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Review of current fisheries management performance and conservation measures in the WECAFC area

Cover photographs:
Susan Singh-Renton.

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Preparation of this document

This document was prepared as part of the ongoing activities of the Food and Agriculture Organization of the United Nations (FAO) Fisheries and Aquaculture Department in the monitoring and analysis of emerging issues with implications for fisheries and aquaculture at the global, regional and national levels.

This document provides an inventory of, and describes the trends in, legal and administrative frameworks, management regimes and the status of marine capture fisheries for 16 countries and overseas territories in the Western Central Atlantic (Area 31) and northern part of the Southwest Atlantic (Area 41) based on the results of a questionnaire. Its purpose is to serve as an easy-to-read and informative reference for policy decision-makers, fishery managers and stakeholders. Similar reviews have been completed for the Indian Ocean and Pacific Ocean areas. Hence, this review fills an important gap in the global review of fisheries management that FAO is conducting.

The preparation of this document was initiated by Mr Raymon van Anrooy, Secretary of the Western Central Atlantic Fishery Commission (WECAFC), and was accomplished with the support of Ms Cassandra De Young, Fishery Policy Analyst of FAO, and that of the executive secretariat of the Commission.

The main authors, Susan Singh-Renton, Deputy Executive Director and Ian McIvor, Research Assistant (pelagic fisheries) of the Caribbean Regional Fisheries Mechanism (CRFM) Secretariat, received considerable support from their colleagues and the contributors from the participating countries. The country review studies, which add essential information to this regional review, can be found in Appendix II of this document. They are reproduced as submitted. This document was edited by Richard Arthur, and José Luis Castilla Civit assisted in formatting it for publication.

Abstract

TThis technical paper provides an inventory of, and describes trends in, legal, administrative and management frameworks in place for managing marine capture fisheries in the Western Central Atlantic Fishery Commission (WECAFC) area. This review includes 16 countries and overseas territories and is part of an ongoing process initiated by FAO to report on the state of world marine capture fisheries management. The review identifies a number of challenges in fisheries management, including: inadequate legislation; ad hoc management processes and plans; uncoordinated monitoring and enforcement; non-management-driven scientific information; insufficient stakeholder identification and participation, conflict resolution and fishing capacity measurements; limited incorporation of issues pertaining to the operation of multispecies fisheries and use of the ecosystem approach; unequal application of management tools and measures across fisheries subsectors; and rising fisheries management costs coupled with stagnant budgets for governments. Actions are listed to address the challenges, and specific recommendations are made to address legislative issues, apply participatory approaches and implement a successful fisheries management process. The fifteenth session of WECAFC (March 2014) endorsed the review outcomes and adopted recommendation WECAFC/15/2014/4 "on strengthening fisheries management planning in the WECAFC area". This technical paper aims to inform fishery policy decision-makers, fishery managers and other stakeholders with interest in fisheries in the Wider Caribbean Region.

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Abbreviations and acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLME	Caribbean Large Marine Ecosystem
COPESCAALC	Commission for Inland Fisheries and Aquaculture of Latin America and the Caribbean (FAO)
CRFM	Caribbean Regional Fisheries Mechanism
EAF	Ecosystem approach to fisheries
FAO	Food and Agriculture Organization of the United Nations
ICCAT	International Commission for the Conservation of Atlantic Tunas
IPOA	international plan of action
MPAs	marine protected areas
NGOs	non-governmental organizations
NOAA	National Oceanic and Atmospheric Administration
OSPESCA	Fisheries and Aquaculture Organization for Meso-America
R&D	research and development
RFB	regional fishery body
RFMOs	regional fisheries management organizations
SAG	Scientific Advisory Group (of WECAFC)
SICA	Central American Integration System
SOWMCFM	State of World Marine Capture Fisheries Management
TAC	total allowable catch
UNCLOS	United Nations Convention on the Law of the Sea
VMS	vessel monitoring system
WECAFC	Western Central Atlantic Fishery Commission (FAO)

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Foreword

Fish is a renewable but finite resource. Global understanding of this concept improved only after the excessive capitalization of the fishing industry following the Second World War, and after the popular target species of some fisheries had suffered sufficient depletion to affect economic returns (e.g. North Sea herring). Such experiences provided valuable lessons to some, but broader appreciation of the concept of sustainable fisheries management and its relation to environmental and ecosystem conservation only unfolded gradually, as did its acceptance and incorporation into international law. The United Nations Convention on the Law of the Sea (UNCLOS) (adopted in 1982) marked an important development in the history of fisheries management, conferring rights and responsibilities to countries for the maritime spaces under their jurisdiction.

