Report of the

NATIONAL CONSULTATION in GUYANA
CASE STUDY ON SHARED STOCKS OF THE SHRIMP AND GROUNDFISH FISHERY OF THE GUIANAS-BRAZIL SHELF

Georgetown, 18 September 2012

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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FAO implemented a "Case Study on Shared Stocks of the Shrimp and Groundfish Fishery of the Guianas-Brazil Shelf" (UNGF/INT/001/OPS) between July 2011 and February 2013, with six participating countries (Brazil, French Guiana (EU/France), Guyana, Suriname, Trinidad and Tobago and Venezuela). The case study was carried out within the framework of the GEF-funded Caribbean Large Marine Ecosystem (CLME) Project. The CLME Project is aimed at assisting Caribbean countries to improve the management of their shared living marine resources, most of which are considered to be fully or over exploited, through an ecosystem approach. A preliminary Transboundary Diagnostic Analysis identified three priority transboundary problems that affect the CLME: unsustainable exploitation of fish and other living resources, habitat degradation and community modification, and pollution.

The purpose of the case study on Shared Stocks of the Shrimp and Groundfish Fishery of the Guianas-Brazil Shelf was to fill knowledge gaps, contribute to the final CLME Transboundary Diagnostic Analysis and to the Strategic Action Programme (SAP), with priority actions to be undertaken to ensure the sustainability of the shrimp and groundfish fisheries. Another objective was to mainstream the Ecosystem Approach to Fisheries (EAF) in the management of shrimp and ground fish fisheries. Both objectives were addressed through assessments/studies at the national and regional levels, with the participation of stakeholders and following some of the key steps of the planning process within an EAF framework.

PREPARATION OF THIS DOCUMENT

This is the report of the national consultation organized by the Ministry of Agriculture of Guyana, in collaboration with FAO and the Caribbean Regional Fisheries Mechanism (CRFM), held in Georgetown, Guyana, on 18 September 2012. The report contains a summary of the discussions held during the national consultation, the results of a scoping exercise that was carried out by the participants, the baseline report that was discussed and agreed upon by the stakeholders, as well as the results of the preliminary meetings that were held prior to the national consultation. The organizers are grateful to all workshop participants for their input into the report and to all resources persons for their presentations and summaries provided for this report.

CASE STUDY ON SHARED STOCKS OF THE SHRIMP AND GROUNDFISH FISHERY OF THE GUIANAS-BRAZIL SHELF
Report of the National Consultation in Guyana, Georgetown, 18 September 2012.
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ABSTRACT

This is the report of the national consultation organized by the Ministry of Agriculture of Guyana, in collaboration with FAO and the Caribbean Regional Fisheries Mechanism (CRFM), held in Georgetown, Guyana on 18 September 2012. The consultation was organized as part of the Case study on shared stocks of the shrimp and groundfish fishery of the Guianas-Brazil Shelf of the Caribbean Large Marine Ecosystem Project. The meeting was attended by 37 participants, including artisanal fishermen, representatives from the Environmental Protection Agency, Conservation International (CI), World Wildlife Fund (WWF), Maritime Authority, the Coast Guard, the Fisheries Department, the University of Guyana and the Association of Trawler Owners & Seafood Processors, CRFM, and FAO.

Participants were provided with an overview of the CLME Project and the case study on shrimp and groundfish, as well as the key principles of the Ecosystem Approach to Fisheries. The baseline report was presented and participants were encouraged to contribute to the finalization of the report. The summary of priority issues and suggested actions from the sixteen preparatory meetings that were held prior to the national consultation was presented. Participants were divided into three groups to validate the issues identified during the preliminary meetings and allocate a priority level to the issues to be addressed.

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INTRODUCTION

The national consultation workshop held in Guyana on 18 September 2012 was organized within the framework of the Caribbean Large Marine Ecosystem (CLME)[1] Project funded by the Global Environment Facility (GEF). The CLME Project assists participating countries from the Wider Caribbean Region to improve the management of their shared Living Marine Resources -most of which are considered to be fully or overexploited- through an Ecosystem-Based Management (EBM) approach.

The CLME project is part of the global Large Marine Ecosystem initiative that started in the 1980s. The Caribbean LME and the North Brazil Shelf LME form the focus of the CLME project as the Wider Caribbean Region, encompassing 26 countries and 45 state entities (highest number of all LMEs) with a broad variety of ethnicity and language, size and level of wealth.

As part of the CLME Project, a preliminary Transboundary Diagnostic Analysis (TDA) was undertaken which identified three priority transboundary problems that affect the Caribbean Large Marine Ecosystem (CLME): unsustainable exploitation of fish and other living resources, habitat degradation and community modification, and pollution. Through the project, the TDA will be reviewed to include a full analysis of data and information gaps, a complete causal chain analysis, a public involvement and communication strategy, institutional mapping, a legislative review, a socio-economic review and identification of interventions for inclusion in the Strategic Action Programme (SAP). The results of the TDA gap filling activities and the demonstration projects will be incorporated into a final updated TDA. An important contribution to the TDA will be the gap filling activities related to the Brazil-Guianas shrimp and groundfish fisheries.

To this end, the shrimp and groundfish fisheries case study is one of three case studies identified within the framework of the CLME project to fill knowledge gaps that will contribute to the final CLME TDA as a basis for preparation of the SAP, with priority actions for the sustainability of the shrimp and groundfish fisheries.

The case study is also aimed at mainstreaming the Ecosystem Approach to Fisheries (EAF) in the management of shrimp and groundfish fisheries in the six participating countries and overseas territories: Brazil, French Guiana, Guyana, Suriname, Trinidad and Tobago and Venezuela. The case study also provides for the fisheries to be assessed in all their components (ecological, socio-economic, governance); based on various sources of information including stakeholder and institutional analyses. The above integrated assessment of the fishery will be carried out at the local level and with stakeholders' participation. Key priority issues which are considered the main hindrances to sustainability will be identified. The integrated assessments described above will constitute a validation/completion of the TDA process and form the basis for the completion of the SAP.

As part of the case study, a number of activities have been undertaken since July 2011 at the national and regional levels. These include:

- ✓ Training of Facilitators Workshop to train facilitators from each of the participating countries on participatory planning, stakeholder analysis/identification, Trinidad July 11-16, 2011
- ✓ Training Workshop on Ecosystem Approach to Fisheries, Suriname October 17-21, 2012
- ✓ A series of preparatory meetings with national stakeholders in Guyana to inform on the project and to identify the priority issues and key fisheries management actions to address these issues at the national as well as regional level
- ✓ Preparation of an Ecosystem Approach to Fisheries (EAF) Baseline Report on the shrimp and groundfish fishery in Guyana

[1] For more information consult http://www.clmeproject.org/portal/default.aspx

These above activities have provided valuable information to the national stakeholder consultation workshop which was aimed at providing an introduction to the main Ecosystem Approach to Fisheries (EAF) principles and to provide a list of priority issues and suggested actions for the shared stocks of the shrimp and groundfish fishery in Guyana, both at the national and at the transboundary level.

The national consultation in Guyana was attended by 37 participants, including artisanal fishermen, representatives from the Environmental Protection Agency, Conservation International (CI), World Wildlife Fund (WWF), Maritime Authority, the Coast Guard, the Fisheries Department, the University of Guyana and the Association of Trawler Owners & Seafood Processors. The list of participant is provided in Appendix 1.

The specific objectives of the workshop were to:
- ✓ Familiarize participants with the principles and practices of the EAF
- ✓ Present the draft EAF baseline report
- ✓ Identifypriority issues (both national and transboundary) for the sustainable management of shrimp and groundfish fisheries, based on the EAF framework
- ✓ Identify key actions to address identified priority issues

The methods used at the national consultation included presentations, plenary discussions and working groups. The workshop agenda is provided in Appendix 2.

OPENING OF THE NATIONAL CONSULTATION WORKSHOP

The master of ceremonies, Mr Denzil Roberts, Chief Fisheries Officer, Ministry of Agriculture of Guyana welcomed the participants and briefly recalled the overall purpose of the workshop.

Mr Terrence Phillips, Programme Manager of the Caribbean Regional Fisheries Mechanism (CRFM) gave brief welcoming remarks. He reminded the participants of the importance of the shrimp and groundfish fisheries to the region. He mentioned that penaeid shrimps of the region are subject to increasing fishing mortality and that most groundfish stocks are currently fully to overexploited, reminding participants though that seabob shrimps of Guyana and Suriname do not show any sign of overexploitation. He recalled that the case study is aimed at incorporating EAF in the management of these resources and underlined the importance of designing management plans, developing and managing fisheries so as to address societal needs without jeopardizing the options of future generations to benefit from marine ecosystems. The full text of his remarks is presented in Appendix 3.

The FAO Representative in Guyana, Mrs Lystra Fletcher-Paul, welcomed the participants on behalf of the FAO and provided a short background of the CLME Project under which the workshop was organized. She highlighted the important contribution of fish as a source of animal protein to the diets of people worldwide, as an important source of livelihood and also the critical role it plays in disaster risk management, as in many Caribbean countries, it is an immediate source of food security in the wake of catastrophic events. She noted that Guyana's fisheries are under threat because of overfishing, use of destructive fishing practices, open access of many fisheries, pollution, siltation and coastal development. She further noted that climate change is likely to impact on the fisheries resource, in ways that are difficult to predict.

The FAO Representative called on decision-makers to act now and decisively to reduce the vulnerability of the fisheries and highlighted that the EAF is being promoted internationally and by FAO as a way to address the key sustainability issues of the fisheries sector, while empowering stakeholders to play a more active part in decision-making so that they can take greater ownership and responsibility for the management of the fisheries resources. She noted the commitment of the Ministry as an indicator that the Government is willing to create an enabling environment and formulate and enforce the necessary policies and legislation to promote sustainable fisheries

management and indicated that FAO is committed to assisting the Government of Guyana, as has been done over the past 20 years.

Ms Fletcher-Paul also informed the meeting of ongoing assistance to the Government of Guyana through the FAO Technical Cooperation Programme funds, including the development of an Inland Fisheries Policy and the development of a Disaster Risk Management Plan for the Agriculture Sector including Fisheries. The FAO Representative thanked the Government of Guyana for hosting the workshop and for its continued support and close collaboration. The full speech of the FAO Representative can be found in Appendix 4.

The Honourable Minister of Agriculture, Dr Ramsammy, in his workshop opening remarks, thanked the organizers. He stressed the importance of the fisheries sector, which contributes some 3 percent to the Gross Domestic Product (GDP) of the country nowadays. He recalled that the consumption per capita in Guyana is more than three times the World average, with 58 kg per capita. The fishing industry in Guyana is an important source of employment and even though the Government is currently encouraging the development of inland fisheries and aquaculture, there is still a strong will to promote sustainable marine fishing. He underlined the fact that marine fishing is not able to contribute to the fish production as it did in the past and stressed the necessity to protect ecosystems and rebuild and maintain fish stocks. He also mentioned the need to assess the impacts of different users on marine ecosystems: tourism, increasing number of vessels, industrial activities and the resulting pollution. He called for an evolution of the fishing industry, in order to keep it safe, successful and maintain its contribution to the economy of the country, highlighting the importance of licensing systems, and use of VMS. He also touched on several issues affecting the fishery sector. These included: (i) the unavailability of ice; (ii) piracy; (iii) climate change; and (iv) the high cost of fishing gear. He urged the sectors to play a larger role in providing high quality fish protein to the people of Guyana and take advantage of the export opportunities presented in the CARICOM and elsewhere.

PLENARY PRESENTATIONS

OVERVIEW OF THE CARIBBEAN LARGE MARINE ECOSYSTEM (CLME) PROJECT AND THE CASE STUDY FOR THE SHARED STOCK OF THE SHRIMP AND GROUNDFISH FISHERYIN THE NORTH BRAZIL-GUIANAS SHELF

FAO's Fisheries Officer, Ms Tarub Bahri, presented an overview of the CLME Project and the case study on the Shrimp and Groundfish Fishery in the North Brazil-Guianas Shelf. She informed the workshop that the CLME project is part of the global Large Marine Ecosystem initiative and explained the linkage between the CLME project and the case study on shrimp and groundfish fisheries. The case study covers six countries, Brazil, France (French Guyana), Guyana, Suriname Trinidad and Tobago and Venezuela. The project is funded by GEF and implemented by FAO in collaboration with the Caribbean Natural Resources Institute (CANARI), Centre for Resource Management and Environmental Studies (CERMES) of the University of the West Indies and the Caribbean Regional Fisheries Mechanism (CRFM). The total duration of the project is 16 months. The overall objective is to fill knowledge gaps so as to contribute to the final CLME Strategic Action Programme that will outline the legal, policy and institutional reforms required in the participating countries to achieve sustainable management of marine living resources. In addition, the case study will help to mainstream EAF in the management of the shrimp and groundfish fisheries. Ms Bahri ended her presentation with the overall roadmap of the case study where the workshop was informed that the priority issues affecting the shrimp and groundfish fishery as identified by the different countries will be presented and discussed during the final regional workshop that will be held in October 2012 in Trinidad and Tobago. The purpose of the final regional workshop is to agree on the priority actions that countries should address and that will be included in the SAP.

WORKSHOP OBJECTIVES AND EXPECTED OUTPUTS

Ms Angela Alleyne, Assistant FAO Representative (Programme) in Guyana, introduced the workshop objectives and expected outputs. She informed the workshop that the objectives of the workshop were to (i) familiarize participants with the basic principles and practices of the Ecosystem Approach to Fisheries (EAF); (ii) review the Draft EAF Baseline Report and provide additional inputs to the Report; (iii) discuss, validate and agree on priority issues (both national and transboundary) for the sustainable management of shrimp and groundfish fisheries that were identified during the 16 preparatory meetings that were held throughout the country in preparation for the national consultation; and (iv) identify key actions to address identified priority issues.

The workshop outputs included input of the draft EAF baseline report revision, list of issues (both national and transboundary) for the sustainable management of shrimp and groundfish fisheries and a list of key actions to address these identified priority issues.

OVERVIEW OF ECOSYSTEM APPROACH TO FISHERIES PRINCIPLES

Mr Terrence Phillips, Programme Manager, CRFM, provided a general overview of the key principles of the ecosystem approach to fisheries (EAF). He reported that the purpose of an ecosystem approach to fisheries is to plan, develop and manage fisheries in a manner that addresses the multiplicity of societal needs and desires, without jeopardising the options for future generations to benefit from marine ecosystems. He further reported that the EAF benefits fish, fishers and fishing communities and builds on the conventional approach to fisheries management. An Ecosystem Approach to Fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.EAF, as adopted by FAO, is not considered a major departure from conventional fisheries management but rather an extension of it and with a greater emphasis on sustainability concepts. Mr Phillips further presented the overall EAF process which adopts a four step approach (see Figure 1) and informed the workshop that throughout the process stakeholders are consulted and decisions are informed by the best available knowledge which in addition to scientific knowledge refers to a more extended knowledge base, including traditional knowledge.

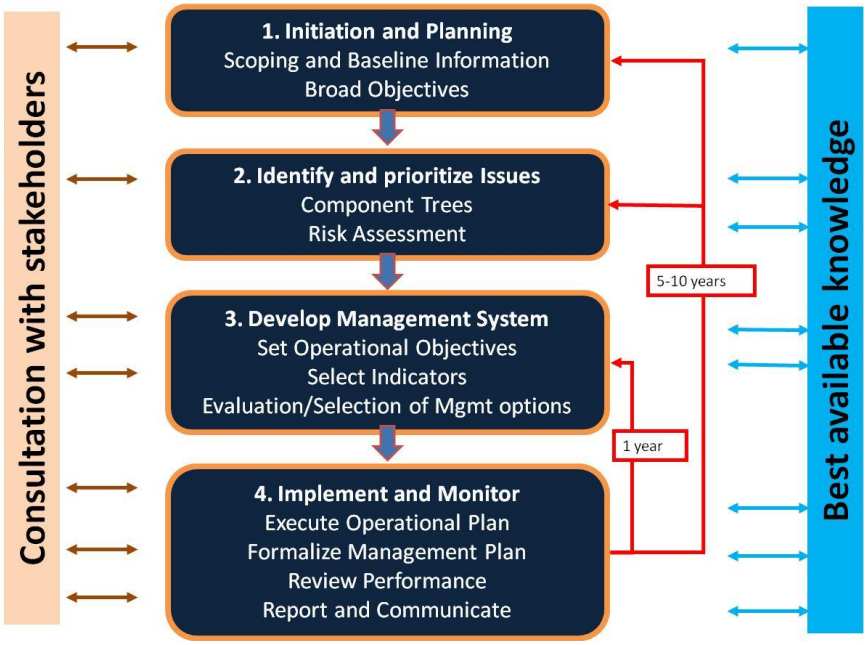


Figure 1. EAF steps

The EAF uses three main components as a basis for the analysis of a fishery: (i) ecological wellbeing of the retained species, the non-retained species and the general ecosystem; (ii) human wellbeing at the community and the national level; and (iii) ability to achieve which refers to governance issues and external drivers (see Figure 2).

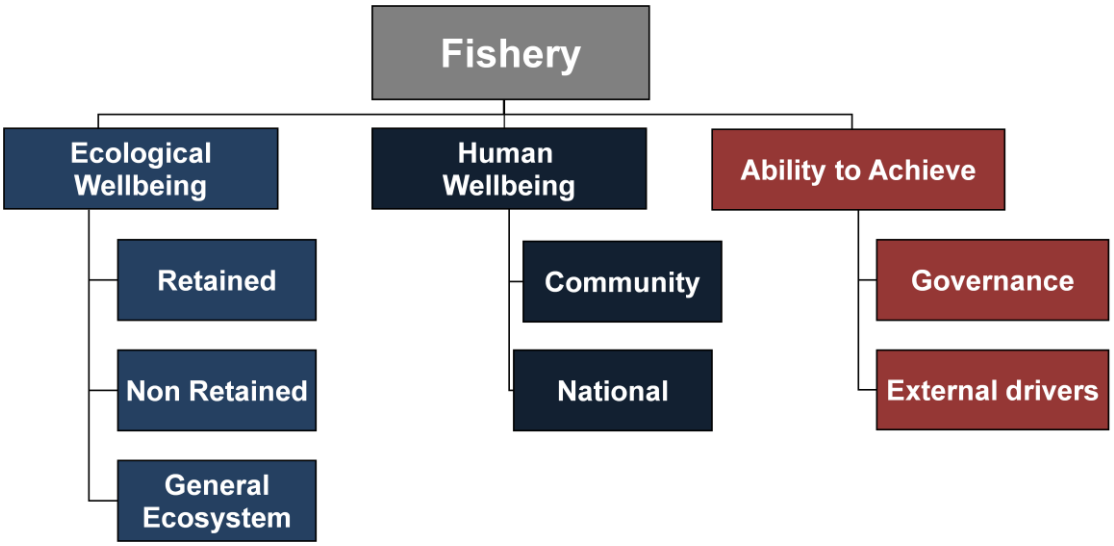


Figure 2. EAF components

In conclusion, the process of evolution from conventional management has started and is gaining momentum. Valuable experience is already available and effective action can be readily taken. He ended his presentation by noting that the EAF implementation can only be incremental and adaptive. Guidance is provided, by FAO and other institutions, but the actual application of EAF can only take place with the main actors on the ground taking responsibility for the needed changes and in a way relevant to the given context.

PRESENTATION OF THE DRAFT BASELINE REPORT

Mr Calvin Bernard, FAO National Consultant, presented the draft EAF Baseline Report on the Shrimp and Groundfish Fishery in Guyana (Appendix 6). He informed the workshop that the report is a negotiated document and provides an overview of the shrimp and groundfish fishery of the country in terms of the status of the stocks, management measures, legal, administrative and institutional frameworks, fishing techniques, and socioeconomic importance of the fisheries.

Information on the management measures and tools being used in the fisheries are highlighted in the report. The final sections of the report focus on the effectiveness of the management of the fisheries; compliance and enforcement issues; national and regional fora for resources management; and implications of moving towards the EAF.

He ended his presentation by reminding the workshop that the report is a negotiated document with contributions from all stakeholders and encouraged participants to contribute to the finalization of the report.

SUMMARY OF PRIORITY ISSUES AND SUGGESTED ACTIONS FROM THE PREPARATORY MEETINGS

Sixteen preparatory meetings were held from 18 July to 3 August 2012 throughout the country with stakeholders involved in the shrimp and groundfish fishery in preparation for the national consultation workshop. These meeting sought to share information on the CLME Case Study project and to gather

information from stakeholders on the priority issues/problems affecting the shrimp and groundfish fishery and key fisheries management actions to address these issues at the national and transboundary levels. Stakeholders were also informed of the preparation of the Ecosystem Approach to Fisheries Baseline Report on the Shrimp and Groundfish Fishery of Guyana and of the need to solicit their inputs for the preparation of the report. Stakeholder meetings were held at the Parika Fish Port Complex, Trawler Association, #43, 66-79 villages, Rose Hall and Albion Association, Canje Bridge, Rosignol, Bushlot, Mahaica, Montrose Koker, Zeeburg, Windsor Forest, Goed Fortuin, Charity and Cullen. Over 181 persons were consulted. While fisher folk were consulted, other stakeholders involved in the fishery such as the Environmental Protection Department, Coast Guard, Maritime Authority, Conservation International, Guyana Marine Turtle Conservation Society, University of Guyana, etc., were not consulted during the process. Annex 5 provides the results of the preparatory meetings.

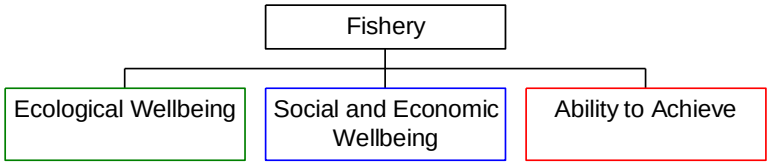
Mr Calvin Bernard presented a summary of the main issues identified from the preparatory meetings. These included the following:

1. Fuel price is high and supply is short and/or unstable.
2. Ice prices are high and supply is short and/or unstable.
3. Gear prices are high, supply short, distant (including foreign) and gear of poor quality.
4. There is a high capital investment in fuel, gear and other consumables required for the fisheries.
5. The catch (specifically of the target species) has reduced for a variety of reasons.
6. Landing site facilities need to be built or repaired for improved work conditions, security and safety.
7. Piracy and security for fishermen and property.
8. Conflict over access to fishing grounds and resources manifested especially as gear interaction.
9. Fishing gear often stolen or damaged by various vessels (not including gear interaction).

NATIONAL CONSULTATION OUTCOMES

The participants of the national consultation workshop were divided into three groups to review the main issues identified from the preparatory meetings. The groups were established in a way that ensured equal representation of the different stakeholders in each group (e.g. artisanal fishers, industrial fishers, government authorities). The groups were tasked with validating the identified issues as well as identifying additional issues if necessary based on Step 2 of the EAF.

This step of the EAF process aims to identify all the relevant issues across the three key dimensions of EAF for the fishery being examined in order to decide where to focus the management system to generate the best community outcomes.



The three EAF components to which the issues identified by the group refer are:

- ✓ Ecosystem Well-being: All ecological 'assets' (e.g. stocks, habitats, ecosystems) relevant to the fishery and the issues/impacts being generated by the fishery that may be affecting them.
- ✓ Human Well-being: The social and/or economic 'outcomes' currently being generated by the fishery, both the good-those outcomes the community wants to have generated (e.g. food security, economic development), and the bad: those it wants to avoid (e.g. conflicts; injuries).

- ✓ Ability to Achieve: The management and institutional 'systems' in place or proposed to deliver the wanted outcomes (e.g. access and tenure systems, compliance, democratic processes, conflict resolution), along with the external 'drivers' (not controlled by the fishery) which may be affecting performance.

