	Vessel Monitoring System
WECAFC	Western Central Atlantic Fishery Commission
WG	Working Group

## **FOREWORD**

The CRFM is mandated under its 2013 – 2021 Strategic Plan to develop a regional fisheries and aquaculture research agenda which is to be implemented through several means, including meetings of its specific Working Groups and targeted research projects and in collaboration with national, regional and international academic and research institutions. This Strategic Plan seeks to initiate implementation of the Caribbean Community Common Fisheries Policy (CCCFP) which was approved as a regional policy document by the Council for Trade and Economic Development (COTED) in October 2014.

In 2015, with the approval of 13<sup>th</sup> meeting of the Caribbean Fisheries Forum, the CRFM embarked on an exercise to develop a regional Fisheries and Aquaculture Research Agenda. This Research Agenda is 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 effort involved review of 36 regionally agreed policies, strategies and action plans, reports of the CRFM's Annual Scientific Meetings and reports of regional projects to identify and consolidate the respective research recommendations. The consolidated list of 182 research recommendations was circulated to the CRFM's 17 Member States for feedback aimed at identifying those activities of high-priority for regional implementation. Simultaneously, the full list of research recommendations was circulated to 50 academic and research institutions, regional partners and related agencies in order to identify potential research collaborators and to 10 donor agencies in order to identify potential financial sources for implementation of the Research Agenda.

The major components of the Research Agenda include a list of research activities to be implemented regionally in accordance with the CRFM's Strategic Plan (2013-2021) based on inputs of Member States and the First Special Meeting of the Executive Committee of the Caribbean Fisheries Forum, a list of potential research collaborators and a list of potential sources of funding. Regional projects that are currently being, or soon to be, implemented and which may contribute to achievement of activities under the Research Agenda, either through technical or financial assistance, are also identified.

The first draft of the Research Agenda was reviewed and endorsed, with specific amendments, by the First Special Meeting of the Executive Committee on 14 September 2015, as a provisional document for immediate implementation throughout the rest of PY 2015/2016. Additional time would be given to facilitate full participation of Member States in developing the final draft of the Research Agenda. This final draft would be submitted for consideration and endorsement of the Caribbean Fisheries Forum in 2016. Thereafter, the Research Agenda would be subject to review and update biennially, or on the request of the Caribbean Fisheries Forum (as appropriate), to consider any new developments, changing circumstances or emerging issues; the respective activities would be integrated into the CRFM's biennial Work Plan from PY 2016/2017 onwards. The CRFM's Resource Mobilization Committee will play a critical role in identifying and sourcing funds in support of implementation of the Research Agenda.

The Research Agenda is published as CRFM Special Publication No. 5. The detailed process followed in its development, including: the responses of Member States, academic and research institutions, regional partners and related agencies as well as donor agencies pertaining to the full list of 182 research recommendations; the method used to identify high-priority research activities for regional implementation; regional projects which will contribute to achieving recommended research in general; the constraints in development of the Research Agenda; and recommendations for updating the document is published as CRFM Technical and Advisory Document – Number 2015/03.



## ACKNOWLEDGEMENTS

The production of the CRFM's Fisheries and Aquaculture Research Agenda would not have been possible without the support of our Member States, several national, regional and international academic and research institutions, as well as donor agencies and staff of the Secretariat. We especially would like to thank the Fisheries Departments/Divisions of Belize, Barbados, Grenada, Montserrat, St Vincent and the Grenadines, Trinidad and Tobago and the Turks and Caicos Islands for their feedback and inputs.

We also wish to express our gratitude to the following institutions and donor agencies which provided feedback: The University of the West Indies (including the Centre for Resource Management and Environmental Studies and the Faculty of Law), the French Research Institute for Exploitation of the Sea, the Institute of Marine Affairs, the Caribbean Agricultural Research and Development Institute, the Caribbean Community Climate Change Centre, the Caribbean Disaster Emergency Management Agency, the Caribbean Fisheries Training and Development Institute, the Caribbean Natural Resources Institute, the Caribbean Public Health Agency, the Fisheries and Aquaculture Sector Organization of the Central American Isthmus, NOAA Fisheries Southeast Regional Office, the Aquaculture and Fisheries Group (Wageningen University), the Australian National Centre for Ocean Resources and Security (University of Wollongong), the Fisheries Department of the Institute of Agricultural and Fisheries Research (Belgium), the Fisheries Training Programme (United Nations University), the Florida Sea Grant (University of Florida), the Horticulture and Aquaculture Program (University of the Virgin Islands), the Marine Affairs Program (Dalhousie University), the Melbourne Law School (University of Melbourne), the Fisheries Centre (University of British Columbia), the University of Ghent, the Network of Co-operating Marine Laboratories (University of South Florida), the University of Southern Mississippi, the Virginia Institute of Marine Science, the Inter-American Development Bank, the National Oceanic and Atmospheric Administration, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GMBH (implementing agency of the German Government) and the Technical Centre for Agricultural and Rural Cooperation.

## **EXECUTIVE SUMMARY**

The CRFM is mandated under its 2013 – 2021 Strategic Plan to develop a regional fisheries and aquaculture research agenda which is to be implemented through several means, including meetings of its specific Working Groups and targeted research projects and in collaboration with national, regional and international academic and research institutions. This Strategic Plan seeks to initiate implementation of the Caribbean Community Common Fisheries Policy (CCCFP) which was approved as a regional policy document by the Council for Trade and Economic Development in October 2014.

In 2015, with the approval of 13<sup>th</sup> meeting of the Caribbean Fisheries Forum, the CRFM embarked on an exercise to develop a regional Fisheries and Aquaculture Research Agenda. This research agenda is 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 effort involved review of 36 regionally agreed policies, strategies and action plans as well as reports of the CRFM's Annual Scientific Meetings and reports of regional projects to identify and consolidate the respective research recommendations. The consolidated list of 182 research recommendations was subsequently circulated to the 17 CRFM Member States for review and prioritization, to arrive at a list of high-priority research activities of regional importance that is feasible to implement (the research agenda), and to focus the activities of the CRFM's Working Groups, the Resource Mobilization Committee and the Secretariat. The list of research recommendations was also circulated to 50 academic, research and related institutions in order to identify potential research collaborators and to 10 donor agencies in order to identify potential financial sources for implementation of the research agenda.

The current version of the Research Agenda is based on feedback and inputs from seven CRFM Member States, 26 academic and research institutions, regional partners and related agencies and four donor agencies. Recommendations of the First Special Meeting of the Executive Committee of the Caribbean Fisheries convened electronically on 14 September 2015 are also included. The process of development of the Research Agenda and associated details are documented in Mohammed (2015).

The Research Agenda comprises 26 high-priority regional research activities which were identified based on the weighted average priorities assigned to the list of 182 research recommendations by the seven CRFM Member States as well as eight (8) research activities extracted from the same list, that are consistent with proposals of the First Special Meeting of the Executive Committee, for implementation in 2015 – 2016. The proposals of the Executive Committee highlight matters which have been receiving recent and urgent attention of policy makers, but the respective research recommendations were not scored as high-priority by the seven CRFM Member States. Potential research collaborators and sources of funding to facilitate implementation of the Research Agenda are also identified.

The 26 high-priority research activities identified by Member States focus on the following subject areas: invasive alien species; climate change and natural hazards; stock assessment and fisheries

analyses; illegal, unreported and unregulated fishing; reef and slope species, fisheries and ecosystems; pelagic, species, fisheries and ecosystems; policy, governance and management; and underutilized and unutilized species. The eight research activities based on the proposals of the Executive Committee pertain to the invasive *Sargassum* seaweed and aquaculture. The Executive Committee re-emphasized the importance of ocean governance in light of recent and accelerating initiatives which necessitate that related research in fisheries is adequately addressed. Economic valuation of fisheries and aquaculture resources was an underlying high-priority research recommendation repeated in four of the categories identified. Guidance of the Caribbean Fisheries Forum will be required to identify specific research requirements in cases where the identified activities are too broad to facilitate implementation.

Fourteen academic and research institutions, regional partners and related agencies were identified as potential collaborators for implementation of the 34 research activities: the University of Southern Mississippi, the University of the West Indies in general, the Marine Affairs Program of Dalhousie University, the Fisheries Centre of the University of British Columbia, the Aquaculture and Fisheries Group of the Wageningen University, CCCCC, CDEMA, CANARI, CERMES (of the UWI), NOAA's Fisheries South East Regional Office, the Institute of Marine Affairs, OSPESCA, IFREMER and the University of Ghent. The CRFM already has formal arrangements in place to facilitate cooperation in areas of mutual interest or capacity development with the University of the West Indies (which includes CERMES and the Faculty of Law), IFREMER, OSPESCA and the Marine Affairs Program (Dalhousie University), however, similar formal arrangement is required with the other institutions in order to fully implement the Research Agenda. It is noted that the Gulf and Caribbean Fisheries Institute has made significant strides in collaborating research on the invasive lionfish from which the CRFM Member States could benefit in their efforts to manage this invasive alien species. In addition, opportunities for collaboration under several regional projects and initiatives to implement the 26 high-priority research activities as well as other research are identified.

Seven academic and research institutions, regional partners and related agencies indicated research areas for which they may be able to provide funding (IFREMER, IMA, CARDI, CCCCC, CARPHA, the Florida Sea Grant Program and the University of Southern Mississippi) and one donor agency, the Technical Centre for Agricultural and Rural Cooperation (CTA), identified the possibility of funding or willingness to seek funding to facilitate implementation of specific research activities. Funding, as well as technical assistance, is also available under four regional projects to implement some of the research activities: Caribbean Large Marine Ecosystem Project: Catalysing Implementation of the Strategic Action Programme for the Sustainable Management of Shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+ Project – Second Phase); (2) the Pilot Programme for Climate Resilience – Regional Track (PPCR); (3) Climate Change Adaptation in the Eastern Caribbean Fisheries Sector (CC4FISH Project); and (4) Sustainable management of bycatch in Latin America and Caribbean trawl fisheries (REBYC-II LAC). However, the CRFM's Resource Mobilization Committee will play a critical role in identifying and sourcing funds in support of implementation of the Research Agenda.

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## **1. BACKGROUND AND RATIONALE**

The CRFM has, since its inauguration in 2003, implemented an informal research agenda based on its biennial work plans, annual Scientific Meetings, specific donor-funded research projects and individual country requests for technical assistance. As the Mechanism moves towards implementation of the Caribbean Community Common Fisheries Policy (CCCFP), which was adopted by the 4<sup>th</sup> Meeting of the Ministerial Council in Antigua and Barbuda in May 2011 and approved as a regional policy document by the Council for Trade and Economic Development at its 51<sup>st</sup> Special Meeting in Suriname on 10 October 2014, it has developed a new Strategic Plan for the period 2013 to 2021 and an Action Plan for the CCCFP to guide the way forward. Underlying the key requirements to facilitate management of fisheries and aquaculture, research remains a critical component to the activities of the Mechanism in its efforts to improve the information base for decision-making.

The Strategic Plan (CRFM, 2013), and specifically Strategic Objective B2, mandates that *A regional (collaborative) fisheries and aquaculture research agenda is effectively implemented through annual scientific meetings, joint species specific Working Groups, and targeted research projects and in collaboration with national, regional and international academic and research institutions*. Such a research agenda is 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.

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 Caribbean Fisheries Forum in 2016, would be subject to review and update biennially, or on the request of the Caribbean Fisheries Forum (as appropriate). The Executive Committee also agreed that the final Research Agenda would be integrated into the CRFM's biennial Work Plan from PY 2016/2017 onwards and recognized the critical role of the CRFM's Resource Mobilization in identifying and sourcing funds in support of implementation of the Research Agenda.

