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**WESTERN CENTRAL ATLANTIC FISHERY COMMISSION
COMISION DE PESCA PARA EL ATLÁNTICO CENTRO-OCCIDENTAL**

Report of the

**WORKSHOP ON INVESTING IN ECOSYSTEM-BASED SHRIMP AND
GROUND FISH FISHERIES MANAGEMENT OF THE GUIANAS -
BRAZIL SHELF**

Barbados, 7-8 September 2015

Informe del

**TALLER DE INVERSIÓN EN EL MANEJO ECO-SISTÉMICO EN LA
PESCA DE CAMARONES Y PECES DE FONDO EN LA PLATAFORMA
GUYANA-BRASIL**

Barbados, 7-8 Septiembre 2015

PREPARATION OF THIS DOCUMENT

This is the report of the Workshop on Investing in Ecosystem-based shrimp and groundfish fisheries management of the Guianas –Brazil shelf, which was held in Barbados on 7-8 September 2015.

The Workshop served as a meeting of the joint Working Group on Shrimp and Groundfish of the Western Central Atlantic Fisheries Commission (WECAFC), Caribbean Regional Fisheries Mechanism (CRFM), and the French Research Institute for Exploitation of the Sea (IFREMER). Experts from the following countries and regional partner organizations participated: Brazil, French Guiana, Guyana, Norway, Suriname, Trinidad and Tobago, United States of America and Venezuela, CRFM, Caribbean Large Marine Ecosystem Project (CLME+), Caribbean Network of Fisherfolk Organizations (CNFO), Inter-American Development Bank (IADB), IFREMER, Marine Stewardship Council (MSC) and National Oceanic and Atmospheric Administration (NOAA). Staff and resource persons from FAO also contributed.

The workshop was made possible through generous financial assistance received from the IADB via FAO Trust Fund project GCP/SLC/004/IAB - Investing in ecosystem-based shrimp and groundfish fisheries management of the Guianas -Brazil Shelf, under the IADB programme for Managing Regional Marine and Freshwater Ecosystems for Biodiversity Conservation.

FAO technical assistance to the workshop and its preparations was provided by Mr. Raymon van Anrooy, Mr. Carlos Fuentesvilla and Ms. Tarub Bahri. Logistical assistance was provided by Ms Bertha Simmons, Ms. Sonya Thompson, Ms Wanda Fontenelle and Ms Grace Brome from the FAO Subregional Office for the Caribbean.

The participants discussed the status of the shrimp and groundfish stocks, investment options for fisheries in the sub-region and opportunities to harmonize fisheries management measures that would increase financial and environmental sustainability of the fisheries sector.

The workshop agreed on the new Terms of Reference for the Working Group and working group discussed and agreed on the content of a Draft Recommendation WECAFC/16/2016/-- “On the management of shrimp and groundfish resources in the WECAFC area” to be reviewed and submitted to the Scientific Advisory Group and to the Commission for adoption in 2016.

This report contains a record of the workshop, including summaries of presentations and discussions, as well as the finalized reports prepared by the FAO resource persons, Mr Uwe Tietze, Mr Juan Carlos Seijo, and Mr Paul Medley. The reports of the FAO resource persons in the appendix are reproduced as received.

PREPARACIÓN DE ESTE DOCUMENTO

FAO Western Central Atlantic Fishery Commission/ FAO Comisión de Pesca para el Atlántico Centro-Occidental. 2015. FAO. 2015.

Report of the Workshop on Investing in Ecosystem-based shrimp and groundfish fisheries management of the Guianas –Brazil shelf, Barbados, 7-8 September 2015.

Informe del taller de inversión en el manejo eco-sistémico en la pesca de camarones y peces de fondo en la plataforma Guyana-Brasil, Barbados, 7-8 Septiembre 2015.

FAO Fisheries and Aquaculture Report/FAO Informe de Pesca y Acuicultura. No. 1125, Bridgetown, Barbados. 150 pp.

ABSTRACT

The Workshop on Investing in Ecosystem-based shrimp and groundfish fisheries management of the Guianas –Brazil shelf, was held in Barbados, on 7-8 September 2015. The Workshop was the 1st meeting of the joint Working Group on Shrimp and Groundfish of the Western Central Atlantic Fisheries Commission (WECAFC), Caribbean Regional Fisheries Mechanism (CRFM), and the French Research Institute for Exploitation of the Seas (IFREMER). The 35 experts attending discussed the status of the shrimp and groundfish stocks, investment options for shrimp and groundfish fisheries in the sub-region - which comprises Brazil, Venezuela, French Guiana, Guyana, Trinidad and Tobago and Suriname - and opportunities to harmonize fisheries management measures that would increase financial and environmental sustainability of the sector. Recommendations were made to increase collaboration in stock assessments of the fish and shrimp resources between the countries, to build capacity to carry out the necessary analyses in support of fisheries management decision making, to develop a regional plan of action to combat illegal, unreported and unregulated (IUU) fishing as well as a sub-regional shrimp and groundfish fishery management plan for the Northern Brazil-Guianas Shelf countries, to finalize a general investment plan and to assist the countries in conducting the necessary feasibility studies for the preparation of full-fledged, location specific fisheries investment proposals. The Terms of Reference for the Working Group were discussed and updated, and a Convener for the Working Group was elected.

RESUMEN

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CONTENTS

PREPARATION OF THIS DOCUMENT	III
ABSTRACT	V
ABBREVIATIONS AND ACRONYMS	VIII
OPENING OF THE WORKSHOP	9
ATTENDANCE	10
SCOPE OF THE WORKSHOP	10
ELECTION OF CHAIRPERSONS AND RAPORTEURS	11
ADOPTION OF THE AGENDA	11
BIOECONOMICS OF SHRIMP AND GROUND FISH FISHERIES OF THE BRAZIL-GUIANAS SHELF	11
CURRENT FISHERIES MANAGEMENT MEASURES IN THE GUIANAS-BRAZIL SHELF SUB-REGION	14
CURRENT STATUS OF CLME+ DEMONSTRATION PROJECT ON SHRIMP AND GROUND FISH RESOURCES	17
INVESTING IN ECOSYSTEM BASED SHRIMP AND GROUND FISH FISHERIES MANAGEMENT OF THE GUIANAS-BRAZIL SHELF – A CONCEPTUAL FRAMEWORK	18
THE WAY FORWARD: COMPONENTS OF THE PROPOSED INVESTMENT PROGRAMME AND CASE STUDIES OF SUCCESSFUL INVESTMENT PROJECTS	20
RECOMMENDATIONS TO WECAFC AND CRFM	24
TERMS OF REFERENCE AND WORK PLAN OF THE WORKING GROUP ON SHRIMP AND GROUND FISH	24
NEXT STEPS	24
DATE AND PACE OF THE NEXT MEETING	25
CLOSURE OF THE MEETING	25
APPENDIX A	26
APPENDIX B	27
APPENDIX C	31
APPENDIX D	31
APPENDIX E	31
APPENDIX F	32
APPENDIX G	35
APPENDIX H	38

CONTENIDO

ABBREVIATIONS AND ACRONYMS

CCCFP	Caribbean Community Common Fisheries Policy
CLME	Caribbean Large Marine Ecosystem
CRFM	Caribbean Regional Fishery Mechanism
DAS	Day at Sea
FIRF	Marine and Inland Fisheries Branch (FAO)
GEF	Global Environment Facility
IADB	Inter-American Development Bank
Ifremer	French Research Institute for Exploitation of the Sea
IUU	illegal, unreported and unregulated (fishing)
MCS	monitoring, control and surveillance
MPA	marine protected areas
MSC	Marine Stewardship Council
NBSLME	North Brazil Shelf Large Marine Ecosystem
NOAA	National Oceanic and Atmospheric Administration
OSPESCA	Central American Fisheries and Aquaculture Organization
RFB	regional fishery body
SAG	Scientific Advisory Group
SAP	Strategic Action Programme
SICA	Central American Integration System
WECAFC	Western Central Atlantic Fishery Commission