The groups used brainstorming as a tool to identify relevant issues. Issues were identified by individual group members and the discussed. The group work outcomes were recorded on a flip chart and notebook and one group member reported the outcomes of the discussions back to the plenary.

In plenary, all three groups endorsed the main issues identified during the preparatory meetings. However, the following additional issues were identified:

- ✓ Habitat degradation and pollution
- ✓ Climate change and climate variability
- ✓ Inadequate fishing technology to capture the resource
- ✓ Market prices not compensating fishermen
- ✓ Lack of functioning organisation for small-scale fisher folk/inadequate representation of small-scale fisher folk at national, local and regional levels
- ✓ Lack of resources for enforcement and regulation/inadequate capacity for monitoring, control and surveillance
- ✓ Insufficient protection of juveniles
- ✓ Lack of access to information/information sharing
- ✓ Insufficient inter-agency collaboration

PRIORITIZATION OF EAF ISSUES AND PROPOSED ACTIONS TO ADDRESS THEM

Following the report back by groups, participants were then tasked with prioritizing the issues. A large number of issues were identified in the aforementioned process. Therefore, a key part of the EAF process is to ensure that only the most important issues are addressed by direct management intervention. This requires determining their relative priority using some form of risk assessment and/or prioritization procedure based on the fishery trying to deliver certain agreed objectives. Due to time constraints, the risk analysis method was not used to determine the priority issues and therefore the appropriate level of management response. The method used in this national consultation was one in which the issues were recorded on flip chart papers and each participant was given sticking notes and asked to place these against the top four priority issues. Piracy and security of fishermen and property, inadequate protection of juveniles and the high cost of fishing operations were ranked the highest with scores of 15, 13 and 10 respectively. The scores were tallied and the results are presented in the table below.

Issues	Score	Proposed actions
Piracy and security for fishermen and property	15	• Regular patrols by Coast Guard with boats and helicopters • Increased penalties for acts of piracy • Installation of tracking devices on fishing equipment/gear, engine • Better security and penalties for those caught stealing • Traceability system to track stolen engines • Building awareness in the judicial system of fishery enforcement issues. • Better communication between fishermen and improved management and sharing of the information
Inadequate protection of juveniles	13	• Zoning and appropriate legislation on gear types that can be used • Regulated fishing season and rest period for both artisanal and industrial fisheries

Issues	Score	Proposed actions
High cost of fishing operation/inadequate access to market	10	• Fuel concession • Duty free concession on fishing gear/equipment • Upgrade ice factory facilities to increase supply to meet demand • Need to look at more value added products to attract new markets
Landing sites facilities need to be built or repaired for improved work conditions, security and safety	9	• General repair of all wharves • Increased security features (e.g. light) • Dredging of waterways to remove siltation and to allow small boats to enter • Proper management and regular maintenance
Inadequate representation of small scale fishermen at local, national and regional level – Lack of functional fishers' organizations, in particular of artisanal fishermen (national representation body)	8	• Need for more input from the different agencies to help the Coop function properly. Management needs to share information with fishermen at the regional and national levels. Fishermen in turn have the responsibility of seeking and soliciting information from Coop
Lack of knowledge on biology of target species	7	• Training should be organized for fishermen to educate them on the importance of fishery biology data • Knowledge sharing Local/traditional knowledge to be incorporated into the scientific knowledge • Training of Fisheries Department staff to improve their performance • Improve relationships between fishermen and Fisheries Department staff
The catch (specifically of the target species) has reduced for a variety of reasons)	6	• Limit on fleet size • Implement different zoning areas with appropriate fishing gear/equipment usage
Inadequate capacity and resources allocation for monitoring, control and surveillance and enforcement	5	• Increased amount of patrol vessels on the water • Need for increased human and technical capacities and resources (electronic devices)
Inadequate fishing technology to explore all fishing grounds	3	Not discussed
Conflict over access to fishing grounds and resources manifested especially as gear interaction	1	• Zoning in terms of water depth and different gears. • Strengthening of the various fisheries regulations • Monitoring device should be installed on various vessels (self-policing) • Regulated fishing season with efficient monitoring • Zoning with monitoring of gear types within zones
Climate change and climate variability	1	Not discussed
Insufficient inter-agency collaboration/information sharing	1	Not discussed

As a last step, participants remained in their same groups and discussed the potential actions to address the priority issues identified. Below are the proposed actions as reported in plenary by each group. Due to time constraints, the feasibility and relevance of proposed actions were not discussed in detail. For example, regarding the reduction of fishing operation costs, one of the solutions proposed by the participants is to establish duty-free concession on fishing gear/equipment. However, other strategies were discussed, such as to increase the efficiency of fishing operations (ie.: four-stroke engines) or to increase the added value of fish products by processing them locally instead of exporting raw products that are processed in other countries. More time was needed to refine the exercise and go further in

the discussions. However, these outcomes can be considered a valuable input to be considered by policy makers.

NEXT STEPS

Ms Tarub Bahri presented the next steps in the process. The following next steps were agreed upon by the Workshop for action at the national and regional levels:

1) Draft EAF Baseline Report to be circulated to workshop participants for comments. Comments to be sent to FAO (Angela Alleyne) on or before Wednesday 3 October 2012.
2) Finalization of the EAF Baseline Report before the Regional Workshop.
3) Priority issues and suggested actions to be presented at Regional Workshop in October 2012 in Trinidad. All countries to agree on what priority issue to put in the Strategic Action Programme (SAP).
4) The feedback from the six national consultations will inform the development of the Regional Strategic Action Programme (SAP) which has to be finalized by the end of 2012 by the Caribbean Large Marine Ecosystem Project Coordination Unit.
5) The final SAP report has to be approved by the Ministries of all the countries involved by April 2013. This approval is critical for resource mobilization necessary for implementation.
6) FAO and CRFM will work with the Ministry of Agriculture to implement whatever action can be addressed immediately until resources are mobilized for the implementation of the SAP.
7) In preparation for the regional workshop in Trinidad and Tobago on 16-18 October 2012, a report on the national consultation process and results will be prepared.

CLOSING REMARKS

Denzil Roberts noted that some issues and actions proposed would need additional debate and that this exercise would be considered as a work in progress. He formally closed the workshop and thanked the participants and institutions for their active participation.

Tarub Bahri thanked participants on behalf of FAO.

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APPENDIX 2 – WORKSHOP AGENDA

8.00-8.30 am	Registration of Participants
8.30 - 9.00 am	Opening Session- Welcome Remarks by **CRFM Rep, FAO Rep. and Minister of Agriculture**
9.00 – 9.10 am	Overview of CLME Case Study: FAO Fisheries Officer- **Tarub Bahri**
9.10 – 9.20 am	Workshop Objectives and Expected Outputs: Assistant FAO Representative (Programme) – **Angela Alleyne**
9.20 – 9.35 am	Overview of Ecosystem Approach to Fisheries (EAF) principles: CRFM Rep – **Terrence Phillips**
9.35 – 10.00 am	Presentation of Draft EAF Baseline Report: FAO Consultant – **Calvin Bernard**
10.00 – 10.15am	Questions and Answers session
10.15 – 10.30 am	**Coffee Break and Group Photograph**
10.30 – 10:40 am	Summary of Main Issues from Preparatory Meetings: FAO Consultant – **Calvin Bernard**
10:40 – 11:30am	Group work on review and validation of issues
11:30- 12:15 am	Group presentation and plenary discussion on the issues
12:15 – 1:15pm	**Lunch**
1:15 – 1:30 pm	Presentation on prioritization of issues – FAO Fisheries Officer- **Tarub Bahri**
1:30- 2:15pm	Group work on prioritization of EAF issues and proposed actions to address them
2:15 – 3.00 pm	Group Presentations and discussions in plenary
3:00 – 3.15 pm	Next Steps (Revision of EAF Baseline Report, SAP, Follow up activities)
3.15 – 3.30 pm	Closing of Workshop/Vote of Thanks – **Denzil Roberts**

APPENDIX 3 – OPENING REMARKS BY THE CRFM

Opening remarks by Terrence Phillips, Programme Manager, CRFM

Chairman, Mr Denzil Roberts; Chief Fisheries Officer, Honourable Dr Leslie Ramsammy, Minister of Agriculture; Dr Lystra Fletcher-Paul, FAO Representative; Ms Tarub Bahri, FAO Fishery Resource Officer; representatives of the Fisheries Department, Industrial and Small-scale Fishers and their Organizations, representatives from other public and private sector agencies; members of the Media; ladies and gentlemen.

Chairman, I would like to take this opportunity to express the CRFM Secretariat's appreciation to the Ministry of Agriculture and the FAO for inviting us to participate in this National Stakeholder Consultation.

The shrimp resources in the Guianas-Brazil area support one of the most important export oriented shrimp fisheries in the world while the groundfish resources are significant for commercial and social reasons. These fisheries are multigear, multispecies and multinational, using fishing methods that can be classified as industrial or artisanal depending on the level of mechanization.

In general, all the penaeid shrimp species in the region are subjected to increasing trends in fishing mortality and the fisheries are generally overcapitalized. However, in the case of the seabob shrimp fisheries of Suriname and Guyana, analyses have indicated that there is no evidence from the catch and effort data that the stock is overfished.

With regard to the groundfish, despite relatively stable catches, overexploitation was found to be severe for some species, being evidence that some of the fisheries in this area may be fully or overexploited.

As such, we are glad to be involved in this partnership, with the FAO (as lead), UWI-CERMES and CANARI, which is collaborating with the countries of the Guianas-Brazil Shelf Area or the North Brazil Shelf Large Marine Ecosystem in the implementation of this Case Study. More especially, as this Study is seeking to promote the incorporation of the ecosystem approach to fisheries (EAF) into the shrimp and groundfish fisheries of this Continental Shelf Ecosystem.

The purpose of an ecosystem approach to fisheries is to plan, develop and manage fisheries in a manner that addresses the multiplicity of societal needs and desires, without jeopardising the options for future generations to benefit from marine ecosystems.

It calls for such things as an agreement on policy, goals, and management objectives for the goods and services being provided by the ecosystem; identification and involvement of all stakeholder groups; development and implementation of national and regional EAF fisheries management plans; and application of adaptive management and the precautionary approach given the degree of uncertainty and dynamics of the ecosystem.

Implementing EAF would require robust, participatory decision-making mechanisms at all levels, which would lead to more effective adoption of management advice. However, it should be pointed out that the EAF will not be an instant replacement for traditional fisheries management and should be seen as an evolution of the existing fisheries management systems.

The recently held National Stakeholder Consultations in Suriname and Trinidad and Tobago helped to validate the transboundary issues (unsustainable fisheries, habitat degradation and pollution) identified in the Transboundary Diagnostic Analysis. They also demonstrated the stakeholders' commitment to maintaining a healthy ecosystem in order to safeguard the social, economic, cultural and other benefits being provided by the Continental Shelf Ecosystem. There were some 40 representatives from different stakeholder groups at the first consultation in Suriname, and about 200 at the third in

Trinidad and Tobago. We are awaiting feedback on the second one which was held in Brazil last week.

This National Consultation to validate priority issues and identify key actions should be seen as critical to the involvement of the stakeholders in the implementation of EAF in the continental shelf ecosystem of the Guiana-Brazil area.

The component of the strategic action programme (SAP) for the shrimp and groundfish fisheries of the Guiana-Brazil area which is being developed under the Caribbean Large Marine Ecosystem (CLME) Project will benefit from the outcome of this Consultation. The SAP is a negotiated document which will require ministerial endorsement.

Thank you.

APPENDIX 4 – OPENING REMARKS BY FAO

Opening remarks by Ms Lystra Fletcher Paul, FAO Representative in Guyana
Honourable Dr Leslie Ramsammy, Minister of Agriculture
Mr Denzil Roberts, Chief Fisheries Officer
MrTerrence Phillips, Programme Manager, Caribbean Regional Fisheries Mechanism (CRFM)
Ms Tarub Bahri – FAO Fisheries Officer
Distinguished guests
Ladies and gentlemen

Good morning. I am pleased to welcome you, on behalf of the Food and Agriculture Organization of the United Nations, to this workshop on the Ecosystem Approach to Fisheries to be applied to the shrimp and groundfish fisheries in the region. Today, you are here to discuss the findings of the case study which was conducted for Guyana. This case study is one of several which are being developed within the framework of the Caribbean Large Marine Ecosystem project. This is a GEF funded project which was developed in response to the serious challenges confronting the marine ecosystems of the Caribbean.

The overall objective of the project is to improve management practices through the implementation of Ecosystem Approach to Fisheries (EAF) at the national and sub-regional levels, to ensure that maximum benefits can be gained from these resources and to improve livelihoods of those directly and indirectly dependent on these fisheries. In addition to Guyana, Brazil, French Guiana, Suriname, Trinidad and Tobago and Venezuela are also involved in the study.

As part of the national level activities under the case study on shrimp and groundfish, several consultations were convened with stakeholders involved in these fisheries to gather information on the priority issues affecting the fisheries and the suggested solutions to address the issues. In addition, a Draft EAF Baseline Report was prepared.

The recommendations of this workshop, as well as those of the national stakeholder workshops of the other participating countries, will be used to develop the Strategic Action Programme (SAP). This SAP will then be the basis on which countries such as Guyana could obtain additional resources for implementation of the recommendations.

Ladies and gentlemen, this project is very important for Guyana's and, indeed, the world's food security. Fish contribute a significant amount of animal protein to the diets of people worldwide. It is estimated that between 15 and 20 percent of all animal proteins come from aquatic animals. Fish is highly nutritious and serves as a valuable supplement in diets lacking essential vitamins and minerals. Not only is fish a vital food, it is also a source of livelihood for millions of people around the globe. In 2010, an estimated 55 million men and women were deriving an income from fisheries. An overwhelming majority of them: some 95 percent were in developing countries. In the Caribbean, fish also play an important role in disaster risk management, as in many countries, it is an immediate source of food security in the wake of catastrophic events.

Furthermore, recent trends in food consumption indicate that dietary patterns are changing towards more livestock products (which include fish products); as the world's population, the global economy and urbanization continue to grow. We must, therefore, seek to increase our fish production to capitalize on this growing trend.

However, Guyana's fisheries are under threat. Up to a few years ago, Guyana used to be one of the region's largest exporters of shrimp and prawns. Today, you are lucky if you find local shrimps in the supermarket. The stocks have been depleted because of overfishing, use of destructive fishing practices and open access of many fisheries. External factors such as effluents from land based activities containing pollutants, siltation resulting from indiscriminate deforestation and coastal development which results in habitat modification and degradation; also have negative impacts on the

fisheries resources. Additionally, climate change is likely to impact on the fisheries resource, in ways that are difficult to predict.

It is, therefore, imperative, that decision-makers act now and decisively to reduce the vulnerability of the fisheries subsector to both the internal and external threats and thereby ensure the sustainability of the resource.

The Ecosystem Approach is being promoted internationally and by FAO as a way to address the key sustainability issues of the fisheries sector, in a comprehensive and systematic manner. It identifies the main internal and external factors which affect sustainability, it develops clear and definite plans to address the main issues, it allocates responsibilities for action, it identifies incentives for compliance and, perhaps most importantly, this approach empowers stakeholders to play a more active part in decision-making so that you can assume greater ownership and responsibility for the management of your country's fisheries resources.

The government also has an important role to play in creating an enabling environment and formulating and enforcing the necessary policies and legislation to promote sustainable fisheries management. The fact that you, Minister Ramsammy, are here at today's Opening Ceremony, sends a strong message of your commitment and support to the sector and your willingness to play your part in ensuring its sustainability.

We at FAO, are also committed to assisting the Government of Guyana in its quest to promote sustainable fisheries management. We have been providing support to the fisheries sector of Guyana for over 20 years – in the areas such as institutional strengthening, capacity building, Fish Stock Assessment and Aquaculture.

Through the use of our Technical Cooperation Programme funds, we are currently assisting in the development of an Inland Fisheries Policy. A few months ago, we held the first national stakeholder consultation. A draft policy has been prepared and distributed for review and comment and next week, we shall have the second national consultation bringing all the stakeholders together to agree on the final policy and strategic plan for Inland Fisheries for Guyana.

We are also assisting the Government of Guyana in developing a Disaster Risk Management Plan for the Agriculture Sector and the Fisheries sector is an important component of that plan. Last month, the consultant was here for her first mission and she is currently working on the first draft of the policy. She will undertake her second mission later this month, in which she presents the first draft of the ADRM Plan and it is hoped to finalize the plan by the end of the year.

In closing, we would like to thank the Government of Guyana for hosting this workshop and for its continued support and close collaboration with the FAO as we work together to fulfill our mandate of eradicating hunger and promoting food and nutrition security in this beautiful country.

I wish you fruitful deliberations and a very successful workshop.

Thank you.

APPENDIX 5 – RESULTS OF THE PREPARATORY MEETINGS - Priority issues

Issue	**Solution**	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	3 Door	Unity	Montrose	Zeeburg	WinsdorForest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop
Fuel price is high and supply is short and/or unstable				x					x			x				x		
	There should be a subsidy to coops			o					o							o		
	A workable system to allow genuine fishermen access fuel exempt from taxes			o					o			o						
	Good representation of the industry on these issues											o						
Ice prices are high and supply is short and/or unstable		x		x				x	x		x					x		
	Coop has an ice machine but needs stable power supply.			o					o									
	Government intervention needed to restore GPL power supply			o														
	Private investment to expand supply							o										
	Establishment of coop based ice supply										o					o		
	Coop ownership of coop facility with ice machine	o																
Gear prices are high, supply short, distant (including foreign) and gear of poor quality								x	x		x	x					x	
	Investment in marine supplies (particularly for fishing on high seas)							o										
	Revitalization of coop shops							o										
	Guyana Bureau of Standards regulates quality of gear imported for sale																o	
	A workable system to allow genuine fishermen to access gear exempt from taxes (through public or private facility)								o		o	o						

Issue	Solution	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	3 Door	Unity	Montrose	Zeeburg	WinsdorForest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop
There is a high capital investment in fuel, gear and other consumables required for the fisheries						x									x		x	
	A workable system to allow genuine fishermen to access all inputs to fisheries exempt from taxes														o		o	
	Infrastructure for small vessels to easily access ice plant at GFC														o			
	A workable system to allow genuine fishermen to access pen post easier					o									o			
The catch (specifically of the target species) has reduced for a variety of reasons		x		x										x				
	Restrict gear that can be used (pin seine)			o														
	Improve data management and feedback for management decision making			o														
	Ban lower eye sizes of gill nets			o														
	Conduct stock assessments			o														
	Establish zoning system for fisheries.													o				
	Establish closed seasons for all fisheries	o																
	Conduct research on environmental factors affecting the resource	o																
Landing site facilities need to be built or repaired for improved work conditions, Security and safety					x	x			x	x	x		x	x	x			
	Installation of security lights													o	o			
	Repair/upgrade existing facilities								o		o							
	Establish a coop society				o					o								
	Government (Ministry of Works, Sea Defense and Department of Fisheries) to intervene to help improve current facility				o								o		o			

Issue	Solution	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	3 Door	Unity	Montrose	Zeeburg	WinsdorForest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop
	Upgrade access to landing site					o				o			o		o			
	Dredge channels to and areas around wharfs														o			
Piracy and security for fishermen and property					x				x	x		x		x		x	x	x
	Provide firearms to fishermen													o		o		
	Establish workable facilities for compensation																	o
	Improve enforcement and execution of justice				o							o						
	Provide a rescue boat at key locations				o													
Market availability and pricing of products		x												x			x	
	Government to help to secure markets	o															o	
	Investment in post harvest processing for longer shelf life	o																
Fishing industry is treated (by government) as being of less importance compared to other industries																x		x
	Government to provide general support															o		
	Government to establish facilities for tax free access to inputs for fisheries																	o
Conflict over access to fishing grounds and resources manifested especially as gear interaction		x				x									x	x		
	Establish zoning system for fisheries.	o				o									o	o		
	Establish system of alternation access of competing gear to the same fishing grounds															o		
	Flagging of deployed gear to make them identifiable.	o																

Issue	Solution	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	3 Door	Unity	Montrose	Zeeburg	WinsdorForest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop
Difficulties faced with securing licenses for boar captains and vessels										x							x	
	Establish local offices empowered to issue these licenses in a timely fashion																o	
Fishing gear often stolen or damaged by various vessels (not including gear interaction)									x	x					x			
	A workable system of compensation from the party causing damage.								o	o								
	Improved enforcement of transit zones for cargo and related vessels								o	o					o			
	Establish zoning system for fisheries.								o	o								
	Improve enforcement and execution of justice														o			
Lack of implementation of Regional Fisher s' Organization and its related regulations in Guyana										x								
	Implement the RFO and regulations in Guyana									o								
Improper export policy causes exploitation of industry for illegal shipments																		x
	Revise policy particularly in relation to who can export fisheries products																	o
Lack of cooperatives to empower fisher communities					x								x					
	Ministry of Labour, Coops Department and the Department of Fisheries to assist with the establishment of co-ops				o								o					
	Fishermen initiate action towards establishing coops				o								o					

Issue	Solution	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	3 Door	Unity	Montrose	Zeeburg	WinsdorForest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop
Unfair/uneven sharing of benefits derived from increased export market for bangamary											x							
	Introduce price controls										o							
Trawlers venture into shallow waters and destroy stock of white belly shrimp.													x					
	Establish zoning system for fisheries.												o					

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
The bycatch: - Polyethylene gill nets-cuirass, catfish, cuffum, snook, mackerel, gill baker, cuvalli, and sea conga - Red snapper- grunts and groupers - White belly shrimp–angamary, suriname mullet - Nylon drift seine–catfish, annafoke, basha and Kuma kuma - Industrial seabob–butterfish, bangamary, small sea trout - Some large penaeid shrimp and seabob vessels fitted with bycatch reduction devices. Bycatch reduced by 50 percent - Large penaeid shrimp–grunts, red snapper, groupers, lobsters, crabs, squid, seabob and stingray	x	x	x				x										

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
Reduction of catch: - Not enough target species - Movement of mud sediments in fishing ground observed during 1995 and 1996 to affect fishes - Overfishing maybe occurring (one person) - More boats and gear per boat than in the past. There are approximately 200 boats between Leonora and Goed Fortunin - Trawlers, Chinese seine, pin seine and fine seines fishing inshore kill many small fishes - Chinese seine band in other countries - More freshwater coming into the ocean (Chinese seine fin fish) - Spring tides negatively affect fishes - Vessel makes longer trip with more gear for smaller catch - Trawlers should fish beyond 90 ft depth. - Ten pounds of gill net give more catch approximately 20 years ago than 350 pounds of net today - There is fear that most of the fishes will be gone in 15 years (Rosignol) - There is need for regulation on destructive gear - Global climate presumed to cause reduction in stuck. Grey snapper is estimated to have reduced by 70 percent caused by excess freshwater coming to the ocean - Many fish observed dead during periods of heavy rains (Rosignol) - White belly shrimp catch affected by species being taken as trash in other fisheries - White belly shrimp fishers at Parika observe that shrimp with eggs are caught in large quantities in a spawning area further east - Open access fisheries have negative impact on resource - Chemicals from agriculture may be killing fish at sea. Observed snail	x		x	x		x		x	x	x	x		x	x		x	