### **1.1 Agreed Process for Development and Finalization of the Research Agenda**

The process for development, finalization and update of the Research Agenda was approved by the Executive Committee at its 24<sup>th</sup> meeting in St Vincent and the Grenadines in February 2015 (CRFM, 2015), endorsed by the Caribbean Fisheries Forum at its 13<sup>th</sup> meeting held in Grenada in March 2015 (CRFM, 2015a) and subsequently revised by the First Special Meeting of the Executive Committee held electronically on 14 September 2015 (CRFM, 2015b).

This process includes a transparent and participatory mechanism for arriving at a comprehensive list of regionally-prioritized research activities for immediate implementation, in collaboration with CRFM

Member States. In addition, the process includes consultation with a range of national, regional and international academic and research institutions, regional partners and related agencies as well as donor agencies, identified by the Secretariat, so as to ascertain potential research collaborators and donor partners with which formal arrangements could be made to facilitate implementation of the finalized and approved research agenda. The Executive Committee and Caribbean Fisheries Forum agreed that the Secretariat would:

- (a) complete the first draft of the Research Agenda and circulate to Member States by 06 March 2015, for their review, inputs, prioritization of activities and feedback by 20 March 2015;
- (b) make the necessary amendments to the Research Agenda and circulate by 17 April 2015 to national, regional and international research and academic institutions as well as to donor partners for review, prioritization of activities and feedback as to possible areas of collaboration by 15 May 2015;
- (c) finalize the Research Agenda with all inputs and submit to the Executive Committee by 30 June 2015 for its review and endorsement for immediate implementation; and
- (d) share the final Research Agenda for 2015- 2016 with the Caribbean Fisheries Forum and Ministerial Council.

Due to the limited participation of Member States in development of the Research Agenda, the Secretariat, in consultation with the Executive Committee, extended the deadline for submission of Member States' feedback from 20 March 2015 to 24 June 2015 in order to facilitate their wider participation. During this period inputs were sought simultaneously from academic and research institutions, regional partners and related agencies as well as donor agencies so as not to further delay production of the document. Consequently, it was agreed that the first draft of the Research Agenda would be submitted to the Executive Committee by 31 August 2015.

The First Special Meeting of the Executive Committee was convened electronically on 14 September 2015, to review the first draft of the Research Agenda and provide specific recommendations for its improvement, endorsement and implementation (CRFM, 2015b). The Executive Committee endorsed the Research Agenda, which contains 26 high-priority research activities identified by Member States and 8 research activities identified by the Executive Committee, as a provisional document for immediate implementation in PY 2015/2016. The Executive Committee also agreed that Member States would be given further opportunity to participate fully in development of the final draft of the Research Agenda, which is to be submitted for consideration and adoption of the Caribbean Fisheries Forum in 2016. In accordance with the CRFM's Strategic Plan, this final Research Agenda would outline the CRFM's research priorities and the respective activities would be integrated into the CRFM's biennial Work Plan from PY 2016/2017 onwards. The Research Agenda would be subject to review and update biennially, or on the request of the Caribbean Fisheries Forum (as appropriate). Such updates are necessary to ensure that the Research Agenda remains relevant i.e. new developments, changing circumstances or emerging issues are considered.

## 2. DEVELOPING THE RESEARCH AGENDA

The detailed process followed in development of the research agenda, including: the detailed responses of Member States, academic and research institutions, regional partners and related agencies as well as donor agencies; the method used to identify high-priority research activities for regional implementation; regional projects which will contribute to achieving recommended research of the CRFM in general; the constraints in development of the Research Agenda; and recommendations for updating the document, is outlined in Mohammed (2015).

Based on a review of 36 documents (*Appendix 1*) comprising CRFM regionally agreed policies, strategies and action plans, reports of the CRFM's Annual Scientific Meetings from 2004 to 2014 pertaining to regional level stock assessments (a core research activity of the Mechanism), and other relevant publications of the CRFM, a total of 182 research recommendations were identified and aligned with the CRFM's Strategic Plan for 2013 to 2021 (CRFM, 2013), (See corresponding Strategic Objectives and Organizational Results in *Appendix 2*). These research recommendations ranged from the general to the very specific, with some topics repeated in various contexts or overlapping with others. They were categorised according to broad subject areas of regional interest for ease of presentation.

The 182 research recommendations were prioritized by CRFM Member States and, based on these inputs a regional priority level was assigned to each recommendation based on the weighted average priority level across all countries. Only the regional, high priority research recommendations were included in the Research Agenda<sup>1</sup>. Based on the responses of academic and research institutions, regional partners and related agencies potential collaborators for implementation of the Research Agenda were identified. A similar procedure was followed to identify potential donor partners based on responses from donor agencies. Regional projects which are currently being, or soon to be, implemented and which may contribute to achievement of activities under the Research Agenda, either through technical or financial assistance, were also identified.

## 3. STAKEHOLDER INPUTS

This version of the research agenda is based on feedback from:

- Seven CRFM Member States - Barbados, Belize, Grenada, Montserrat, St Vincent and the Grenadines, Trinidad and Tobago and Turks and Caicos Islands. Feedback from Barbados, Belize, Grenada and Trinidad and Tobago however, was limited to the first 144 research recommendations, which exclude research identified in the Regional Invasive Alien Species Strategy and Action Plan, the Diagnostic Study on Poverty Levels, the JICA Master Plan Study and the CLME+ Strategic Action Programme.
- 26 academic and research institutions, regional partners and related agencies as listed below<sup>2</sup>:

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<sup>1</sup> Details on the full list of 182 research recommendations are available in Mohammed (2015)

<sup>2</sup> The institutions marked with (\*) are those with which the CRFM already has a formal arrangement in place to facilitate cooperation in areas of mutual interest and or capacity development.

National and Regional Academic and Research Institutions

The University of the West Indies (UWI - Mona, Cave Hill and St. Augustine Campuses)\*  
Centre for Resource Management and Environmental Studies (UWI, Cave Hill Campus)  
Faculty of Law (UWI, Cave Hill Campus)  
French Research Institute for Exploration of the Sea (IFREMER)\*  
Institute of Marine Affairs

Other Regional Partners or Institutions

Caribbean Agricultural Research and Development Institute (CARDI)  
Caribbean Community Climate Change Centre (CCCCC)  
Caribbean Disaster Emergency Management Agency (CDEMA)  
Caribbean Fisheries Training and Development Institute (CFTDI)  
Caribbean Natural Resources Institute (CANARI)  
Caribbean Public Health Agency (CARPHA)  
Fisheries and Aquaculture Sector Organization of the Central American Isthmus (OSPESCA)\*  
Southeast Regional Office (National Oceanic and Atmospheric Administration – Fisheries)<sup>3</sup>

International Academic and Research Institutions

Aquaculture and Fisheries Group (AFG, Wageningen University)  
Australian National Centre for Ocean Resources and Security (ANCORS, University of Wollongong)\*  
Fisheries Department, Institute of Agricultural and Fisheries Research (ILVO, Belgium)<sup>4</sup>  
Fisheries Training Programme (FTP, United Nations University)\*  
Florida Sea Grant Program (FSG, University of Florida)\*  
Horticulture and Aquaculture Program (University of the Virgin Islands, St Croix)  
Marine Affairs Program (MFAP, Dalhousie University, International Ocean Institute)\*  
Melbourne Law School (MLS, University of Melbourne)  
The Fisheries Centre (FC, University of British Columbia)  
University of Ghent (UG)  
University of South Florida (NCML, Network of Cooperating Marine Laboratories)  
University of Southern Mississippi (USM)  
Virginia Institute of Marine Science (VIMS)

The Fisheries Training Program (United Nations University), Melbourne Law School and University of South Florida (Network of Cooperating Marine Laboratories) provided responses in emails instead of prioritizing the specific activities in the research agenda (Excel worksheet).

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<sup>3</sup> Inputs and feedback facilitated through the Florida Sea Grant Programme, University of Florida

<sup>4</sup> Inputs facilitated through sharing of the Research Agenda with this department by the University of Ghent



- Four donor agencies - Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GMBH (German Government), the Inter-American Development Bank (IDB) the National Oceanic and Atmospheric Administration (NOAA) and the Technical Centre for Agricultural and Rural Cooperation (CTA), with only the CTA providing a positive response.
- The First Special Meeting of the Executive Committee of the Caribbean Fisheries Forum (CRFM, 2015b).

#### 4. REGIONAL RESEARCH PRIORITIES

Based on feedback from seven CRFM Member States, 26 high-priority research activities were identified for inclusion in the Research Agenda across eight subject areas as follows: (1) invasive alien species - 9; (2) climate change and natural hazards- 4; (3) stock assessment and fisheries analyses – 4; (4) illegal, unreported and unregulated fishing- 2; (5) reef and slope species, fisheries and ecosystems – 2; (6) pelagic species, fisheries and ecosystems – 1; (7) policy, governance and management – 1; and (8) under- or unutilized species – 1. However, of the seven Member States, four prioritized only the first 144, of the full list of 182, research recommendations.

Based on the decisions of the First Special Meeting of the Executive Committee of the Caribbean Fisheries Forum (CRFM, 2015b) eight additional research activities were included in the Research Agenda, across the following four subject areas: (1) invasive alien species – 1; (2) climate change and natural hazards – 1; (3) pelagic species, fisheries and ecosystems – 2; and (4) aquaculture – 4.

**Table 1** lists the high priority research activities identified by Member States as well as activities identified by the First Special Meeting of the Executive Committee of the Caribbean Fisheries Forum. Details of the respective priorities assigned by each Member State are given in *Appendix 3*.

<b>Table 1. Research activities identified by seven Member States and the First Special Meeting of the Executive Committee for focus at the regional level.</b>			
Note research activities listed in decreasing order of priority;			
*Research activities identified by the Executive Committee;			
Estimated Regional Priority Level - 1 - 1.4 = High; 1.5 - 2.4 = Medium to High; 2.5 - 3.4 = Medium; 3.5 - 4.4. = Low to Medium; 4.5 - 5 = Low.			
See <i>Appendix 3</i> for further details.			
<b>ID#</b>	<b>Subject Areas</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Priority</b>
36	Climate change & natural hazards	Economic valuation of fisheries and aquaculture resources in selected countries	1.0
140	Stock assessment and fisheries analyses	Conduct research in order to ascertain the status of fish stocks	1.0
148	IUU fishing	Assessment and management of overcapacity and IUU: IUU (illegal, unreported and unregulated) fishing affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their	1.0

**Table 1. Research activities identified by seven Member States and the First Special Meeting of the Executive Committee for focus at the regional level.**

Note research activities listed in decreasing order of priority;

\*Research activities identified by the Executive Committee;

Estimated Regional Priority Level - 1 - 1.4 = High; 1.5 - 2.4 = Medium to High; 2.5 - 3.4 = Medium; 3.5 - 4.4. = Low to Medium; 4.5 - 5 = Low.

See *Appendix 3* for further details.

<b>ID#</b>	<b>Subject Areas</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Priority</b>
		capacity to contribute to poverty alleviation.	
170	Invasive alien species	Promote and provide assistance to the development and implementation of National monitoring plans for IAS	1.0
171	Invasive alien species	Identify priority habitats or ecosystems severely impacted by IAS for rehabilitation or restoration	1.0
172	Invasive alien species	Adopt or develop protocols for rehabilitation or restoration of IAS impacted sites	1.0
40	Reef and slope species, fisheries and ecosystems	Valuation of resources and communicate results to policy makers, decision makers and stakeholders	1.2
82	Invasive alien species	Assess and develop safe lionfish harvesting strategies for seafood markets	1.2
83	Invasive alien species	Record and assess existing technologies to control lionfish invasion and identify most successful ones	1.2
134	Stock assessment and fisheries analyses	Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture	1.2
116	Stock assessment and fisheries analyses	Valuation of the fisheries sector and related activities	1.2
22	Climate change & natural hazards	(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	1.3
30	Climate change & natural hazards	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.	1.3
24	Climate change & natural hazards	Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors	1.3
25	Climate change & natural hazards	Assess the vulnerability and risks associated with changing climate;	1.3

**Table 1. Research activities identified by seven Member States and the First Special Meeting of the Executive Committee for focus at the regional level.**

Note research activities listed in decreasing order of priority;

\*Research activities identified by the Executive Committee;

Estimated Regional Priority Level - 1 - 1.4 = High; 1.5 - 2.4 = Medium to High; 2.5 - 3.4 = Medium; 3.5 - 4.4. = Low to Medium; 4.5 - 5 = Low.