OPENING OF THE WORKSHOP

1. The Workshop on Investing in Ecosystem-based shrimp and groundfish fisheries management of the Guianas –Brazil shelf, was held in Barbados, on 7-8 September 2015. The Workshop was the 1st meeting of the joint Working Group on Shrimp and Groundfish of the Western Central Atlantic Fisheries Commission (WECAFC), Caribbean Regional Fisheries Mechanism (CRFM), and the French Research Institute for Exploitation of the Seas (IFREMER). The workshop was made possible with assistance from the Inter- American Development Bank (IADB) programme for Managing Regional Marine and Freshwater Ecosystems for Biodiversity Conservation. Mr. Raymon VanAnrooy, FAO Regional Fisheries Officer, welcomed the workshop participants and briefed the meeting on the workshop logistics.
2. Workshop opening remarks were delivered by Mr. Deep Ford, FAO’s Subregional Coordinator for the Caribbean and Ms. Caroline Bidault, Rural Development Specialist, on behalf of the IADB.
3. The FAO Sub-regional Representative welcomed the workshop participants on behalf of FAO. He highlighted that the workshop was organized in cooperation with WECAFC, CRFM, IFREMER and supported by the IADB. The representative stressed the critical contribution that groundfish and shrimp fisheries of the Brazil-Guianas continental shelf make to food security and livelihoods. 170 thousand people are employed in these fisheries, which generate 500 million in export earnings.
4. Mr. Ford explained the purpose and objectives of the workshop as stated in the workshop agenda. He reminded the participants that the workshop takes place 20 years after the UN Fish Stocks Agreement and the adoption of the FAO Code of Conduct for Responsible Fisheries. Much has been learned in the more than 2 decades since then, including the need to involve the private sector in efforts for the sustainable management of fisheries and conservation of fishery resources and habitat. He highlighted that enforcement of regulations remains a problem and suggested a more educational approach to enforcement and involving fishermen and women in the process. He also highlighted the need for greater regional cooperation to ensure that stocks are not overfished. He noted that there is a need for greater investment in the sustainable shrimp and groundfish fisheries and that both public and private investment is needed. Mr. Ford invited the workshop participants to provide pragmatic, realistic and feasible recommendations to stakeholders and decision makers on the issues under discussion and assured the participants that FAO will be a strong and reliable partner in implementing the workshop recommendations and follow-up.
5. Ms. Bidault welcomed the workshop participants on behalf of the Bio Diversity Programme of IADB. The IADB BIO Program was established in 2012 by the bank and aims to put Latin America and the Caribbean at the forefront of environmental economics applied to development by integrating natural capital, one of the measures of wealth of the Region, into the sector work of the IADB. As part of 2015-2016 plans, the programme is focusing on the creation of co-management regimes for priority ecosystems. The BIO Programme is targeting the development of fully endorsed collaborative work plans for the recovery of marine fisheries in large marine ecosystems (LMEs) in the Atlantic and the Pacific coasts of LAC. This collaboration also aims at establishing a partnership with the FAO, to develop collaborative work plans for the recovery of marine fisheries of shrimp and ground fish in the North Brazil-Guianas Shelf. More specifically, through this partnership with FAO, the IADB is supporting the development of a cooperative work plan for the recovery of marine fisheries (an particularly the shrimp and groundfish stocks) in the North Brazil-Guianas Shelf Large Marine Ecosystem.

6. This work seeks to:
 1. Improve understanding of economic value of the shrimp and groundfish stocks and the economic impact of the related fisheries sector of the Guianas-Brazil shelf.
 2. Initiate an ecosystem-based shrimp and groundfish fisheries management of the Guianas -Brazil Shelf planning process.

7. Ms. Bidault looked forward to seeing the presentations on shrimp and groundfish fisheries management as well as the bioeconomic fisheries model. She particularly thanked FAO and the WECAFC working group for organizing and providing their assistance to the organization of this workshop. She expressed hope that this workshop would contribute to move forward with strategies that will lead to a better management of shrimp and groundfish resources and wished the participants a fruitful workshop.

ATTENDANCE

8. Experts from the following countries and regional partner organizations attended the workshop: Brazil, French Guiana, Guyana, Norway, Suriname, Trinidad and Tobago, United States of America and Venezuela. The CRFM, Caribbean Large Marine Ecosystem Project (CLME+), Caribbean Network of Fisherfolk Organizations (CNFO), Inter-American Development Bank (IADB), IFREMER, FAO, Marine Stewardship Council (MSC), National Oceanic and Atmospheric Administration (NOAA), WECAFC and various fisherfolk and fish processors were also in attendance. The list of 35 participants, including Working Group members and resource persons, can be found in Appendix B.

SCOPE OF THE WORKSHOP

9. Mr. Raymon Van Anrooy, Secretary of WECAFC, started his presentation with a short overview of WECAFC. He outlined the objectives, membership, area of competence and structure of the Commission. He informed the workshop about some outcomes of the 15th Session of WECAFC, which was held in Trinidad and Tobago in March 2014. Reference was made to the WECAFC working Groups, and particularly the WECAFC/CRFM/IFREMER Working Group on shrimp and groundfish of the North-Brazil Guianas shelf.

10. Mr. van Anrooy gave then a historical overview of shrimp and groundfish work by WECAFC since the 1970s, which included:
 - Since 1975 (1st WECAFC session) a working party on stock assessment of shrimp and lobster resources existed, which held meetings in 1976 and 1979.
 - A working group on biological and economic modelling of shrimp of the Brazil-Guianas shelf held meetings in 1986, 1988 and 1992.
 - Stock assessment workshops of the Ad Hoc Working Group on Shrimp and Groundfish (with the predecessor of CRFM) were organized in 1996 and 1997
 - Stock assessment training with support from DANIDA took place at the end of the 1990s.
 - CLME/FAO/WECAFC joint work on shrimp and groundfish was conducted in the period 2008 - 2013.

11. He referred to the terms of reference of the Working Group on Shrimp and Groundfish and that in recent years the working group received support from different resource partners. It was noted that the Working Group is incorporated within CLME+ project SAP governance structure for shrimp and groundfish – with an aim to support sub-regional management planning and capacity building. Moreover, the IADB funded project on “Investing in ecosystem-based shrimp and groundfish fisheries management of the Guianas -Brazil Shelf” provides support to assessments and an investment proposal. Finally, some tasks under the TORs of the Working Group can be supported by the FAO/GEF REBYC II LAC project on “sustainable management of bycatch in Latin American and Caribbean Trawl Fisheries”.
12. He finalized his presentation with listing the objectives of the workshop, which were the following:
 1. To present and discuss updated information on current management of the shrimp and groundfish fisheries.
 2. To present, discuss and finalize bioeconomic modeling of the fisheries and assess their current profitability.
 3. To present, discuss and provide inputs to a draft investment plan for the shrimp and groundfish fisheries of the Guianas -Brazil Shelf.
 4. To update the Working Group TORS + Work plan.
 5. To make clear advice and recommendations to WECAFC and CRFM.
13. Following the presentation, a participant from Venezuela observed that the implementation of the workshop’s recommendations might be hampered by the lack of trained staff of national fisheries administrations. Staff previously trained in stock assessment and other fields with the help of FAO, DANIDA, NORAD and others, have retired or are about to retire. There is a need for future training efforts, if efforts to improve the management of shrimp and groundfish fisheries of the Guianas-Brazil are to be successful.

ELECTION OF CHAIRPERSONS AND RAPORTEURS

14. The workshop was co-chaired by Mr Fabian Blanchard (IFREMER), Mr Uwe Tietze (FAO) and Ms Elizabeth Mohammed (CRFM). Mr Raymon van Anrooy (FAO/WECAFC) assisted by Mr Carlos Fuentesvilla, Mr Manuel Perez and Mr Uwe Tietze agreed to act as rapporteurs.

ADOPTION OF THE AGENDA

15. The workshop adopted the agenda as shown in Appendix A.

BIOECONOMICS OF SHRIMP AND GROUND FISH FISHERIES OF THE BRAZIL-GUIANAS SHELF

16. Mr Juan Carlos Seijo (FAO resource person) made a presentation of a study he did with cooperation from A. Hernández, J.A. Negreiros-Aragão, M.A. Cabrera and M. Yspol.
17. Mr Seijo that the study carried out reviews the existing contributions to bioeconomic analysis of the shrimp and ground fisheries of the Brazil-Guianas shelf, and assesses the bioeconomic performance of shrimp fisheries of Guyana, Suriname, French Guyana and Brazil. Four research/management questions were addressed in this study: What is the resource rent generated by shrimp, seabob and

groundfish fisheries of the Brazil-Guianas shelf ecosystem? (ii) Are stocks of the main species harvested (*L. subtilis*) shared by countries with EEZ's in the NBSLME? What is the current bio-economic performance of fisheries targeting shrimp resources in the Brazil-Guianas shelf?, (iii) what are the levels of effort required to operate in maximum economic yield and maximum sustainable yield in each of the EEZ's, and (iv) what is biomass level at which the fleets of each of the countries would have exhausted the economic rent generated by the resource.