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
powder in rice fields causing fish kills there - Waste oil pollution from bauxite vessels - Changes in wind affect ability to fish when the less desired winds prevail (Goed Fortuin) - Unpredictable changes in rain patterns reduce catch by reducing ability to fish. Fishers once worked day to day (Goed Fortuin) - Siltation of fishing grounds (Goed Fortuin, Canje) - Decrease in catch of white belly shrimp approximately at the same time seabob trawling was introduced (Zeeburg) - Destruction of grounds by other gear - 80 lbs of seine took 600 lbs of fish. Now 600 lbs of net take much less fish																
Market: - Low or poor prizes - Payment for product supply for red snapper - prize lowering occurs in competition for market share (red snapper) - Over the side sales (red snapper) - There is high export demand for plate size red snapper - No market for whole sale - Price drops considerably when catch is high - Insufficient market (Charity) - At Charity ice can only be purchased if fish is sold at lower prize to factory owner - Exporters drive price down at Meadowbank - No market for dried shrimp (Cullen) - Foreign vessels harvesting sharks for export only take fins, whereas local vessels land the whole fish. Nonetheless, major import and port	x		x	x			x				x	x		x	x	x	I

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
countries have banded shark fins on the basis of the action of foreign vessels. This has made market inaccessible and reduced the price of the product - There is need for documentation of the harvest and use of shark by Guyanese fishermen to support arguments for special import conditions for this product - The inability to process or access a market for large quantities of fresh-caught white belly shrimp at Parika prevents a bountiful resource in May and June from being harvested because of the heavy rains - Worms in mullets at Corentyne coast have eliminated the market for the species - Perceptions that the worms in mullet at Corentyne coast are also present in other species have caused a general decline in consumption of fish in the area and affected local market for fish - Position of vessels at the GFC landing site reduces access to markets and results in reduced prices - For white belly shrimp at Zeeburg, the one who brings in the most determines the price - GFC preferred landing site for price - Fishermen are not reaping the benefits of the increased demand for Bangamary because they have to see to exporters. Price controls valued (Unity)																
High capital investment - High fuel prize - No fuel tax concession to red snapper vessels, artisanal vessels - Ice expensive - Ice supply by private operators (mostly negative, but positive at Cullen)	x	x	x	x	x		x	x	x	x	x		x	x	x	x	I

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
- At Charity some persons barred from purchasing ice and ice can only be purchased if fish is sold to factory owner - Engine parts expensive - Gear purchased with VAT - Overall investment increase - High investment makes fishing no longer economical (Rosignol) - Longer trips now require greater expense for ice, fuel and supplies - Pen post for Chinese seine costly to acquire because of change in laws regarding mangroves - Cost of pen posts for Chinese seine is multiplied when damaged/stolen - Reduced effort in low period (August to December) because of fuel price (Parika)																
Consumable and equipment supply: - Ice supply is short - Gear for red snapper and gill nets of poor quality - All gear imported by individuals - Unstable fuel supply at lima - Gear supply tax - Inadequate and expensive local gear supply (Charity, Cullen) - Pen post for Chinese seine in limited supply. Fishermen can no longer harvest poles because of new GFC regulations - Coop owns ice machine but electricity supply has been cut by GPL for outstanding bill (Rosignol) - Electricity supply to coop cut after GPL over charged and matter remains unresolved	x		x	x		x	x	x	x	x	x		x	x	x		I
International issues - Harassment from Surinamese authorities			x				x										

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
- Suriname band gill nets of eyes sizes of lower than 8” - 30 percent of fishermen use gill nets between 5-7”; main catch is trout - Guyanese fishermen hold license to fish in both Suriname and Guyana - No forum for negotiations between fishermen and Surinamese authorities - No Guyana–Suriname fishery agreement - Foreign boats fished snapper illegally - Foreign license owners may not land all their catch (red snapper) - There is need to negotiate special conditions for Guyanese exporters to land shark products in major port and import countries where a ban currently exists - Guyanese government needs to negotiate with foreign import countries for the sale of red snapper																
Piracy: - No compensation - No proper enforcement - Total loss usually occurs - Likely done by fellow fishermen - Poor security at sea - Justice not being served			x	x		x		x	x	x	x	x		x	x	x	
Catch : - For red snapper first quarter of the year, there is a small catch. The remainder of the year brings good catch. The catch has been relatively constant over the years - Catch varies with cycles of erosion and accretion (Cullen) - Plate- size red snapper accounts for 80 percent of the catch in traps and 10-40 percent of the catch with long lines	x		x				x				x		x	x	x		

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
- Best catch for cadell, April to August (Charity) - Best catch for drift seine, May/June to August/September (Charity) - White belly shrimp is a seasonal resource - Best catch for white belly shrimp comes between February and May (Parika, Zeeburg) - White belly shrimp is abundant in May and June and is not fully harvested (Parika) - The white belly shrimp caught by one Chinese seine in 1972 now requires four seines (Parika) - 2012 has been the best year for white belly shrimp at Parika - Catch for nylon drift seines best from January to August (Parika) - Catch for polyethylene gillnets best from January–August - Fish catch in Chinese seine good with east winds, poor with west winds (Goed Fortuin) - White belly shrimp at its lowest in December (Zeeburg) - For polyethylene gillnets, most fish (grey snapper and trout) are caught between 30-48 ft. Sharks are caught between 90-150 ft (#66) - For polyethylene gillnets, at depth less than 30 ft, the catch consist of mixed fishes. Between 30 and 72 ft, it's almost purely trout (#66)																
Data for management decision-making: - Need research on stuck assessment and CPUE for red snapper - Lack of information on stuck - Information in environmental assessment by private company may be valuable such as CGX - Department of Fisheries needs to study the issue of stock depletion - The impact of climate change on fisheries needs urgent research - Research needed to determine biotic zones for resources		x					x		x							x	

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
- Enforcement of reporting requirements of companies needs to be improved - There is need for feedback on analysis of data given to Department of Fisheries - Report forms need to be standardized across industry - There is need for a complete ecosystem assessment - Life cycle of shrimp needs to be assessed - Restoration of the large penaeid shrimp populations needs to be studied																	
Gear theft and damage: - Red snapper traps are stolen by other fishers - Nets and lines damaged by thug boats, cargo ships, illegal fuel boats and trawlers - Damage by vessels (Tugs) and trawlers occurs in waters as low as 12-18 ft (Charity) - Damaged gear is usually flagged - There is no legal recourse for damaged gear - There is no compensation for damaged gear - Nylon gillnets are stolen (Parika) - Trawler industry resolves issues of vessels damaging other fishers' gear when proven - Strong waves caused by large bauxite vessels cause fishing vessels to be damaged against the sea defense	x	x				x	x	x	x		x		x	x			
Landing facilities: - Rosignol, GFL and GFC wharf needs repair - There is siltation near GFL and GFC wharf - At Windsdor Forest and Zeeburg landing occurs at a koka with no security and little safety			x	x	x		x	x	x	x	x	x			x	x	

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
- Channel to secure boats in accessible in low tide due to poor work (Cullen) - No coop members use landing facilities without paying (Rosignol) - Facility at #43 village needs to be restored - Fishers from as far as Charity, Cullen, Montrose and Unity land catch at GFC - Need better accommodation for artisanal vessels at GFC - Landing site at Zeeburg was closed by Ministry of Health based on sanitary standards - Fishers land at GFC with less rights than members - Facility needed on lower east coast; possibly at Mon Repos - Access to current facility needs upgrading (Rose Hall, Zeeburg, Unity)																
Fishing industry is treated as being of less importance compared to other industries: - No government support - No government investment - Taxes on inputs would be a good incentive - There is need for more public investment in fisheries: landing facilities; ice machines; gear supply - Conflict exists with other industries over the area used for landing at #43 village. Rice has priority in relation to use of the canal - Chinese seine boats have lowest priority (Goed Fortuin)				x				x		x		x		x		x	
Fisherman coop - Windsdor forest fishermen members of Parika coop - No coop exists (#43, charity, Zeeburg) - Attempts by Charity fishermen to establish coop obstructed - Georgetown coop is being used extensively as a fish market				x				x		x	x	x		x		x	

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
- There is major competition from fishermen from other areas who truck fish to the Georgetown coop for sale - The implementation of Regional Fishers' Organization and related regulations will significantly benefit fisheries and fisher folk in Guyana (Rosignol) - Some coops have capped membership and are inaccessible to persons desirous of joining - Once a large society at Zeeburg was destroyed when a society was established at Parika - There is need for a functional Lower East Coast coop - There are perceived social barriers to persons getting involved in fisheries at high levels and this may cause conflict																	
Conflict over access to fishing grounds and resources - Drifts seines entangle with cadell gear (Windsdor Forest, Charity) - Nets and lines damaged by shrimp trawlers (Charity, Canje) - Drift seines entangle with anchor seines (Charity) - At Charity drift seines fish between 3-36 ft, cadell lines and anchor seines at approximately 30 ft and fine seines at approximately 24 ft - At Charity gillbaker is the target for cadell lines, drift seines and anchor seines - All fishers on Essequibo coast compete for same grounds - Foreign company may be over investing and proving unfair competition for access to resource - Illegal fishing observed by fishermen on the high seas mainly targeting mackerel, sharks and tuna. There is no enforcement - Because of increased price for some fish species, seabob trawlers deliberately take larger quantities of fish bycatch by coming closer to	x	x							x		x	x	x	x	x	x	

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
shore (24 to 30 ft of water) - Industrial large penaeid shrimp trawlers take some white belly as discard - Drift seines from Parika entangle with cadell lines from West Bank Demerara - Drift seine fishers from Parika compete with cadell line fishers from West Bank Demerara for fishing grounds and resource - Anchor seines sharing grounds of Chinese seines block entrance to the Chinese seine pens (Goed Fortuin) - Catch is sometimes stolen from gear (Goed Fortuin) - Because Chinese seines are stationary they need exclusive rights to licensed grounds																	
Closed season: - For cadell, drift seine and fine seine, mid-November to end-January (Charity) - Closed season implementation for artisanal fishers requires financial support - Access to market for large quantities of fresh caught white belly shrimp (access to a processing facility for the product during May and June could allow for a closed season without external support (Parika) - Possible closed season for white belly shrimp between August and December (Parika and Zeeburg) - Closed season for trawling set at six weeks between August and October and determined in yearly negotiation between industry and Department of Fisheries - Large penaeid shrimp needs a longer closed season - White belly shrimp fishermen stop fishing once juveniles appear as a significant catch (Zeeburg)	x	x								x	x			x			

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
- Price controls can allow Unity fishers to survive a closed season without external support - Closed seasons should apply for all gear																	
Fishing has employment and cultural value at Cullen															x		
Licensing: - Boat and captain license can only be obtained in Georgetown - Need for local office - License should specify gear including size of eye for nets - License should at all times be with vessels and should include enforcement of compliance - Less than 20 percent of all fishers are licensed (Rosignol) - Captain's license renewal is too cumbersome and needs to be addressed. Could be treated as a driver's license					x			x	x						x		
Reproductive periods/biology - Gravid fish and shrimp observed between August and November (Culler - Sea trout gravid in November (Parika) - Catfishes gravid in June to July (Parika) - Major spawning area for white belly shrimp exists between Essequibo and Demerara river mouths	x														x		
Export policy to address who can export is needed. - Fish export is used as a means to carry illegal drugs and is affecting the genuine exporters																x	
Gear interaction with the environment: - Chinese seines in the mouth of the Berbice River are destroyed by grass floating out of the Canje River - Drift seine boat destroy seabed (Montrose)						x		x									

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
Fishing gear and practices: - Chinese seine fishermen targeting white belly shrimp add hooks to target catfish during low periods for shrimp (Parika) - Polyethylene gillnets used eye size 5", 6", 7", 8" (#66 village) - Polyethylene gillnet fish between 30- 150 ft depth (#66 village) - Only 7 and 8" eye polyethylene nets used at Parika - In 1980 only 8" eye polyethylene nets were used - Red snapper fleet consists of 38 local vessels and 20 vessels at least to Laparkan and 10 to N De Grout - Nylon drift seines used to fish in waters of 24 to 42' depth - Seabob trawlers currently fish between 36–72' depth - Large penaeid shrimp trawlers operate beyond 36' depth - Chinese seines at Goed Fortuin operate only during spring tides and during the falling tide only, working only 12 to 14 days per month - For Zeeburg fishing grounds local, with 10-12' of water	x	x	x				x				x		x				
Discards - White belly shrimp–jelly fish, juvenile/small fish species and rock head - For white belly shrimp this can be as high as 60 percent between July and January (Parika) - Trash from white belly shrimp used for stock feed production by one individual at Parika - No discard from nylon drift seines - Discards for Nobel House Seafoods have been documented as part of documentation for MSC	x	x															
Participation in resource management - Fishermen willing to aid enforcement of related laws (Parika) - Fishers should have rights to manage dedicated fishing zones (Parika)	x																

Issue	Parika	Guyana Trawler Association	#66 Village	#43 Village	Rose Hall	Canje/New Amsterdam	Red Snapper	Rosignol	Unity	Montrose	Zeeburg	Winsdor Forest	Goed Fortuin	Charity	Cullen	Georgetown Fisheries Coop	Note
External influences - Cargo ships damage grounds for white belly shrimp (Parika) - Changes in the condition of the water and waves observed over the last 20 years (Parika) - Chemical run-off from agriculture perceived to kill fish in marine environment - Bauxite vessels pollute the Berbice river with waste oil	x			x		x											
Zoning of grounds - Trawlers should operate beyond 60' depth - There is not enough information for zoning based on resource distribution - There is currently no zoning of the fishing grounds - Zoning should be done with Vessel Monitoring Systems for enforcement	x	x							x	x							
Governance of fisheries - Department of Fisheries needs to address staffing in terms of numbers and stability. Budgeting needs to be addressed in this regard - Fisheries Advisory Committee is non-functional. There has been no follow-up on decisions of the committee - The FAC consists of too many people with too few industry representatives - MSC certification should be sought for trawling industry - Seabob working group needs to be established with more power to the industry		x															
Mullets on the Corentyne found with large quantities of worms				x													
Northwest remains an untapped resource because of remoteness and lack of facilities										x							

APPENDIX 6– BASELINE REPORT

Introduction

This report was developed to provide an overview of the shrimp and groundfish fisheries of Guyana in terms of the status of the stocks, management measures, legal, administrative and institutional frameworks, fishing techniques, and socioeconomic importance of the fisheries. It forms the baseline for decisions on the future implementation of an Ecosystem Approach to Fisheries management in the country. It was developed based on current available knowledge on the various issues raised, and has benefited from inputs from stakeholders in the fisheries subsector.

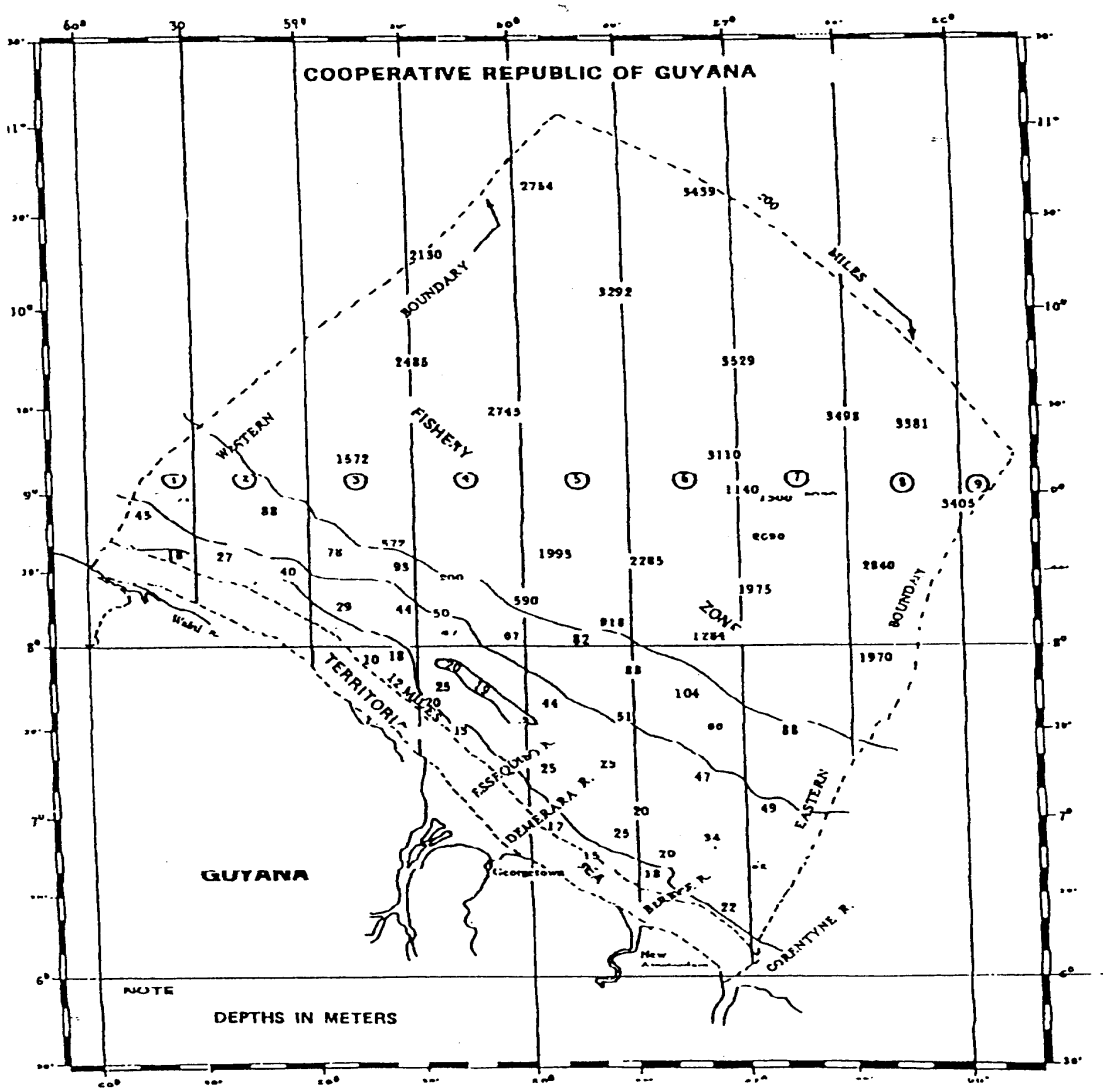

Figure 1. Illustration of Guyana's EEZ. From Draft Fisheries Management Plan, 2007-2011

Guyana is a tropical country located on the northeastern Atlantic shore of South America with a flat surface area of 214 970 km^2. It is bordered to the east by Suriname, with Venezuela to the northwest and Brazil to the southwest and south. The Guyana shoreline extends over 432 km with an associated continental shelf area of 48 665 km^2. The territorial sea extends over 12 miles from the shoreline and its Exclusive Economic Zone (EEZ) of 138 240 km^2 (GOG, 2000) extends across 200 miles. The continental shelf extends on average 113 km from the shoreline with the narrower areas being west of the Essequibo River. Moving outwards from the land, the sediments on the slope change from

soft mud to mud, and then to a sandy mud, followed by sand and finally corals. Water colour also changes from brown near the shore to green mostly above the sand and then to blue above the corals. The continental slope begins at approximately 100 m depth. The illustration below, taken from Lowe-McConnell (1962), provides more details on the nature of the environment above the Continental Shelf of Guyana and the distribution of the fishes in this zone.

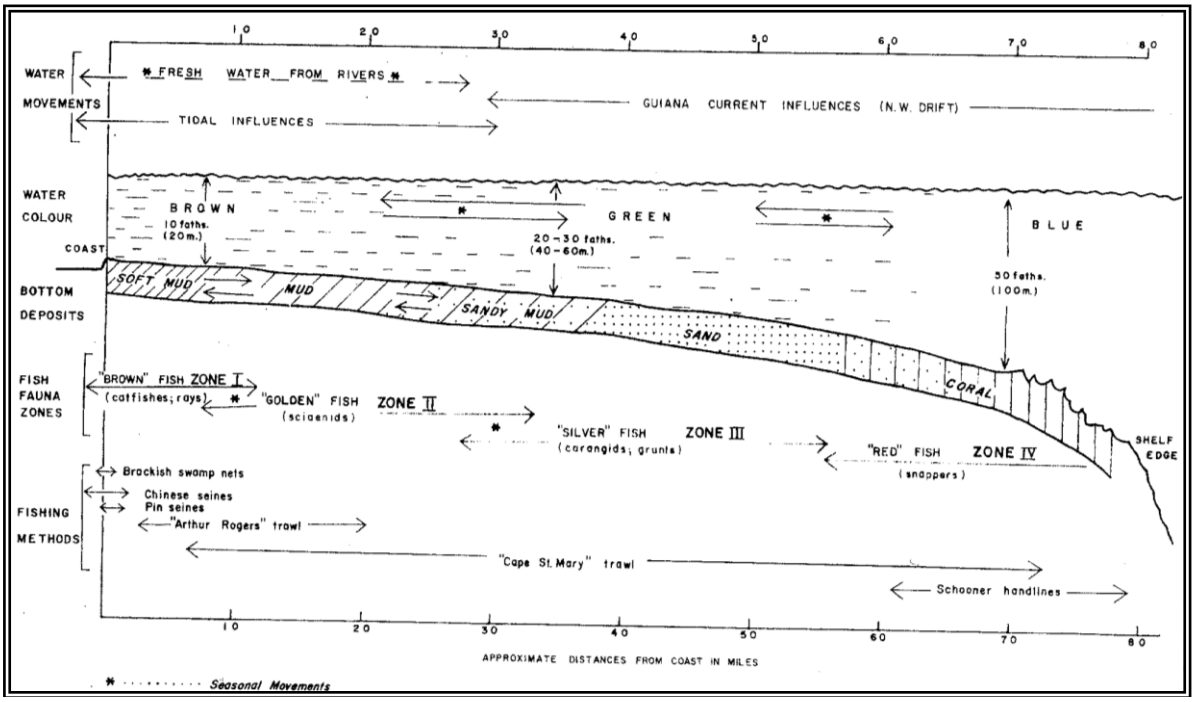

Figure 2. Diagrammatic section through the continental shelf of Guyana showing faunal zones and physical characteristics of the region. Not to scale and only for one season (arrows indicate movements during seasons). Published in Lowe-McConnell (1962)

The fisheries sector in Guyana consists of three main components – Inland Fishery, Aquaculture and Marine Fishery. As a commercial activity, the marine fishery has the longest history of the three and is by far the largest. The inland fishery has been largely subsistence - based until quite recently when demand rose for some species in local and foreign markets. Aquaculture is a fairly recent introduction to Guyana, but is receiving significant attention from both public and private investments and is therefore a growing fishery.

The shrimp and groundfish fisheries represent the major fisheries subsector in Guyana and account for all of the marine fisheries. This subsector focuses on the areas over the continental shelf. Artisanal fishers generally harvest finfish and shrimp within the Lowe-McConnell's brown fish zone. Semi-industrial and industrial fishers operate from the outer limits of the brown fish zone taking mainly shrimp, out to the red fish zone where industrial longline vessels target snappers.

The shrimp and groundfish fisheries contribute to the economy and to the national food and nutrition security of the country. The fishery is considered to be both economically and culturally important to Guyana. In 2010, production in the industry reached 45 072 m of which 16 037.86 m were exported for a value of approximately 9 Billion Guyana dollars (DOF, 2011). The contribution of fisheries to the Gross Domestic Product (GDP) of Guyana is approximately 3 percent. Its contribution to the agriculture GDP in 2011 was 13.36 percent (Guyana Bureau of Statistics, 2012). The country has had the highest annual per capita consumption of fish and seafood in the region, with a consumption rate of 57 kg/capita (CARICOM 2011; Haughton, 2011).