See *Appendix 3* for further details.

<b>ID#</b>	<b>Subject Areas</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Priority</b>
38	Climate change & natural hazards	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	1.3
39	Reef and slope species, fisheries and ecosystems	Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments	1.3
72	IUU fishing	To establish a Working Group to be convened through the CRFM to regularly consult on methodologies and approaches that will harmonise and enhance the reliability of data collection in relation to IUU fishing [this will require the corresponding research support]	1.3
84	Invasive alien species	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	1.3
88	Invasive alien species	Develop new control technologies for lionfish (where relevant)	1.3
126	Pelagic species, fisheries and ecosystems	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.	1.3
160	Invasive alien species	Refer to existing data, historical records and institutional knowledge to create baseline status of species	1.3
161	Invasive alien species	Develop reference list of species	1.3
182	Policy, Governance & management	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 sLMR management	1.3
61	Stock assessment and fisheries analyses	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	1.4
141	Under- or unutilised species	Conduct research in order to determine the development potential of underutilised and unutilised fisheries resources	1.4
80*	Pelagic species, fisheries and ecosystems	Determine spatial distribution for commercial large pelagic species; [impacts of <i>Sargassum</i> and other environmental factors]	1.7

**Table 1. Research activities identified by seven Member States and the First Special Meeting of the Executive Committee for focus at the regional level.**

Note research activities listed in decreasing order of priority;

\*Research activities identified by the Executive Committee;

Estimated Regional Priority Level - 1 - 1.4 = High; 1.5 - 2.4 = Medium to High; 2.5 - 3.4 = Medium; 3.5 - 4.4 = Low to Medium; 4.5 - 5 = Low.

See *Appendix 3* for further details.

ID#	Subject Areas	Research Recommendation (as stated in source document)	Regional Priority
71*	Invasive alien species	Support scientific research on invasive species such as lionfish and <i>Sargassum</i> to consider the current and long term impacts on the regional fisheries	1.8
78*	Pelagic species, fisheries and ecosystems	Conduct studies to assess the impact of <i>Sargassum</i> on pelagics, especially dolphinfish and wahoo	1.8
31*	Climate change & natural hazards	Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica]	2.2
10*	Aquaculture	Industry research on local feed material substitution in small-scale fish farming	2.7
4*	Aquaculture	National GIS-based surveys of biophysical, infrastructural and institutional factors to assess aquaculture potentials of country or region within country	3.0
9*	Aquaculture	Preliminary scoping study and pilot project in 2 countries on renewable energy development in aquaculture	3.2
3*	Aquaculture	Market and technical feasibility assessments of ornamental fish culture	3.8

**Economic valuation of fisheries and aquaculture** is an underlying, high-priority research recommendation that is incorporated under several broad categories (climate change and natural hazards; reef and slope species, fisheries and ecosystems; stock assessment and fisheries analyses), including analyses of the social and economic importance of fisheries and aquaculture (under the broad category of stock assessment and fisheries analyses), with emphasis on small coastal pelagic fisheries (under the broad category of pelagic species, fisheries and ecosystems).

## 5. POTENTIAL RESEARCH COLLABORATORS

The list of all academic and research institutions, regional partners and related agencies which prioritized the 34 research activities in this Research Agenda is given in *Appendix 4*. Details concerning the areas of interest of the 26 institutions, partners and agencies pertaining to the full list of 182 research recommendations are published in Mohammed (2015). Fourteen of these institutions, partners and agencies scored activities in the Research Agenda as being either of high, or medium to high priority, in their respective research programmes: the University of Southern Mississippi, the University of the West Indies in general, the Marine Affairs Program of Dalhousie University, the Fisheries Centre of the University of British Columbia, the Aquaculture and Fisheries Group of the Wageningen University, CCCCC, CDEMA, CANARI, CERMES (of the UWI), NOAA's Fisheries South East Regional Office,

the Institute of Marine Affairs, OSPESCA, IFREMER and the University of Ghent. The respective details for each research activity are given in **Table 2**. The CRFM already has formal arrangements in place to facilitate cooperation in areas of mutual interest or capacity development with the University of the West Indies (which includes CERMES and the Faculty of Law), IFREMER, OSPESCA and the Marine Affairs Program (Dalhousie University), but will need to establish similar arrangements with the other institutions, regional partners and related agencies to facilitate full implementation of the Research Agenda.

In addition to the above institutions and agencies, the GCFI has made significant strides in coordinating lionfish research in the region, from which the CRFM Member States could benefit in managing the respective invasion. The GCFI's areas of research address the three high-priority research activities to assess and develop harvesting strategies for safe seafood markets (activity #82), assessing technologies to control the lionfish invasion (activity #83) as well as keeping current on the biology and ecology of the species (activity #84). Consequently, a formal collaborative arrangement between the CRFM and the GCFI is desired. **Section 7** also highlights key regional projects and initiatives which may contribute to achievement of activities under the Research Agenda, either through technical or financial assistance.

**Table 2: Potential Research Collaborators for Implementation of the Research Agenda**

Other Details: the number of academic and research institutions, regional partners and related agencies which indicated some level of interest in the respective activity – includes those which assigned high or medium to high priority to the respective activity.

ID#	Research Recommendation (as stated in source document)	High Priority	Medium to High Priority	Other Details
36	Economic valuation of fisheries and aquaculture resources in selected countries	CCCCC; University of Southern Mississippi; Aquaculture and Fisheries Group (University of Wageningen)	UWI; CDEMA; Marine Affairs Program (Dalhousie University); Fisheries Centre (University of British Columbia)	11 + interest of Network of Cooperating Laboratories
140	Conduct research in order to ascertain the status of fish stocks	University of Southern Mississippi; Aquaculture and Fisheries Group (University of Wageningen)	UWI; Marine Affairs Program (Dalhousie University); NOAA	6
148	Assessment and management of overcapacity and IUU: IUU (illegal, unreported and unregulated) fishing affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their capacity to contribute to poverty alleviation.		Fisheries Centre (University of British Columbia)	7 + interest of Network of Cooperating Marine Laboratories
170	Promote and provide assistance to the development and implementation of National monitoring plans for IAS	University of Southern Mississippi		4
171	Identify priority habitats or ecosystems severely impacted by IAS for rehabilitation or restoration	University of Southern Mississippi		4
172	Adopt or develop protocols for rehabilitation or restoration of IAS impacted sites	University of Southern Mississippi		4

**Table 2: Potential Research Collaborators for Implementation of the Research Agenda**

Other Details: the number of academic and research institutions, regional partners and related agencies which indicated some level of interest in the respective activity – includes those which assigned high or medium to high priority to the respective activity.

ID#	Research Recommendation (as stated in source document)	High Priority	Medium to High Priority	Other Details
40	Valuation of resources and communicate results to policy makers, decision makers and stakeholders	CCCCC	UWI; IMA; CDEMA; Marine Affairs Program (Dalhousie University); Fisheries Centre (University of British Columbia)	11 + interest of Network of Cooperating Laboratories
82	Assess and develop safe lionfish harvesting strategies for seafood markets	Research coordinated by GCFI		9 + interest of IFREMER
83	Record and assess existing technologies to control lionfish invasion and identify most successful ones		UWI; Aquaculture and Fisheries Group (Wageningen University)	9 + interest of IFREMER and Network of Cooperating Marine Laboratories
134	Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture	CERMES; IFREMER; CANARI; University of Southern Mississippi; Aquaculture and Fisheries Group (Wageningen University)	Marine Affairs Program (Dalhousie University); Fisheries Centre (University of British Columbia)	10
116	Valuation of the fisheries sector and related activities		CERMES; Marine Affairs Program (Dalhousie University); Fisheries Centre (University of British Columbia)	9

**Table 2: Potential Research Collaborators for Implementation of the Research Agenda**

Other Details: the number of academic and research institutions, regional partners and related agencies which indicated some level of interest in the respective activity – includes those which assigned high or medium to high priority to the respective activity.

ID#	Research Recommendation (as stated in source document)	High Priority	Medium to High Priority	Other Details
22	(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	UWI; CCCCC; CANARI; OSPESCA; the University of Southern Mississippi	CERMES; CDEMA; Marine Affairs Program (Dalhousie University); Fisheries Center (University of British Columbia)	12
30	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.	CCCCC; University of Southern Mississippi	UWI; CDEMA; Marine Affairs Program (Dalhousie University); the Fisheries Centre (University of British Columbia); Aquaculture and Fisheries Group (Wageningen University)	11 + interest of Network of Cooperating Marine Laboratories
24	Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors	CDEMA; OSPESCA; University of Southern Mississippi	CERMES; CANARI; Marine Affairs Program (Dalhousie University); the Fisheries Centre (University of British Columbia)	11 + interest of the Network of Cooperating Marine Laboratories
25	Assess the vulnerability and risks associated with changing climate;	UWI; CERMES; CCCCC; CDEMA; CANARI; University of Southern Mississippi	Fisheries Centre (University of British Columbia); University of Ghent	11 + interest of CARPHA and Network of Cooperating Marine Laboratories



**Table 2: Potential Research Collaborators for Implementation of the Research Agenda**

Other Details: the number of academic and research institutions, regional partners and related agencies which indicated some level of interest in the respective activity – includes those which assigned high or medium to high priority to the respective activity.

ID#	Research Recommendation (as stated in source document)	High Priority	Medium to High Priority	Other Details
38	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	CCCCC; University of Southern Mississippi	UWI; Marine Affairs Program (Dalhousie University); Fisheries Centre (University of British Columbia)	12 + interest of Network of Cooperating Marine Laboratories
39	Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments	CERMES; CCCCC; CANARI	UWI; Marine Affairs Program (Dalhousie University); Fisheries Centre (University of British Columbia)	11
72	To establish a Working Group to be convened through the CRFM to regularly consult on methodologies and approaches that will harmonise and enhance the reliability of data collection in relation to IUU fishing [this will require the corresponding research support]		Fisheries Centre (University of British Columbia); NOAA	8 + interest of IFREMER
84	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	University of Southern Mississippi	UWI; Aquaculture and Fisheries Group (Wageningen University)	9 + interests of IFREMER and Network of Cooperating Marine Laboratories
88	Develop new control technologies for lionfish (where relevant)		University of Southern Mississippi	7 + interest of IFREMER and Network of Cooperating Marine

**Table 2: Potential Research Collaborators for Implementation of the Research Agenda**

Other Details: the number of academic and research institutions, regional partners and related agencies which indicated some level of interest in the respective activity – includes those which assigned high or medium to high priority to the respective activity.

ID#	Research Recommendation (as stated in source document)	High Priority	Medium to High Priority	Other Details
				Laboratories
126	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.		UWI; CERMES; IFREMER; CANARI; University of Southern Mississippi; Aquaculture and Fisheries Group (Wageningen University)	8
160	Refer to existing data, historical records and institutional knowledge to create baseline status of species	University of Southern Mississippi		6
161	Develop reference list of species	University of Southern Mississippi	UWI	4
182	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 sLMR management	UWI	CERMES; CANARI; Marine Affairs Program (Dalhousie University)	8 + interest of UWI Faculty of Law

**Table 2: Potential Research Collaborators for Implementation of the Research Agenda**

Other Details: the number of academic and research institutions, regional partners and related agencies which indicated some level of interest in the respective activity – includes those which assigned high or medium to high priority to the respective activity.