18. To answer the above mentioned questions, within a data limited situation, the following steps were undertaken: (i) a characterization of the NBSLME shrimp, seabob and groundfish fisheries and review of existing bioeconomic studies in the region, (ii) a review of available data to estimate biologic and economic parameters for the shrimp *Penaeus spp.* and seabob (*Xiphopenaeus kroyeri*) fisheries of the NBSLME, (iv) testing of the shared shrimp stocks (i.e. *F. subtilis*) hypothesis based on index of abundance, (v) calculation of x-vessel landed value and resource rent for the shrimp, seabob fisheries, and groundfish fisheries, (vi) analytic calculation of equations for determining bioeconomic reference points of the shared stock fisheries in the region including their bycatch, (vii) current bioeconomic performance of fleets targeting the shrimp and seabob stocks in the study region with respect to target reference points, and (viii) conclusions and recommendation emerging from this study.
19. He then presented some of the conclusions of the study, which included the following:
 - a. In the last 15 years, the trend of whole weight catch for Guyana, Suriname, French Guyana and North Brazil decreased in the four countries: from 3 019 tonnes to 1019 tonnes in Guyana, from 3,267 tonnes to 624 tonnes in Suriname, from 3940 tonnes to 732 tonnes in French Guyana, and from 6224 tonnes to 2482 tonnes in North Brazil.
 - b. One of the main factors of this reduction has been the deliberate exit of vessels in all four countries during this period. The number of trawlers in North of Brazil were 135 in 1998 and have decreased to 60 in 2013, a reduction of 56%. In Suriname a reduction from 109 to 23 trawlers took place in the same period, a reduction of 79%. In Guyana the number of trawlers reduced from 73 to 30, a reduction of 59%, and in French Guyana from 58 to 12 in the same period, a reduction of 79% of their trawlers.
 - c. The calculated resource rent for the four countries explains the reduction of the number of vessels during the period under consideration. The cost of fishing was affected in the region as in many areas of the world by increasing oil and gas prices for the period of consideration in this study. Recently, increasing abundance, as indicated by catch per unit of effort in Brazil, French Guyana and Surinam, has resulted in positive resource rents for the period 2010 to 2013.
 - d. Catches of seabob for the period 1999-2009 tended to be similar in Guyana and Suriname, but not their corresponding CPUE. The reason for this is that their level of harvest is obtained by a major difference in the number of vessel and corresponding days at sea.
 - e. The number of seabob trawlers in Guyana is more than four times the number for Suriname, which has been relatively low and very stable. As a result, CPUE for Suriname is substantially higher than the one for Guyana. For 2013, whole weight CPUE in Suriname reached 3509 kg/day at sea (das), while the one for Guyana was 1308 kg/das for the same year.
 - f. In 2011 the multi-species industrial groundfish fishery of Suriname harvested 45 finfish species and mollusks like squids. From these, 10 species accounted for 80% of the harvest in order of their contribution: kandratiki (*Cynoscion virescens*), black snapper (*Lutjanus griseus*), krokus (*Micropogonias furnieri*), grunts (*Haemulon spp.*), lane snapper (*Lutjanus synagris*), barracuda (*Sphyraena barracuda*), witwittie (*Cynoscion jamaicensis*), zilverbelt (*Trichiurus lepturus*), makreel (*Scomberomorus spp.*), dagoetifi (*Macrondon ancylodon*). It should be noted that, of the 45 species harvested, the largest catch of industrial groundfish trawlers was 987.1 ton of kandratiki (*Cynoscion virescens*), and the smallest one (30 kg), corresponded to the mutton snapper (*Lutjanus analis*).

- g. The species non-discriminatory nature of trawling gear could have serious effects on less abundant species and therefore their indices of abundance (CPUE) should be monitored over time. It is critical to obtain the data and analyze at least a 10 year time series of multi-species harvest and corresponding fishing effort of the industrial groundfish fishery and calculate their corresponding trends in CPUE.
 - h. An analysis of this fishery indicates that overall CPUE for the groundfish fishery of Suriname, is fairly stable with mean CPUE of 1.73 ton/day at sea for the 1998-2011 period. However looking at species specific CPUE, lane snapper (*Lutjanus synagris*), which provided the largest catch per day at sea in 1998 (498 kg/day) is currently yielding 103 kg/das. This indicates a reduction of 79% in its CPUE index of abundance. Therefore in multispecies fisheries it is essential to be aware of the resilience of different species (renewability capacity) especially for those species like *L. synagris*, which has a relatively lower rate of population growth (usually higher longevity) with respect to other currently more abundant groundfish species in the ecosystem being harvested.
 - i. The study reported landed value and resource rent generated by shrimp (*Penaeus spp.*), seabob (*X. kroyeri*), their bycatch, and groundfish species of the Suriname fish bottom trawling fishery for the 1998-2013 in the North Brazil Shelf Large Marine Ecosystem (NBSLME).
 - j. The results of a preliminary statistical test suggest that pink shrimp (*Farfantepenaeus subtilis*) resources exploited by French Guyana and North Brazil could be a shared stock in the area, as well as the stocks harvested by Guyana and Suriname. The hypothesis of all four countries sharing the same stock in the NBSLME was rejected. It should be pointed out however, that it is essential to undertake genetic studies to have the appropriate certainty for the share stock hypotheses for Brazil and French Guyana on the one hand, and Guyana and Suriname on the other hand.
 - k. To properly determine bioeconomic reference points for the share stock situation it is necessary to develop an appropriate heterogeneous fleet - share stock bioeconomic model with by-catch included in the analytical solution.
 - l. It is recommended that future work in this field considers sequential interdependencies between small-scale fisheries targeting or incidentally harvesting, in coastal lagoons, estuaries and nearby marine coastal areas, the most important species reported in this study.
20. The finalized report of the Bioeconomics of shrimp and groundfish fisheries of the Brazil-Guianas Shelf can be found in Appendix C.
21. The presentation triggered a lively discussion with a number of comments and observations. It was noted that since 2010 a positive trend in resource rents. It was estimated that some 12 percent of the landed value could be regarded as resource rent received by the trawler fleets. It was also mentioned that genetic studies are needed to see if stocks of shrimp are in fact shared or not. In this respect there seems to be evidence that pink shrimp are shared between French Guyana and North Brazil, but that there is only some overlap in the boundary and that the stocks are not distributed widely.
22. A discussion on carrying capacity and Maximum Economic Yields (MEY) took place as well. It was noted that in some cases efforts could be doubled to get closer to MEY. CPUE was not considered a good indicator for species abundance. Questions were also raised about whether the Sargassum influx in recent times is affecting the stocks and fisheries and whether data and information from the artisanal fleets is properly included in the study. The relationship between the stock status and environmental factors would require more investigation, as it seems that for instance rainfall is affecting shrimp recruitment. Some participants were of the opinion that certain “source” areas for shrimp and groundfish recruitment would need protection.

23. Mr Juan Carlos Seijo made in his presentation various recommendations for capacity building in bio-economic modeling, the ecosystem approach to fisheries (EAF) and fisheries management. The subsequent plenary discussion emphasized capacity building needs for periodic fisheries data collection and analysis of (i) catch, catch composition (i.e. species and sizes) capacities, (ii) fishing effort (fleet specific, gear specific), (iii) costs and earnings of different fisheries of interest in the country/region, (iv) alternative bioeconomic models for different species (i.e. species different degree of mobility), being targeted (v) bioeconomic modelling of technologically interdependent fisheries (e.g. shrimp and snapper fisheries) , and (vi) joint capacity building of fishers and vessel owners, fisheries officers, scientists, processing sector decision-makers, for understanding the ecosystems approach to fisheries management.
24. Topics of these capacity building efforts may include: (a) oceanographic pattern of the ecosystem where the fishery is taking place, (b) ecological/technological interdependencies of fisheries, (c) dynamics of space-time of stocks and fishing effort, and (d) cooperation for governance and conservation of fish resources and the ecosystems sustaining them.
25. It was further noted that this capacity building should be tied up with the necessary resources and means to actually use the knowledge, abilities, and approaches to fisheries bioeconomic analysis and management.
26. Reference was made to the Techno-economic performance of marine capture fisheries¹ study that FAO conducted in the late 1990s, and that it would be very useful to repeat such study in the Caribbean.
27. It was further noted that CRFM stock assessment trainings held in 2012 were considered useful tools to build capacity in the CRFM countries for stock assessment. However, it was also recognized that the last highly effective training on stock assessment was given in 1988 under an FAO-Nansen programme with DANDIDA support, in which many experts from the region were trained for 15 days on stock assessment techniques, data processing and analysis. These kind of longer-term training sessions have not been held since.