1. Is there a Management Plan for the Fishery?

There is a Draft Fisheries Management Plan (FMP) for the period 2007-2011. The FMP provides an overview of the fisheries sub-sector including its contribution to the economy, legal and institutional framework and decision-making mechanisms. It sets out guiding principles, policies and goals for the entire subsector. The plan's intent was "…to promote the conservation and sustainable utilization of the fisheries resources of Guyana. It seeks to address a number of issues that are affecting the management and development of the fisheries sector as it relates to the resource managers and users. As such, it addresses the reformation of the Fisheries Advisory Committee, institutional strengthening of the Department of Fisheries and management and development plans for the various fisheries…" (DOF, 2006b). Seven of the fisheries recognized in the plan are shrimp and groundfish type fisheries: (i) Offshore Industrial Large Penaeid Shrimp Fishery; (ii) Industrial Seabob Fishery; (iii) Inshore Artisanal Fishery (Pin Seines, Chinese Seines, Cadell Lines, Gillnets); (iv) Snapper and Grouper – Deep Slope Fishery; (v) Large Pelagic Fishery; (vi) Coastal Pelagic Fishery; and (vii) Small Pelagic Fishery. Although the Plan was never approved, it still guides the management of the fisheries subsector in Guyana.

This report will focus largely on these fisheries or an amalgamation of (i) and (ii) as Industrial fisheries; (iii) and (v-vii) as artisanal, according to the Fisheries Background Report (FBR), 1994; and (iv) is classed as a semi-industrial fishery according to the FMP.

2. Where there is no management plan, are there stated or *de facto* objectives for the fishery?

The draft Fisheries Management Plan, 2007-2011 identifies several goals which focus on the management of shrimp and groundfish resources in Guyana. It is important to recognize the connection between the development of the inland and aquaculture fisheries and the management of the shrimp and groundfish fisheries in that, the former can reduce pressures on the latter. The goals of the FMP directly related to the shrimp and groundfish are:

- ✓ To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities.
- ✓ To optimize the amount of fish protein available for domestic consumption and export consistent with sound resource management practices.
- ✓ To optimize the value of the limited fisheries resources through cost-effective harvesting, value added processing and diversification of markets.
- ✓ To promote the image of fishing as an occupation that is socially desirable and financially rewarding.
- ✓ To maintain or restore populations of marine species at levels that can produce the optimum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species.
- ✓ To preserve rare or fragile ecosystems, as well as habitats and other ecologically sensitive areas, especially estuaries, mangroves, seagrass beds, and other spawning and nursery areas.

The seven fisheries identified above in 1. have more specific objectives laid out in the FMP as part of their detailed management plans. These objectives are provided in Annex 1.

It is important to recognize that the goals above and the specific objectives for the individual fisheries address ecological well-being, social and economic well-being and issues related to the ability to achieve. Because these are the core components of the ecosystem approach, this means that Guyana has in some ways been setting itself on a path to take a holistic approach to managing its fisheries.

3. What is the legal framework within which the fishery is operating?

The exploitation of fisheries resources is managed under the Fisheries Act of 2002. The main section of this act focus on: fisheries management and development; registration of local and foreign fishing vessels; licenses for fishing by local and foreign vessels and the provisions applicable therein; fees, royalties and related issues; marine reserves and fishing priority areas; prohibited fishing methods and related issues; high seas fishing; fish processing establishments, import and export of fish; and, enforcement and judicial proceedings. This law addresses the management of natural caught fisheries and refers to sustainability, safety and quality of the resources and products derived from it. The broader ecosystem concerns in relation to the resource are however treated in a minor way. The law also supports a top-down approach to management of the fisheries from a central unit.

Additionally, the Maritime Zones Act of 2010 focuses more generally on the overall management of the marine environment and sets out authorities for the designation of areas for conservation and resources exploitation including fisheries. As a replacement for the Maritime Boundaries Act of 1977, it is a far more holistic piece of legislation and does not have a special focus on fisheries, but provides for it amidst a range of other activities.

Fisheries operations and products are subject to the laws governing labour and health, to protect the workers in the industry and the consumers of the products (Food and Drug Act of 1971; Labour Act of 1942).

Because the fisheries law cannot fully address the wider ecosystem, the Environmental Protection Act of 1996 is relevant to the fisheries operations in so far as it addressed issues of pollution on/from land and sea, and is concerned with the overall state and quality of the ecosystem on which the fisheries depend.

Internationally, Guyana's marine fisheries operations are governed by: the UN Law of the Sea; the UNFAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas; the United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks; and the United Nations Convention on Biological Diversity.

4. What are the institutional and administrative frameworks for fisheries management in the country?

The Department of Fisheries (DOF) of the Ministry of Agriculture is the key institution which oversees the management of the fisheries sector and implements policies and programmes related to the sector on behalf of the Government of Guyana. The Department operates three units: Programme Administration; Legal and Inspectorate; and Research and Development. It is headed by a Chief Fisheries Officer appointed by the Public Service Commission of Guyana.

The Coast Guard and Marine Police are empowered as fisheries officers by legislation. These officers along with others from the DOF are responsible for the monitoring, control and surveillance activities related to the management of the fisheries.

Other public sector institutions are involved in fisheries management with the following roles identified in the current FMP (DOF, 2006b):

- ✓ **Ministry of Foreign Affairs** is responsible for international access agreements with other nations' fishing vessels**.**
- ✓ **Ministry of Health**: Units dealing with quality assurance and safety in fisheries are the Veterinary and Public Health Unit, Food and Drug Department and the Environmental Health Unit.

- ✓ **Central Planning and Housing Authority** is responsible for certification of processing plants.
- ✓ **Guyana Bureau of Standards** is responsible for processing/final product standards.
- ✓ **Environmental Protection Agency** is responsible for habitat protection, coastal zone management, promoting the maintenance of biodiversity and environmental impact assessment.
- ✓ **New Guyana Marketing Corporation** is responsible for providing market facilitation services to the private sector for the export of non-traditional agricultural produce which include facilitating local market development, developing and disseminating post harvest technology and providing appropriate market research.
- ✓ **Customs section of the Guyana Revenue Authority** deals with the importation and exportation of seafood, registration of coastal vessels, collection of levies and granting concessions on materials and equipment imported.
- ✓ **Maritime Administration** is responsible for inspection and issuance of Sea Worthiness Certificates for Vessels, enforces safety regulations and licensing of captains.
- ✓ **Hydrometeorological Service** is responsible for observing, archiving and understanding Guyanese weather and climate, and providing meteorological, hydrological and oceanographic services in support of Guyana's national needs and international obligations.
- ✓ **University of Guyana** is responsible for discovering, generating, disseminating and applying knowledge of the highest standard for the service of the community, the nation and of all mankind within an atmosphere of academic freedom that allows for free and critical enquiry.
- ✓ **Institute of Applied Science and Technology** provides laboratory services in testing for heavy metals in fish and fish products.
- ✓ **Statistical Bureau** is responsible for the conducting of censuses, the collection, compilation, analysis and publication of certain statistical information and for other matters relating thereto.

In addition to these, three NGOs: Conservation International–Guyana (CIG), World Wide Fund for Nature (WWF) and Guyana Marine Turtle Conservation Society, share concerns and functions related to the management and conservation of the coastal and marine environment and marine turtles in particular.

Eight Fishermen Cooperative Societies are registered, and these are intended to provide representation and a range of services for fisher folk in a specific region. The functioning of these societies may require focused study since anecdotal evidence suggests that there are challenges to the operation of the societies which have not be surmounted. There is also the Trawler Owners and Seafood Processors Association set up to protect the economic and financial interest of its members and seafood industry in general.

The Food and Agriculture Organization of the United Nations is the only international fisheries organization operating in Guyana and they play a significant role in the management of the fisheries mainly through the provision of expert support and advice to the Department of Fisheries.

In order to involve multiple stakeholders in decision making, a Fisheries Advisory Committee has been established. The Committee, consisting of the Chief Fisheries Officer and representatives of several government institutions and various fishers' groups, provides advice on fisheries matters to the Minister with responsibility for fisheries. The Committee is not currently functioning.

Two institutions function in decision-making at the regional level. The Caribbean Regional Fisheries Mechanism (CRFM) Secretariat functions 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 Western Central Atlantic Fishery Commission (WECAFC) functions mainly to facilitate the coordination of research, encourage education and training, and assist its members in establishing rational policies to promote the rational management of resources that are of interest for two or more countries. The Commission has an advisory management function but has no regulatory powers.

Internationally, the International Committee for the Conservation of Atlantic Tunas (ICCAT) is an intergovernmental fishery organization responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas. Guyana contributes catch and effort statistics, participates in ICCAT research programmes, and in 2002 sought and acquired Cooperating Party status in ICCAT (DOF, 2006b).

5. Overview of the fishery and resources exploited

5.1 Details of fishing gear used and areas fished

The marine fisheries in Guyana operate in three main areas within its EEZ–inshore; offshore and deep slope (DOF, 2006b). These fisheries may be roughly partitioned based on depth and gear that is appropriated to the species being exploited. For practical reasons this report will describe the gear used by the artisanal, semi-industrial and industrial fisheries as described in Chapter 1 above. Table 1, however, provides a summary of the gear used by each individual fishery identified in the FMP.

Table 1. Summary of gear used in each fishery. * indicates that the gear is not used to target the species but is noted for incidental catch. Developed based mainly on FMP. Artisanal fisheries

Gear \ Fisheries	Offshore Industrial Large Penaeid Shrimp Fishery	Industrial Seabob Fishery	Inshore Artisanal Fishery	Snapper and Grouper – Deep Slope Fishery	Large Pelagic Fishery,	Coastal Pelagic Fishery,	Small Pelagic Fishery
Jib Trawl nets	√	√			√*	√*	√*
Pin Seine			√		√*	√*	√*
Chinese Seine			√			√*	√*
Gillnet Polyethylene			√		√	√	
Gillnet Nylon			√		√		
Circle seine			√				
Handlines					√	√*	
Cadell			√		√	√*	
Traps				√			
Longlines				√			

5.1.1. Artisanal Fisheries

The FBR (1994) identified three vessel types which operate in the artisanal fisheries:

- ✓ Flat-bottom Dory powered by sail, paddle or small outboard engines and which are used to fish with Chinese seines, Pin Seines and Cadell lines.
- ✓ Small V-bottom boats which are larger than the flat-bottom dory, with icebox but no cabin and powered by 25-55 HP outboard engines for fishing with small gillnets.
- ✓ Large V-bottom boats with both icebox and cabin, powered by inboard engines and used for fishing with large pin seines, drift seines, Cadell lines and Hand lines.

The specific fishing gear used in the fishery is described below.

- ✓ Pin seines or beach seines are used to target a range of ground fish in the intertidal zone. The nets measure 2 m high and up to 2 km in length with a stretched mesh size of 9 cm or less,

are set during the high tide and the catch is retrieved from the mud flats after the ebb tide. The main species caught are mullet, queriman, snook, bangamary, croaker and catfish.

- ✓ Chinese seines target a few groundfish and shrimp species on mud banks along the coast, in rivers and especially at river mouths where intertidal flows are greatest. They are funnel-shaped, 16 m long and 4-6 m wide at the mouth end. Their mesh size gradually tapers from the mouth end (8 cm) toward the bag end (1 cm). The net is attached to poles when set, and the catch is swept into the mouth by tidal currents. Fish and shrimp are carried into the bag where they are trapped. The main species caught include whitebelly shrimp, seabob, bangamary, butterfish and catfishes.
- ✓ There are three variations of the basic gillnet used in these fisheries: polyethylene; nylon (regular); and nylon circle:
    - The polyethylene net (used as drift seine) targets a range of medium to large-sized groundfish. It is 4 m deep and varies in length from 1-1.6 km, with a stretched mesh eye of 20 cm. Recent interactions with fishermen indicate that these nets may now reach as long as 4.8 km in length. These are set out and hauled from the boats. The main catch includes gray snapper, sea trout, cuffum, gillbacker, mackerel and sharks.
    - The regular styled nylon net is essentially a smaller version of the polyethylene net used to target smaller species further inshore. The nets measure approximately 300 m in length with stretched eye size of 8 cm. Historically, the main catch is catfishes (FBR, 1994) but recent demand for bangamary on the export market seems to have increased the use of these nets (called 'fine seine') to target this species.
    - The circle seine is unique to the artisanal fishery in the Corentyne River to target smaller species. It is a nylon type net, 300m long with stretched eye sizes below 8 cm. The main catch is lau lau, silver bashaw and highwater.
- ✓ Handlines are longlines with several baited hooks connected. They are used to target species in the near shore area. A vessel ordinarily carries approximately eight polyethylene handlines, each with 16 hooks. The hooks are baited with small species of fish caught inshore.
- ✓ Cadell lines are a demersal form of the longline used to target fishes in waters of approximately 9 m. The gear consists of a ground-line anchored before and after the point at which hooks are connected. Approximately 800 hooks are connected between the anchors by a short line to the ground-line at 2 m intervals. These are referred to as the dangling line. Hooks are baited with small fish from inshore. The catch includes mainly gillbacker, cuirass, other catfishes and sharks.

5.1.2. Semi-industrial Fisheries

The Red snapper and grouper fisheries are classed as semi-industrial based on the level of mechanization used in fishing. The fishery uses vessels that are essentially large V-bottom vessels with inboard engines as described for artisanal vessels. One notable modification is the inclusion of an extended shed over the deck of the vessel for the storage of traps mainly.

The two gears used widely to fishes in this fishery are:

- ✓ Traps are specifically set to target the red snapper groupers and grunts on the deep slope. These are baited with suitable available baits and deployed for two to three days tied to large buoys by rope. In recent times, some fishermen have connected the traps together with a single line to avoid traps being easily stolen or lost.
- ✓ Longlines are similar in construction to the artisanal handline. The difference is that each line can carry a greater number of hooks, hold a greater load and is taken in by powerful mechanical winches. The vessels have relatively smaller crews and can remain at sea for longer periods and hold a larger catch.

5.1.3. Industrial Fisheries

The industrial fisheries focus mainly on shrimp. The vessels are all foreign built Gulf of Mexico type vessels operating between 18-91 m depth and within 40-145 km offshore for Large Penaeid shrimp and between 13 to 18 m depth and within 15 30 km offshore for Seabob. The gear is mechanized and the vessels are built with facilities for long deployment at sea.

These fisheries use Jib Trawl nets with 4-5 cm stretched mesh in the wings and 2.5-3.5 cm in the cod end and are fitted with Turtle Exclusion Devices (TEDS) by law.

5.2 Give brief information on the resources exploited

The marine shrimp and groundfish fisheries in Guyana target six species of shrimp and over thirty fish species, but also take a number of other species as saleable bycatch or discards. Table 2 in Annex 2 provides a listing of these species with information on the fisheries in which they appear as catch or bycatch. It also provides some information on species that are discarded by some fisheries. (This information is based on the FMP and interviews with fishermen.)

5.3 Number of fishers and land-based workers by sector. Indicate full-time and part-time

For management purposes, seven fisheries are recognized within the broad headings of inshore, offshore and deep slope (DOF, 2006b). It is practical to address these fisheries as separate units in terms of employment, as well as look at the overall employment in the industry; however information is incomplete to allow for such a thorough analysis.

In 2005, it was estimated that the total employment in the industry was about 10 500 individuals. This remains the best estimate and is the figure currently quoted. The majority of these are persons directly involved in the capture of the resource. Based on information available in 2005, almost 50 percent of this employment was in the inshore artisanal fishery which accounted for approximately 4 888 fishers when all gears are considered. Other estimation about the same time suggests that approximately one fifth of the fishermen in this fishery owned boats, and the majority were part of a cooperative society. The industrial Offshore Fishery for large penaeid shrimp is estimated to have employed 145 fishermen in 2005. Employment of fishers in the industrial seabob fishery stood at approximately 600 and there were an estimated 500 vendors of fish.

It is worthwhile to note that a recent CRFM study of poverty in the fishing industry stated that the direct and indirect employment in the fishing industry in Guyana accounts for 17 400 jobs (CRFM, 2012). This data was, however, not disaggregated for further analysis.

5.4 Provide information on direct interactions with other fisheries, e.g. competing for same target species, target species taken as bycatch in another fishery, bycatch in this fishery

Table 2 in 5.2 provides some information on the current available knowledge as it relates to the interaction among fisheries in terms of bycatch and competition for resources. It suggests that only minor interaction occurs between pelagic fisheries and between the industrial and artisanal seabob fisheries competing for the same target species. However, there is significant interaction between the industrial large penaeid shrimp and industrial seabob fisheries and the inshore artisanal fisheries in that the first two take the target species of the latter as bycatch. Bycatch interaction also exists where the industrial large penaeid shrimp fishery takes as bycatch, some target species of the large pelagic and deep slope fisheries.

Additional information gathered during recent meeting with fishermen indicates that there is significant interaction among the fisheries. This is illustrated in identification of conflicts over fishing grounds and resources as an issue of concern by several fishers' groups. Fishermen also perceive that such interaction may be the cause of declining catch (another issue of concern for the industry).

All fishing areas are open to all licensed fishers and as a result fishermen try to guard information about productive grounds to avoid competition. Where highly productive grounds are commonly known much conflict occurs. The current situation among the fishers at Charity, Essequibo coast is one such case. Drift seines, cadell lines and at one time anchor seines competed for access to grounds to catch mainly the high priced gillbacker (*Arius parkeri),* but also other valuable species. The mobility of the drift seines is a significant contributor to the issue since they report fishing above and below the grounds used by stationary gear. The result is frequent occurrences of drift seines coming into contact with the stationary gear (cadell lines and anchor seines) and causing damage to both gears. This has caused tension situation among fishers in the area. Similar interactions were reported from WinsdorForest, and the West Bank Demerara areas. Chinese seine fishers at Goed Fortuin reported anchor seines being placed in positions where they block the entrance to their pens. They emphasized that they are required to license their pen space and should have exclusive rights to the space. However, there is also some conflict over spaces to place pens for Chinese seines.

Across the coast artisanal fishers also report being encroached upon by seabob trawlers which come into areas as shallow as 7.5 m. At Rosignol, artisanal fishers contend that trawlers are deliberately coming into shallower waters to increase their take of finfish because the price of finfish had increased above that of the seabob.

Some areas report the occurrence of theft of both the gear and catch by other competing fishermen.

Fishermen also perceive that foreign companies have an unfair advantage in terms of being able to access the resource because they have a greater ability to invest.

6. Available scientific and traditional knowledge on the resources

6.1 Brief biology of the major fish species

The major fish species presented here are the main species (and in some cases where species have not been identified, groups) that are taken either as catch or saleable bycatch in the various fisheries. The details on the biology of each species (or group) is provided in Table 3 in Annex 3 and outlines information on size, spatial distribution, feeding habits, reproduction and general ecology. The species are grouped into fish and shrimp, and within these two groups they are arranged alphabetically first on the basis of family then on the basis of scientific names. The information was extracted from the various pages on the taxa available on fishbase.org (for fish) and sealifebase.org (for shrimp).

6.2 Geographical distribution of the species

All species harvested live mainly on the continental shelf and the first part of the slope; mostly as demersal groups. They are distributed across the large ecosystem and stocks are shared with other countries. There are no species harvested that are endemic to Guyana.

There is no information on the local distribution of these species. However, Figure 2 above and Figure 3 below gives some general information on where fish is concentrated and where some types of fish are found in Guyana's marine environment.

Details on the distribution of the group described in 6.1 above are provided in Table 3 in Annex 3. This provides general information on the broad geographic distribution of the species and groups listed.

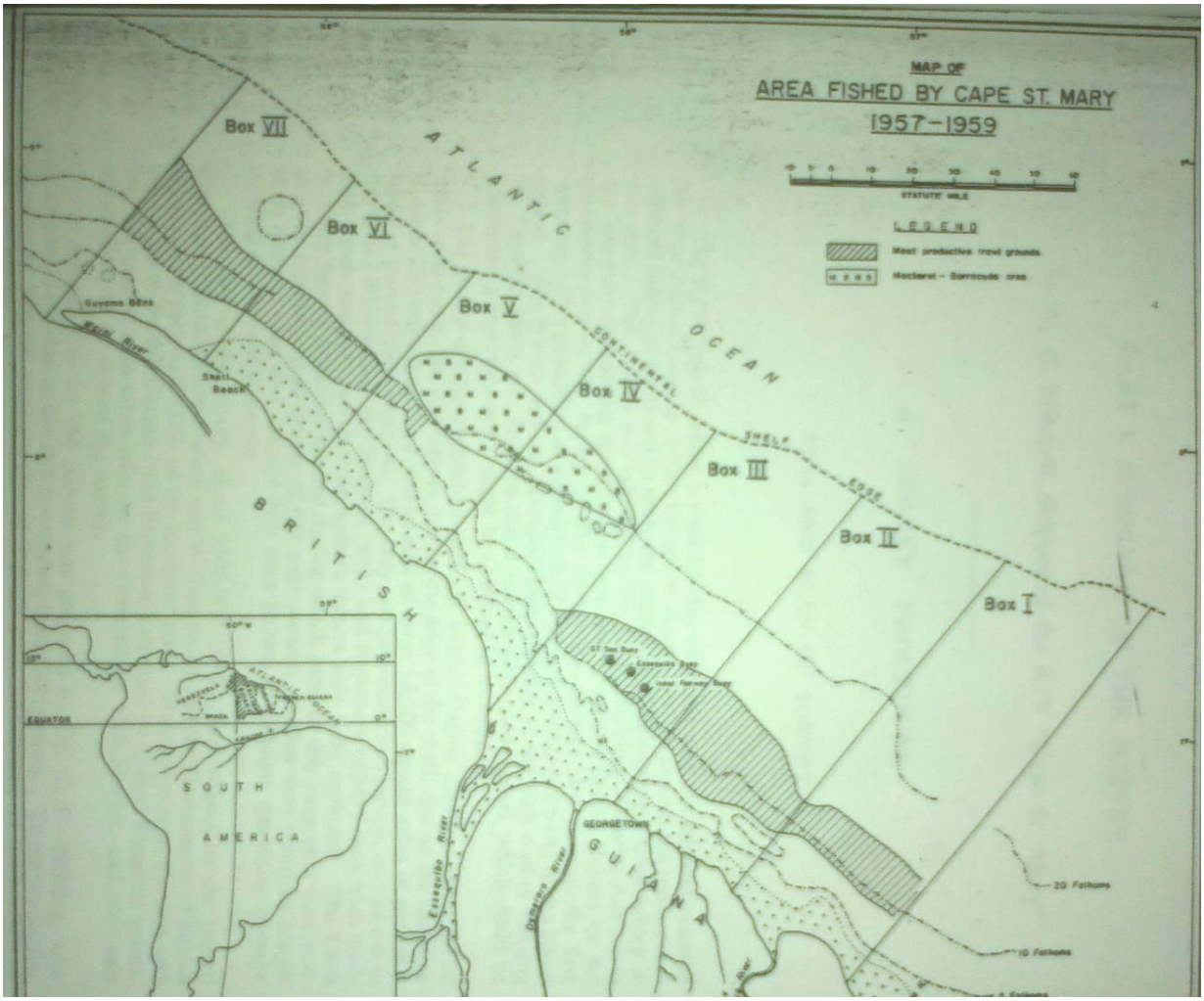

Figure 3. Illustration of the areas fished by the Cape St. Mary between 1957 and 1959 indicating the area of greatest general production and greatest abundance of mackerels (McConnell)

6.3 Estimated status of the stocks (especially over the last five years)

Over the last five years, the stock of three species were assessed in Guyana. However, there is data on the status of the stock for five additional species over the last 10 years. The Research and Development Unit of the Department of Fisheries, in its 2010 report, indicated an intention to undertake an assessment of the Grey Snapper (*Cynoscion acoupa*) in 2011. The results of this assessment are not presently available.

The general assessment of the industry as a whole is that there is a trend of decreasing total catch based on landing statistics over the years for both shrimp and ground fish. Detailed stock assessments for the eight species mentioned above are taken from various sources over the years. The most recent is an assessment of the Seabob stock in 2009. The table below summarizes available knowledge of the stocks in various fisheries (Data sources cited).