ID#	Research Recommendation (as stated in source document)	High Priority	Medium to High Priority	Other Details
61	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	IFREMER; OSPESCA; University of Southern Mississippi	UWI	10
141	Conduct research in order to determine the development potential of underutilised and unutilised fisheries resources	University of Southern Mississippi		6
80	Determine spatial distribution for commercial large pelagic species; [impacts of <i>Sargassum</i> and other environmental factors]	University of Southern Mississippi	UWI; IFREMER	9 + interest of Network of Cooperating Marine Laboratories
71	Support scientific research on invasive species such as lionfish and <i>Sargassum</i> to consider the current and long term impacts on the regional fisheries	CERMES; University of Southern Mississippi	UWI; Fisheries Centre (University of British Columbia)	9 + interest of Network of Cooperating Marine Laboratories
78	Conduct studies to assess the impact of <i>Sargassum</i> on pelagics, especially dolphinfish and wahoo	UWI; CERMES; IFREMER; University of Southern Mississippi		9 + interest of Network of Cooperating Marine Laboratories
31	Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica]	University of Southern Mississippi	Fisheries Centre (University of British Columbia); Aquaculture and Fisheries Group (Wageningen University)	9 + interest of Network of Cooperating Marine Laboratories

**Table 2: Potential Research Collaborators for Implementation of the Research Agenda**

Other Details: the number of academic and research institutions, regional partners and related agencies which indicated some level of interest in the respective activity – includes those which assigned high or medium to high priority to the respective activity.

<b>ID#</b>	<b>Research Recommendation (as stated in source document)</b>	<b>High Priority</b>	<b>Medium to High Priority</b>	<b>Other Details</b>
10	Industry research on local feed material substitution in small-scale fish farming	Aquaculture and Fisheries Group (Wageningen University)	University of Southern Mississippi	5
4	National GIS-based surveys of biophysical, infrastructural and institutional factors to assess aquaculture potentials of country or region within country		Marine Affairs Program (Dalhousie University)	8
9	Preliminary scoping study and pilot project in 2 countries on renewable energy development in aquaculture		UWI; CCCCC; Aquaculture and Fisheries Group (Wageningen University)	5
3	Market and technical feasibility assessments of ornamental fish culture	University of Southern Mississippi		4

## 6. POTENTIAL SOURCES OF FUNDING

*Table 3* provides information on possible sources of funding to implement the 34 research activities identified in the Research Agenda and to guide the respective activities of the CRFM's Resource Mobilization Committee.

Eight academic and research institutions, regional partners and related agencies indicated areas of possible funding or willingness to seek funding (IFREMER, IMA, CARDI, CCCCC, CARPHA, the Florida Sea Grant Program, the University of Southern Mississippi, the Melbourne Law School) as well as one donor agency, the Technical Centre for Agricultural and Rural Cooperation (CTA).

The Virginia Institute of Marine Sciences expressed specific interest in collaborating with the CRFM to develop research/grant proposals in areas of mutual interest while OSPESCA indicated that it was in the process of seeking funds from donor agencies to facilitate implementation of research in areas of mutual interest. The Fisheries Centre (University of British Columbia) pointed to opportunities for funding research through Canada's Caribbean Program accessible through the Department of Foreign Affairs, Trade and Development, Canada. The Florida Sea Grant (FSG) Program indicated specific areas of available funding in its inputs to the Research Agenda but noted its constraints and those of the NOAA to directly fund research outside of the US territories in the Caribbean. It indicated its support for co-ordination of collective research such that projects and results can be used more broadly or be more applicable or relevant to the region. The Fisheries Training Program (United Nations University) also expressed interest in being a co-funder, or co-applicant for funds, to facilitate activities of mutual interest but these were mainly related to capacity-building.

Funding is also available under current, or soon to be implemented, regional projects such as the: (1) Caribbean Large Marine Ecosystem Project: Catalysing Implementation of the Strategic Action Programme for the Sustainable Management of shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+ Project – Second Phase); (2) the Pilot Programme for Climate Resilience – Regional Track (PPCR); (3) Climate Change Adaptation in the Eastern Caribbean Fisheries Sector (CC4FISH Project); and (4) Sustainable management of bycatch in Latin America and Caribbean trawl fisheries (REBYC-II LAC) – See *Section 7*.

**Table 3. Potential sources of funding to implement the Research agenda.**

E = Institute of Marine Affairs; F = Caribbean Agricultural Research Development Institute (CARDI); G = Caribbean Community Climate Change Centre (CCCCC); K = Caribbean Public Health Agency (CARPHA); P = Florida Sea Grant Program (University of Florida); R = University of Southern Mississippi.  
 1 = Technical Centre for Agricultural and Rural Cooperation (CTA); 2 = CLME + Project (Second Phase); 3 = PPCR; 4 = CC4FISH Project; 5 = REBYC-II LAC Project - Y = Yes; P = may be possible.; Shaded rows represent those for which funding is not yet identified.

ID#	Research Recommendation (as stated in source document)	E	F	G	K	P	R	1	2	3	4	5
36	Economic valuation of fisheries and aquaculture resources in selected countries										Y	Y
140	Conduct research in order to ascertain the status of fish stocks								Y	Y	Y	
148	Assessment and management of overcapacity and IUU: IUU (illegal, unreported and unregulated) fishing affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their capacity to contribute to poverty alleviation.							Y	Y			
170	Promote and provide assistance to the development and implementation of National monitoring plans for IAS											
171	Identify priority habitats or ecosystems severely impacted by IAS for rehabilitation or restoration											
172	Adopt or develop protocols for rehabilitation or restoration of IAS impacted sites											
40	Valuation of resources and communicate results to policy makers, decision makers and stakeholders											
82	Assess and develop safe lionfish harvesting strategies for seafood markets	Y			Y5							
83	Record and assess existing technologies to control lionfish invasion and identify most successful ones	Y										
134	Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture								Y			Y

**Table 3. Potential sources of funding to implement the Research agenda.**

E = Institute of Marine Affairs; F = Caribbean Agricultural Research Development Institute (CARDI); G = Caribbean Community Climate Change Centre (CCCCC); K = Caribbean Public Health Agency (CARPHA); P = Florida Sea Grant Program (University of Florida); R = University of Southern Mississippi.  
 1 = Technical Centre for Agricultural and Rural Cooperation (CTA); 2 = CLME + Project (Second Phase); 3 = PPCR; 4 = CC4FISH Project; 5 = REBYC-II LAC Project - Y = Yes; P = may be possible.; Shaded rows represent those for which funding is not yet identified.

ID#	Research Recommendation (as stated in source document)	E	F	G	K	P	R	1	2	3	4	5
116	Valuation of the fisheries sector and related activities											Y
22	(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			Y1							Y	Y
30	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.		Y	Y2						Y	Y	
24	Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors										Y	
25	Assess the vulnerability and risks associated with changing climate;		Y	Y3							Y	
38	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	Y		Y4				P				
39	Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments										Y	

**Table 3. Potential sources of funding to implement the Research agenda.**

E = Institute of Marine Affairs; F = Caribbean Agricultural Research Development Institute (CARDI); G = Caribbean Community Climate Change Centre (CCCCC); K = Caribbean Public Health Agency (CARPHA); P = Florida Sea Grant Program (University of Florida); R = University of Southern Mississippi.  
 1 = Technical Centre for Agricultural and Rural Cooperation (CTA); 2 = CLME + Project (Second Phase); 3 = PPCR; 4 = CC4FISH Project; 5 = REBYC-II LAC Project - Y = Yes; P = may be possible.; Shaded rows represent those for which funding is not yet identified.

ID#	Research Recommendation (as stated in source document)	E	F	G	K	P	R	1	2	3	4	5
72	To establish a Working Group to be convened through the CRFM to regularly consult on methodologies and approaches that will harmonise and enhance the reliability of data collection in relation to IUU fishing [this will require the corresponding research support]							Y	Y			
84	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											
88	Develop new control technologies for lionfish (where relevant)											
126	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.											
160	Refer to existing data, historical records and institutional knowledge to create baseline status of species											
161	Develop reference list of species											
182	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 sLMR management								Y	Y	Y	Y
61	Collaboration with OSPESCA on regional research concerning species/fisheries of interest such a the spiny lobster, large pelagic fisheries, queen conch and lionfish - biology, ecology and management											



**Table 3. Potential sources of funding to implement the Research agenda.**

E = Institute of Marine Affairs; F = Caribbean Agricultural Research Development Institute (CARDI); G = Caribbean Community Climate Change Centre (CCCCC); K = Caribbean Public Health Agency (CARPHA); P = Florida Sea Grant Program (University of Florida); R = University of Southern Mississippi.  
 1 = Technical Centre for Agricultural and Rural Cooperation (CTA); 2 = CLME + Project (Second Phase); 3 = PPCR; 4 = CC4FISH Project; 5 = REBYC-II LAC Project - Y = Yes; P = may be possible.; Shaded rows represent those for which funding is not yet identified.

ID#	Research Recommendation (as stated in source document)	E	F	G	K	P	R	1	2	3	4	5
141	Conduct research in order to determine the development potential of underutilised and unutilised fisheries resources										Y	
80	Determine spatial distribution for commercial large pelagic species; [impacts of <i>Sargassum</i> and other environmental factors]										Y	
71	Support scientific research on invasive species such as lionfish and <i>Sargassum</i> to consider the current and long term impacts on the regional fisheries										Y	
78	Conduct studies to assess the impact of <i>Sargassum</i> on pelagics, especially dolphinfish and wahoo										Y	
31	Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica]					P						
10	Industry research on local feed material substitution in small-scale fish farming											
4	National GIS-based surveys of biophysical, infrastructural and institutional factors to assess aquaculture potentials of country or region within country											
9	Preliminary scoping study and pilot project in 2 countries on renewable energy development in aquaculture											
3	Market and technical feasibility assessments of ornamental fish culture						Y					

Y1 = Possible funding from Green Climate Fund (GCF), Department for International Development (DFID, UK), European Union (EU) for collaborative programs between CCCCC and CRFM.

Y2 = Centre in the process of developing site specific climate scenarios for all CARICOM countries. Training will at some time be provided for sectoral experts to integrate the scenarios into available impact models.

Y3 = Could seek funding through Kreditanstalt für Wiederaufbau (KfW), EU, Department of Foreign Affairs, Trade and Development (DFATD, Canada)

**Table 3. Potential sources of funding to implement the Research agenda.**

E = Institute of Marine Affairs; F = Caribbean Agricultural Research Development Institute (CARDI); G = Caribbean Community Climate Change Centre (CCCCC); K = Caribbean Public Health Agency (CARPHA); P = Florida Sea Grant Program (University of Florida); R = University of Southern Mississippi.  
 1 = Technical Centre for Agricultural and Rural Cooperation (CTA); 2 = CLME + Project (Second Phase); 3 = PPCR; 4 = CC4FISH Project; 5 = REBYC-II LAC Project - Y = Yes; P = may be possible.; Shaded rows represent those for which funding is not yet identified.

ID#	Research Recommendation (as stated in source document)	E	F	G	K	P	R	1	2	3	4	5
Y4 = Possible funding under the KfW coastal adaptation project now being implemented by the Centre. In addition possible funding under the GCF, EU Global Climate Change Alliance (GCCA) Program Y5 = in discussion with the Government of Japan on a ciguatera research project; possible advancement through Caribbean Aqua-Terrestrial Solutions (CATS) project with GIZ, as well as under the 11th EDF Intra-ACP Strategy												

## 7. REGIONAL PROJECTS AND INITIATIVES CONTRIBUTING TO ACTIVITIES UNDER THE RESEARCH AGENDA

At the time of development of this Research Agenda there were already some regional projects and initiatives either approved, at an advanced stage of development, or completed that could, or have, contributed to achievement of some of the research activities in the Research Agenda. These projects and initiatives and the respective research activities are listed in **Table 4**. No regional projects or research initiatives were identified for research activities numbered 170, 171, 172, 160, 161, 10, 4, 9, and 3.