As understanding of the impacts of fishing activities on the environment and ecosystems improved, this led to the formulation of a range of international agreements, with the following being among the more important fundamental ones: UNCLOS (1982); the 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 (adopted in 1995); the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (adopted in 1993); the FAO Code of Conduct for Responsible Fisheries (adopted in 1995); and the United Nations Conference on Environment and Sustainable Development Agenda 21 (adopted in 1992). Despite these developments, there continues to be widespread concern about the state of the world's fisheries, based on the scientific evidence, and there have been further recent efforts to strengthen global legislation, e.g. the Agreement on Port State Measures to Prevent, Deter and Eliminate IUU Fishing (adopted in 2009).

In an effort to improve understanding of the present level of fisheries management performance actually being achieved, a detailed questionnaire, the State of World Marine Capture Fisheries Management (SOWMCFM), was developed to facilitate fisheries management performance studies that have since been completed for the Indian and Pacific Oceans. For the present study, the original SOWMCFM questionnaire was updated and expanded for application in the Western Central Atlantic to take into account the characteristics of fisheries there, as well as recent developments in fisheries management expectations. As in the case of the Indian and Pacific Ocean studies, the questionnaire for the present study allowed country respondents to organize their information on the fisheries management situation as it pertains to: legislation (direct and indirect), costs and funding, stakeholder involvement, transparency and conflict, and compliance and enforcement. In addition, the questionnaire facilitated the organization of this information, first at the level of the country or territory, and then for major fishery subsectors.

The questionnaire facilitating country reviews contained four major sections. Section 1 sought to obtain a general country overview of the fisheries management mechanism in place. Sections 2–4 then facilitated closer examination of current fisheries management tools and trends for the following three major subsectors: (i) commercial/industrial (large-scale); (ii) small-scale, artisanal, lifestyle, subsistence, indigenous, customary fisheries; and (iii) recreational, including non-consumptive use such as catch and release fishing, ecotourism and diving. For the purposes of administering the questionnaire, some definitions of fishery types were provided as a guide, but country

respondents were requested to indicate where these definitions differed from what was applied within their respective countries.

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1. Introduction

The management of fish as a renewable resource has received increasing attention since the adoption of the United Nations Convention on the Law of the Sea (UNCLOS) in 1982, and as a consequence of improved understanding of the ecosystem concept, notable declines in several major fish resources, and greater appreciation of the corresponding related challenges posed by overcapitalization of the fishing industry, illegal fishing and the need to guarantee food and nutritional security for the world's increasing population. Although several international legal instruments have been adopted and are in force, real progress in securing sustainable fisheries can only be measured by the actions and achievements that become incorporated into routine fisheries management and conservation practices for those concerned. In view of this, current fisheries management and conservation measures are being reviewed in several regions of the world, with reviews completed so far for the Indian and Pacific Oceans (De Young, 2006, 2007). These reviews are intended to shed light on the level of application and success of internationally agreed fisheries management paradigms, and to foster

The present regional review covers countries located in the Western Central Atlantic Ocean (FAO Statistical Area 31), as well as Brazil in the southwest Atlantic Ocean (northern portion of FAO Statistical Area 41). This is a large area with a notable diversity of oceanic habitat, including continental shelves receiving outflows from large rivers, island platforms often in close proximity to each other, offshore banks and deep ocean trenches (Stevenson, 1981; Bahri, 2011). Primary productivity varies spatially and temporally within the area covered by this study, but generally with highest productivity recorded along the Brazil-Guianas shelf (Muller-Karger and Aparicio-Castro, 1994; Heileman, 2007). As such, the fisheries of the region are also very diverse, with higher levels of production occurring in coastal waters, particularly off the northeast coast of South America and in the Gulf of Mexico, which are influenced by both upwelling and river plumes, and also on island platforms and offshore banks harbouring richly diverse coral reef and seagrass ecosystems (CARSEA, 2007).

A total of 29 member countries of the Western Central Atlantic Fishery Commission (WECAFC), including several overseas territories belonging to the United Kingdom of Great Britain and Northern Ireland, France, the United States of America, and the Netherlands, are located in this region, and thus there is a complex myriad of claimed maritime jurisdictions. Moreover, the region is home to some of the world's richest and poorest countries in terms of economic development. The variety of oceanic habitat and conditions, diverse nature and extent of fishery production, the network of national jurisdictions, and country development status have all influenced the evolution of fishing operations, and in so doing, have also contributed to the characteristics of management and conservation measures applied in practice.