CURRENT FISHERIES MANAGEMENT MEASURES IN THE GUIANAS-BRAZIL SHELF SUB-REGION

28. Mr Paul Medley presented the preliminary outcomes of a review of fisheries management controls applied in the sub-region. Management controls are used to implement policy and control the way the fishery is prosecuted. These are tools used to achieve each fishery's objectives. A review of management controls, as presented in a draft report, was updated based on information obtained from participants, but was not presented in full. However, a brief summary identified the most widely used and most important controls by type that are being applied in at least one fishery in the region. Controls include those on capacity, effort, landings, minimum fish size, closed areas, closed seasons as well as technical controls on gear.

¹ FAO Fisheries Technical Paper No.421, available at: <http://www.fao.org/docrep/004/Y2786E/Y2786E00.HTM>

29. Effective controls have the following attributes:

- a) A clear stated purpose so that it can be seen whether they are achieving their objectives;
 - b) At least one measurable indicator that allows the control to be evaluated;
 - c) Be simple and easy to understand, and fishers should be aware of the controls and why they are required;
 - d) Possess a mechanism to remove, adjust or implement controls based on regular evaluation.
30. The fishery management objectives vary, but the overall goal is usually to maximise socio-economic benefits from the fishery. Other objectives, such as to conserve the ecosystem, prevent recruitment overfishing, protect fish habitats, improve compliance and so on, may be considered constraints or operational objectives to achieve the overall goal.
31. To ensure controls are effective, they need to be evaluated. Evaluation is part of a standard management feedback process which consists of implementation of the control, data collection on the control's effect, an analysis of that data, and a resulting management response. If there is no evaluation, it is difficult to guarantee a control is effective, although some controls may still be implemented because they are precautionary (e.g. banning destructive fishing practices).
32. Controls may first be evaluated for whether they have been properly implemented, which may simply measure compliance with the control. For many controls, it is also necessary to test whether they help achieve some overall objective as well.
33. An example of an evaluation was presented for the use of Turtle Exclusion Devices / Bycatch Reduction Devices (TED/BRD) in seabob trawl nets in Suriname. The assessment was based on trials with nets fitted with and without TED/BRD being hauled concurrently side-by-side, so that their catches could be compared. The example illustrated how the effectiveness of this control might be measured. It covered both the degree to which catches of vulnerable indicator species were reduced, and also the degree to which this reduction might meet the overall objectives of maintaining populations above biological reference levels. The example also illustrated that effects of controls were not necessarily straightforward, making evaluation often difficult and complex.
34. Finally, various management control options that might be available to fisheries managers and decision makers were reviewed. These included controls used in some, but not all fisheries, and others which should be applied across most fisheries if effective management is to be implemented. The table of options was circulated for comments by participants. Some controls were introduced that have not been used in the region were "move-on" rules and individual transferable quotas (and their variants).
35. An example of an effort-based harvest control rule (HCR) used in the Suriname and Guyana seabob fisheries was presented. The presentation illustrated how the HCR worked and how it had been tested.
36. The finalized Review of Management Controls Used in Shrimp and Groundfish Fisheries Operating on the Brazil-Guianas Shelf can be found in Appendix D.
37. The discussion that succeeded the presentation touched upon many different aspects of fisheries management. Some participants asked why sub-regional management plans are needed and for

which resources. It was mentioned that shared stocks or shared fisheries would require joint management, either bilateral or sub-regional.

38. It was noted that scientific collaboration between the countries would have to increase to determine whether stocks would require management at national, bilateral or sub-regional level. In this respect it was noted that few national level fisheries management plans for shrimp and groundfish were formally approved by the countries and that even less are actively implemented.
39. French Guyana suggested to meet with North Brazil and Surinamese experts to review stock assessments undertaken in the three countries concerning shrimp and groundfish species. Working Group members from Guyana and Suriname agreed with those of French Guyana to organize a meeting to review stock assessment evidence, and suggested that, in the absence of genetic studies, it was too early to establish that shrimp stocks of *F. subtilis* actually are shared stocks. It was mentioned that groundfish species needed to be considered also as possible shared stocks and that ad hoc arrangements could be made for shared stocks.
40. Attention was further called to the fact that this type of expert meetings represents a unique opportunity for exchanging experiences and foster discussions among countries and members of the working group. In the region there are a lot of needs, but also opportunities to develop shrimp and groundfish fisheries based on management plans with investments and in line with the CLME+ project.
41. The workshop discussed then specific management controls in place for southern brown shrimp, pink spotted shrimp and southern pink shrimp and whether these controls were similar.
42. Mr Paul Medley introduced a table with a list of management controls used in shrimp and groundfish fisheries operating at the Brazil-Guianas Shelf for revision and comments from the participants. Two questions were identified: whether the current tools available to managers were adequate to achieve objectives, and whether co-operation was necessary between countries to achieve any objectives. In the latter case, co-operation may be necessary or only desirable.
43. Some comments and examples on management actions and national/local experiences were provided by the experts (e.g. on capacity controls, fishing effort, landings, gears, seasons and area controls). Particular mention was made to the IUU fishing issue and the need to increase collaboration among countries and enforcement agencies, the implementation of the Port State Measures and the development of National Plans of Action to combat IUU Fishing (NPOA-IUU).
44. In reviewing the options for harmonization of management controls, various points were made.
45. Vessel Monitoring Systems (VMS) are increasingly used across the region and are effective tools for various management controls on fishing activity, including providing greater safety-at-sea. For example, VMS may be fitted with a “panic button” which requests rapid assistance. It was also pointed out that related initiatives include port state measures, a CRFM review of Monitoring, Control and Surveillance (MCS) options, manuals with protocols and a related strategy were considered valuable tools as well. It was recognised that an increase international co-operation between enforcement agencies was required, but that this Working Group would probably not be the suitable forum for such a group as membership is focused on fisheries stakeholders. Other suggested innovations included mobile phone based VMS for which there has been a pilot project (*mFisheries*) in Trinidad and Tobago and elsewhere, but a system still needs development for use in the region.

46. It was noted that some fisheries in the region lack a basic license system. Trinidad, for instance, is awaiting relevant legislation to implement a limited licensing system for its fisheries. Guyana has except for seabob, no limit on licences for its artisanal fleets. In contrast, Suriname, French Guiana and Brazil have a relatively complete and functioning license system. Brazil has however some problems with implementation and enforcement of some parts related to licenses in its Fishery Management Plan (FMP) for the northern shrimp, while the FMP for demersal fish fisheries is still under development. Suriname noted that encroachment of fishing vessels from neighbouring countries undermined the effectiveness of its licence system. It was suggested that increasing bilateral co-operation between Suriname and Guyana and between Trinidad and Tobago with Venezuela would be beneficial for all.
47. The experts recognized that while shrimp and groundfish stocks are not always shared, the fisheries are generally shared in the sub-region. In this respect it was repeated that the Ecosystem Approach to Fisheries requires implementation and that specific controls to reduce unwanted bycatch can have a major impact on the resources status/stocks of groundfish species. The REBYC II LAC project can support the introduction of appropriate controls to manage bycatch and also considers the impact of fisheries on vulnerable marine ecosystems.
48. Brazil and Venezuelan experts provided examples of closed area use to protect juveniles, reduction of discards and unwanted bycatch. French Guiana/Guyana/Suriname experts informed the meeting that they have no-trawl zone in inshore areas.
49. It was noted that wider environmental effects seem to have a serious impact on fishing (e.g. current high amounts of Sargassum found in the region). Trinidad and Tobago is currently mapping fishing areas and gathering knowledge from fishers on critical habitats. There could be greater co-operation between Trinidad and Tobago and Venezuela over bycatch reduction devices (BRD) development. The experts from French Guiana noted that they have a protected area in place and are improving TED/BRD selectivity and have an initiative to decrease post-capture mortality of turtles (ETP). How the existing controls were managed and governed was raised as an issue to consider. Working groups and management committees exist for most fisheries, but are organised in different ways within each of the countries.
50. The Working Group agreed to circulate a table of management controls for further comments by the experts. These would be included in the final report, with gaps identified for countries to further consider and address.

CURRENT STATUS OF CLME+ DEMONSTRATION PROJECT ON SHRIMP AND GROUND FISH RESOURCES

37. Ms. Laverne Walker, Senior Project Officer, with the UNDP/GEF Caribbean Large Marine Ecosystem (CLME+) Project presented on the CLME and CLME+ Project initiatives on shrimp and groundfish along the Guianas-Brazil Shelf on behalf of Ms. Tarub Bahri from FAO who was unable to attend the workshop.
38. She gave a summary of the outputs of the shrimp and groundfish case study implemented by FAO under the first CLME Project, indicating that the case study sought to mainstream the ecosystem approach to fisheries (EAF) into fisheries within the sub-region. To achieve this, the case study partners which included FAO, CRFM, CERMES and CANARI along with the stakeholders developed a roadmap towards EAF. Key outputs along this roadmap included the development

of a communications strategy, stakeholder analysis and a bioeconomic analysis. Further, a number of awareness raising and training workshops were held on EAF both at the regional and national level to ensure that all stakeholders understood the concept of EAF and could identify priorities for the improved management of the sub-region's fishery.