The main regional projects are as follows:

*CLME+ (Second Phase)*: This project was approved by the Global Environment Facility in March 2015. It is a 5-year project that aims to facilitate the implementation of the 10-year politically endorsed Strategic Action Programme for the Sustainable Management of the Shared Living Marine Resources of the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+ SAP). The project will focus on establishment and implementation of governance mechanisms and therefore will contribute to the broad governance activity #182. It is also expected to address some of the research recommendations pertaining to the flyingfish, lobster and shrimp and groundfish fisheries (with direct linkages with recommendations concerning reef and slope, pelagic and continental shelf species, fisheries and ecosystems). The Project is being executed by a Program Coordination Unit in Colombia. The CRFM is implementing the Flyingfish Sub-project, while the FAO is implementing the Shrimp and Groundfish Sub-project and OSPESCA is implementing the Lobster Sub-Project. All CRFM Member States are included in the list of participating countries which extend to Latin America and Brazil.

*PPCR*: The Investment Proposal for this 4-year project was approved by the Inter-American Development Bank (IDB) in May 2015. The overall executing agency is the Mona Campus for Research and Innovation (UWI), in partnership with eight regional organizations. The project is focusing on improving geospatial data and management for adaptation planning, sea level rise and storm surge impact analysis; consolidating and expanding the regional climate network and global platform linkages; downscaling and expanded climate projection models and high resolution maps; and applied adaptation initiatives. The CRFM is implementing the Applied Adaptation Initiatives Component – Marine Sub-Component. The main research activities focuses on fisheries and marine ecosystem assessments and analyses as well as socio-economic and ecological climate impact assessments – focusing on 3 main ecosystems (pelagic, reef and continental shelf), in order to provide management advice for decision-making in climate change adaptation and disaster risk management in fisheries. There is preference by the funding agency for implementation of this project in countries which are already implementing the national-track of the PPCR, namely: Jamaica, Haiti, Dominica, Saint Lucia, Grenada and St Vincent and the Grenadines. However, it is recognized that analyses on the continental shelf fisheries and ecosystems would require inclusion of additional CRFM Member States.

*REBYC-II LAC*: This project was approved by the Global Environment Facility in March 2015. The project addresses the barriers to better management of bycatch in support of sustainable development of the trawling sector and the people who depend on and are influenced by it, including also other fisheries. The project focuses on improving institutional and regulatory frameworks for shrimp/bottom trawl

fisheries and co-management; strengthening by-catch management and responsible trawling practices within an EAF framework; and promoting sustainable and equitable livelihoods through enhancement and diversification. The project is being executed by the Western Central Atlantic Fishery Commission in partnership with the governments of six countries with significant trawl fisheries, including two CRFM Member States, Suriname and Trinidad and Tobago.

*CC4FISH*: This project is not yet approved. The full Project Document was to be submitted to the Global Environment Facility in mid-2015, for this 4-year project. The Project aims to build understanding and awareness-building of climate change and vulnerability; to build fisherfolk, aquaculturists and coastal community resilience to climate change and vulnerability; and to mainstream climate change adaptation into multi-level fisheries governance. The Project is being executed by the Western Central Atlantic Fishery Commission with other regional partners (CRFM, CNFO, UWI, TNC and CARIBSAVE Partnership) and the governments of the seven participating countries (Antigua and Barbuda, St Kitts and Nevis, Dominica, Saint Lucia, St Vincent and the Grenadines, Grenada and Trinidad and Tobago).

In addition to the regional projects achievement of the research activities could also be facilitated through implementation of the CRFM-OSPESCA Joint Action Plan as well as numerous joint regional working groups established under the WECAFC.

<b>Table 4: Regional projects and initiatives contributing to achievement of activities in the Research Agenda.</b>		
<b>ID#</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Projects and Initiatives</b>
36	Economic valuation of fisheries and aquaculture resources in selected countries	Concept Note being developed by Secretariat to attract donor support; <b>CLME + -</b> focus on flyingfish (Value-chain problem solving - feasible options for added value, improved SPS and distribution and marketing); <b>REBYC-II LAC</b> - Value chain analysis with focus on the utilisation of bycatch in shrimp trawl fisheries and the roles of gender and vulnerable groups.
140	Conduct research in order to ascertain the status of fish stocks	Some progress made by the <b>CRFM and WECAFC Working Groups</b> as well as by the <b>Future of Reefs in a Changing Environment (FORCE)</b> initiative to develop indicators of fishing pressure on reefs with focus on parrotfish; <b>CLME+ -</b> focus is on flyingfish fisheries (Updated and broadened multi-objective assessment of Eastern Caribbean Flyingfish Fisheries; Critical assessment of performance of all components of the policy cycle with recommendations for improvements at each stage of the policy cycle); <b>CLME + -</b> focus on lobster fisheries (Develop common stock assessment model and carry out stock assessment for south-central stock); <b>CLME + -</b> focus on shrimp and groundfish fisheries (Updated shrimp and groundfish status reports on catch and effort, biological and socio-economic information disseminated through FIRMS resources and fisheries inventories for 4 participating countries); <b>PPCR</b> - Fisheries and marine ecosystem assessments and analyses and Socio-economic and ecological climate impact assessments – focusing on 3 main ecosystems (pelagic, reef and continental shelf); <b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability and modeling growth, abundance and mass-transport of pelagic Sargassum invasions into the Eastern Caribbean and implications for pelagic fisheries - emphasis on dolphinfish and flyingfish
148	Assessment and management of overcapacity and IUU: IUU (illegal, unreported and unregulated) fishing affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their capacity to contribute to poverty alleviation.	<b>CLME + -</b> focus on shrimp and groundfish fisheries (Updated information on IUU fishing for shrimp and groundfish, spiny lobster and flyingfish fisheries)
40	Valuation of resources and communicate results to policy makers, decision makers and stakeholders	Concept Note being developed to attract donor support

<b>Table 4: Regional projects and initiatives contributing to achievement of activities in the Research Agenda.</b>		
<b>ID#</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Projects and Initiatives</b>
82	Assess and develop safe lionfish harvesting strategies for seafood markets	Significant progress of related activities coordinated by the <b>GCFI</b>
83	Record and assess existing technologies to control lionfish invasion and identify most successful ones	Some work done under the coordination of <b>GCFI</b>
134	Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture	Concept Note being developed to attract donor support; <b>CLME +</b> - focus on flyingfish (Comprehensive and gender-sensitive valuation (social and economic) of the current and potential future contribution of flyingfish and associated pelagic fisheries to food security (socio-economic), income (costs and earnings) and employment (socio-economic) and ecosystem goods and services (ecological); Development and implementation of activity proposals to facilitate livelihood enhancement, focused either on increasing market or livelihood opportunities from current levels, and taking into account gender equality and youth development considerations; Support for implementation of activity proposals, including hands-on training of the stakeholders involved in proposal development and implementation, as well as core business and management skills); <b>REBYC-II LAC</b> - Socio-economic assessment of the shrimp trawl fishery
116	Valuation of the fisheries sector and related activities	Concept Note being developed to attract donor support; <b>REBYC-II LAC</b> - Value chain analysis with focus on the utilisation of bycatch in shrimp trawl fisheries and the roles of gender and vulnerable groups; <b>CERMES</b> - <i>some research already done</i>
22	(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	<b>CC4FISH</b> - development of alternative, improved livelihoods; Also, progress made by <b>The Nature Conservancy</b> and the <b>Biodiversity and Protected Areas Management (BIOPAMA)</b> ; <b>REBYC-II LAC</b> - specific to shrimp and groundfish fisheries management and related By-catch issues - Existing and potential non-fisheries livelihood alternatives for both men and women identified along the value chain, and capacity building support provided accordingly, including promotion of decent work.

<b>Table 4: Regional projects and initiatives contributing to achievement of activities in the Research Agenda.</b>		
<b>ID#</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Projects and Initiatives</b>
30	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.	<b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability and modeling growth, abundance and mass-transport of pelagic Sargassum invasions into the Eastern Caribbean and implications for pelagic fisheries - emphasis on dolphinfish and flyingfish; <b>PPCR</b> - Fisheries and marine ecosystem assessments and analyses and Socio-economic and ecological climate impact assessments – focusing on 3 main ecosystems (pelagic, reef and continental shelf).
24	Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors	<b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability with emphasis on dolphinfish and pelagic fisheries; Local vulnerability assessments;
25	Assess the vulnerability and risks associated with changing climate;	<b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability with emphasis on dolphinfish and pelagic fisheries; Local vulnerability assessments;
38	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	Some progress on coral reefs made by the <b>World Resources Institute</b> in Saint Lucia and Tobago.
39	Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments	<b>CC4FISH</b> - Local vulnerability assessments;
72	To establish a Working Group to be convened through the CRFM to regularly consult on methodologies and approaches that will harmonize and enhance the reliability of data collection in relation to IUU fishing [this will require the	<b>CLME +</b> - focus on shrimp and groundfish fisheries (Updated information on IUU fishing for shrimp and groundfish, spiny lobster and flyingfish fisheries). Also opportunity under the respective <b>WECAFC IUU Fishing Working Group</b> .

<b>Table 4: Regional projects and initiatives contributing to achievement of activities in the Research Agenda.</b>		
<b>ID#</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Projects and Initiatives</b>
	corresponding research support]	
84	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	Some work done under the coordination of <b>GCFI</b>
88	Develop new control technologies for lionfish (where relevant)	Some work done under the coordination of <b>GCFI</b>
126	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.	Concept Note being developed to attract donor support
182	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 sLMR management	<b>CLME</b> + - focus on flyingfish, lobster, shrimp and groundfish; <b>REBYC-II LAC</b> - regional strategy for shrimp/bottom trawl fisheries and bycatch management, national legal frameworks for shrimp/bottom trawl fisheries and bycatch co-management reviewed and amended, institutional structures for EAF and co-management of shrimp/bottom trawl fisheries and bycatch in place. <b>PPCR</b> – generation of advice for decision-making on climate change adaptation and disaster risk management in fisheries; <b>CC4FISH</b> – development of a regional protocol for integrating climate change adaptation and disaster risk management into the Caribbean Community Common Fisheries Policy.