The present review examines the existing fisheries management situation in the region, with emphasis on the governance and management frameworks in place in the various countries studied, and assesses how these national frameworks have so far contributed to achieving sustainable fisheries management as prescribed by internationally agreed standards.

2. Methods

A detailed questionnaire, the State of World Marine Capture Fisheries Management (SOWMCFM), which had been developed for use in similar studies that have since been completed for the Indian and Pacific Oceans (De Young, 2006, 2007), was updated and expanded for application in the Western Central Atlantic area to take into account the characteristics of fisheries in that region, as well as recent developments in fisheries management. As in the case of the Indian and Pacific Ocean studies, the questionnaire for the present study allowed country respondents to organize their information on the fisheries management situation as it pertained to: legislation (direct and indirect), costs and funding, stakeholder involvement, transparency and conflict, compliance and enforcement. In addition, the questionnaire facilitated the organization of this information, first at the level of the country or territory, and then for three major fishery subsectors.

The questionnaire therefore contained four major sections. Section 1 sought to obtain a general country overview of the fisheries management framework and mechanism in place. Sections 2–4 then facilitated closer examination of current fisheries management tools and trends for the following three major subsectors: (i) commercial/industrial (large-scale); (ii) small-scale, artisanal, lifestyle, subsistence, indigenous, customary fisheries; and (iii) recreational, including non-consumptive use such as catch and release fishing, ecotourism and diving. Country respondents were selected based on their expert knowledge and experience.

2.1 DEFINITIONS, SAMPLING COVERAGE AND INTERPRETATION OF CHART DATA

For the purposes of administering the questionnaire, some guiding definitions of each fishery type were provided (Table 1), but country respondents were also requested to indicate where these definitions differed from what was applied within their own countries. Table 2 lists the 16 countries that participated in the questionnaire survey, and which contributed to the regional picture described in this report.

Respondents did not answer every question in the survey. For some questions, the illustrated results have included the percentage frequency of blank responses, and this allows the reader to appreciate exactly the number and percentages of countries providing positive, negative and blank responses. Where blank responses have not been included in the illustrations (owing to charting limitations), the results are given instead in terms of confirmed frequency of occurrence (percentage of responses) among the total number of non-blank responses for that question. This latter option allows the reader to remain aware of the varying level of survey participation for each question, while evaluating levels of management performance. In so doing, the information also allows automatically for an appreciation of the number of blank responses per question, and what this may imply about lack of knowledge, poor governance practices and management non-performance in relation to the particular issue of concern.

For the section on management tools used in the largest marine capture fisheries, in which charts illustrate the percentage frequencies of positive responses only, the percentages are calculated based on the total number of major fisheries identified for each subregion and each subsector (commercial/industrial, small-scale, recreational). These totals are provided at the start of the relevant section for ease of reference.

TABLE 1
Definitions of fishery types included as a guide on the questionnaire survey form

Term	Definition*
Commercial/industrial fishery	Fishery conducted for the purpose of wide marketing.
Small-scale fishery	A term of English origin with a technological foundation. It tends to imply the use of a relatively small-sized gear and vessel. The term sometimes has the added connotation of low levels of technology and capital investment per fisher, although that may not always be the case.
Artisanal fishery	A term of Latin origin with a socio-economic foundation. It tends to imply a simple, individual (self-employed) or family type of enterprise (as opposed to an industrial company), most often operated by the owner (although the vessels may sometimes belong to the fishmonger or some external investor), with the support of the household. The term has no obvious reference to size but tends to have the connotation of relatively low levels of technology, but this may not always be the case.
Lifestyle, subsistence, indigenous and customary fishery	Variations of small-scale or artisanal fishery operations, i.e. associated with relatively small-sized gear and vessel, and the use of relatively low levels of technology.
Recreational fishery	Fishery conducted for reasons other than to satisfy essential nutritional needs and where fishing products are generally not sold or otherwise traded on markets.

* The definitions used are not the official definitions used by FAO, but are those applied by the CRFM in the Caribbean region and were considered useful for the purpose of this study.