39. The priority areas, results and recommendations from many of these national and regional workshops were presented at a regional workshop held in Trinidad and Tobago in 2012. The agreed upon priority areas identified at this workshop provided guidance to what is now Strategy 6 of the CLME Strategic Action Programme (SAP): Implement EBM/EAF of the Guianas-Brazil continental shelf with special reference to the shrimp and groundfish fishery. The WECAFC and CRFM were assigned under this strategy important coordination and support roles for improving the sustainability of shrimp and groundfish fisheries.
40. Ms Walker also indicated that the outputs from this regional workshop informed the development of the CLME+ Sub-Project: EAF for the Shrimp and Groundfish Fishery. This sub-project is to be implemented as part of the recently approved UNDP/GEF 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 between 2015- 2019. Ms. Walker then went on to present a summary of the Shrimp and Groundfish EAF Sub-Project. She indicated that one of the activities under the sub-project which was very much aligned with the discussions that they were having at this workshop is the development of EAF sub-regional management plan(s) for shrimp and groundfish fisheries.
41. Ms Walker concluded the presentation by indicating that there is a need to optimise resources as much as possible within this region by building on the outcome from past activities and for greater collaboration between initiatives where synergies have been identified such as the CLME+ Project and REBYC II.
42. The discussion that followed the presentation made it clear that few working group members knew about the CLME and its SAP and that it would therefore be good to continue awareness raising among the stakeholders, particularly in the private sector, on what was endorsed by the governments in the region. It was requested by various members that the working group should receive sufficient support from the CLME+ project to ensure that progress can be achieved towards the objectives of the SAP. It was added that parallel systems should be avoided and that the working group is already embedded in the firm institutional structures of FAO/WECAFC, CRFM and IFREMER. Mr Williams (Norway) indicated that in order to move towards the EAF, which even in Europe is still half way in the process, there is a need for proper stock assessments and joint management of shared stocks. Applying an EAF without knowledge of the stocks status and its fisheries is not possible.

INVESTING IN ECOSYSTEM BASED SHRIMP AND GROUND FISH FISHERIES MANAGEMENT OF THE GUIANAS-BRAZIL SHELF – A CONCEPTUAL FRAMEWORK

37. Mr Uwe Tietze made two presentations on investment in shrimp and groundfish. He started with an overview of background and methodology of the investment planning study. Implementation of a sub-regional shrimp and groundfish management plan will require major investments from both public and private sources. He noted that an investment planning component supports the component 4 of the new five-year UNDP/GEF CLME+ project that will allow the region to start implementing the 10-year CLME Strategic Action Programme (SAP). Component 4 consists of (pre)feasibility studies to identify major high priority investment needs and opportunities in the CLME region.

38. The methodology for the investment study applied under this IADB project included A) a desk review of literature and documents to extract information from activities, carried out earlier under the umbrella of the CLME project, and on investment needs and opportunities which could be used for the preparation of investment proposals, as well as B) Collection of information from key stakeholders in the concerned countries, i.e. fisheries/environmental authorities, fishing industry, financial institutions/investors by means of a questionnaire (Annex II of the investment report).
39. The presentation then elaborated on the conceptual framework of the study, including the synergy of the concepts of sustainable livelihoods approaches and the ecosystem approach to fisheries. This included an overview of the findings and recommendations of the CRFM poverty study and a reference to the CLME project long-term vision for the CLME region, as well as an introduction on the relationship between fisheries investment, credit and microfinance and on the role of fisheries cooperatives.
40. Mr Tietze continued by identifying criteria for assessing performance and success of fishery enterprises and investments. These included criteria of economic performance/success; financial and social performance as well as ecological performance. This was followed by an overview of the investment planning process, which includes the stages of identification, preparation, appraisal and implementation making reference to the FAO guidelines for the design of Agricultural Investment Projects.
41. The presentation concluded by recalling the findings of a study carried out by the FAO Investment Centre on success and failure of agricultural investment projects. The study found that failures were mainly due in flaws of underlying concepts on which the projects were based.
42. The first presentation by Mr Tietze was directly followed by a second one, in which he identified the proposed investment components in support of an ecosystem-based management of the shrimp and groundfish fisheries of the Guianas-Brazil Shelf.
43. The investments aim to achieve the following objectives:
- a) Poverty reduction and equity enhancement;
 - b) Food security;
 - c) Environmental sustainability within marine and aquatic ecosystems;
 - d) Protection of the environment, response/adaptation to climate change, promotion of renewable energy;
 - e) Mainstreaming of biodiversity and ecosystem services into key productive sectors and infrastructure.
44. The following key investment components have been identified:
- A. Investments to achieve Ecosystem Quality Objectives (EcoQOs)**
- A.1 Investments in water treatment infrastructure
 - A.2 Investments in support of conservation of natural and aquatic resources and habitat restoration
 - A.3 Investments in support of regional coordination and capacity building
- B. Investments to achieve Societal Benefit Objectives (SBOs)**
- B.1 Investments in support of livelihoods and fulfillment of basic need
 - B.2 Investments in fishing community infrastructure

B.3 Investments in sustainable, economically efficient and safe capture fishery technology²including those that reduce carbon emissions, promote the use of renewable energies and the use of overall more energy efficient technologies.

B.4 Investments in community-level financial intermediation and associations³

C. Investments in regional cooperation, management and capacity building

C.1 Investments in establishing a regional capacity to coordinate the development and implementation of regional, sub-regional and national initiatives to enhance safety and reduce risk factors including safety-at-sea for fishers, with particular focus on risk management.

C.2 Investment in national and regional fisheries institutional capacity building including research, modernization and harmonization of fisheries acts and regulations and capacity building programmes

C.3 Investment in the development and implementation of a regional fisheries management organization (RFMO).

C.4 Investment in collection, analysis and sharing of data and information on shrimp and groundfish resources/shared stocks and related fisheries, as well as their ecosystem services, through regional databases and capacity building efforts.

C.5 Investment in long-term market access and sustainable coordination mechanism at regional and international level, through joint programmes to combat IUU fishing in the shrimp and groundfish sector along with building capacity to implement international binding fisheries instruments (FAO Compliance Agreement, UN Fish Stocks Agreement, FAO Port State Measures Agreement).

45. The presentation concluded with an overview of the country responses to the questionnaire indicating their priority investment needs.

46. The discussion that followed the two presentations was diverse. It was noted that a number of potential opportunities exist including training programmes, fleet modernisation, as well as scope for increasing production and value-addition. A general point was made that institutional strengthening was required across the region and this is a common pattern. It was noted that potential investment projects should be framed within current coastal zone planning activities in each of the countries, where possible.

47. The IADB delegates commented that it would be good to target special areas of attention, in particular those related with institutional strengthening and capacity building, as an entry point before initiating investments in fleets, gears, etc. Capacity building needs will require to be identified at country level in each of the countries. The importance of having sufficient information available for identification and planning for a pre-feasibility study was mentioned as well.

THE WAY FORWARD: COMPONENTS OF THE PROPOSED INVESTMENT PROGRAMME AND CASE STUDIES OF SUCCESSFUL INVESTMENT PROJECTS

48. The third presentation by Mr Tietze drew the attention of the participants to Table 22 of the report, which specifies proposed investments, benefits, beneficiaries/recipients, financial intermediaries, term/maturity, source of revenue for repayment and risks and includes country specific references.

² Annex 1, case study 1 shows the economic and financial performance of selected Caribbean small-scale fishing vessels.

³ Case studies of successful microfinance investments are shown in Annex 1, case studies 6, 7 and 9.