Table 2. Known status of stocks of fisheries resources (Sources cited in table)

Resource (Species or group)	Status	Assessment/year
Farfantepenaeus (P.) notialis - Pink Shrimp	Fully exploited	CARICOM Fisheries Unit, Status Report and Recommendations for Management of the Shrimp and Ground-fish Fisheries of Guyana. 2001 (data extracted from FAO, 2005)

Resource (Species or group)	Status	Assessment/year
Farfantepenaeus (P.) subtilis - Brown Shrimp	Fully exploited	CARICOM Fisheries Unit, Status Report and Recommendations for Management of the Shrimp and Ground-fish Fisheries of Guyana. 2001 (data extracted from FAO, 2005)
Farfantepenaeus (Penaeus) brasiliensis - Pink-spotted Shrimp	Overexploited	CARICOM Fisheries Unit, Status Report and Recommendations for Management of the Shrimp and Ground-fish Fisheries of Guyana. 2001 (data extracted from FAO, 2005)
Xiphopenaeus kroyeri - Seabob	There is no evidence from the catch and effort data that the stock is overfished and or that overfishing is occurring.	Report of Fifth Annual Scientific Meeting – Kingstown, St Vincent and the Grenadines, 09-18 June 2009
Cynoscion virescens – Sea Trout	Results of the assessment suggest a high fishing mortality rate, particularly on younger fish, which may exceed the level that maximizes the yield per recruit. The catch per day from gillnet vessels has declined in recent years, which suggests that too many young fish are being caught by the trawl and other inshore fisheries to sustain the adult population of sea trout.	Report of the Third Annual Scientific Meeting - St. Vincent and the Grenadines, 17-26 July 2007
Macrodon ancylodon - Bangamary	It is unclear whether these trends continue. The data were insufficient to clearly determine the status of the stock but the recent decline in gillnet catches is cause for concern.	Report of the Third Annual Scientific Meeting - St Vincent and the Grenadines, 17-26 July 2007
Lutjanus *campechanus* – Red Snapper	Status of the stock is unclear as further data on the production of the fishery is needed (i.e. all species as well as southern red snapper). However, there is a worrying recent decrease in recruitment (CPUE) which could be caused by overexploitation.	Report on the Shrimp and Groundfish Workshops conducted in Guyana (No.2003) Belize (December 2003) and Trinidad (January 2004)
Lutjanus purpureus - Red Snapper	The preliminary results from the present analysis indicate that the stock may be overfished.	Report of Second Annual Scientific Meeting – Port of Spain, Trinidad and Tobago, 13-22 March 2006

6.4 Provide information on any direct interactions with the ecosystem (impact on sea bottom, pollution caused by the fishery, effects of coastal zone development or land-based pollution, etc.)

There is not a consistent set of recent information available on the direct impact of the fisheries on the ecosystems and vice versa. However, there are some critical points to be made.

The CIDA (1994) draft FBR identifies several environmental issues still of relevance today to the industry. The loss of marine biodiversity, due possibly to overharvesting and dumping of 'trash'[2] containing juveniles of other economically important species was a main issue linked to harvesting in the industrial sector. A 1997 National Report on fisheries stock assessment submitted as part of the CFRAMP/FAO/DANIDA stock assessment workshop also raised a concern, without any details, over the use of sledges in the shrimp trawl fisheries as it relates to possible habitat degradation. At the time, there was a call for the impact of this practice to be examined.

Attempts have since been made to reduce the impact of industrial harvesting with the legislating of the use of Turtle Exclusion Devices (TED) and the voluntary introduction of Bycatch Reduction Devices (BRD). The industry has reported a 50 percent decrease in bycatch with the introduction of the BRD.

The processing component of the industrial fisheries was identified as raising several environmental concerns including the disposal of liquid and solid waste, air and water pollution, use of refrigerants, use of chlorine wash and bleach. Plants put a large quantity of organic waste into the ecosystem which could either rot and spoil the environment, or support a spike in predatory fish population. The high demand for potable water at the plants is also noted as contributing to the depletion of the ground water supply on the coast.

In the artisanal fisheries, the FBR identifies the use of gear such as pin seines, Chinese seines and gillnets used near the shore as possibly very destructive to juveniles of many species. While there are regulations governing this gear, their use continues to have negative impacts. There is also speculation among fishermen that the use of drift seines is having a destructive impact on the benthos. On the other hand, fishermen on the Berbice River face the challenge of having their Chinese seine pens and other gear destroyed by large clumps of floating grass which are periodically discharged from the Canje River. These grasses also affect boat engines. The artisanal processors operate in residential areas and generally raise the same concerns of water and air pollution, and high water demand as their industrial counterparts. Water supply is usually limited and, pollution more likely to occur.

The FBR also highlighted the issue of pollution offshore from vessels traversing the waters, and fishing vessels that have no waste management systems. All solid and liquid waste is released directly into the ocean and the accumulation of this could be having significant impacts on the environment. There however is no data to prove or disprove this assumption because there is no monitoring of the quality of the environment offshore.

Guyana's population is almost entirely coastal, occupying a narrow strip of land close to the sea and mostly formed of clay deposits. Cycles of erosion and accretion are known to occur on the shore line. This natural phenomenon is understood scientifically and among fishermen to have impacts on the availability of fisheries resources. In recent times, fishers have noted the presence of mud in the gills of fish caused by high sediment loads and the abundance of resources causing conflict on the Essequibo coast is linked to the current movement of mud in the area.

While Guyana may be classed as a moderately industrialized country, its coastal communities have traditionally put significant pressures on the natural resources of the area, and natural defences such as mangroves have been removed in some areas[3]. The National Report on fisheries stock assessment submitted as part of the CFRAMP/FAO/DANIDA stock assessment workshop in 1997, recognized that the coastal mangroves and other wetlands are also critical to the recruitment of juveniles to the fisheries, and posited that attention needs to be given to two issues: (i) general development of the

[2]Trash refers to the discarded catch which is dumped back into the ocean because of low or no economic value.
[3] An assessment in early 2011 found that the standing coastal forest was only 28.1 percent of the 2001 estimate by Hans ter Steege. Forests in Administrative Regions #1, #2 and #6 account for almost 84 percent of coastal forest while forests in region 4 account for only 0.004 percent (Persaud, 2011)

coastal zone; (ii) development of coastal aquaculture. The concern is that these activities will destroy the ecosystems on which the fish and prawn depend for nursery areas and thereby affect the fisheries by reducing recruitment.

The Mangrove Action Plan (GFC,2010) was developed with recognition of the importance of mangroves to fisheries. While it does not highlight the issues of mangroves being destroyed because of the need for landing sites for fisheries, it does address the need for mangrove forests to be maintained and restored for the cause of supporting fisheries. The ongoing Mangrove Restoration Project is expected to have significant impact in providing future habitat for breeding fish and shrimp.

Further inland the wastes and run off from activities in manufacturing, agriculture, mining and forestry, among other things are also of concern as it relates to the impact on the marine environment and the fisheries resource (CIDA, 1994). The release of untreated sewage is also of significant concern (CIDA, 1994) and solid waste from daily human activities commonly finds its way to the ocean and can be seen along much of the shoreline. .

There is a need for empirical data on land-based pollution sources and their impact on the marine ecosystems and fisheries. There is also a need for information on the impact of pollution caused by fishing, and other vessels at sea.

Traditional knowledge of the experienced fishermen has also suggested that there are some visible impacts of climate variability on the marine ecosystem and fishes. The main observation is that reduction in salinity due to a greater flow of freshwater into the ocean has caused a reduction in groundfish because of the changes in salinity. Fishermen have reported dead fish at sea during periods of heavy rainfall.

6.5 Summarize the traditional knowledge about the fishery and the resources exploited

Studies of the fishing communities in the early 1990s indicated that persons involved in the fisheries were fairly experienced; having been involved in the industry for more than ten years (CIDA, 1994). Recent work under the CLME case study on shrimp and groundfish has found this to be roughly still the situation. This experience has brought the fishermen a good understanding of the fisheries and the environment in which they operate. Fishers are particularly keen on fluctuations in resource abundance, the impact of environmental parameters on their ability to fish and availability of fish and distribution of resources. The following notes from meetings with fishermen illustrate this.

1. Chemicals from agriculture may be killing fish at sea. Observed snail powder in rice fields is causing fish kills there.
2. Changes in wind affect ability to fish when the less desired winds prevail. Fish catch in Chinese seine good with east winds, poor with west winds (Goed Fortuin).
3. Relatively recent unpredictable changes in rain patterns reduce catch by reducing ability to fish. Fishers once worked day to day (Goed Fortuin).
4. Siltation of fishing grounds coincides with decrease catch (Goed Fortuin).
5. Decrease in catch of white belly shrimp occurred approximately at the same time seabob trawling was introduced (Zeeburg).
6. For red snapper, in first quarter of the year there is a small catch. The remainder of the year brings good catch. The catch has been relatively constant over the years.
7. Catch varies with cycles of erosion and accretion (Cullen).
8. Plate-size red snapper accounts for 80 percent of the catch in traps and 10-40 percent of the catch with long lines.
9. White belly shrimp is a seasonal resource. Best catch for white belly shrimp comes between February and May (Parika, Zeeburg). White belly shrimp is abundant in May and June and is not fully harvested (Parika).
10. The white belly shrimp caught by one Chinese seine in 1972 now require four seines (Parika).

11. The best year for white belly shrimp at Parika was 2012.
12. A gill net of 4.5 kg gave more catch approximately 20 years ago than 159 kg of net today.
13. White belly shrimp is at its lowest in December (Zeeburg).
14. For polyethylene gillnets, most fish (grey snapper and trout) are caught between 9-14 m depth. Sharks are caught between 27 and 48 m (#66 village).
15. For polyethylene gill net, at depths less than 9 m, the catch consist of mixed fishes .Between 9 and 22 m, it's almost purely trout (#66 village).
16. Gravid fish and shrimp observed between August and November (Cullen).
17. Sea trout gravid observed in November (Parika).
18. Catfishes gravid observed in June to July (Parika).
19. Major spawning area for white belly shrimp exists between Essequibo and Demerara river mouths.
20. Changes in the condition of the water and waves observed over the last 20 years (Parika).

7. Annual catches from the earliest time available (by species or lowest available taxonomic group where landings are multispecies)

The annual catch for fisheries in Guyana is not, in most cases, reported at the species level. Data from four sources are presented here (Guyana Bureau of Statistics, Fisheries Annual Reports, Fisheries Reports to CRFM; and the FMP). Figures 4 and 5 show data from the Bureau of Statistics, which reports amount of fishery production in three categories: prawn, small shrimp and fish.

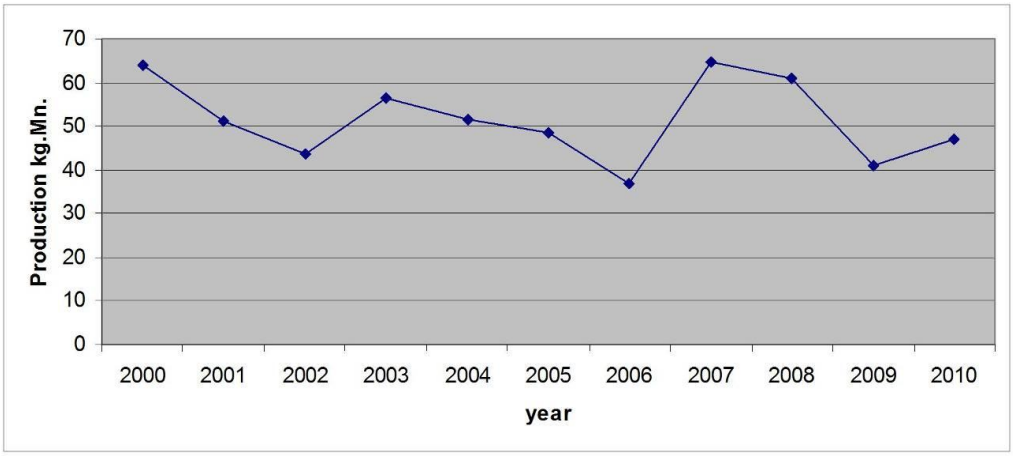

Figure 4. Trend in overall fisheries production for Guyana between 2000-2010, Guyana Bureau of Statistics data

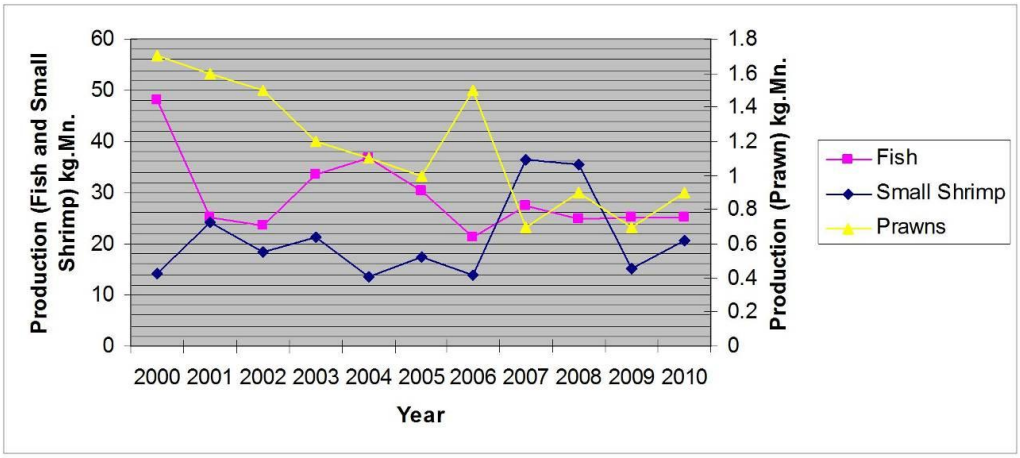

Figure 5. Trends in fisheries production for fish, small shrimp and prawn for Guyana between 2000-2010, Guyana Bureau of Statistics data

Annual reports of the Department of Fisheries and the reports submitted to the CRFM annually presents statistics on the production of prawns, seabob (artisanal and industrial), whitebelly shrimp, finfish (artisanal and industrial) and red snapper. These two data sets should agree but there are some major discrepancies for the years 2005–2007, particularly in the figures quoted for production of seabob by the industrial fleet. These data are provided in Figures 6–11.

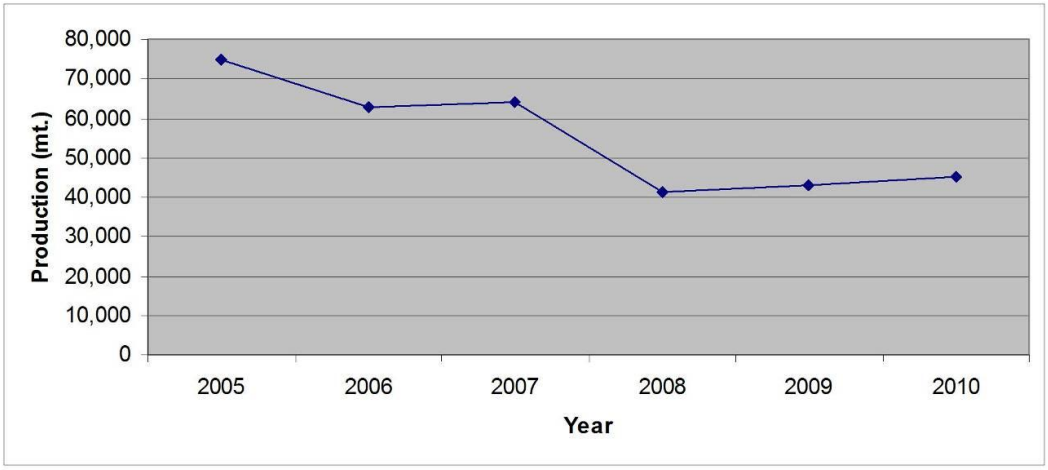

Figure 6. Overall annual production of shrimp and groundfish for the years 2005-2010 based on data from Fisheries Annual Reports

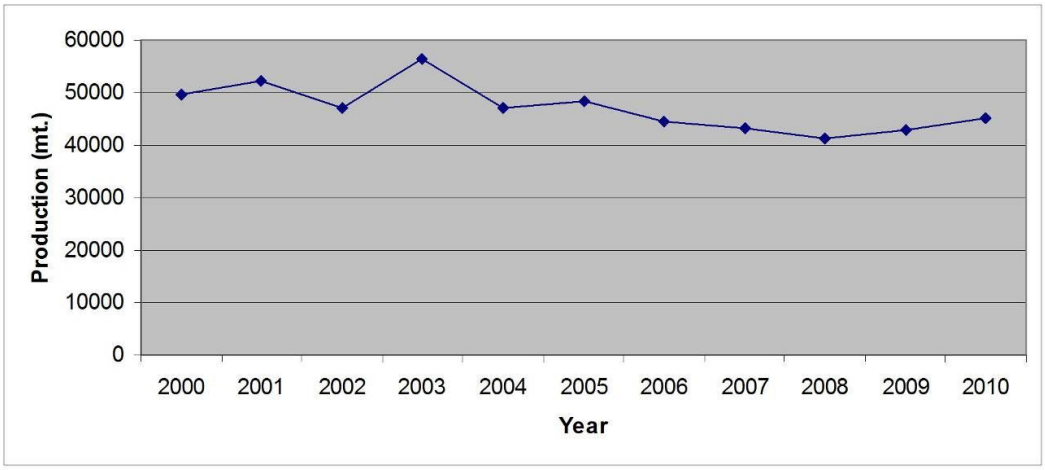

Figure 7. Overall annual production of shrimp and groundfish for the years 2000-2010. Data for 2000 to 2008 from Guyana reports to CRFM for 2009 and 2010 from Fisheries Annual Reports

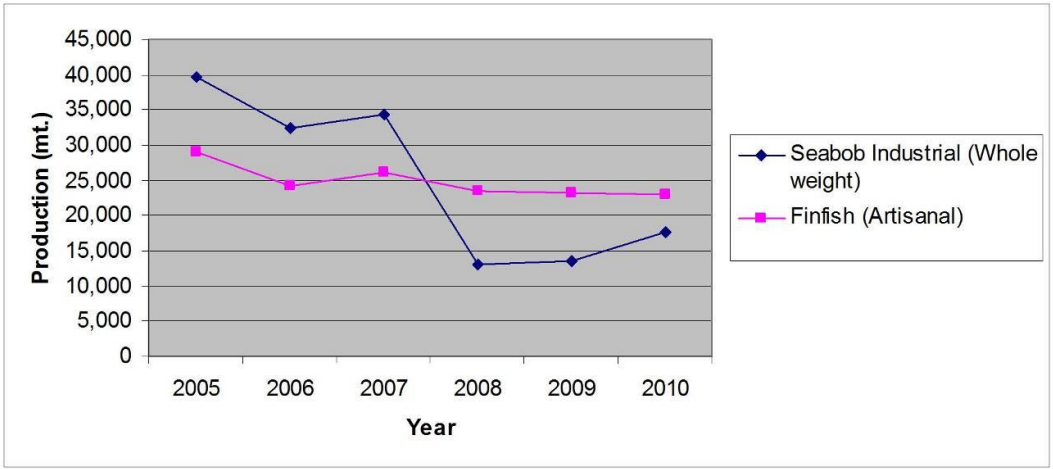

Figure 8. Annual production of the two highest producing fisheries for the years 2005 2010 based on data from Fisheries Annual Reports

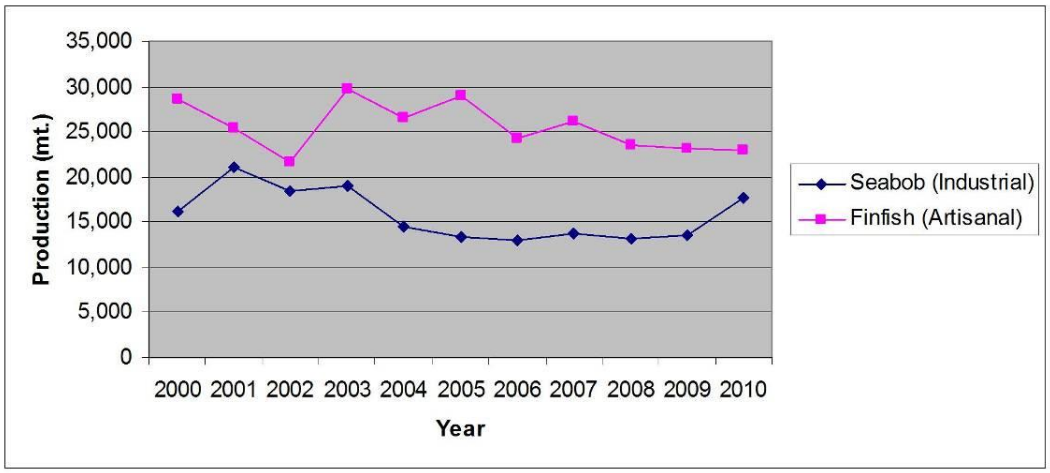

Figure 9. Annual production of the two highest producing fisheries for the years 2000-2010. Data for 2000 to 2008 from Guyana reports to CRFM for 2009 and 2010 from Fisheries Annual Reports

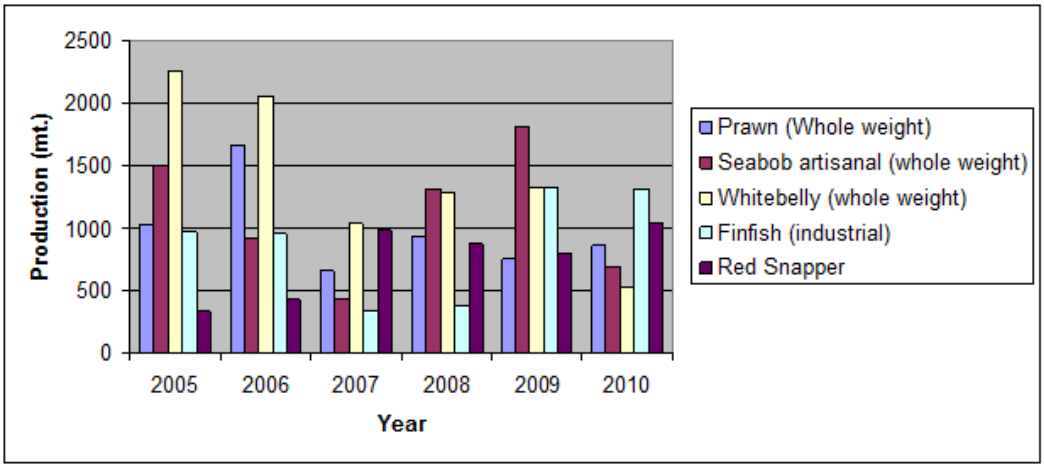

Figure 10. Annual production of five lower producing fisheries for the years 2005 2010 based on data from Fisheries Annual Reports

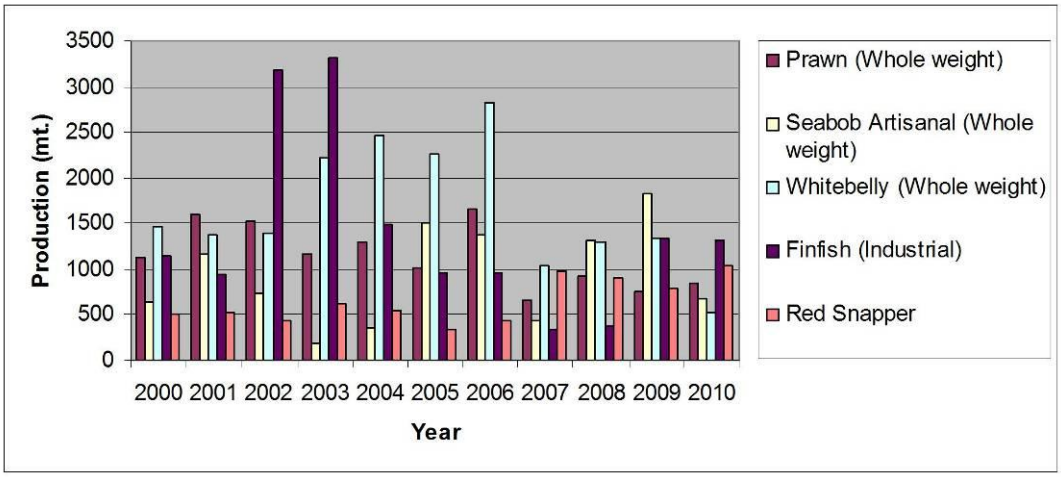

Figure 11. Annual production of five lower producing fisheries for the years 2000 2010. Data for 2000 to 2008 from Guyana reports to CRFM for 2009 and 2010 from Fisheries Annual Reports

Annual production in the prawn and seabob fisheries over an extended period was extracted from the FAO Country Profile for Guyana's Fisheries subsector published in November 2005. It was complemented with data from various Fisheries Annual Reports. However, data from the Fisheries Annual Reports for seabob production are not in sync with data from reports submitted to the CRFM.