TABLE 2
Countries that participated actively in the questionnaire survey, listed according to the subregions represented

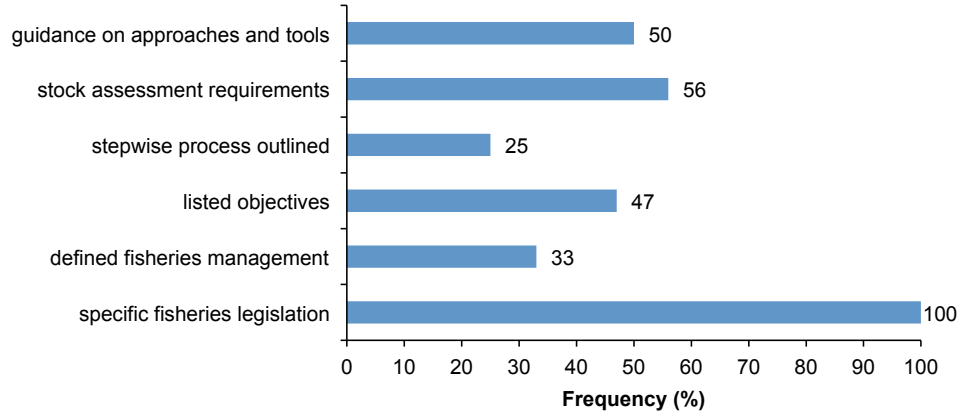
Central and Northeast Insular WECAFC Subregion	Southern WECAFC Subregion	Western WECAFC Subregion
Anguilla	Venezuela (Bolivarian Republic of)	Colombia
Antigua and Barbuda	Trinidad and Tobago	Mexico
Aruba	Suriname	Nicaragua
Dominica	Brazil	Panama
Dominican Republic		
Caribbean Netherlands		
Saint Kitts and Nevis		
Saint Lucia		

3. National marine fisheries frameworks

3.1 BASIC LEGISLATIVE FRAMEWORKS

At the national level, all 16 countries had specific instruments of legislation in place for the management of marine capture fisheries, which included both legal and administrative frameworks. At the regional and local levels, legislation existed in 86 percent of 14 responding countries[1] and 77 percent of 13 responding countries, respectively. While only 33 percent of 15 responding countries explicitly defined the term "fisheries management" in national legislation, 50 percent of 16 responding countries had legislation that provided specific guidance on the application of management approaches and tools. In 47 percent of 15 responding countries, the legislation listed the objectives of fisheries management, but fewer countries (25 percent of all 16 countries) had legislation in place that outlined a stepwise process for establishing effective fisheries management (Figure 1).

FIGURE 1
General characteristics of the fisheries legislation in responding countries



Note: For each category, the data label provides the percentage of the responding countries (which vary between 13 and 16, as explained in the text).

In the Central and Northeast Insular Subregion, in those instances where overall objectives were indicated, there was no prioritization, and legislated objectives seldom appeared to form part of management plans or guiding documents. In fact, the legislated objectives of fisheries management were indicated for only two countries: Antigua and Barbuda and the Dominican Republic. In these two cases, the objectives incorporated paradigms of ecologically sustainable development and scientific understanding alongside economic development goals. These two countries were also those with the newest legislation in place, with Antigua and Barbuda having enacted a new fisheries act in 2006 and the Dominican Republic in 2004.

In the Southern Subregion, despite the recent efforts to update legislation in the four responding countries, only Suriname and Brazil had legislative frameworks that listed the objectives of fisheries management. In these instances, the objectives addressed the sustainable development of fisheries, the preservation of the resource and the need

[1] Responding countries" here means countries that provided non-blank responses.

for enforcement, but did not address the need for scientific understanding of fisheries. Although neither of these two countries had prioritized its established objectives, the objectives were included in fisheries management plans.

In the case of the Western Subregion, the legislation of all four responding countries listed fisheries management objectives. Apart from Colombia, which listed only a single general management objective, the other countries noted that management objectives were prioritized. In all cases, management objectives were also incorporated into fisheries management plans. Details of specific management objectives for Panama were unavailable, but for the other three responding countries, sustainable use was included in the formulation of at least the first or only management objective, as the cases may be. In addition, except for Panama, for which the response was unavailable, management objectives of the other three countries had been informed by the work of regional fishery bodies (RFBs) and/or regional fisheries management organizations (RFMOs).