49. After this presentation, the workshop participants were invited to review the proposals provided in table 22 and suggest modifications and amendments as deemed necessary. They were also asked to identify the most urgent investment needs out of the many investment needs proposed by them before the workshop.
50. When it comes to identifying potential investments as laid out in table 22 above, these should be framed as far as possible within existing marine and coastal zoning processes. Examples were given of the National Plan for Integrated Coastal Zone Management (NPICZM) of Venezuela and the integrated coastal zone management plan of Brazil. Participants were invited to provide information on coastal zone management plans of their country as well as suggestions as to how the proposed investments can be framed within these plans.
51. The presentation then drew attention to the case studies. ANNEX I to the investment report contains case studies of successful fisheries investment, credit and enterprise development and ecosystem restoration and conservation projects. Most of these relate to small-scale fisheries.
52. Mr Tietze mentioned that the case studies aimed to provide examples from the region and around the world, on how investment proposals can be successfully identified and implemented. Participants were invited to review the case studies and discuss whether and how the experiences documented in the studies can be applied to countries in the region. Participants were also invited to identify additional case studies and examples from the region and provide references to documents that describe these cases.
53. The presentation concluded by identifying the next steps towards preparation of location-specific, full-fledged investment proposals. These steps include the following:
- A. Identification of and consultation with suitable and interested investors and ultimate recipients/beneficiaries of financial assistance.
 - B. Identification of capacity building and institutional strengthening needs, including strengthening of stock assessment and fisheries statistics/data information and business management skills. Related to the envisaged investments, an assessment needs to be made whether institutional capacities and existing data/information systems are sufficient to support investment decisions or whether strengthening is needed.
 - C. Specification of the detailed features of the proposed investments such as environmentally responsible and energy saving fishing gear and craft specifications, infrastructure/artificial reef engineering designs, detailed habitat restoration designs and plans, livelihood options and detailed business plans for small- and medium-scale enterprises.
 - D. Determination of physical investment components, of capital and working capital requirements and investment support measures and determination of investment volume as well as phasing.
 - E. Estimation of economic, financial, social and ecological benefits of the proposed investments and preparation of technical and financial feasibility studies, cash flows and calculation of indicators for economic and financial performance and preparation of business plans for each investment
 - F. Monitoring mechanism to ensure that only sustainable activities/investments are funded, that conservation, restoration and fisheries development are properly balanced and that an ecosystem approach to fisheries is followed and the precautionary approach is adhered to.

G. Determination of policies and procedures for disbursements and repayments of financial assistance in support of investments including procedures for arrears control, adjustment of repayment schedules, and monitoring of investment performance.

54. Following this presentation the Working Group agreed on the next steps presented and that pre-feasibility studies should be conducted in at least two of the countries, in order to move forward.
55. It was noted that investments should not focus alone on private sector infrastructure improvements, but also should include capacity building, institutional strengthening and governance by the public sector.
56. It was also mentioned that lack of information has an effect on where to invest and carry out the feasibility studies. Related to the limited information availability, which confirmed the need for pre-feasibility studies, it was also mentioned that in many investment projects, there is a strong political component, which not always meets a real need. Pre-feasibility studies could avoid large investments that not feasible.
57. At a request from various experts, the IADB delegation detailed the procedures used by the bank for requesting and evaluating proposals for grants and loans. The different tools available, including technical assistance and grants were mentioned. It was noted that it is important that the country requests the bank's assistance through the formal Government channels (i.e. through the Ministry of Finance) and that the priority areas for government loans are generally laid-out in the Government-IADB strategy or agreement. The IADB delegation mentioned that proposals to conduct pre-feasibility studies, following the general shrimp and groundfish investment plan finalization, would be welcomed.
58. It was further noted that there is a Marine Stewardship Council (MSC) Global Fisheries Fund initiative to give access to the MSC programme for developing countries through MSC Fishery Improvement Projects.
59. Break-out groups were then set up to discuss priorities investment opportunities. Participants reviewed and annotated Table 22 in the main investment report and investment summary for the investment planning report on a country-by-country basis. The rapporteurs of all break-out groups confirmed that in most cases, external assistance was needed for the preparation of (pre-) feasibility studies. While there were individuals with the required knowledge and qualifications in each of the countries, these were not readily available as they were already employed full-time.
60. The national level investment needs of the countries had been further prioritized as follows (reference is made to the numbering in table 22 of the investment planning report):

Venezuela

1. B.1 Investments in support of livelihoods and basic needs.
2. C.2 Investments in national capacity building including research and modernization of fisheries acts and regulations.
3. C.4 Investment in the collection, analysis and sharing of data on groundfish and shrimp fisheries and resources, through regional data bases and capacity building.

French Guyana

1. B.2.1 Investments in rehabilitation/construction of landing sites.
2. B.4.2 Investment for establishment/expansion of fisheries cooperatives and associations.
3. C.4 Investment in collection, analysis and sharing of data on groundfish and shrimp fisheries and resources, through regional data bases and capacity building.

Trinidad and Tobago

1. B.1.1 Investments in identification and promotion of alternative livelihoods for small-scale fisherfolk with a focus on women in fishing communities, combined with B.3.2, i.e. investment in fishing vessel buy-back and compensation schemes. It was noted that B2.1 was important in the context of empowering fisherfolk.
2. C.2 Investments in national capacity building including research and modernization of fisheries acts and regulations. Modernization of the structure of the fisheries division to more efficiently deal with fisheries management is required as well.
3. B 4.1 Investments in the establishment of local financial intermediaries and/or expansion of existing financial services to rural fishing communities and tailoring these to their needs.

Guyana

1. A.2 Investments in research projects on gathering of data on fisheries ecosystem and subsequent analysis. Capacity building on Ecosystem management
2. B.2 Investments in the development and better management of landing sites and accompanying infrastructure i.e. ice facilities, marketing structures, fuel and other resource availability to improve self-sufficiency.
3. B.3.1 Investments in small scale aquaculture.
4. B.3.3 Investments in gathering of sufficient data to assess artisanal fishery, e.g. Chinese seine fishery. It was further noted that investments in cost effective communication systems for artisanal fisheries to address issues of piracy and improve MCS are required.

Suriname

1. B2 Investments in fishing Community Infrastructure, particularly storage, jetty and Ice production facilities.
2. A 2.1 Investments in monitoring facilities of protected areas and no fishing zones.
3. A 3.1 Investments in regional coordination of reef fishery, specifically the snapper fisheries in the region, operating from Venezuela
4. B 1.1 Investments in the identification and promotion of alternative livelihoods for small small-scale fisherfolk in three fishing communities

Brazil

1. A.2 Investment in environmental protection and restoration of habitat including spawning and nursery grounds. Also A.2.2. was considered important, in view of the need to implement a project on mangrove reahabilitation.
2. C.1 and C.2 Investment in fisheries institutional capacity, national and regional fisheries management planning and implementation; MCS and enforcement programmes.
3. B.2.1 Investments in the rehabilitation and construction of fisheries landing site infrastructure.

61. It was recognized by the Working Group that these national investment priorities are preliminary and can be changed during pre-feasibility studies. In terms of regional level investment priorities the Working Group confirmed that the priorities listed in the planning report were all valid.

62. The investment planning report had been reviewed and was fully endorsed. Minor editorial changes and updates of information were submitted to the author for incorporation in the final version.
63. The finalized Investment Planning Report can be found in Appendix E.

RECOMMENDATIONS TO WECAFC AND CRFM

64. The Working Group revised in plenary the draft recommendations from the workshop to be presented to WECAFC 16 in June 2016. The draft recommendations were sent before to the participants to allow time to read and comment. The WECAFC Secretary explained that the recommendations follow the usual format used by WECAFC and he outlined the procedures for issuing and adopting the recommendations. The draft recommendations agreed by the Working Group are presented in Appendix F.
65. Considering that these draft recommendations are made by the Working Group experts, and thus concern the technical advice only, it is foreseen that the final version at endorsement by WECAFC 16 will be slightly different from what was agreed by the Working Group. The draft recommendations will be sent by the WECAFC Secretariat for information and review to the CRFM and the OSPESCA and then to the Scientific Advisory Group for final review before being presented to WECAFC 16.

TERMS OF REFERENCE AND WORK PLAN OF THE WORKING GROUP ON SHRIMP AND GROUND FISH

66. The draft Terms of Reference and Work Plan of the Working Group for a 5-year period were presented by Mr Carlos Fuentevilla (FAO) and reviewed by the Working Group. After the necessary amendments were made the finalized TORs and Work Plan were endorsed for submission to the CRFM and WECAFC. The Terms of Reference and Work Plan can be found in Appendices G and H.
67. The election of the Convener of the group was also addressed and the Secretariat thanked Mr Fabian Blanchard for the excellent work conducted as convener. Mr Blanchard was therefore reconfirmed by the group as the Convener for the next 2-year period.

NEXT STEPS

68. At the end of the meeting the WECAFC Secretary pointed out the next steps for the different pending works regarding the preparation of the report of this workshop, on the bioeconomic modelling and the fisheries management controls reports and the fisheries investment plan. The various reports prepared would be circulated to all participants for a final round of comments before translation and publication. All the work is scheduled to be completed before December 2015.
69. The investment plan follow-up comprises the development of a draft project proposal, circulation to the working group and finalization and formal submission to the IADB in December 2015.