<b>Table 4: Regional projects and initiatives contributing to achievement of activities in the Research Agenda.</b>		
<b>ID#</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Regional Projects and Initiatives</b>
61	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	Joint Action Plan between the CRFM and OSPESCA to be implemented
141	Conduct research in order to determine the development potential of underutilised and unutilised fisheries resources	<b>CC4FISH</b> - Development of business proposals to facilitate full utilization of key commercial and under-utilized species;
80	Determine spatial distribution for commercial large pelagic species; [impacts of <i>Sargassum</i> and other environmental factors]	<b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability and modeling growth, abundance and mass-transport of pelagic <i>Sargassum</i> invasions into the Eastern Caribbean and implications for pelagic fisheries - emphasis on dolphinfish and flyingfish
71	Support scientific research on invasive species such as lionfish and <i>Sargassum</i> to consider the current and long term impacts on the regional fisheries	<b>CERMES</b> - <i>ongoing survey of impacts of lionfish on fishers planned in the near future</i> ; <i>Sargassum</i> bring addressed under <b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability and modeling growth, abundance and mass-transport of pelagic <i>Sargassum</i> invasions into the Eastern Caribbean and implications for pelagic fisheries - emphasis on dolphinfish and flyingfish
78	Conduct studies to assess the impact of <i>Sargassum</i> on pelagics, especially dolphinfish and wahoo	<b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability and modeling growth, abundance and mass-transport of pelagic <i>Sargassum</i> invasions into the Eastern Caribbean and implications for pelagic fisheries - emphasis on dolphinfish and flyingfish
31	Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica]	<b>CC4FISH</b> - Risk assessment modeling for pelagic fisheries with climate change and variability and modeling growth, abundance and mass-transport of pelagic <i>Sargassum</i> invasions into the Eastern Caribbean and implications for pelagic fisheries - emphasis on dolphinfish and flyingfish

## **8. RESOURCES REQUIRED FOR NATIONAL IMPLEMENTATION OF THE RESEARCH AGENDA**

Effective implementation of the CRFM Fisheries and Aquaculture Research Agenda will require technical, financial and human resource support at both the regional and national levels. While the Secretariat will seek the necessary technical support at the regional level through its interactions with key research and academic institutions and it is expected that the Resource Mobilization Committee will do same in seeking financial support, complementary support at the national level is critical in ensuring that Member States receive optimal benefits of such research towards improved management of their fisheries and aquaculture resources and the respective ecosystems. In this regard, institutional strengthening and capacity-building to fully implement the Research Agenda at the national level, including establishment of the required data collection systems whether on a continuous, periodic or *ad-hoc* basis, are key factors which will impact on the success of implementation of the regional Research Agenda. Opportunities exist for the respective capacity building through existing Memoranda of Understanding between the CRFM and specific academic institutions while there is potential for support from the International Commission for the Conservation of Atlantic Tunas and the Fisheries and Resources Monitoring System (FIRMS) of the Food and Agriculture Organization to improve national data collection systems.

## **9. REFERENCES**

- CRFM, 2013. CRFM Strategic Plan (2013 – 2021) [provisional]. CRFM Administrative Report. 35 pp.
- CRFM 2015. Report and Proceedings of the Twenty-fourth Meeting of the Executive Committee of the Caribbean Fisheries Forum. Kingstown, St. Vincent and the Grenadines, 19 – 20 February, 2015. Volume 1 – Supplement 2. CRFM Management Report – PY 2014 / 15. 73 pp.
- CRFM 2015a. Draft Report and Proceedings of the Thirteenth Meeting of the Caribbean Fisheries Forum, St. George's, Grenada, 30 – 31 March 2015. Volume 1. CRFM Management Report – PY 2015 / 16. 136 pp.
- CRFM 2015b. Report and Proceedings of the First Special Meeting of the Executive Committee of the Caribbean Fisheries Forum, 14 September 2015. Volume 1 – Supplement 1. CRFM Management Report – PY 2015 / 16. 16 pp.
- Mohammed, E. 2015. Developing the CRFM's Fisheries and Aquaculture Research Agenda. *CRFM Technical & Advisory Document*, No. 2015/ 03. 110 pp.

**APPENDIX 1: LIST OF REFERENCE DOCUMENTS USED TO DEVELOP THE CRFM FISHERIES AND AQUACULTURE RESEARCH AGENDA**

<b>Shortened Reference</b>	<b>Full Citation</b>
Coral Reef PoA	Australia Caribbean Coral Reef Collaboration 2014. Improving the outlook for Caribbean coral reefs: A Regional Plan of Action 2014-2019, Great Barrier Reef Marine Park Authority, Townsville.
Regional IAS Strategy & Action Plan	CABI. 2011. Strategy and Action Plan for Invasive Alien Species in the Caribbean Region 2011-2016. CABI, Curepe, Trinidad and Tobago. [An output of the Project: Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (MTIASCIC) and collaborating countries, institutions, not for profit organizations and citizens of the wider Caribbean.
CCCFP	Caribbean Community Common Fisheries Policy
Food and Nutrition Security Policy	CARICOM Secretariat. 2011. Caribbean Regional Food and Nutrition Security Policy. CARICOM Secretariat, Turkeyen, Greater Georgetown, Guyana. 63 p.
IUU Fishing Declaration	Castries (St Lucia) Declaration on Illegal, Unreported and Unregulated Fishing - July 2010
CLME+ SAP	CLME Project. 2013. Strategic Action Programme (SAP) for the Sustainable Management of the shared Living Marine Resources of the Caribbean and North Brazil Shelf Large Marine Ecosystem. GEF/UNDP. 99p.
9th ASM	CRFM 2013. Report of Ninth Annual CRFM Scientific Meeting - Kingstown, St. Vincent and the Grenadines, 10-14 June 2013. CRFM Fishery Report - 2013. Volume 1. 85p.
10th ASM	CRFM 2014. Report of Tenth Annual CRFM Scientific Meeting - Kingstown, St. Vincent and the Grenadines, 10-17 June 2013. CRFM Fishery Report - 2014. Volume 1. 179 p.
Blue Growth	CRFM 2014. Report of the CRFM / CNFO / CTA Regional Fisheries Workshop: Investing in Blue Growth, St. George's, Grenada on 20 - 21 November 2014
2nd Joint FF WG Mtg.	CRFM 2014. Report of the Second Joint meeting of the CRFM Small Coastal Pelagic Fish Resource Working Group (SCPWG) and the CRFM/WECAFC Working Group on Flyingfish in the Eastern Caribbean. CRFM Fishery Report - 2013. Volume 1, Suppl. 3. 4p.
CRFM News	CRFM Newsletter - Scientific Issue - August 2014
CCA and DRM Assessment	CRFM, 2013. McConney, P., J. Charlery, M. Pena. Climate Change Adaptation and Disaster Risk Management in Fisheries And Aquaculture in the Caribbean Region. Volume 1 - Assessment Report. CRFM Technical & Advisory Document, No. 2013/8. 93p.
CCA and DRM Strategy	CRFM, 2013. McConney, P., J. Charlery, M. Pena. Climate Change Adaptation and Disaster Risk Management in Fisheries And Aquaculture in

<b>Shortened Reference</b>	<b>Full Citation</b>
	the Caribbean Region. Volume 2 - Regional Strategy and Action Plan. CRFM Technical & Advisory Document, No. 2013/8. 29p.
CCA And DRM Projects	CRFM, 2013. McConney, P., J. Charlery, M. Pena. Climate Change Adaptation and Disaster Risk Management in Fisheries And Aquaculture in the Caribbean Region. Volume 3 - Programme Proposals. CRFM Technical & Advisory Document, No. 2013/8. 20p.
MCS Strategy	CRFM, 2013. Regional Strategy on Monitoring, Control and Surveillance to Combat Illegal, Unreported and Unregulated Fishing in the CARICOM/CARIFORUM Region. CRFM Technical & Advisory Document, No. 2013 / 11. 79 p.
FAD Fishery Management	CRFM, 2013. Report of the CRFM-JICA CARIFICO/WECAFC - IFREMER MAGDELESA Workshop on FAD Fishery Management, 09 - 11 December 2013, St Vincent and the Grenadines. CRFM Technical & Advisory Document, No. 2013/9. 42p. (Appendix 11 - Conclusions)
Queen Conch fishery management	CRFM, 2013. Support to improve and harmonize the scientific approaches required to inform sustainable management of Queen Conch ( <i>Strombus gigas</i> ) by CARIFORUM States: Regional Review of the Queen Conch. CRFM Technical and Advisory Document. No. 2013/11
CRFM/CARICOM/ Japan Friendship Year	CRFM, 2014. Draft Report of the CRFM / CARICOM/Japan Friendship Year: Regional Fisheries Workshop. 04 – 05 December 2014, Trinidad and Tobago. CRFM Technical & Advisory Document, No. 2014/ 6 . 65p
Statistics and Information Wksp.	CRFM, 2014. Report of Workshop to Develop Draft Strategy to Strengthen Capacity in CRFM States in the Area of Fisheries Statistics and Information, 10-12 February 2014, St Vincent and the Grenadines. CRFM Technical & Advisory Document, No. 2014/1. 135p.
Aquaculture PoA	CRFM, 2014. Study on the Potential of Fish Farming in the Caribbean. CRFM Technical & Advisory Document No. 2014/2. 78p.
Flyingfish FMP	CRFM, 2014. Sub-Regional Fisheries Management Plan for Flyingfish in the Eastern Caribbean. CRFM Special Publication No. 2. 42p. + annexes.
1st ASM	CRFM. 2005. Report of the First Annual CRFM Scientific Meeting. CRFM Fishery Report No. 11. 318 p.
2nd ASM	CRFM. 2006. Report of Second Annual Scientific Meeting - Port of Spain, Trinidad and Tobago, 13-22 March 2006. CRFM Fishery Report - 2006, Volume 1. 188 p.
3rd ASM	CRFM. 2007. Report of the Third Annual Scientific Meeting - St Vincent and the Grenadines, 17-26 July 2007. CRFM Fishery Report - 2007, Volume 1. 183 p.
4th ASM	CRFM. 2008. Report of the Fourth Annual Scientific Meeting - Kingstown, St Vincent and the Grenadines, 10-20 June 2008. CRFM Fishery Report - 2008. Volume 1. 219 p.
5th ASM	CRFM. 2009. Report of the Fifth Annual Scientific Meeting - Kingstown, St Vincent and the Grenadines, 09-18 June 2009. CRFM Fishery Report - 2009.

<b>Shortened Reference</b>	<b>Full Citation</b>
	Volume 1. 180 p.
6th ASM	CRFM. 2010. Report of the Sixth Annual Scientific Meeting - Kingstown, St Vincent and the Grenadines, 07-16 June. CRFM Fishery Report - 2010. Volume 1. 109 p.
7th ASM	CRFM. 2011. Report of the Seventh Annual Scientific Meeting - Kingstown, St Vincent and the Grenadines, 16-24 June 2011. CRFM Fishery Report - 2011. Volume 1. 181 p.
Diagnostic study on poverty levels	CRFM. 2012. Diagnostic Study to Determine Poverty Levels in CARICOM Fishing Communities - Policy Document. CRFM Technical & Advisory Document, Number 2012/3, Volume II. 25p. (Policy Document)
CRFM Management Report - PY 2013-14	CRFM. 2013. Report and Proceedings of the Seventh Meeting of the Ministerial Council of the Caribbean Regional Fisheries Mechanism, Accra Beach Hotel and Spa, Christ Church, Barbados, 31 May 2013. Volume 2. CRFM Management Report - PY 2013/14. 86 p.
Queen Conch field surveys	CRFM. 2013. Report of Workshop to deliver training in the conduct of queen conch field surveys. CRFM Technical and Advisory Document, No. 2013/16.
CRFM-OSPESCA Joint Action Plan	CRFM-OSPESCA Joint Action Plan - September 2012
Lionfish Strategy	Gomez Lozano, R., L. Anderson, J.L. Akins, D.S.A. Budd. Garcia-Moliner, F. Gourdin, M. Laurent, C. Lilyestrom, J.A. Morris, Jr., N. Ramnanan and R. Torres. 2013. Regional Strategy for the Control of Invasive Lionfish in the Wider Caribbean. International Coral Reef Initiative, 31 pp.
Spiny Lobster monitoring	Headley, M. and Seijo, J.C., 2015. A review of the methodologies used for monitoring and evaluation of the spiny lobster stocks in the WECAFC countries and the development of a common methodology. FAO Publication - in prep.
JICA Master Plan Study	JICA IC Net Limited. 2012. Study on the Formulation of a Master Plan on the Sustainable Use of Fisheries Resources for Coastal Community Development in the Caribbean - Final Report. JICA, Japan. 153 pp + Appendices
EC recreational fisheries	Mohammed, E. 2012. Recreational Fisheries of the Eastern Caribbean. CRFM Research Paper Collection. Volume 7: 27-92.

