

1 INTRODUCTION

The 1999 workshop formed part of a series of workshops, which began with the Third FAOWECAFC Workshop on the biological and economic modelling of the shrimp resources of the Brazil – Guianas Shelf, held in Paramaribo, Suriname, 22 – 25 June 1992, which was attended by representatives from Brazil, French Guiana, Guyana, Suriname, Trinidad and Tobago, Venezuela and FAO. The conclusions and recommendations from that meeting included the following:

- The need for improvement in data collection systems in most countries including initiating the collection of biological, social and economic data required for bio-economic modelling;
- The shrimp industry in collaboration with governments should take a pro-active approach with regards to management and conservation of secondary stocks (finfish bycatch, turtles, marine mammals, etc.), including studies relating to bycatch reduction, rather than reacting to outside impositions, which may have disruptive effects on the industry;
- Sufficient time should be allocated for bio-economic analyses of one or two shrimp fisheries of the region during the next Workshop and countries should evaluate the impacts of various management strategies applied in the region;
- A harmonised approach to management of the shrimp fisheries in the region should start by acknowledging the common objectives, such as protection of nurseries, regulating effort, etc.;
- That it would be desirable to establish a Scientific Advisory Committee for the Management of the Shrimp Fisheries in the Brazil – Guianas region (SAC);
- That a collaborative working relationship should be established with the Shrimp and Groundfish Assessment Unit of CFRAMP, which will be based in Trinidad and Tobago.

These recommendations were followed up at the subsequent Joint Meeting of the CFRAMP Shrimp and Groundfish Subproject Specification Workshop and Fourth WECAFC *Ad hoc* Shrimp and Groundfish Working Group of the Guianas – Brazil Shelf, held in Trinidad and Tobago, 8 – 12 January 1996, which was attended by representatives from Belize, Cuba, French Guiana, Guyana, Jamaica, Suriname, Trinidad and Tobago, Venezuela, CFRAMP and FAO. This meeting re-examined the earlier recommendations and explored approaches to implementing the revised recommendations. Participants considered the following actions to have the highest priority:

- Rigorous analysis of the available fisheries data in the countries and region to assess the status of the shrimp and groundfish stocks, which would lead to:
 - Identifying the optimal data requirements for the countries of the region;
 - Facilitating the development of national and regional management scenarios to inform decision makers as to the options available to them and the importance of rigorous resource management;
 - Training personnel from the region in the field, in data collection and analysis;
 - Facilitating greater cooperation between the countries of the region in the experimental development, design and testing of shrimp gear to minimise undesirable bycatch.

Acting directly on the recommendations of the 1996 Joint Meeting, the First CFRAMP/FAO/DANIDA Stock Assessment Workshop on the Shrimp and Groundfish Fisheries on the Brazil-Guianas Shelf, was held in Trinidad and Tobago, 7 – 18 April 1997.

Representatives from the Brazil-Guianas coastal states: Brazil, French Guiana, Guyana, Suriname, Trinidad and Tobago Venezuela, as well as from Cuba, Jamaica, CFRAMP and FAO, participated in the Workshop. The objectives of this Workshop were as follows:

- To undertake full assessments of the status of the stock or stocks, the current levels of exploitation and the potential yields of the Brazil-Guianas shrimp and groundfish resources.
- To examine the biological, economic and social implications of different harvesting and management strategies for the resources, to provide decision makers with information on which to identify an appropriate management strategy for each stock.

One of the more important results of the Workshop was the rigorous evaluation of the input data within the context of stock assessments, which demonstrated to the participants the exact types of data needed for such assessments. Also, detailed procedures appropriate to the data available were developed and used to analyse the data from both shrimp and groundfish fisheries in order to assess the status of the stocks and the impact of fishing on them. These procedures were based on surplus production modelling for shrimp, (the method also has potential for the regional groundfish stocks), length-based catch curve analysis (shrimp) and length-based growth, catch curve and yield-per-recruit analyses (groundfish).