This particular work would be initiated by the Secretariat, in close collaboration with Mr Tietze and the Convener of the group.

70. The next steps in terms of follow-up with the draft recommendation from the working group and the Terms of Reference are detailed above.

DATE AND PACE OF THE NEXT MEETING

71. It was agreed that the next meeting of the Working Group would be organized with support from the REBYC II LAC and CLME+ projects in the 2nd semester of 2016. The Convener and WECAFC Secretariat would inform the members of any developments in this respect. Items to include in the agenda for the next meeting would be the sub-regional management plan and the regional trawl by-catch strategy.

CLOSURE OF THE MEETING

72. Mr Van Anrooy on behalf of FAO and WECAFC thanked all Working Group members and other meeting participants for the active participation in the meeting. He acknowledged the work of the Convener and Co-Chairs, the rapporteurs, consultants, interpreters and also thanked the IADB for the support and contribution provided. He thanked all for their contributions to the success of the meeting and expressed his hope to see some sustainable investments in shrimp and groundfish fisheries being made in the region in the short term.
73. The meeting was adjourned on Tuesday 8 September at 18:00 hours.

APPENDIX A

Agenda

1. Opening Ceremony
2. Election of Chairperson
3. Scope of the workshop
4. Adoption of the agenda and election of chairpersons
5. Bioeconomic analysis of the shared stocks of shrimp and groundfish fisheries of the Guianas-Brazil Shelf
6. Current fisheries management measures in the Guianas-Brazil Shelf sub-region
7. Current status of CLME+ demonstration project on shrimp and groundfish resources
8. Investing in ecosystem based shrimp and groundfish fisheries management of the Guianas-Brazil Shelf – a conceptual framework
9. The way forward: components of the proposed investment programme and case studies of successful investment projects
10. Recommendations to WECAFC and CRFM
11. ToRs and Work plan of the Working Group on Shrimp and Groundfish
12. Next steps
13. Date and place of the next meeting
14. Closure of the Workshop

APPENDIX B

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APPENDIX C

Report of the Bioeconomics of shrimp and groundfish fisheries of the Brazil-Guianas Shelf

(to be inserted as received)

APPENDIX D

Review of Management Controls Used in Shrimp and Groundfish Fisheries Operating on the Brazil-Guianas Shelf

(to be inserted as received)

APPENDIX E

Investment Planning Report

(to be inserted as received)

APPENDIX F

Draft Recommendation WECAFC/16/2016/--

ON THE MANAGEMENT OF SHRIMP AND GROUND FISH RESOURCES IN THE WECAFC AREA

The Western Central Atlantic Fishery Commission (WECAFC),

RECALLING that the objective of the Commission is to promote the effective conservation, management and development of the living marine resources within the area of competence of the Commission, in accordance with the FAO Code of Conduct for Responsible Fisheries, and address common problems of fisheries management and development faced by members of the Commission;

RECALLING that most WECAFC members have endorsed the Caribbean Large Marine Ecosystem (CLME) Strategic Action Programme (SAP) and that under its Strategy 6 “Implement EBM/EAF of the Guianas-Brazil continental shelf with special reference to the shrimp and groundfish fishery” the same members are required to “Strengthen the FAO-WECAFC-CRFM sub-regional arrangement for the management of the shrimp and groundfish fisheries, and establish a decision-making capacity for policy formulation and management”;

NOTING the long history of work of WECAFC (since 1975) on shrimp and groundfish resource assessment and biological and economic modeling of shrimp fisheries, that guided the management of these resources by the members, as well as the more recent CLME project Trans boundary Diagnostic Analysis (TDA), which demonstrated the current challenges to the sector, including habitat damage and destruction of mangroves, land-based water pollution, Illegal, Unreported and Unregulated (IUU) fishing, overexploitation of some resources, piracy, and conflicts between stakeholders within the sector and with other sectors;

REAFFIRMING its commitments, made at the 15th session of WECAFC, through establishing the WECAFC/CRFM/IFREMER Working Group on Shrimp and Groundfish in the Northern Brazil-Guianas Shelf;

MINDFUL of the discussions and outcomes of the Inter-American Development Bank financed Workshop on Investing in Ecosystem-based shrimp and groundfish fisheries management of the Guianas–Brazil shelf, which was held Barbados, 7-8 September 2015;

RECOGNIZING the significant contribution of the shrimp and groundfish fisheries to food and nutrition security, poverty alleviation, income generation, and employment for present and future generations in the WECAFC area;

REAFFIRMING the need for continued action by all stakeholders to ensure the long-term sustainable use and management of the shared shrimp and groundfish fisheries resources in the region based on the ecosystem approach to fisheries (EAF);

NOTING the concerns of the WECAFC/CRFM/IFREMER Working Group on Shrimp and Groundfish in the Northern Brazil-Guianas Shelf that available and shared information to inform fisheries management and decision making processes at the sub-regional level has been reduced over the last 15 years. Researchers and fisheries officers have not received the necessary capacity building to carry out such assessments, most management plans are in draft form only and enforcement capacity and collaboration in fisheries management is weak.

ACNOWLEDGING that this capacity building should be tied up to resources and means to actually use the knowledge, abilities, and approaches to bioeconomic analysis and management of fisheries of the North Brazil-Guianas ecosystem.

RECOGNIZING the need to improve data and information to reduce uncertainties to stock assessment methodologies currently used, to investigate whether stocks are shared or not and to monitor the long term impacts of the trawl fisheries on the stocks;

RECOGNIZING that while certain shrimp and groundfish stocks may not be shared by all Brazil-Guianas Shelf countries, there are substantial linkages between the fisheries fleets from the different countries and the ecosystems where these stocks are exploited.

CONSIDERING the opportunities offered by the GEF projects on Sustainable management of bycatch in Latin America and Caribbean trawl fisheries (REBYC II LAC) and on Catalyzing 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+), for introducing and testing shrimp fisheries bycatch reduction technologies and fisheries co-management and for increasing regional collaboration in management of the common and transboundary resources, as well as for combating IUU fishing and building of national capacities;

RECOGNIZING the efforts from the CRFM through its annual scientific meetings and intersessional activities, in facilitating assessment of the commercial seabob fisheries in Guyana and Suriname, as well as the shrimp fisheries in Trinidad and Tobago, to provide information in support of fisheries management decision making;

RECOGNIZING efforts made by France, the IFREMER in French Guiana, and in Brazil to carry out stocks assessments of penaeid shrimps and red snapper;

PENDING the delivery of additional information by the Working Group, CRFM continental shelf fisheries working group meetings and the Scientific Advisory Group (SAG);

ADOPTS in conformity with the provision of Article 6 (h) of the Revised Statutes of the WECAFC the **RECOMMENDATION** that:

1. Members of WECAFC prepare (if relevant) national level shrimp and groundfish fishery management plans, and put in place appropriate legislation in support of a sustainable shrimp and groundfish fishery.
2. WECAFC, in close coordination with CRFM, IFREMER and the Secretariat of the Cartagena Convention, develop a sub-regional shrimp and groundfish fishery management plan for the Northern Brazil-Guianas Shelf countries, in accordance with the best available scientific evidence to be presented to WECAFC 17 for final review and adoption.
3. WECAFC, in close collaboration with FAO, CRFM, IFREMER and NOAA develops appropriate methodologies for shrimp and groundfish data collection on catch, catch composition (i.e species and sizes) and fishing effort (fleet specific, gear specific), including also a common methodology for multispecies shrimp and groundfish stock assessments in the sub-region taking in consideration environmental variable, for initial implementation by the members from 2018 onwards.
4. WECAFC, in close coordination with CRFM, IFREMER, CLME+, FAO, the FIRMS Partnership, and as required with the support of the iMarine/BlueBridge project, establishes a shared regional database matching confidentiality and security requirements, containing raw data of the collected

biological and physical/environmental parameters, and as required fishery data (catch, effort, length frequencies, ...), to support outcomes achieved through stock assessments, bio-economic modeling and other relevant information on shrimp and groundfish fisheries for decision making process for the management of these resources in the sub-region. The database outputs concerning state of stocks and fishery management status would be made available through the FIRMS website, applying well-established and agreed protocols for data and information sharing compliant with data policies of the participating countries.