Figure 12 illustrates these two sets of data. The series labeled 1 (Prawn 1 and Seabob 1) include data from the Fisheries Annual Reports for the years 2000-2010, while the series labeled 2 (Prawn 2 and Seabob 2) include data from the submissions to CRFM for the years 2000 to 2008 and data from the Fisheries Annual Reports for 2009 and 2010. The Seabob 1 series shows a steep drop in production from 2003 to 2004 followed by sharply elevated production for 2005-2007 and a drop again in 2008. The Seabob 2 series shows a less steep decline between 2003 and 2004 and relatively stable production between 2004 and 2008. Differences in the figures for the production of prawn are less prevalent and evident. This discrepancy needs to be resolved and avoided in the future.

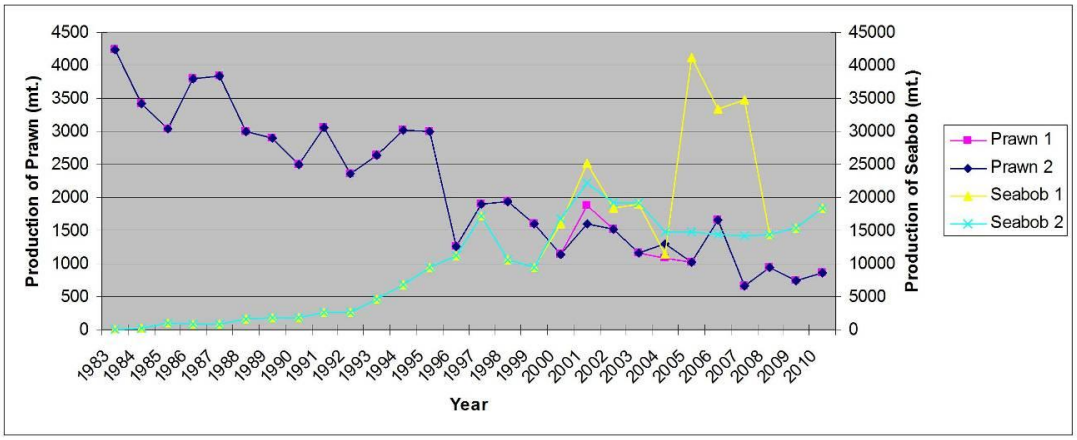

Figure 12. Production for prawn and seabob for the years 1983-2010. Data for Prawn 1 and Seabob 1 taken from FAO Fisheries Country Profile – The Republic of Guyana (for 1983-1999) and Fisheries Annual Reports (for 2000-2010). Data from Prawn 2 and Seabob 2 are the same as for Prawn 1 and Seabob 1 but with data from National Reports to the CRFM replacing the data from 2000-2008

Data on other fisheries extracted from the Draft Fisheries Management Plan 2007-2011 have been presented in three sets for practical purposes. Data on a major fishery consisting of more than two species when not disaggregated (Artisanal Demersal fish and Sharks) are presented as separate illustrations; data for minor fisheries consisting of multiple species, or individual species, is presented collectively; these are presented in Figures 13-15.

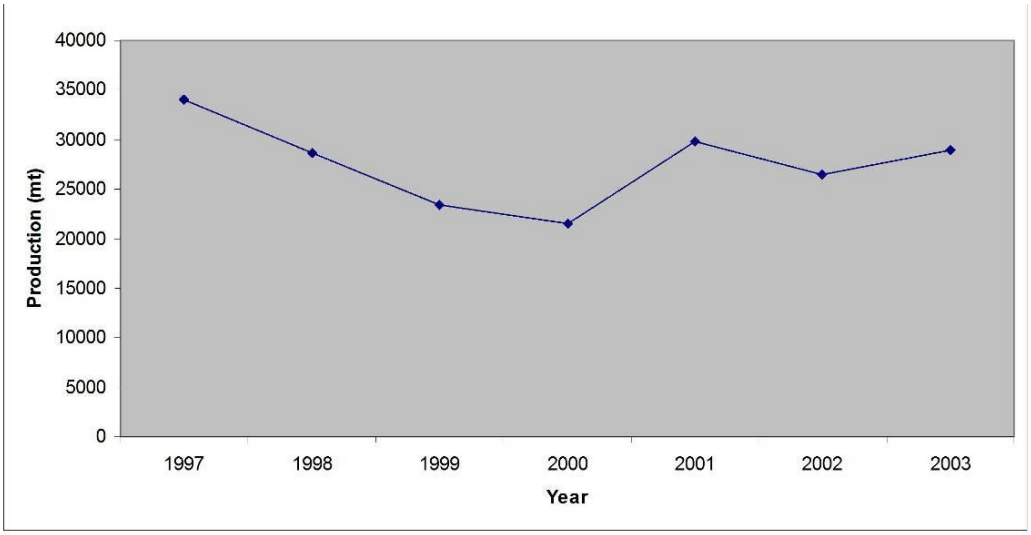

Figure 13. Artisanal Demersal Fish production for the years 1997–2003 based on data from Fisheries Management Plan 2007-2011 (Draft)

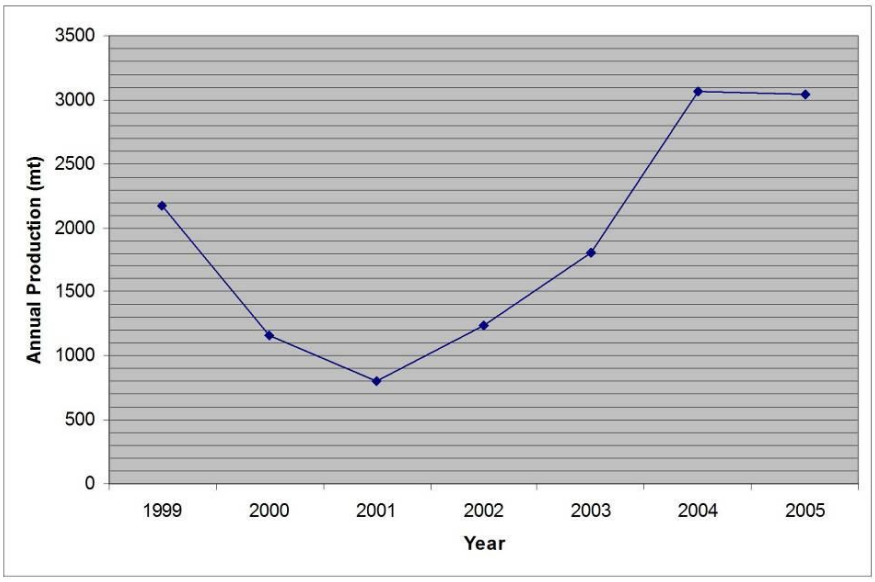

Figure 14. Shark production for the years 1999-2005 based on data from Fisheries Management Plan 2007-2011 (Draft)

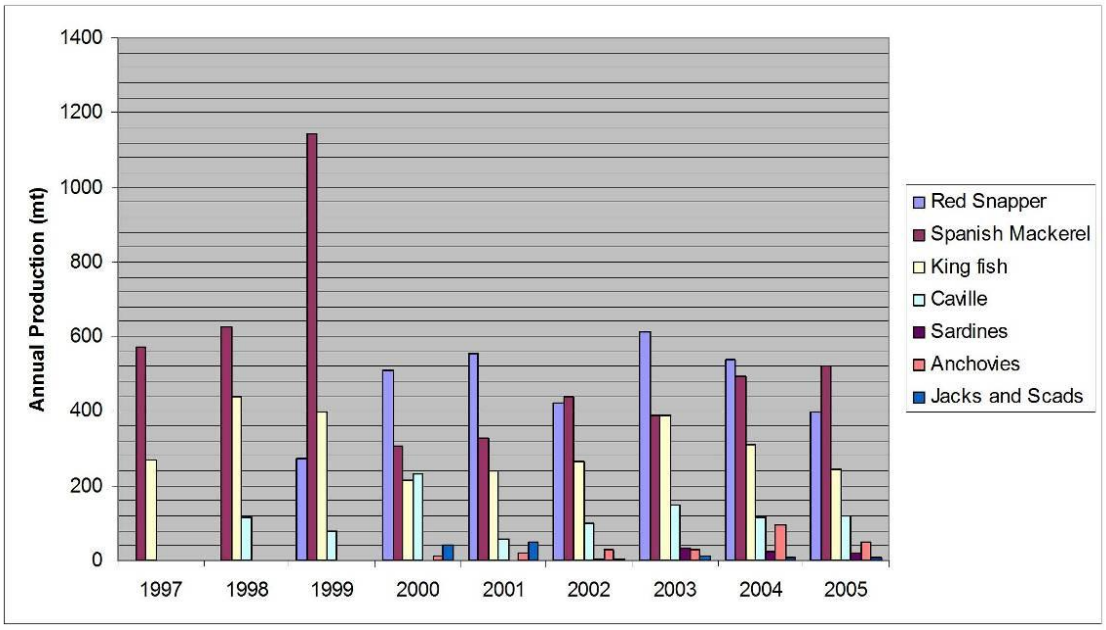

Figure 15. Annual production of seven fish resource for the year 1997-2005 based on data from Fisheries Management Plan (Draft)

8. Assessment of the importance of the fishery to the national economy

8.1 Value of the catches from the fishery per year for the last five years (by species or lowest available taxonomic group where landings are multispecies). Also add time series of market prices for the landings

The fisheries subsector is a significant contributor to the Guyanese economy both in terms of food security and revenue earnings. While data on the economic contribution of fisheries in Guyana does not sufficiently discriminate between the shrimp and groundfish fishery and other industries, because the shrimp and groundfish fishery accounts for over 90 percent of the documented fisheries activities, the general data is representative of the contribution of shrimp and groundfish.

Guyana is ranked as being number one in the region and among the highest in the world for annual per capita fish consumption with a figure of 57 kg/capita (CARICOM 2011; Haughton, 2011). Per capita fish consumption data from 2003 indicated a 45 kg/capita consumption (FAO, 2005). This followed significant increases during the 1980s and 1990s, consumption rose from 9 to 27 kg/capita between 1980 and 1988 and peaked in 1999 at 58.7 kg/capita (FAO, 2005; 2012).

The Fisheries of the United States reports between 1996 and 2011 reported data collected from various countries including annual fish consumption. This data for Guyana, extracted from the FAO Yearbooks for Fisheries and Aquaculture Statistics (year), was reported as average consumption over regular three year periods. A graphical analysis of this data (Figure 10) suggests that after the peak in 1999, per capita annual fish consumption in Guyana has been on the decline and between 2005 and 2007 averaged approximately the 1988 figure.

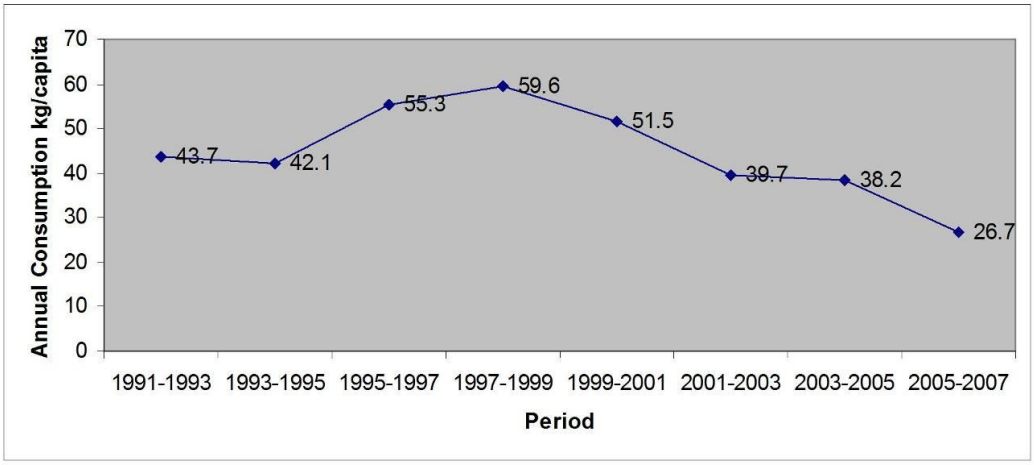

Figure 16. Trends in per capita annual fish consumption averaged over regular three year periods between 1991 and 2007; based on data from Fisheries of the United States reports between 1996 and 2010

This trend in consumption may be due to one or more of the following: changes in the economic status of the Guyanese population such that more persons can afford other meats; increase in the percentage of production that is exported, leading to reduced availability on the local market; and, increase in the rearing of livestock in low-income homes. While our population is relatively small on a global scale, in 2010 Guyanese consumed locally 64.4 percent of the fisheries production (DOF, 2011) compared to 72.7 percent in 2000 (CRFM, 2009). In 2010, the average price per pound for the locally sold species ranged from GUY 100 to 1 036 for fish and GUY 140 to 1 147 for shrimp species. The average price for all species was GUY 256 per pound and was lowest of all the meats sold on the local market.

The estimated total value of fisheries products in 2004 was GUY 26.7 billion with the domestic sales accounting for approximately 53 percent of that value. The value of the local sale appears disproportionate to the volume of fish consumed on the local market since the market consumed 61 percent of the products in 2004. It is perhaps explained by the fact that the export market takes a smaller quantity of higher value products.

Fisheries remain a major economic contributor, but its contribution has been on the decline in recent years. Between 2003 and 2005, the contribution of fisheries to Guyana's GDP ranged from 1.59 percent to 2.8 percent based on 1988 prices. Since 2006, these figures have been calculated using 2006 as the new reference point for prices. On the basis of this analysis, the contribution of the primary sector of fisheries to GDP rose to 3.56 percent in 2006 but has been in a steady decline since. The contribution of fisheries to the Agriculture, Fishing and Forestry GDP rose gradually between 2006 and 2008, but has been in decline since. Fisheries had overtaken rice in contributing to GDP before 2010, however current trends suggest that if all things remain the same, rice will again overtake fishing and in 2011 rice did narrowly outperform fishing by 0.06 percent in contribution to

overall GDP and 0.28 percent in contribution to the Agriculture, Fishing and Forestry GDP (GBS, 2012).

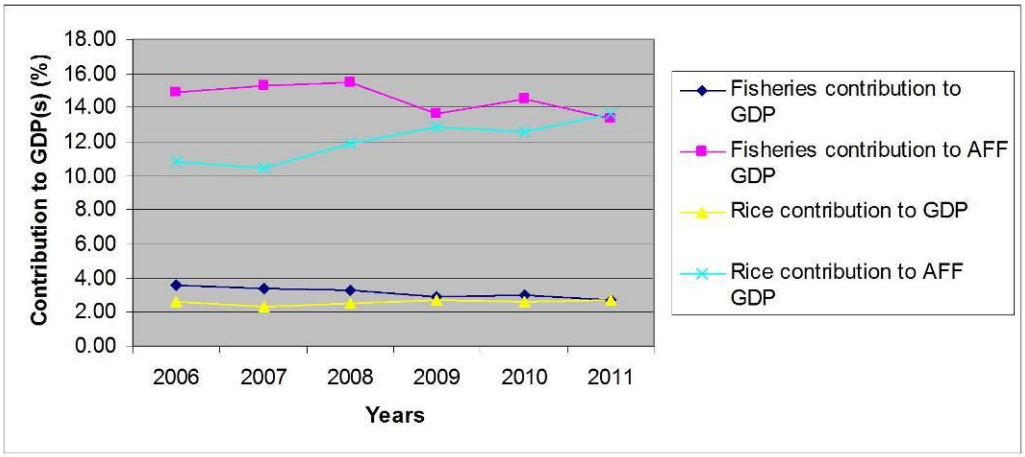

Figure 17. Trends in the contribution of fishing (primary sector of fisheries) to the GDP of Guyana compared to rice for the years 2006-2011; including contributions to overall GDP and the Agriculture, Fishing and Forestry GDP (GBS, 2012 - Constant Gross Domestic Product at 2006 Prices)

Trends in the export of fisheries products show a steady increase from 1999 to a peak in 2003. It has fluctuated little since, suggesting stability, but the trend is unclear because of missing data. The years when the export was of greatest value were from 2002 to 2004, however the price per tonne was greatest in 1999 when the weight exported was lowest. Conversely, the lowest price per tonne was observed in the year of highest weight exported (2003). The difference between the two being GUY 295 000 (FAO, 2005; DOF, 2011). The price per tonne of exported products has been fairly stable since 2004.

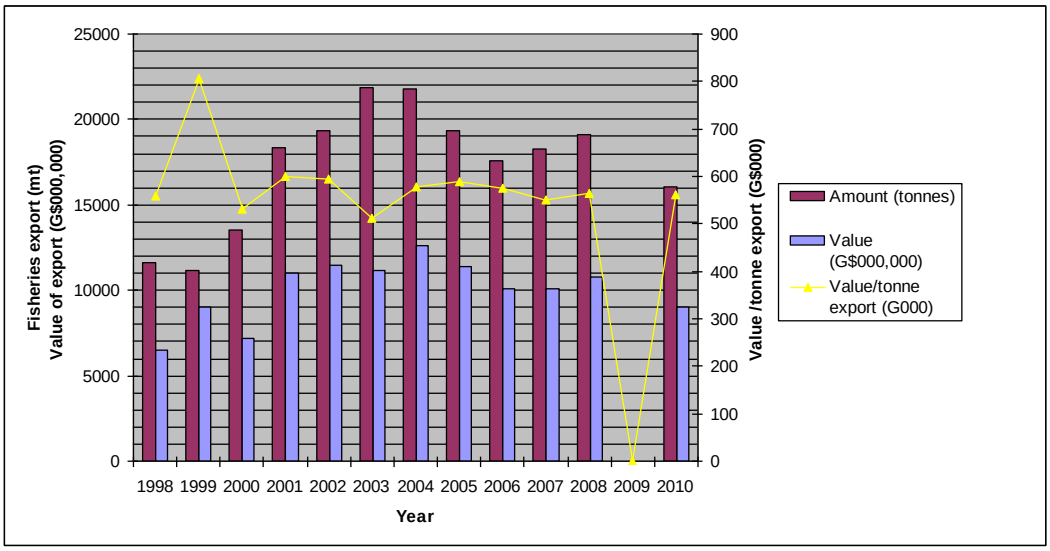

Figure 18. Total fisheries export (mt) and value of the export (GUY 000 000) compared along with trend in average price of export per metric tonne (GUY 000) for years 1998–2010 (with data missing for 2009) (Based on data from Fisheries Management Plan (Draft), FAO Fisheries Country Profile – The Republic of Guyana and Fisheries Annual Reports)

There is no data series available on the incomes from employment in the industry. However, in 2012, the CRFM published the findings of a diagnostic study of poverty levels in the CARICOM fishing communities. This study found that only 50.3 percent of the fishing households in Guyana had no unsatisfied basic needs. The 16.97 percent of the households had both economic capacity and dwelling quality unsatisfied, 13.94 percent had unsatisfied economic capacity and 7.27 percent had

unsatisfied dwelling quality. On this basis, 25.45 percent of the households were determined to be vulnerable, and another 24.24 percent were determined to be poor. Vulnerability was spread across the three subsectors considered (Aquaculture, Fishing and Processing), but was highest among those involved in Aquaculture (41.18 percent of households) and lowest among those in Fishing (23.48 percent of households). Poverty was however restricted to households in Aquaculture (17.65 percent determined as poor) and Fishing (28.03 percent determined as poor). Regions #2 and #3 had the highest percentage of the vulnerable and poor fishing households. There were no women in the industry whose household was determined to be poor and among the men, the poor were almost evenly distributed among those in age groups between 26 and 65 (a range of 20-27.5 percent). Men between 15 and 25 had a significantly lower poverty level (5 percent).

Poor households in this study were found to have an average per capita annual income of USD1 012.51 with the highest in Region #2 (USD1 116.14) and the lowest in Region #6 (USD801.57). The 99 percent of this income to these households was determined to be coming from their involvement in the fishing industry.

The CIDA (1994) study showed that direct employment in the industry contributes to gender equality, as much of the processing plant workers employed during the expansions in 2003 and 2004 were women. Additionally, women have been involved in the fishers as boat owners. The CRFM (2012) study states, "… women are important contributors to both national and household food security while their labour adds to the foreign earnings of the countries."

The industry also supports employment in other areas because of its demand for gear and vessel supply and maintenance. It also supports private entrepreneurial activities around major landing sites.

Fisheries also contributes to the local economy through the collection of licensing and registration fees for vessels, processing plants and export, and the collection of import/export levies on fish products. In 2010 the revenue was reported at GUY 13.84 million for licenses and registration and GUY 76.84 million in levies on fish products.

8.2 Products, markets and quantitative assessment of the value and employment of activities in value-addition and linked to the sector

The main products from the fisheries are fresh, fresh frozen and dried products, but there are a number of other minor products. These are sold mainly on the local market across the coast of Guyana (particularly in the county of Demerara and Essequibo), but a significant portion goes to foreign markets in Asia, Europe, the Caribbean, North America and South America.

Fresh products are only sold in Guyana (mainly fish but also small quantities of prawn, seabob, whitebelly shrimp and crabs). Also sold on the local markets is a large quantity of frozen whole and filleted fish, and relatively small quantities of frozen prawn, seabob, whitebelly shrimp, squid and crabs, and dried/smoked/salted fish and whitebelly shrimp. Most of the frozen and dried/smoked/salted products sold locally come from the artisanal processors (cottage industry) and only recently (over the last few years) are small quantities of industrially processed products found on the local market. The export markets consume most of the prawn and seabob processed industrially and all of the fish glue and shark fins. Figure 19 below gives some details on the proportion of the various products that went to the various export markets in 2007. Overall, it is clear that the major markets are in the Caribbean and North America. However, the Asian market consumes almost all of the Shark fins and Glue and the South American market consumes more than 60 percent of the Salted shark.