Taking into consideration the difficulties in data availability and accessibility, substantial progress was made at the Workshop in assessing the most important shrimp and groundfish resources of the Brazil-Guianas Shelf. It was recognised that an on-going process of data collection and analysis, with further capacity building, was still required. As a part of this process, a follow-up Workshop in 1998 was seen as essential. Therefore the Second CFRAMP/FAO/DANIDA Stock Assessment Workshop on the Shrimp and Groundfish Fishery on the Brazil - Guianas Shelf, was held in Georgetown, Guyana, 18 – 29 May 1998. The objectives of this Workshop were as follows.

- To use new data that had become available since the 1997 Trinidad and Tobago Workshop to update the assessments of the shrimp and groundfish stocks selected for assessment in 1997, so as to evaluate the current status of the resources and identify any major changes that may have occurred over the last 12 months;
- To begin integrating the national assessments of shrimp and groundfish into sub-regional assessments of shared stocks;
- Where feasible, to improve upon, or extend, the assessments undertaken in 1997 by further analysis and/or application of alternative assessment methods;
- To provide managers with the biological information to enable them to make informal management decisions on the shrimp and groundfish fisheries, including:
 - consideration of multi-fishery impacts on groundfish stocks, including impacts of bycatch in the shrimp fisheries, to begin evaluation of overall management strategies.
 - using the results of the assessments to investigate alternative options for managing the shrimp and groundfish stocks and the probable average annual yields of both shrimp and groundfish under these alternative options.

Based on the assessments undertaken at that Workshop, there was no evidence of biological overfishing of most shrimp stocks that were examined. Exceptions were the estimated high fishing mortality on *P. brasiliensis* in Guyana and a declining trend in CPUE of *P. subtilis* in the Trinidad and Tobago fishery. However, there is evidence that the latter case could have been caused by environmental factors rather than overfishing. In contrast to the shrimp stocks, there were indications that most of the groundfish stocks examined were experiencing fishing mortality in excess of desirable target levels and therefore that the long-term productivity of these stocks was under threat.

Other recommendations and conclusions were as follows:

- The Working Group should continue with the assessments of *P. subtilis* and *P. brasiliensis* and start assessments for *P. notialis*;
- The Working Group should begin to compare and to interpret the national assessments for *P. subtilis* and *P. brasiliensis* in a regional context;
- The Working Group should further examine the linkages between parent stock, recruitment and the environment in shrimp and the implication of these linkages for assessment and management;
- Each country should ensure that adequate, accurate data on catch, effort and the size and sex composition of catches (including discards) are being collected for all the important fisheries and for each of the priority finfish stocks identified at the Workshop;
- The importance of estimating bycatch and simultaneously, considering means of reducing bycatch was emphasised;
- For the planned 1999 Workshop, the countries should undertake growth, catch curve and yield and biomass per recruit analyses to estimate the current states of exploitation of each stock and the desirable biological reference points.

The four Fisheries Directors from Guyana, Suriname, Trinidad and Tobago and Venezuela, who were present for the last two days of the Workshop, issued a statement expressing their satisfaction with the activities of the *Ad hoc* Shrimp and Groundfish Working Group and requested CFRAMP and FAO to continue with their collaborative effort in this regard

During 1998, it was agreed by FAO that the on-going activities of the *Ad hoc* Shrimp and Groundfish Working Group would form a part of the FISHCODE project funded by the Government of Norway and intended to facilitate implementation of the Code of Conduct for Responsible Fisheries (Project GCP/INT/648/NOR). With this funding and on-going cooperation with CFRAMP, it was possible to schedule two more stock assessment Workshops in 1999 and 2000. Therefore, FAO and CFRAMP, in collaboration with IBAMA, organised the third Workshop on the assessment of shrimp and groundfish fisheries on the Brazil-Guianas shelf in Belém, Brazil, from 24 May to 10 June 1999.

With good progress having been made on the biological assessments, it was determined that the group would begin studying bio-economic assessments and assist the national decision makers in working towards optimal management of their resources. Hence biological and bio-economic evaluation of management strategies, including multispecies and multi-fleet strategies and the reporting of these results to senior fisheries officials was the primary goal of the workshop.

A list of participants in the Workshop is given at the end of this report.