5. WECAFC, in close collaboration with FAO, CRFM and NOAA and IFREMER build capacity in the Brazil-Guianas region for periodic bioeconomic analysis of fisheries to undertake: (i) robust stock assessments (ii) costs and earnings studies of different fisheries of interest in the country/region, (iii) bioeconomic modelling and analysis of technologically interdependent fisheries (e.g. shrimp and snapper fisheries), (iv) bioeconomic modelling of sequential fisheries with fleets harvesting different components of the population structure (e.g. shrimp fisheries targeted by small-scale and industrial fleets in different stages of their life cycle), and (v) alternative bioeconomic models for different species being targeted (i.e. species with different degrees of mobility) and multi-species fisheries, e.g. groundfish and small-scale fisheries.
6. The Working Group on Shrimp and Groundfish to assist the Regional Working Group on IUU to develop a regional plan of action to combat Illegal, Unreported and Unregulated (IUU) fishing (RPOA-IUU).
7. The Working Group on Shrimp and Groundfish assists the REBYC II LAC project countries with the development of a regional trawl fisheries bycatch strategy, for review and endorsement by CRFM, OSPESCA and WECAFC in 2018.
8. WECAFC members promote the shrimp and groundfish fisheries general investment plan for the Brazil-Guianas shelf countries at national and sub-regional level.
9. WECAFC, IDB and CRFM further facilitate the member countries (as needed) in conducting the necessary feasibility studies for the preparation of full-fledged, location-specific investment proposals.

APPENDIX G

Terms of Reference of the Working Group

WECAFC/CRFM/IFREMER Working Group on Shrimp and Groundfish in the Northern Brazil-Guianas Shelf

Convener: Fabian Blanchard (Ifremer, French Guyana)

1. ROLE OF THE WORKING GROUP

1.1 Scope

The scope of the working group is to provide scientific and management advice for the sustainable management of the shrimp and groundfish resources of the Northern Brazil-Guianas shelf in the WECAFC Region. In undertaking its work, the working group will pay due attention to the Code of Conduct's Article 6.4 of the general principles⁴ and the principles of the Ecosystem Approach to Fisheries.

1.2 The goal of the Working Group

Using a multidisciplinary approach the working group will contribute to the sustainable management of the shrimp and groundfish resources of the Brazil-Guianas shelf by providing management advice to Members of WECAFC based on the best available knowledge.

In pursuing this goal the working group will contribute to the fulfilment of national and regional responsibilities for the marine environment and for the management of the shrimp and groundfish resources and related or interacting species or fisheries in the WECAFC Region under the code of Conduct for Responsible Fisheries, in line with the principles of Ecosystem Approach to Fisheries and in accordance with agreed, documented management goals.

1.3 Terms of Reference (TORs)

Some shrimp and groundfish resources are transboundary and therefore the TORs may apply at sub-regional and/or national levels as appropriate. The working group, with the support of FAO, WECAFC Secretariat, CRFM and UNEP-CEP, will act in an advisory capacity to guide and facilitate the sustainable management of the shrimp and groundfish resources.

Specifically, the working group will:

- (a) Share available data and information on shrimp and groundfish resources.

⁴ 6.4 Conservation and management decisions for fisheries should be based on the best scientific evidence available, also taking into account traditional knowledge of the resources and their habitat, as well as relevant environmental, economic and social factors. States should assign priority to undertake research and data collection in order to improve scientific and technical knowledge of fisheries including their interaction with the ecosystem. In recognizing the transboundary nature of many aquatic ecosystems, States should encourage bilateral and multilateral cooperation in research, as appropriate.

- (b) Develop common methods for assessment and monitoring of shrimp and groundfish stocks, possibly involving the private sector formally in data collection.
- (c) Undertake, review and validate stock assessments of shrimp and groundfish resources in the Brazil-Guianas shelf
- (d) Monitor changes in availability, distribution and abundance of shrimp and groundfish resources in the Brazil-Guianas shelf
- (e) Compile and analyse data on catch, effort, size composition, changes in habitat and reproductive patterns () of shrimp and groundfish fisheries in the sub-region and monitor and evaluate changes.
- (f) Compile and analyse data and information about the social and economic importance of shrimp and groundfish fisheries.
- (g) Provide management advice and advice on the implementation and performance of sub-regional management regulations on shrimp and groundfish resources to countries and regional organizations.
- (h) Establish communication between the members of the working group, and between the working group and interested parties including the private sector.
- (i) Evaluate and make recommendations on emerging issues regarding the shrimp and groundfish resources, such as environmental changes of local or global economic context. Wherever relevant, address issues dealing with pollution and habitat degradation and their impacts on the shrimp and groundfish resources in collaboration with appropriate national, sub-regional and/or regional institutions or stakeholders.
- (j)
- (k) Establish links with the CRFM continental shelf fisheries working group as appropriate, in order to avoid duplicating efforts and tasks and optimize use of technical and financial resources.
- (l) Establish link with other sub-regional initiatives (ex. CLME+, ReByC II projects) for mutual benefits.
- (m) Collaborate with IUU working group on development and implementation of the regional plan of action on IUU fishing.
- (n) Report to WECAFC and CRFM on the outcome of each session.

1.4 Mode of Operation

1.4.1 Role of Countries

The members of the working group will play a leading role in its activities through the following activities and commitments:

- Participate in agreed activities of the working group, and ensure the participation of appropriate experts;
- Implement, at the National level, the work identified in the agreed work plan of the Group;
- Host working group meetings on a rotational basis.

1.4.2 Role of Convenor

The Convenor of the working group will play a leading role during the organization of the meetings by coordinating the inputs of the members of the working group:

- Call for meetings as appropriate;
- Ensure that contributions are received in a timely manner and in the appropriate format;
- Ensure that outputs are delivered as agreed during each meeting;
- Collaborate closely with FAO-WECAFC and other sub-regional and regional organizations as appropriate.

1.4.3 Role of FAO

The FAO/WECAFC Secretariat will play a supporting role in the activities of the working group by assisting in:

- Co-coordinating the activities of the working group (including facilitate procurement of funding);
- Providing a technical secretary and technical backstopping;
- Providing technical assistance and support to research;
- Facilitating training.

1.4.4 Role of other organisations (e.g. CRFM, UNEP-CEP, IFREMER, NOAA)

Subregional organisations have an important role to play in assisting their member countries to participate fully in the activities of the working group by:

- Providing technical assistance and support;
- Facilitating procurement of funding when possible;
- Facilitating the decision-making process at the Subregional level.

1.5 Communication

A mechanism for on-going communication among working group members (Video conference, Skype and email), is essential to ensure that the work of the group is sustained between meetings. It must include all working group members.

The successful functioning of the working group also requires that each member country and organization/ agency identify a national focal point through which communications will be directed. The outputs of the working group will be communicated through working group reports to WECAFC, CRFM, UNEP-CEP, IFREMER and national fishery administrations via the WECAFC Secretariat.

1.6 Working Group meetings

Working Group meetings will be organized according to the workplan and depending on resources available.

APPENDIX H**Work Plan****WECAFC/CRFM/IFREMER Working Group on Shrimp and Groundfish in the Guianas-Brazil Shelf (WGS GF)**

The joint Working Group intends to carry out the following activities over the period 2015 - 2018:

Activity	Timeframe	Responsible
1. Finalization, publication and dissemination of the Report of the WG meeting in Barbados September 7-8 2015	January 2016	WECAFC/CRFM/IFREMER and FAO with inputs from meeting participants
2. Provide technical and scientific advice to national governments and WECAFC Commission	January 2015 – December 2018	WG members
3. Report to the: – 7th meeting of the WECAFC Scientific Advisory Group (SAG), November 2015. -16th session of WECAFC, June 2016	As deadlines for reporting require	WECAFC Secretariat
4. Contribute to the regional plan of action to combat IUU fishing	May 2018	IUU Working Group with support from this Working Group and CLME+
5. Formulate draft sub-regional management plan for shrimp and groundfish in Guianas-Brazil Shelf	May 2018	Working Group with support from CLME+
6. Reactivate Stock assessment: - Training in stock assessment for WG Countries - Carry out planned periodic stock assessments	January 2015 onwards	IFREMER in collaboration with CRFM/WECAFC and support from IADB
7. Finalize Investment Plan for Investment in EAF management	December 2015	IFREMER/CRFM/WECAFC with support from IADB
8. Develop draft Regional Strategy on Shrimp and groundfish trawl fisheries by-catch and introduce to WECAFC Commission.	May 2018	Working group Members with Support from CRFM/WECAFC/IFREMER and REBYC II LAC
9. Recommend and test co-management arrangements for sustainable by-catch management.	January 2015- May 2018	REBYC-II LAC, WECAFC, and CRFM, OSPESCA, IFREMER and the authorities in the region
10. Increase collaboration with other partners on MCS	January 2016	WG supported by CLME+ through WECAFC