## APPENDIX 2: LIST OF STRATEGIC OBJECTIVES - CRFM STRATEGIC PLAN - 2013 TO 2021

(Source: CRFM, 2013)

Strategic Objectives	Organizational Results
Strategic Objective A: Information on status and trends in the fisheries and aquaculture sector	<p>A1 – Countries and the CRFM Secretariat have strengthened capacities to collect, manage, analyze and use data and information for decision making, planning, policy formulation and implementation.</p> <p>A2 - Appropriate (regional) standards for data and information sharing are adopted by the Countries, supported by a protocol for data and information sharing</p> <p>A3 - A regional database on fisheries and aquaculture statistics and information from the CRFM members is established and maintained at the Secretariat offices.</p> <p>A4 – A CRFM Statistics and Information report is published annually.</p>
Strategic Objective B: Research & Development	<p>B1 - The social and economic performance of fisheries and aquaculture is evaluated and enhanced through appropriate measures (such as fuel saving technologies).</p> <p>B2 – A regional (collaborative) fisheries and aquaculture research agenda is effectively implemented through annual scientific meetings, joint species specific Working Groups, and targeted research projects and collaboration with national, regional and international academic and research institutions.</p> <p>B3 – The status of the ten most important commercially targeted fisheries stocks in the CRFM region is known, management performance relative to agreed targets is determined’ , as well as the need for conservation and potential scope for increase in production.</p> <p>B4 - The effectiveness of management and conservation measures is monitored and evaluated in line with internationally accepted indicators, and results are made publicly available.</p> <p>B5 – Best-practices fisheries technologies and gears are introduced by CRFM members, accompanied by technology transfer compliant with international standards.</p>
Strategic Objective C: Sustainable management of fisheries resources	<p>C1 – Policies, institutional arrangements and standards that facilitate the implementation of the CCCFP and the CCRF and other regional/international fisheries instruments have improved.</p> <p>C2 – The Precautionary approach (PA), Ecosystem Approach to Fisheries (EAF) and the Castries Declaration on Illegal, Unreported and Unregulated Fishing are actively implemented by the CRFM.</p> <p>C3 – Fisheries legal frameworks in the CRFM member countries, in support of sustainable utilization of the fisheries resources, are updated and harmonized where possible.</p>

Strategic Objectives	Organizational Results
	<p>C4 - Fisheries management and development plans and other fishery-specific conservation, management and recovery plans are prepared, adopted and implemented at national level and regional level where appropriate</p> <p>C5 – The state of fisheries resources and aquatic ecosystems in general in the CRFM mandate area is improved through effecting change to more sustainable fisheries practices.</p> <p>C6 - Fisheries operations by all CRFM members are made more transparent, efficient, safer and compliant with rules at all levels through established and functioning Monitoring, Control and Surveillance (MCS) systems, including a regional vessel monitoring system (VMS).</p>
<p>Strategic Objective D: Sustainable use of fisheries resources</p>	<p>D1 Small-scale fisherfolk organizations in CRFM member countries play an active role in planning, managing and monitoring fisheries.</p> <p>D2- Post-harvest losses are reduced and fish and fisheries products quality and safety are improved in the CRFM member countries.</p> <p>D3–The infrastructure for marketing and trade of fish and fisheries products in the CRFM member countries is improved and meets domestic needs and international standards where required.</p> <p>D4 The role of women in all levels of the fish value chain has been strengthened.</p>
<p>Strategic objective E: Sustainable development of aquaculture</p>	<p>E1 – Policy, institutional and legal frameworks enabling responsible aquaculture development have been established in the CRFM member countries.</p> <p>E2 – Most CRFM members have increased production of fish and fish products through improved aquaculture planning, sustainable expansion, diversification of species and intensification of aquaculture production systems.</p> <p>E3 – Voluntary guidelines, best management practices and standards for sustainable aquaculture in the Caribbean developed and adopted by the stakeholders.</p>
<p>Strategic Objective F: Adaptation to climate change and disaster risk management in fisheries</p>	<p>F1- CRFM members have incorporated the “CARICOM strategy and action plan on climate change adaptation and disaster risk management in fisheries and aquaculture” in their national programmes and plans and are effectively implementing at national level.</p> <p>F2 – Fisherfolk and fishing communities’ vulnerability to crisis, threats and emergencies is reduced through better preparedness and integration of disaster risk management approaches (planning and decision-making).</p> <p>F3 - Partnerships with CDEMA, CCCCC, FAO and others are strengthened to effectively address climate change adaptation issues in fisheries and aquaculture and enable the CRFM to play a more active role and coordinating role in this subject.</p>

Strategic Objectives	Organizational Results
	F4 –The establishment of fisheries and aquaculture insurance schemes is promoted and technically supported by CRFM.
Strategic Objective G: Capacity building and institutional strengthening	<p>G1 - Fisheries governance is benefiting from strengthened national fisheries administrations and other supporting institutional frameworks.</p> <p>G2 – Fisherfolk organizations and their representatives are competent and capable to collaborate and participate actively in fisheries management and conservation processes at local, national and regional level.</p> <p>G3 – Dedicated fisheries skills development programmes designed and implemented at national and regional level through strengthened fisheries extension services.</p> <p>G4 – CRFM member countries and stakeholders have access to formal fisheries and aquaculture education programmes designed and implemented at CARICOM level.</p> <p>G5 – Small and Medium Enterprises (SMEs) active in the fisheries sector in the CRFM member states have business plans and access to micro-finance, credit and investment facilities</p>
Functional Objective H: Effective collaboration with member states and stakeholders	<p>H1 – Effective programme and project development that addresses CRFM members needs and priorities, accompanied by efficient resource mobilization, monitoring, implementation and reporting mechanisms.</p> <p>H2 – The process of provision of fisheries management advice is streamlined within the CRFM structure.</p> <p>H3 –The CRFM Communication Strategy is effectively implemented, addressing communication and information needs of CRFM members, Secretariat and other stakeholders.</p> <p>H4 – The joint CRFM-OSPESCA Action Plan and other key partnerships and alliances that contribute to and complement the CRFM work are implemented effectively.</p> <p>H5 – The Caribbean Large Marine Ecosystem (CLME+) Strategic Action Programme (SAP) is implemented actively by the CRFM.</p> <p>H6 – The presence of CRFM at ICCAT sessions and in ICCAT decision making processes has significantly increased.</p> <p>H7 – Effective direction of CRFM by the Ministerial Council and Fisheries Forum through improved governance, conflict resolution capacity and oversight.</p> <p>H8 – Enhanced representation of CRFM countries in regional/international fora (ICCAT, UNCLOS, COFI) and events through its members or the Secretariat.</p> <p>H9 - CRFM’s status and role within the region as an effective RFB, and its capacity for project management and coordination is strengthened and consolidated</p>



Strategic Objectives	Organizational Results
<p>Functional Objective I: Efficient and Effective administration</p>	<p>I1 – CRFM Member States are paying their annual contributions to CRFM in a timely manner, encouraged by the achievements, successes and benefits of CRFM membership and by the sanctions in the CRFM Agreement for non-payment of the contributions.</p> <p>I2 – Improved capacity in and resources available to the CRFM Secretariat to programme, plan and implement its activities in an effective and efficient manner.</p> <p>I3 – CRFM is recognized as provider of accurate and relevant administrative, financial and management information to its members.</p> <p>I4 – Strengthened capacity of the CRFM Secretariat to assume the additional responsibilities that accompany the role of CRFM as Competent Agency to support implementation of the CCCFP.</p> <p>I5 – Efficiency savings and gains identified, agreed and implemented.</p>

### APPENDIX 3: RESEARCH ACTIVITIES AS PRIORITIZED BY THE RESPECTIVE MEMBER STATES

BA = Barbados; BE = Belize; GR = Grenada; MO = Montserrat; SVG = St Vincent and the Grenadines; TT = Trinidad and Tobago; TCI = Turks and Caiços Islands

Member State Priority Levels - 1 = high priority; 2 = medium to high priority; 3 = medium priority; 4 = low to medium priority; 5 = low priority; 0 = not applicable;

Estimated Regional Priority Level - 1 - 1.4 = High; 1.5 - 2.4 = Medium to High; 2.5 - 3.4 = Medium; 3.5 - 4.4. = Low to Medium; 4.5 - 5 = Low.

Note that Barbados, Belize, Grenada and Trinidad and Tobago, prioritized only the first 144, of the full list of 182, research recommendations.

ID#	SO/OR (See Appendix 2)	Subject Area	Research Recommendation (as stated in source document)	Source (Shortened Reference) – See Appendix 1	BA	BE	GR	MO	SVG	TT	TCI	Regional Priority
36	F1	Climate change & natural hazards	Economic valuation of fisheries and aquaculture resources in selected countries	CCA and DRM Strategy	1		1	1	1	1	1	1.0
140	B3	Stock assessment and fisheries analyses	Conduct research in order to ascertain the status of fish stocks	CCCFP	1		1	1	1	1	1	1.0
148	C2	IUU fishing	Assessment and management of overcapacity and IUU: IUU (illegal, unreported and unregulated) fishing affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their capacity to contribute to poverty alleviation.	Diagnostic study on poverty levels				1	1		1	1.0

<b>ID#</b>	<b>SO/OR (See Appendix 2)</b>	<b>Subject Area</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Source (Shortened Reference) – See Appendix 1</b>	<b>BA</b>	<b>BE</b>	<b>GR</b>	<b>MO</b>	<b>SVG</b>	<b>TT</b>	<b>TCI</b>	<b>Regional Priority</b>
170	B; C	Invasive alien species	Promote and provide assistance to the development and implementation of National monitoring plans for IAS	Regional IAS Strategy & Action Plan				1	1			1.0
171	B; C	Invasive alien species	Identify priority habitats or ecosystems severely impacted by IAS for rehabilitation or restoration	Regional IAS Strategy & Action Plan				1	1			1.0
172	B; C	Invasive alien species	Adopt or develop protocols for rehabilitation or restoration of IAS impacted sites	Regional IAS Strategy & Action Plan				1	1			1.0
40	B1; F1	Reef and slope species, fisheries and ecosystems	Valuation of resources and communicate results to policy makers, decision makers and stakeholders	Coral Reef PoA	1		1	1	1	2	1	1.2
82	B; D3	Invasive alien species	Assess and develop safe lionfish harvesting strategies for seafood markets	Lionfish Strategy	1		1	1	1	1	2	1.2
83	B	Invasive alien species	Record and assess existing technologies to control lionfish invasion and identify most successful ones	Lionfish Strategy	1		1	1	1	1	2	1.2
134	B1	Stock assessment and fisheries analyses	Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture	CCCFP	2		1	1	1	1	1	1.2

<b>ID#</b>	<b>SO/OR (See Appendix 2)</b>	<b>Subject Area</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Source (Shortened Reference) – See Appendix 1</b>	<b>BA</b>	<b>BE</b>	<b>GR</b>	<b>MO</b>	<b>SVG</b>	<b>TT</b>	<b>TCI</b>	<b>Regional Priority</b>
116	B1	Stock assessment and fisheries analyses	Valuation of the fisheries sector and related activities	Statistics and Information Wksp.	2		1		1	1	1	1.2
22	F1; F2	Climate change & natural hazards	(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	CCA and DRM Strategy (A); CRFM-OSPESCA Joint Action Plan (B)	1	1	1	3	1	1	1	1.3
30	F1; F3	Climate change & natural hazards	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.	CCA and DRM Strategy	1	2	1	1	1	1	2	1.3