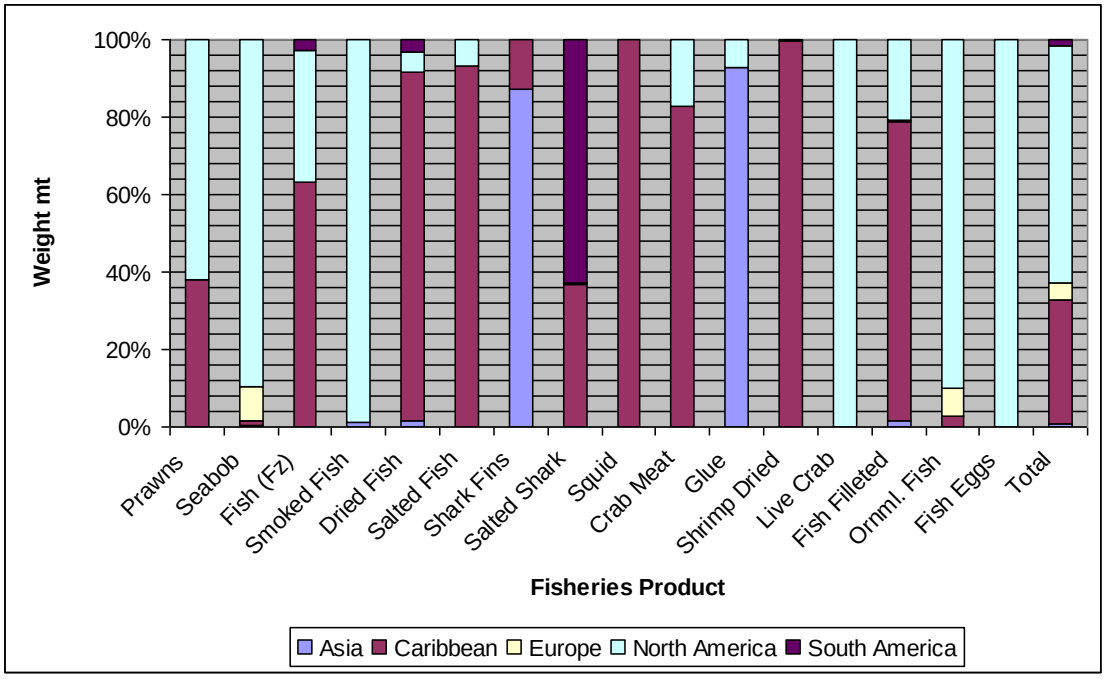

Figure 19. Distribution of exported products based on the import markets in 2007. (Extracted from Fisheries Annual Report, 2007)

There is no easily accessible data on the value of employment in the sectors related to fisheries. However, the CRFM determined that 75 percent of the households involved in processing had no unsatisfied basic needs and the other 25 percent were listed as vulnerable. None were classed as poor. This indicates that income from processing is likely notably higher than income from fishing or aquaculture.

9. Full set of management measures/primary management tools currently being used in the fishery/sector including those indicated in Table 3 below

The laws and regulations in Guyana provide for a number of management measures for fisheries which are not currently implemented. These include provisions in the Fisheries Act of 2002 for marine protected areas and marine reserves with limited fishing.

The FMP 2007-2011 list a range of management strategies to be appropriated to the seven fisheries identified in the plan. These are provided in Annex 1. Except where specifically noted below, there is no record to show that these strategies have been implemented.

Table 3. Management measure or tools currently applied to the fisheries in Guyana

Type of management tool	**Tick**	**Comments** (e.g. when introduced, effectiveness, compliance, etc.)
Spatial (area) restrictions and closures such as:		
○ Marine protected areas where fishing is prohibited		
○ Nursery area closures		
○ No-take zones		
○ Marine reserves where fishing is sometimes allowed		
○ Other temporary areas closures for specific purpose (e.g. spawning aggregations)		

Type of management tool	Tick	Comments (e.g. when introduced, effectiveness, compliance, etc.)
Temporal restrictions such as:		
o Defined fishing season(s)	√	The Fisheries Act does not speak specifically about seasonality in fishing activities. However, the Draft Management Plan 2007-2011 indicates a closed season in place for the Large Penaeid Shrimp and Industrial Seabob fisheries. The plan suggests that the closed season for the LPS is not firmly applied. The closed season for Seabob is determined on a yearly basis and lasts for six weeks
o Defined number of days fishing		
o Defined number of hours per day of fishing		
o Defined number of hours fishing		
Gear restrictions such as:		
o Engine size restrictions		
o Gear size restrictions	√	Pin seines pens are limited to 26' width. TED and BRD
o Gear type restrictions	√	The Fisheries Act prohibits the use of explosives, poisons and noxious chemicals for the purpose of fishing
Size/age restrictions (i.e.: minimum or maximum sizes)		
Participatory restrictions such as:		
o Licences	√	. Under the Fisheries Act (2002) all fishing vessels operating in the marine fishery must be licensed. There is complete registration of vessels participating in the industrial trawl fishery. However, artisanal vessel registration is incomplete and not all registered vessels have been renewing their annual license to fish. . Foreign vessels may also be licensed to fish in Guyana's EEZ and the Maritime Boundary Act provides for catch restrictions to be placed on such vessels. . Established shrimp and finfish processing plants are issued annual processing plant and export licenses, after meeting the inspection requirements, while new plants must go through a probationary period during which export licenses are issued on a per shipment basis.
o Limited entry	√	Only the Large Penaeid Shrimp and Seabob fisheries are limited entry fisheries: LPS upper limit of 45 vessels; and, Seabob upper limit of 30 vessels. The semi-industrial and artisanal are open fisheries. However, the regulations governing pin seines and Chinese seines require the pens to be licensed and that a 70' space is placed between the each pen. The limit of available space for pens is the only limit to entry for these fisheries.
Catch restrictions such as:		
o Total allowable catch (TAC) limits		
o Vessel catch limits		
o Individual vessel quotas		
Rights/incentive-adjusting regulations such as:		
o Individual effort quotas		
o Individual fishing quotas		
o Individual transferable quotas		
o Individual transferable share quotas		
o Group fishing rights (including community development quotas)		
o Territorial use rights	√	Pin seine and Chinese seine fishers have exclusive rights to fish in the space licensed to them for their pens.
o Stock use rights		

10. From the table above, assess the effectiveness of the current management measures in relation to the fishery itself, including effectiveness in ensuring sustainable utilisation. "Effectiveness" may be in terms of better status of the stocks (increasing CPUE), decreasing conflicts, increasing value, level of compliance, etc. It is important to note that in the State of World Fisheries and Aquaculture (SOFIA), FAO defines fisheries governance as "the sum total of the legal, social, economic and political arrangements used to manage fisheries"

The traditional approach to the management of the fisheries can be assessed to have been as a resource that cannot be overexploited: an endless resource. Some remnants of this approach are still evident in the management of the fisheries today. This assessment is based on the fact that much of fisheries still operate as open access fisheries and limits on fishing efforts have only been imposed on fisheries that have been endangered at some point or are closely related to one such species (see Chapter 6.2 and 9 above).

The only fisheries which have imposed limits on the effort are the Large Penaeid Shrimp and Seabob. The Large Penaeid Shrimp fishery was assessed as being overfished in the late 1990s before limits were imposed and a fleet reduction strategy was employed (Chapter 6.2 and 9 above). Nonetheless, the fishery has shown a decline between 1983 and 2010 (see Figure 12). Stock assessments in 2001 determined the stocks to be fully or overexploited (See Table 2).

The Seabob fishery was introduced in 1984 and very quickly surpassed the Large Penaeid Shrimp fishery in terms of production, with a peak in 2001 that was more than 10 times the production of the prawn industry. Despite the relative infancy of the Seabob fishery, the measures applied to the Large Penaeid Shrimp fishery have also been applied to this fishery and production seems to be relative constant since 2004 (Figure 12).

The open access approach to most fisheries could be a one of the factors contributing to the decline in productivity seen in some fisheries. Fisher folk with a wealth of experience have suggested this very thing as an explanation for the decline they are observing in the fisheries productivity. The lack of regular stock assessments for much of the species has also affected the ability of the Department of Fisheries to make informed decisions on the management of these fisheries.

In addition to open access to artisanal fisheries, the lack of zoning for the various fisheries has led to significant conflict over fishing grounds and resources (see Chapter 5.2).

There is not sufficient information available to make a firm inference on the effectiveness of the management measures and tools applied to the shrimp and groundfish fisheries in Guyana. This in itself is a matter worthy of attention for proper management of the fisheries.

11. Any compliance or enforcement problems being experienced in the fishery, and any complaints or dissatisfaction amongst fishers/rights holders. You need to consider scientific monitoring (e.g.: of catches against permitted exploitation) as well as MCS (monitoring, control and surveillance)

The responsibility for enforcement of the regulations and protection of rights of persons involved in the fisheries lies with the Department of Fisheries in collaboration with the Guyana Defence Force, Coast Guard and the Guyana Police Force, Marine Police. While there is collaboration between these bodies, none has the capacity to execute this mandate effectively. The industry has attempted to self-regulate and monitor operations at sea to address this issue, but there is need for greater enforcement to address issues such as theft and damage of gear and catch, piracy, illegal foreign fishing, and over-the-side sales. Licensing is also a major issue. At one of the landing sites, fisher folk reported that only about 20 percent of the artisanal fishermen were operating with licenses. The issue appears not to be one where fishermen try not to comply, but rather, that they require a better system for licensing which take less time.

Fisher folk at a series of meetings to inform this report cited a number of compliance related issues which are of concern to them. These have been appended to this report in Annex 4. Conflicts over access to fishing grounds and resources, theft and damage of fishing gear and piracy involving theft of entire catch, gear and vessels with threat to human life have been identified as common priority issues across several groups of fisher folk and require urgent action.

With respect to the industrial fishery, the Department of Fisheries has been effective in enforcing the use of the Turtle Exclusion Devices on Trawlers. This is as a result of compliance with requirements for the export markets. In addition, some owners of trawlers by virtue of the companies seeking Marine Stewardship Council certification, have voluntarily introduced Bycatch Reduction Devices on their vessels.

12. Is there a national or regional forum for discussions on management of this or other resource? If yes, please give a short description of the forum (nature, frequency, subject of discussions, outcomes, etc.)

The only permanent national forum for the discussion of matters related to fisheries is the Fisheries Advisory Committee with representative being drawn from various stakeholders in the fisheries and related sectors. The focus of the work of this committee is on advising the minister and ministry on matters related to the fisheries. This Committee has been resuscitated in 2007, however it has not been functional in the recent past.

Outside of this, there are case by case meetings and national consultations when major issues arise or projects are being executed.

At the regional level, the CRFM holds annual scientific meetings and interim working group meetings to address issues related to specific fisheries. This forum provides guidance for the management of the fisheries in the various states and allows for transboundary issues to be addressed. The findings and decisions of these meetings are published online with free open access to all who use the internet.

13. Any other comments relevant to current management of the fishery and the way forward for the introduction of EAF

The fishery subsector in Guyana is managed by the Department of Fisheries. The governance structure is significantly centralized with officers placed in the outlined regions where shrimp and groundfish activities are undertaken. Decision-making powers reside in the central body in Georgetown and the industry can influence the process and outcomes through consultations.

The move towards an EAF will engender an evolution of the management practices related to the fisheries. This evolution under an EAF may require changes in the DOF structure and culture. Importantly, the FMP 2007-2011 already includes elements of the EAF, and the full implementation of the approach will itself provide for these changes to be properly negotiated for the sustainable management of the resources.

There are cases where sections of the industry have taken voluntary decisions to preserve the resources. The introduction of the closed season for the trawling industry and reduction of fishing days for Chinese seine fishermen at Goed Fortuin are examples of this. It is important to note, however, that such decisions are made from limited perspectives and interests. However, in consultation with fisherfolk, there have been both expressions of acceptance of the current governance structure and desire for greater participation. Fishermen have expressed a willingness to help with improving security and safety at sea and overall enforcement of laws. Some have also expressed willingness to manage dedicated fishing zones as opposed to having an open access policy.

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Annex 1. Goals and objectives for institutional strengthening of the Fisheries Authority and specific fisheries identified in the Draft Fisheries Management Plan, 2007-2011, including management strategies for each fishery

1. Institutional Strengthening of the Fisheries Authority

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities

Objectives

- To establish the Fisheries Advisory Committee in keeping with the Fisheries Act 2002
- To rebuild and restore minimum core functions of the Fisheries Department
- To reform the fisheries administration to enable it to respond to challenges

2. Offshore Industrial Large Penaeid Shrimp Fishery

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities
- To optimize the value of the limited fisheries resources through cost effective harvesting, value added processing and diversification of markets
- To maintain or restore populations of marine species at levels that can produce the optimum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species

Objectives

- To rebuild and maintain the penaeid shrimp stocks at all times above 50 percent of its mean unexploited level
- To maintain all non-target species, associated and dependent species above 50 percent of their mean biomass levels in the absence of fishing activities
- To maintain and improve on the net incomes of the operators in the large penaeid shrimp fishery at a level above the national minimum desired income
- To include as many of the existing participants in the fishery as is possible given the biological, ecological and economic objectives listed above

Management Strategy

- Maintain a limited entry fleet
- Set a limit on processing plant capacity
- Maintain and establish criteria for the timing of the closed season
- Review and refine the target and limit reference points for the Fishery
- Limit large penaeid shrimp trawlers from fishing 18 fathoms shoreward
- Demarcate the large penaeid shrimp area

3. Industrial Seabob Fishery

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities
- To optimize the value of the limited fisheries resources through cost effective harvesting, value added processing and diversification of markets
- To maintain or restore populations of marine species at levels that can produce the optimum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species

Objectives

- To maintain the seabob stocks at all times above 50 percent of its mean unexploited level
- To maintain all non-target species, associated and dependent species above 50 percent of their mean biomass levels in the absence of fishing activities
- To stabilize the net incomes of the operators in the seabob fishery at a level above the national minimum desired income
- To include as many of the existing participants in the fishery as is possible given the biological, ecological and economic objectives listed above

Management Strategy

- Maintain a limited entry fleet
- Set a limit on processing plant capacity
- Maintain the closed season
- Review and refine the target and limit reference points for the Fishery
- Demarcate the seabob fishing areas

4. Inshore Artisanal Fishery

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities
- To promote sustainable development of inland fisheries, including ornamental and sports fisheries, and diversification of economic activities in the hinterland and coastal communities into these areas

Objectives

- To maintain the stock at all times above 50 percent of its mean unexploited level
- To maintain and improve the net income per fisher at a level above the national minimum desired income
- To include as many of the existing participants in the fishery as is possible given the biological, ecological and economic objectives listed above

Management Strategy

- During the plan period, the target and limit reference points for the fishery would be reviewed and refined
- Priority would be given to the identification and elimination and/or reduction of destructive gear while developing an effective gillnet (polyethylene) fleet. Attention would also be paid to developing a more participatory approach to management of the Inshore Artisanal Fishery
- In the longer term management will have to take into account the multi-species multi-gear nature of the fishery where management measures must apply across all gears. The overall approach

would be to look at total effort, in relation to the size of fish caught by various gear in relation to some biological reference points like optimum size and size at maturity

- Pin Seine
- Elimination can be considered. However, available beach space may already be a limiting factor, taking into consideration the natural erosion and accretion cycle along the coast, and therefore total impact on the resource may not warrant such drastic regulation. Also, the pin seine activity is limited to the high (spring) tides which leads to operations of about 26 weeks per year.
- Regulation of mesh size, length of seine and number of seines could be looked at.

- Chinese Seine
- The Chinese seine is the only known means in Guyana of harvesting the whitebelly shrimp. Thus, in addition to the likely socio-economic aspects there would appear to be some need for the use of the gear.
- Regulation could therefore look at first limiting the number of licences to those operators already in the fishery. Limits on the number of seines per vessel could also be considered.
- Later, by means of investigations the areas of high shrimp concentrations can be identified and mapped and the seasons determined. Operations could then be restricted to these locations and seasons of abundance.

- Cadell Line
- Cadell line fishing should be encouraged but hook size regulations could be looked into as a means of ensuring only larger sizes of the species caught are targeted.

- Nylon Near Shore Gillnet
- More in-depth study of this situation would be required. If found to be necessary, then regulations on mesh size and length of seine could be put in place. Also, the number of licences issued can be restricted.

- Polyethylene Gillnet/Driftnet
- This gear, because of likely good economic returns, has been identified as the one to be encouraged. However, regulations on mesh size should be addressed as a means of conserving the resource. Later, limitations on effort could be addressed.

5. Deep Slope Snapper and Grouper Fishery

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities
- To optimize the value of the limited fisheries resources through cost-effective harvesting, value added processing and diversification of markets
- To maintain or restore populations of marine species at levels that can produce the optimum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species

Objectives

- To maintain the stock at all times above 50 percent of its mean unexploited level
- To maintain and improve the net income per fisher at a level above the national minimum desired income
- To include as many of the existing participants in the fishery as is possible given the biological, ecological and economic objectives listed above

Management Strategy

- Cap the number of vessels operating in the Fishery at the current level as an interim measure until further data/information for decision-making is available
- Review and refine the target and limit reference points for the fishery
- Closed seasons/areas may be considered later in the Fishery given the acquisition of spawning data

6. Large Pelagic Fishery

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities
- To optimize the value of the limited fisheries resources through cost-effective harvesting, value added processing and diversification of markets
- To maintain or restore populations of marine species at levels that can produce the optimum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species

Objectives

- To develop the capacity for optimising catches of large pelagics migrating through the EEZ, bearing in mind the management regime set by ICCAT
- To maintain and improve the net income per operator at a level above the national minimum desired income
- To include as many participants in the fishery as is possible given the biological, ecological and economic objectives listed above

Management Strategy

- The strategy would include strengthening the linkages with international regulatory bodies, such as ICCAT, in order to access information to properly manage the fishery
- Take a cautious exploratory approach to the development of the fishery for large pelagics. This approach would be aimed at determining stock size, distribution and seasonality, fleet size and appropriate gear
- For sharks, a similar approach would be taken as they are likely to be over-exploited by a lower level of effort than the overall inshore assemblage. Targeting may therefore overexploit shark, but separating shark and other inshore fishing may not be possible as the gear being used are gillnet and cadell lines, common to some other species
- In keeping with the IPOA on the conservation and management of sharks, develop an NPOA for the conservation and management of sharks

7. Coastal Pelagic Fishery

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities
- To optimize the amount of fish protein available for domestic consumption and export consistent with sound resource management practices
- To maintain or restore populations of marine species at levels that can produce the optimum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species

Objectives

- To develop the capacity for optimising catches of coastal pelagics migrating through the EEZ
- To maintain and improve the net income per operator at a level above the national minimum desired income
- To include as many participants in the fishery as is possible given the biological, ecological and economic objectives listed above

Management Strategy

- Establish target and limit reference points for the fishery
- Determine the most appropriate fishing gear and set the effort limit

8. Small Pelagic Fishery

Goals

- To optimize the development of the fishery sector through effective management in order to create employment and stable sources of income for the fishers and the communities involved in fisheries and related activities
- To optimize the amount of fish protein available for domestic consumption and export consistent with sound resource management practices
- To maintain or restore populations of marine species at levels that can produce the optimum sustainable yield as qualified by relevant environmental and economic factors, taking into consideration relationships among species

Objectives

- To develop a fishery aimed at optimal utilisation of the underutilized small pelagic resources

Management Strategy

- The lack of data on the fishery would preclude the development of management measures at this stage. However, as data and information become available, an appropriate management strategy would be developed
- Investigate the best means of optimally utilizing the small pelagic resources, including the feasibility of operating a cannery and/or fish meal plant

Annex 2 - Table 2 - List of Species involved in the fisheries as target, bycatch and discarded resources

Family	Species	Common name	Fishery								
			Shrimp				Fish				
			Industrial		Artisanal		Semi-Industrial	Artisanal			
			Large Penaeid	Seabob	Seabob	Inshore	Deep Slope	Inshore	Large Pelagic	Coastal Pelagic	Small pelagic
Ariidae	*Amphiarius phrygiatus*	Kukwari	discard								
Ariidae	*Arius parkeri*	Gillbacker						target/bycatch			
Ariidae	*Notarius (Arius) grandicas*	Tampoco						target			
Ariidae		Other catfishes						target/bycatch			
Ariidae	*Sciades herzbergii*	Mud Cuirass						bycatch			
Carangidae		Jacks and Scads								target	target
Carangidae	*Caranx hippos*	Couvalli						bycatch		target	target
Carcharhinidae	*Carcharhinus sp*	Ground Sharks	bycatch					target			
Carcharhinidae		Ground Sharks	bycatch						target		
Centropomidae	*Centropomus undecimalis*	Snook						target			
Centropomidae	centropomus parallelus	Chinese snook						bycatch			
Clupeidae		Sardines									target
Engraulidae		Anchovies									target
Haemulidae		Grunts	bycatch				bycatch				
Haemulidae	*Genyatremus luteus*	Annafoke						bycatch			
Lobotidae	*Lobotes surinamensis*	Pagee						target/bycatch			
Lutjanidae	*Lutjanus purpureus*	Red Snapper	bycatch				target				
Lutjanidae	*Lutjanus vivanus*	Red Snapper	bycatch				target				
Megalopidae	*Tarpon atlanticus*	Tarpon/Cuffum						target/bycatch			
Mugilidae	*Mugil sp.*	Mullet						target			
Mugilidae	*Mugil sp.*	Suriname mullet			bycatch	bycatch					
Mugilidae	*Mugil cephalus*	Mullet						target			
Mugilidae	*Mugil liza*	Queriman						target			
Pemelodidae	*Hypophthalmus edentatus*	Highwater						target			
Pemelodidae	*Brachyplatystoma filamentosum*	Kumakuma						Bycatch			

Family	Species	Common name	Fishery								
			Shrimp				Fish				
			Industrial		Artisanal		Semi-Industrial	Artisanal			
			Large Penaeid	Seabob	Seabob	Inshore	Deep Slope	Inshore	Large Pelagic	Coastal Pelagic	Small pelagic
Penaeidae	*Farfantepenaeus (P.) notialis*	Pink Shrimp	target								
Penaeidae	*Farfantepenaeus (P.) subtilis*	Brown Shrimp	target								
Penaeidae	*Farfantepenaeus (Penaeus) brasiliensis*	Pink-spotted Shrimp	target								
Penaeidae	*Litopenaeus (P.) schmitti*	White Shrimp	target								
Penaeidae	*Nematopalaemon schmitti*	White bellied prawn			bycatch	target					
Penaeidae	*Xiphopenaeus kroyeri*	Seabob	bycatch	target	target	bycatch					
Rajidae		Sting ray	bycatch								
Sciaenidae	*Cynoscion acoupa*	Grey Snapper						target			
Sciaenidae	*Cynoscion jamaicensis*	Jamaican						target			
Sciaenidae	*Cynoscion virescens*	Sea Trout	bycatch	bycatch				target			
Sciaenidae	*Macrodon ancylodon*	Bangamary	bycatch	bycatch	bycatch	bycatch		target			
Sciaenidae	*Micropogonias furnieri*	Croaker	bycatch	bycatch				target			
Sciaenidae	*Nebris microps*	Butterfish	bycatch	bycatch				target			
Sciaenidae	*Plagioscion auratum*	Silver basha						target/bycatch			
Scombridae	*Scomberomorus maculatus*	Mackerel						target/bycatch			
Scombridae		Tunas and Mackerels							target	target	
Serranidae	*Epinephelus sp.*	Grouper	bycatch				bycatch				
		Squid	bycatch								
		Octopus	bycatch								
		Crabs	bycatch								
		Lobster	bycatch								
		Jellyfish				discard					

Annex 3. Biology and distribution of major species. Information extracted from fishbase.org (for fish) and sealifebase.org (for shrimp)

Species	Biology	Distribution
FISH		
Amphiarius phrygiatus - Kukwari	Max length: 30 cm TL male/unsexed; common length: 20 cm TL male/unsexed. Occurs in brackish estuaries with very low salinities, nearly entering freshwater. Found on shallow muddy bottoms. The female lays her eggs in a gelatinous mass on a sandy depression. Mouth brooding males guard the eggs until hatching. Marketed fresh. (Taylor and Menezes, 1978)	Atlantic: draining rivers and estuaries from Guyana to the mouth of the Amazon River.
Arius parkeri - Gillbacker	Max length: 190 cm TL male/unsexed; common length: 90 cm TL male/unsexed; max. published weight: 50 kg; max. reported age: 4 years. Mainly found in turbid waters over muddy bottoms in coastal areas, estuaries and lower parts of rivers. Sexually mature after around two years of age. Upon hatching, the alevins are relatively large, approximately 6-6.5 cm. Marketed fresh and salted. Fish exported to Canada, USA, England, and Holland (Rayman Bedessee, pers. comm.). Considered Near threatened by IUCN. (Betancur-R, Marceniuk and Béarez, 2008)	Western Atlantic: Coastal rivers from Guyana to northern Brazil.
Notarius (Arius) grandicassis - Tampoco	Max length: 63 cm TL male/unsexed; common length : 40 cm TL male/unsexed. Found on muddy bottoms of shallow brackish waters; also in marine waters. Reproduction seems to occur between May and June. The female lays down 20-30 eggs having a diameter of 10-12 mm, agglutinated in mucus. The male guards the eggs for 10-12 days until hatching. Marketed fresh (Taylor and Menezes, 1978).	South America: Rivers and estuaries from Gulf of Venezuela to mouth of the Amazon River.
Carangidae - Jacks and Scads	Chiefly marine; rarely brackish. Atlantic, Indian and Pacific Oceans. Body generally compressed, although body shape extremely variable from very deep to fusiform. Most species with only small cycloid scales. Scales along lateral line often modified into spiny scutes. Detached finlets, as many as nine, sometimes found behind dorsal and anal fins. Large juveniles and adults with 2 dorsal fins. Anterior dorsal fin with 3-9 spines; the second having 1 spine and usually 18-37 soft rays. Anal spines usually 3, the first 2 separate from the rest; soft rays usually 15-31. Widely forked caudal fin. Caudal peduncle slender. Pelvic fins lacking in *Parona signata*. Vertebrae 24-27 (modally 24). Fast swimming predators of the waters above the reef and in the open sea. Some root in sand for invertebrates and fishes. One of the most important families of tropical marine fishes; fished commercially and for recreation (Nelson, 1984)	
Caranx hippos - Couvalli	Max length: 124 cm TL male/unsexed; common length: 75 cm TL male/unsexed; max published weight: 32 kg. Generally in neritic waters over the continental shelf. Adults ascend rivers. Juveniles abundant in brackish estuaries with muddy bottoms, near sandy beaches and on seagrass beds. Form fast-moving schools, although larger fish may be solitary. Feed on smaller fish, shrimp, and other invertebrates. Often grunts or croaks when caught. Eggs are pelagic (Smith-Vaniz, Quéro and Desoutter, 1990).	Eastern Atlantic: Portugal to Angola, including western Mediterranean. Western Atlantic: Nova Scotia, Canada and northern Gulf of Mexico to Uruguay, including Greater Antilles. Absent from eastern Lesser Antilles. Indian Ocean records are probably misidentifications of *Caranx ignobilis*. Reports from Pacific refer to *Caranx caninus*, which may be conspecific.