<b>ID#</b>	<b>SO/OR (See Appendix 2)</b>	<b>Subject Area</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Source (Shortened Reference) – See Appendix 1</b>	<b>BA</b>	<b>BE</b>	<b>GR</b>	<b>MO</b>	<b>SVG</b>	<b>TT</b>	<b>TCI</b>	<b>Regional Priority</b>
24	F1; F3	Climate change & natural hazards	Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors	CRFM-OSPESCA Joint Action Plan	1		1	1	1	2	2	1.3
25	F1; F3	Climate change & natural hazards	Assess the vulnerability and risks associated with changing climate;	CCA and DRM Strategy	1		1	1	1	2	2	1.3
38	F1	Climate change & natural hazards	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	CCA and DRM Strategy	3		1	1	1	1	1	1.3
39	F1; F2; F3	Reef and slope species, fisheries and ecosystems	Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments	Coral Reef PoA	1		1	1	1	2	2	1.3
72	B3; C2	IUU fishing	To establish a Working Group to be convened through the CRFM to regularly consult on methodologies and approaches that will harmonise and enhance the reliability of data collection in relation to IUU fishing [this will require the corresponding research	IUU Fishing Declaration	3		1	1	1	1	1	1.3

ID#	SO/OR (See Appendix 2)	Subject Area	Research Recommendation (as stated in source document)	Source (Shortened Reference) – See Appendix 1	BA	BE	GR	MO	SVG	TT	TCI	Regional Priority
			support]									
84	B3; C2	Invasive alien species	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 Joint Action Plan	2		1	1	1	1	2	1.3
88	B	Invasive alien species	Develop new control technologies for lionfish (where relevant)	Lionfish Strategy	1		1	1	1	1	3	1.3
126	B3	Pelagic species, fisheries and ecosystems	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	4th ASM	2		1	1	1	1	2	1.3

ID#	SO/OR (See Appendix 2)	Subject Area	Research Recommendation (as stated in source document)	Source (Shortened Reference) – See Appendix 1	BA	BE	GR	MO	SVG	TT	TCI	Regional Priority
			animal protein.									
160	B; C	Invasive alien species	Refer to existing data, historical records and institutional knowledge to create baseline status of species	Regional IAS Strategy & Action Plan				1	1		2	1.3
161	B; C	Invasive alien species	Develop reference list of species	Regional IAS Strategy & Action Plan				1	1		2	1.3
182	C; D; H5	Policy, Governance & management	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 sLMR management	CLME+ SAP				1	1		2	1.3
61	B	Stock assessment and fisheries analyses	Collaboration with OSPESCA on regional research concerning species/fisheries of interest such a the spiny lobster, large pelagic fisheries, queen conch and lionfish -	CRFM-OSPESCA Joint Action Plan	2	1	1	2	1	2	1	1.4

ID#	SO/OR (See Appendix 2)	Subject Area	Research Recommendation (as stated in source document)	Source (Shortened Reference) – See Appendix 1	BA	BE	GR	MO	SVG	TT	TCI	Regional Priority
			biology, ecology and management									
141	B3; C2; F1; F2	Under- or unutilised species	Conduct research in order to determine the development potential of underutilised and unutilised fisheries resources	CCCFP	2	1	1	2	1	2	1	1.4
80	B3;	Pelagic species, fisheries and ecosystems	Determine spatial distribution for commercial large pelagic species; [impacts of <i>Sargassum</i> and other environmental factors]	9th ASM	2		1	2	1	1	3	1.7
71	B3; C2	Invasive alien species	Support scientific research on invasive species such as lionfish and <i>Sargassum</i> to consider the current and long term impacts on the regional fisheries	CRFM/CARICOM/ Japan Friendship Year	1		1	1	3	3	2	1.8
78	B3; C2;	Pelagic species, fisheries and ecosystems	Conduct studies to assess the impact of <i>Sargassum</i> on pelagics, especially dolphinfish and wahoo	10th ASM	1		1	2	1	3	3	1.8
31	F1	Climate change & natural hazards	Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica]	CRFM/CARICOM/ Japan Friendship Year	1		3	1	1	4	3	2.2



<b>ID#</b>	<b>SO/OR (See Appendix 2)</b>	<b>Subject Area</b>	<b>Research Recommendation (as stated in source document)</b>	<b>Source (Shortened Reference) – See Appendix 1</b>	<b>BA</b>	<b>BE</b>	<b>GR</b>	<b>MO</b>	<b>SVG</b>	<b>TT</b>	<b>TCI</b>	<b>Regional Priority</b>
10	E2	Aquaculture	Industry research on local feed material substitution in small-scale fish farming	Aquaculture PoA	4		1	4	1	1	5	2.7
4	E2	Aquaculture	National GIS-based surveys of biophysical, infrastructural and institutional factors to assess aquaculture potentials of country or region within country	Aquaculture PoA; Diagnostic study on poverty levels	4	1	4	5	1	4	2	3.0
9	E2	Aquaculture	Preliminary scoping study and pilot project in 2 countries on renewable energy development in aquaculture	Aquaculture PoA	3		3	5	2	3	3	3.2
3	E2	Aquaculture	Market and technical feasibility assessments of ornamental fish culture	Aquaculture PoA	5		2	5	5	1	5	3.8

**APPENDIX 4. RESEARCH ACTIVITIES AS PRIORITIZED BY ACADEMIC AND RESEARCH INSTITUTIONS, REGIONAL PARTNERS AND RELATED AGENCIES**

**A** = University of the West Indies (3 campuses combined); **B** = Centre for Resource Management and Environmental Studies (UWI, Cave Hill); **C** = Faculty of Law (UWI, Cave Hill); **D** = French Research Institute for Exploitation of the Sea (IFREMER); **E** = Institute of Marine Affairs; **F** = Caribbean Agricultural Research Development Institute (CARDI); **G** = Caribbean Community Climate Change Centre (CCCCC); **H** = Caribbean Disaster Emergency Management Agency (CDEMA); **I** = Caribbean Fisheries Training and Development Institute (CFTDI); **J** = Caribbean Natural Resources Institute (CANARI); **K** = Caribbean Public Health Agency (CARPHA); **L** = the Fisheries and Aquaculture Sector Organization of the Central American Isthmus (OSPESCA); **M** = Australian National Centre for Ocean Resources and Security (University of Wollongong); **N** = Marine Affairs Program (Dalhousie University); **O** = the Fisheries Centre (University of British Columbia); **P** = Florida Sea Grant Program (University of Florida); **Q** = University of Ghent (Belgium); **R** = University of Southern Mississippi; **S** = Horticulture and Aquaculture Program (University of the Virgin Islands); **T** = Virginia Institute of Marine Science (USA); **U** = Aquaculture and Fisheries Group (University of Wageningen, The Netherlands); **V** = Melbourne Law School (University of Melbourne); **W** = National Oceanic and Atmospheric Administration - Fisheries South East Regional Office; **X** = Fisheries Department of the Institute of Agricultural and Fisheries Research (ILVO, Belgium); **Y** = Network of Co-operating Marine Laboratories (respondent from the University of Southern Florida).

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

ID#	Research Recommendation (as stated in source document)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
36	Economic valuation of fisheries and aquaculture resources in selected countries	2	3		0			1	2		3				2	2		0	1		4	1		3		Y
140	Conduct research in order to ascertain the status of fish stocks	2			0						0			0	2	4		0	1		0	1		2		
148	Assessment and management of overcapacity and IUU: IUU (illegal, unreported and unregulated) fishing affect the sustainability and economic efficiency of small-scale fisheries, reducing or even jeopardizing their capacity to	3	3		0						5					2		0	5		0	3	Y	5		

ID#	Research Recommendation (as stated in source document)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
	contribute to poverty alleviation.																									
170	Promote and provide assistance to the development and implementation of National monitoring plans for IAS	3	0		0						0			0		5		0	1		0	5		0		
171	Identify priority habitats or ecosystems severely impacted by IAS for rehabilitation or restoration	3	0		0						0			0		5		0	1		0	4		0		
172	Adopt or develop protocols for rehabilitation or restoration of IAS impacted sites	3	0		0						0			0		5		0	1		0	5		0		
40	Valuation of resources and communicate results to policy makers, decision makers and stakeholders	2	3		0	2		1	2		3					2	2	0	5		0	3		0	4	Y
82	Assess and develop safe lionfish harvesting strategies for seafood markets	3	4		Y	3					4	3				0		0	3		5	5		5		
83	Record and assess existing technologies to control lionfish invasion and identify most successful ones	2	3		Y	3					3			0		5		0	3		5	2		5		Y
134	Conduct research in order to evaluate the social and economic performance of fisheries and aquaculture	3	1		1						1					2	2	0	1		5	1		4		
116	Valuation of the fisheries sector and related activities	3	2								5					2	2	0	3		4	3		4		

ID#	Research Recommendation (as stated in source document)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
22	(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	1	2		0			1	2		1		1		2	2		0	1		4	4		4		
30	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.	2	3		0		3	1	2		3			0	2	2		0	1		0	2		3		Y
24	Undertake risk assessment and risk mapping of natural disasters within the fisheries and aquaculture sectors	3	2		0			3	1		2		1		2	2		0	1		5	4		0		Y
25	Assess the vulnerability and risks associated with changing climate;	1	1		0		3	1	1		1	Y				2		2	1		3	3		0		Y
38	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	2	5		0	2		1	2		5			0	2	4		3	1		0	2		2		Y

ID#	Research Recommendation (as stated in source document)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
39	Identify climate change vulnerabilities and incorporate these into planning and management; Develop and implement vulnerability assessments	2	1		0	3		1	3		1				2	2		0	3		0	3		3		
72	To establish a Working Group to be convened through the CRFM to regularly consult on methodologies and approaches that will harmonise and enhance the reliability of data collection in relation to IUU fishing [this will require the corresponding research support]	3	4		Y						4			0	2		0	3		5	3			2		
84	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	2	3		Y	3					4			0	5		0	1		5	2			4		Y
88	Develop new control technologies for lionfish (where relevant)	3	4		Y						5			0	5		0	2		0	4			5		Y
126	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.	2	2		2						2				4		0	2		0	2			4		

ID#	Research Recommendation (as stated in source document)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
160	Refer to existing data, historical records and institutional knowledge to create baseline status of species	3	4		0						5			0		5		0	1		0	4		0		
161	Develop reference list of species	2	0		0						0			0		5		0	1		0	4		0		
182	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 sLMR management	1	2	Y	0						2			3	2	0		0	3		0	4		4		
61	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	2	5		1						5		1	0		5		0	1		3	3		3		
141	Conduct research in order to determine the development potential of underutilised and unutilised fisheries resources	4			0						4			0		5		0	1		0	3		5		
80	Determine spatial distribution for commercial large pelagic species; [impacts of <i>Sargassum</i> and other environmental factors]	2	3		2						4			0		4		0	1		5	4		4		Y
71	Support scientific research on invasive species such as lionfish and <i>Sargassum</i> to consider the current and long term impacts on the regional fisheries	2	1		0						4			0		2		0	1		4	3		3	3	Y
78	Conduct studies to assess the impact of <i>Sargassum</i> on pelagics, especially	1	1		1						3			0		4		0	1		5	4		4		Y

ID#	Research Recommendation (as stated in source document)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
	dolphinfish and wahoo																									
31	Necessary to advance research in climate change and new invasive species [response based on observation of new seagrass species in Dominica]	3	5		0			3			5			0		2		0	1		4	2			5	Y
10	Industry research on local feed material substitution in small-scale fish farming	4	0		3						0			0		5		0	2		0	1				
4	National GIS-based surveys of biophysical, infrastructural and institutional factors to assess aquaculture potentials of country or region within country	4	0		0	3					5			0	2	5		0	3		3	4				
9	Preliminary scoping study and pilot project in 2 countries on renewable energy development in aquaculture	2	0		0			2			0			0		5		0	3		0	2				
3	Market and technical feasibility assessments of ornamental fish culture	5	0		0						0					5		0	1		0	3				

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, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago and the Turks and Caicos Islands.

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