Species	Biology	Distribution
Carcharhinidae - Ground Sharks	Distribution: global. Gill openings 5, the fifth behind origin of pectoral fin. Small to large sharks with round eyes, internal nictitating eyelids, no nasoral grooves or barbels, usually no spiracles. Teeth usually bladelike with one cusp. Development usually viviparous with young born fully developed. Includes several dangerous species, but most prefer to avoid divers (Compagno, 1984)	
Centropomus undecimalis - Snook	Max length: 140 cm TL male/unsexed; common length: 50 cm TL male/unsexed; max. published weight: 24.3 kg; max. reported age: 7 years. Inhabits coastal waters, estuaries and lagoons, penetrating into freshwater; usually at depths less than 20 m. Feeds on fishes (Gobiidae, Gerreidae, Engraulidae) and crustaceans (shrimps and crabs). Congregates at mouths of passes and rivers during the spawning season, May through September. Seasonal movements into freshwater occur but poorly understood. Marketed fresh. Valued game fish and an excellent food fish. The world record for hook and line is a 53 lb, 10 ounce fish caught at Parismina Ranch, Costa Rica (Robins and Ray, 1986)	Western Atlantic: southern Florida (USA), southeastern coast of the Gulf of Mexico, most of the Antilles and Caribbean coast of Central and South America extending southward to Rio de Janeiro, Brazil; also North Carolina and Texas, USA.
Centropomus parallelus – Chinese snook	Max length: 72 cm TL male/unsexed; common length: 25 cm TL male/unsexed; max. published weight: 5 000 g. Inhabits coastal waters, estuaries and lagoons, penetrating into freshwater; usually prefers very low brackish water or freshwater. Occasionally in hypersaline lagoons. Found over shallow soft bottoms. Feeds on fish and crustaceans. Its flesh is well appreciated (Fraser, 1978)	Western Atlantic: southern Florida (USA) and the Mexican Gulf coast to Florianopolis, Brazil.
Clupeidae - Sardines	Distribution: global (mostly tropical) from 70°N to about 60°S. Chiefly marine coastal and schooling fishes; some freshwater and anadromous. Body usually fusiform, round to strongly compressed. Head without scales; jaw teeth, when present, are small or minute. A single dorsal fin, small and near midpoint of body; pelvic fins more or less below dorsal fin base; dorsal and pelvic fins absent in some species; soft rays only. Lateral line spanning a few scales behind the head in some species, missing in others; scales cycloid (smooth to touch). Branchiostegal rays usually 5-10. Most feed on small planktonic animals. Size range (adults): from 2 to 75 cm. One of the most important family of commercial fishes, processed for food, oil, or fish meal (Whitehead, 1985)	
Engraulidae - Anchovies	Distribution: Atlantic, Indian and PacificOceans. Schooling fishes, mostly of shallow coastal waters and estuaries in tropical and temperate regions. Some species enter or live in freshwater. Mouth inferior. Upper jaw produced. Jaw teeth well developed to absent. Gill rakers on lower limb of first arch 10-50 or more. Branchiostegal rays 7-19. A silvery stripe down flanks. Body translucent. Abdominal scutes present in most Old World anchovies; absent in New World anchovies, except for one pelvic scute. Luminescent organs noted in one species. Mostly filter feeding on zooplankton; a few piscivorous. About 50 cm maximum length; most species below 15 cm. Commercially important for food and fish meal; also used as bait. The name 'Engraulididae' has been proposed for this family (Whitehead, Nelson, and Wongratana, 1988)	

Species	Biology	Distribution
Lobotes surinamensis - Pagee	Max length: 110 cm TL male/unsexed; common length: 80 cm TL male/unsexed; max. published weight: 19.2 kg. Adult inhabits bays, muddy estuaries and lower reaches of large rivers. A sluggish offshore fish that often floats on its side near the surface in the company of floating objects. Occasionally drifts over reefs. Juvenile may occur in floating *Sargassum* and mimic a floating leaf. Feeds on benthic crustaceans and small fish. Marketed fresh, frozen, or salted (Tortonese, 1990).	Tropical and subtropical waters of all oceans. Western Atlantic: Canada to Massachusetts, USA/ Bermuda to Argentina. Eastern Atlantic: Mediterranean Sea; Madeira to Gulf of Guinea; South Africa. Western Pacific: Japan, Fiji, Tuvalu.
Lutjanus purpureus - Red Snapper	Max length: 100 cm TL male/unsexed; common length: 65 cm TL male/unsexed; max. published weight: 10 000 g; max. reported age: 18 years. Inhabits rocky areas. Feeds mainly on fishes, shrimps, crabs, cephalopods and planktonic items (Allen, 1985).	Western Atlantic: throughout most of the Caribbean Sea from Cuba southward to northeastern Brazil. Frequently confused with *Lutjanus campechanus*. Also referred as *Lutjanus aya* by past authors, but Rivas proved that *Bodianus aya* Bloch 1790 is not a lutjanid, but probably a sciaenid.
Lutjanus vivanus - Red Snapper	Max length: 83 cm TL male/unsexed; common length: 45 cm TL male/unsexed; max. published weight: 8 320 g. This species is common near the edge of the continental and island shelves; also found in deeper waters (below 200 m); usually ascending to shallow water at night. Feeds mainly on fishes, shrimps, crabs, gastropods, cephalopods, tunicates and some pelagic items including urochordates. Marketed fresh. Said to be a good food fish (Allen, 1985)	Western Atlantic: North Carolina, USA and Bermuda to São Paulo, Brazil. Most abundant around the Antilles and the Bahamas.
Tarpon atlanticus - Tarpon/Cuffum	Max length: 250 cm TL male/unsexed; common length: 130 cm TL male/unsexed; max. published weight: 161 kg; max. reported age: 55 years. Inhabit coastal waters, bays, estuaries, mangrove-lined lagoons, and rivers. Often found in river mouths and bays, entering fresh water. Large schools may frequent particular spots for years. Feed on fishes like sardines, anchovies, Mugilidae, *Centropomus*, Cichlidae (mainly those forming schools) and crabs . The swim bladder, attached to the esophagus, can be filled directly with air and permits the fish to live in oxygen-poor waters. Has high fecundity, a 203 cm female is estimated to produce over 12 million eggs. Spawn in waters which can be temporarily isolated from the open sea. Transparent leptocephalus larvae migrate into estuaries. Famous for its spectacular leaps when hooked. Marketed fresh or salted. Large scales are used in ornamental work and in preparation of artificial pearls. Used to be cultured commercially in Colombia. Highly appreciated by sport fishers. The flesh is also highly appreciated despite its being bony. The world record for hook and line is 283 lbs. from Lake Maricaibo, Venezuela (Hureau, 1984).	Eastern Atlantic: Senegal to Angola, with exceptional occurrences in Portugal, Azores and Atlantic coast of southern France. Western Atlantic: North Carolina, USA to Bahia, Brazil, with occasional occurrences off the American coast northward to Nova Scotia, Canada and southward to Cananéia, Brazil and Argentina. Throughout Gulf of Mexico and Caribbean. Eastern Central Pacific: Cobia Island in Panama via the Panama Canal.

Species	Biology	Distribution
Mugil cephalus - Mullet	Max length: 100 cm SL male/unsexed; common length: 50 cm SL male/unsexed; max. reported age: 16 years. Coastal species that often enter estuaries and rivers. Usually in schools over sand or mud bottom, between 0 and 10 m, occurring equally in tropical, subtropical and temperate waters (Project MUGIL). Mainly diurnal, feed on zooplankton as larvae, detritus, micro-algae and benthic organisms as juvenile and adult fish. Reproduction takes place in the sea, at various times of the year depending on the location. Does not have an obligatory freshwater phase in its life cycle. Females spawn 0.8 to 2.6 million eggs. Sexually mature at 3 to 4 years. Maximum length reported as 120 cm SL remains to be confirmed (Project MUGIL). Maximum weight reported as 12 kg seems to high for the area and remains to be confirmed (Project MUGIL). Widely cultivated in freshwater and brackish ponds. Marketed fresh, dried, salted, and frozen; roe sold fresh or smoked; also used in Chinese medicine (Harrison, 1995).	Cosmopolitan in coastal waters of the tropical, subtropical and temperate zones of all seas. Eastern Pacific: California, USA to Chile. Western Pacific: Japan to Australia. Western Indian Ocean: from India to South Africa. Western Atlantic: Nova Scotia, Canada to Brazil; Cape Cod to southern Gulf of Mexico; absent in Bahamas and most of West Indies and Caribbean. Eastern Atlantic: Bay of Biscay to South Africa, including the Mediterranean Sea and Black Sea. Reported in Sea of Okhotsk.
Mugil liza - Queriman	Max length: 80 cm TL male/unsexed; common length: 40 cm TL male/unsexed; max. published weight: 9 000 g. Inhabit coastal marine waters and brackish estuaries; also found in hyper-saline lagoons and may enter freshwater. Never far from the sea. Form sizeable schools. Appear to undergo trophic migrations along the coasts. Feed on organic detritus and filamentous algae. Oviparous, eggs are pelagic and non-adhesive. Spawn several million eggs at sea. Also caught with beach nets. Marketed fresh and salted. The roe is marketed salt-pickled and dried and considered a delicacy (Robins and Ray, 1986).	Western Atlantic: Bermuda, Florida (USA), Bahamas, and throughout the Caribbean Sea to Argentina.
Hypophthalmus edentatus - Highwater	Max length: 57.5 cm TL male/unsexed; common length: 45 cm TL male/unsexed; max. published weight: 1 300 g. Pelagic species which lives in schools near the surface of the water. Found over soft muddy bottoms. Has no teeth in its jaws but possesses many long gill rakers that are used as a sieve for feeding on planktonic crustaceans like cladocerans, copepods and ostracods. Also feeds on debris, other plankton. Appears to follow the plankton's vertical movements during the day. Ovaries start to develop in November when the water level rises. Fractional spawning occurs between February and April. The female lays down 50 000 to 100 000 eggs according to its weight. Juveniles inhabit the lower part of streams in estuaries, adult are found more upstream. Marketed fresh and salted (Cervigón *et al*, 1992).	South America: Amazon and Orinoco River basins and Atlantic coastal rivers of Guyana and Suriname. Reported from Paraná River.
Cynoscion acoupa - Grey Snapper	Max length: 110 cm TL male/unsexed; common length: 45 cm TL male/unsexed; max.published weight: 17.0 kg. Forms schools. Found over mud or sandy mud bottoms near mouths of rivers. Juveniles are restricted to brackish and fresh waters. Feeds on shrimps and fishes. Important food fish (Chao, 1978).	Western Atlantic: Panama to Argentina.
Cynoscion jamaicensis - Jamaican weakfish	Max length: 50 cm TL male/unsexed; common length: 35 cm TL male/unsexed; max. published weight: 1 000 g. Found over sand or mud bottoms from the coastline to about 60 m depth; rarely in waters with a depth of less than 18 m. Juveniles inhabit river estuaries. Oviparous, with high fecundity. Feed on fishes and crustaceans like crabs and shrimps. Important food fish (Cervigón, 1993).	Western Atlantic: Panama and Greater Antilles to Argentina. Including Lesser Antilles. Also reported in Nicaragua.

Species	Biology	Distribution
Cynoscion virescens - Sea Trout	Max length: 115 cm TL male/unsexed; common length: 65 cm TL male/unsexed; max. published weight: 3 500 g. Usually found over sandy mud bottoms in coastal waters near river mouths. Adults stay in deep waters during the day and swim to the surface at night. Juveniles inhabit estuaries. Marketed fresh; its flesh is of excellent quality. Its swim bladder is being used to make glue (Cervigón, 1993)	Western Atlantic: Nicaragua to Santos, Brazil.
Macrodon ancylodon - Bangamary	Max length: 45 cm TL male/unsexed; common length : 35 cm TL male/unsexed. Found over mud or sandy mud bottoms in coastal waters to about 60 m depth. Juveniles abundant in estuaries and tidal mud flats. Feeds on shrimps and fishes. Important food fish (Chao, 1978)	Western Atlantic: Venezuela to northern Argentina.
Micropogonias furnieri - Croaker	Max length: 60 cm SL male/unsexed; common length: 45 cm SL male/unsexed; max. reported age: 7 years. Found over muddy and sandy bottoms in coastal waters and in estuaries where the nursery and feeding grounds are located. Adults form schools. Feeding habits vary with ontogenic development and season; juveniles feed on benthic migratory crustaceans and sessile boring mollusks while adults are benthos-feeders and occasionally capture fish. Undergoes seasonal migration. An important food fish which is usually marketed fresh and salted (Isaac, 1988)	Western Atlantic: Greater Antilles and from Costa Rica to Argentina. Also reported in Nicaragua.
Nebris microps - Butterfish	Max length: 40 cm TL male/unsexed; common length: 35 cm TL male/unsexed; max. published weight: 570 g. Inhabits sandy muddy bottoms in coastal waters and in estuaries. Juveniles restricted to brackish waters. Feeds mainly on shrimps. Marketed mostly fresh and salted, an important food fish. One of the most highly priced species in Trinidad (Chao, 1978).	Western Atlantic: Colombia to southeast Brazil.
Plagioscion auratus. - Silver basha	Max length: 34.6 cm SL male/unsexed. Occurs mainly in estuaries although it is rather rare. Occupies the same biotope as *Plagioscion squamosissimus*, but its frequency of capture is notably less. Juveniles feed on insect larvae and crustaceans like copepods and decapods while adults feed essentially on fish. Easily caught during breeding season. An important foodfish (Casatti, 2003).	South America: Amazon, Orinoco, Paraná, Paraguay, and São Francisco River basins and rivers of the Guianas.
Scomberomorus maculatus - Mackerel	Max length: 91 cm FL male/unsexed; max. published weight: 5 890 g; max. reported age: 5 years. Migrates in large schools over great distances along the shore. Larvae are found in surface waters between 19.6° and 29.8°C with salinities of 28.3 to 37.4 ppt. Feeds mainly on small fishes (clupeoids and anchovies), few quantities of penaeoid shrimps and cephalopods. Casting, live-bait fishing, jigging, and drift fishing are also employed in capturing this species. Aerial spotting is sometimes used in locating the fish. Marketed fresh, frozen or smoked; eaten pan-fried, broiled and baked. (Collette and Nauen, 1983)	Western Atlantic: Canada to Cape Cod to Miami, USA, and Gulf of Mexico coasts from Florida, USA to Yucatan, Mexico. Three species: *Scomberomorus tritor* in Eeastern Atlantic, *Scomberomorus sierra* in Eastern Pacific, and *Scomberomorus brasiliensis* in the Caribbean and Atlantic coast of South America have often been confused with this species. Absent in Bahamas.

Species	Biology	Distribution
Epinephelus sp. Grouper	(for E. itajara) Max length: 250 cm TL male/unsexed; common length : 150 cm TL male/unsexed; max. published weight: 455 kg; max. reported age: 37 years. A solitary species occurring in shallow, inshore areas. Found on rock, coral, or mud bottoms. Juveniles found in mangrove areas and brackish estuaries. Large adults may be found in estuaries. Adults appear to occupy limited home ranges with little inter-reef movement. Feeds primarily on crustaceans, particularly spiny lobsters as well as turtles and fishes, including stingrays. Territorial near its refuge cave or wreck where it may show a threat display with open mouth and quivering body. Larger individuals have been known to stalk and attempt to eat divers. Over-fished, primarily by spear fishing. Marketed fresh and salted. Meat is of excellent quality. Important game fish. Reported to reach weights of more than 315 kg. Classed by IUCN as Critically Endangered. (Heemstra and Randall, 1993)	Western Atlantic: Florida, USA to southern Brazil, including the Gulf of Mexico and the Caribbean. Eastern Atlantic: Senegal to Congo (reported as *Epinephelus esonue*); rare in Canary Islands. Eastern Pacific (Gulf of California to Peru) species refers to *Epinephelus quinquefasciatus*. Discrete populations of *E. itajara* exist in the western Atlantic.
SHRIMP		
Farfantepenaeus (P.) notialis - Pink Shrimp	Max length: 17.5 cm TL male/unsexed; 19.2 cm TL (female). Max. carapace length: 4.1 cm (male); 4.8 cm (female). Occurs at depths from 3 to 700 m, common at depths from 10 to 75 m, inhabits bottom mud or sandy mud, and sandy patches among rocks in marine environment. Juveniles found in estuarine environment. Also inhabits lagoons (Holthuis, 1980)	Atlantic Ocean: from Mexico to Brazil and Mauritania to Angola.
Farfantepenaeus (Penaeus) subtilis - Brown Shrimp	Max length: 15.2 cm TL male/unsexed; 20.5 cm TL (female). Max. carapace length: 3.6 cm (male); 5.5 cm (female). Inhabits bottom mud and mud with sand or shells. Adults live in marine environments. Juveniles usually estuarine and marine, sometimes hypersaline (Holthuis, 1980)	Western Atlantic: from the Greater Antilles and Honduras to Brazil.
Farfantepenaeus (Penaeus) brasiliensis - Pink-spotted Shrimp	Max length: 19.1 cm TL male/unsexed; 15 cm TL (female). Max. standard length: 17 cm. Inhabits bottom mud or sand marine (adults) and estuarine (juveniles) environments (Holthuis, 1980)	Western Atlantic: USA to West Indies and Brazil
Litopenaeus (Penaeus) schmitt - White Shrimp	Max length: 17.5 cm TL male/unsexed; 23.5 cm TL (female). Inhabits bottom soft mud or silt and sometimes with sand. Juveniles are found in estuarine environment. Adults are found in marine environment (Holthuis, 1980).	Western Atlantic: Greater Antilles, from Cuba to Virgin Islands, and from British Honduras to southern Brazil.
Nematopalaemon schmitti - White bellied shrimp	A seasonal resource; most abundant in February–June and least abundant in December. Known to spawn between the mouths of the Essequibo and the Demarara river.	
Xiphopenaeus kroyeri – Seabob	Max length: 11.5 cm TL male/unsexed; 17 cm TL (female). Demersal; freshwater; brackish; depth range 1-70 m, usually ?-27 m. Abundant in river estuaries (Holthuis, 1980).	Western Atlantic: from USA to Brazil.

Annex 4. Compliance related issues raised by fishermen at consultations

- Foreign boats fish red snapper illegally
- Foreign license owners may not land all their catch (red snapper)
- Foreign vessels harvesting sharks for export only take fins, whereas local vessels land the whole fish. Nonetheless, major import and port countries have banded shark fins on the basis of the action of foreign vessels. This has made market inaccessible and reduced the price of the product
- Piracy frequently occurs and fishermen note the following:
    - Likely done by fellow fishermen
    - Total loss usually occurs
    - No compensation
    - Low security at sea
    - No proper enforcement
    - Justice not being served
- Enforcement of reporting requirements of companies needs to be improved
- Report forms need to be standardized across the industry
- There is need for feedback on analysis of data given to Department of Fisheries
- Red Snapper traps are stolen by other fishers
- Nets and lines damaged by thug boats, cargo ships, illegal fuel boats and trawlers
- Damage by vessels (Tugs) and trawlers occurs in waters as low as 12—18 ft (Charity)
- Damaged gear is usually flagged
- There is no legal recourse for damaged gear
- There is no compensation for damaged gear
- Nylon gillnets are stolen (Parika)
- Drifts seines entangle with cadell gear (Windsdor Forest, Charity)
- Nets and lines damaged by shrimp trawlers (Charity)
- Drift seines entangle with anchor seines (Charity)
- At Charity drift seines fish between 3-36 ft, cadell lines and anchor seines at approximately 30 ft and fine seines at approximately 24 ft
- At Charity gillbaker is the target for cadell lines, drift seines and anchor seines
- All fishers on Essequibo coast compete for same grounds
- Foreign company may be over- investing and providing unfair competition for access to resource
- Illegal fishing observed by fishermen on the high seas mainly targeting mackerel, sharks and tuna There is no enforcement
- Because of increased price for some fish species, seabob trawlers deliberately take larger quantity of fish bycatch by coming closer to shore (24 to 30 ft of water)
- Industrial large penaeid shrimp trawlers take some white belly as discards
- Drift seines from Parika entangle with cadell lines from West Bank Demerara
- Drift seine fishers from Parika compete with cadell line fishers from West Bank Demerara for fishing grounds and resource
- Anchor seines sharing grounds of Chinese seines block entrance to the Chinese seine pens (Goed Fortuin)
- Catch is sometimes stolen from gear (Goed Fortuin)
- Because Chinese seines are stationary they need exclusive rights to licensed grounds

Less than 20 percent of all fishers are licensed (Rosignol)

This document presents the results of the national consultation tha twas organized in Guyana in the framework of the Case Study on the Shared Stocks of the Shrimp and Groundfish Fishery of the Guianas-Brazil Shelf of the Caribbean Large Marine Ecosystem Project (CLME). It is the seventh of ten reports that were produced as a result of the case study activities. These documents summarize the outputs of the different steps undertaken to mainstream the Ecosystem Approach to Fisheries (EAF) in the management of the shrimp and ground fish resources of the Northern Brazil Shelf Ecosystem.