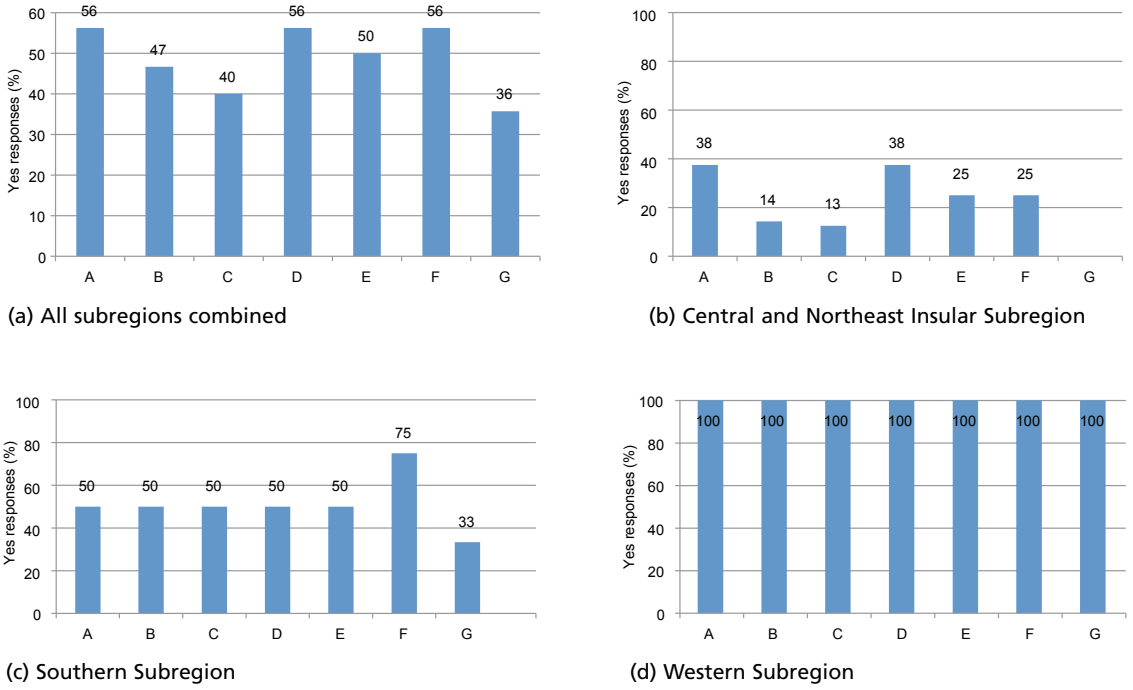
These responses suggest that the legal framework for the implementation of fisheries management and conservation measures appears to be limited and non-specific in many instances. This is at variance with various international instruments of fisheries legislation that make comprehensive, structured and specific provisions regarding preservation of resource health, biodiversity and the associated ecosystems.

Overall, 56 percent of all 16 countries indicated that national legislation required that fisheries management decisions be based on information generated by at least one of the following analyses: biological analyses/stock assessments, social impact analyses, economic analyses, monitoring and enforcement analyses and/or analysis by RFBs (Figure 2a). Analyses by RFBs, social impact analyses and economic analyses were among those types of analyses least required by national legislation (36 percent of 14 responding countries, 40 percent of 15 responding countries, and 47 percent of 15 responding countries, respectively).

In contrast, only 38 percent of 8 responding countries in the Central and Northeast Insular Subregion indicated that the legislative framework included provisions for biological stock assessments and environmental analyses (Figure 2b). That noted, one-quarter of the eight responding countries confirmed that their legislation made provisions also for use of information from ecosystem analyses and from monitoring and enforcement activities. However, legislation in none of seven responding countries of this subregion apparently made provisions for use of information obtained from RFBs, and social and economic analyses were required in only 13 percent of 8 and in 14 percent of 7 responding countries, respectively.

In comparison, of information requirements stipulated in the fisheries legislation for responding countries in the Southern Subregion, monitoring and enforcement information was prevalent (75 percent of all 4 countries), with the full range of biological, social, economic, ecological and environmental analyses each receiving equal but less attention (50 percent of all 4 countries in each case) (Figure 2c). However, only one country's legislation in the Southern Subregion (33 percent of 3 responding countries) appeared to make provisions for consideration of information from RFBs. Finally, in the Western Subregion, the legislative framework included provisions for the full range of scientific information to be used in all four countries (Figure 2d). The four responding western countries indicated that management decision-making was also influenced by external players and factors, such as other parts of government, other countries' experiences, RFMOs, and non-RFBs such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

FIGURE 2
Frequency of countries that legally require information for management decisions



Notes: The figures show the frequency of countries (given as a percentage of responding countries, i.e. countries providing non-blank responses) that legally require the following information for management decisions: A – biological analyses/stock assessments; B – economic analysis; C – social impact analyses; D – environmental analysis; E – ecosystem analysis; F – monitoring and enforcement options; G – analysis by regional fisheries bodies. The information is illustrated for: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion. Refer also to Table 2 for the list of countries by subregion.

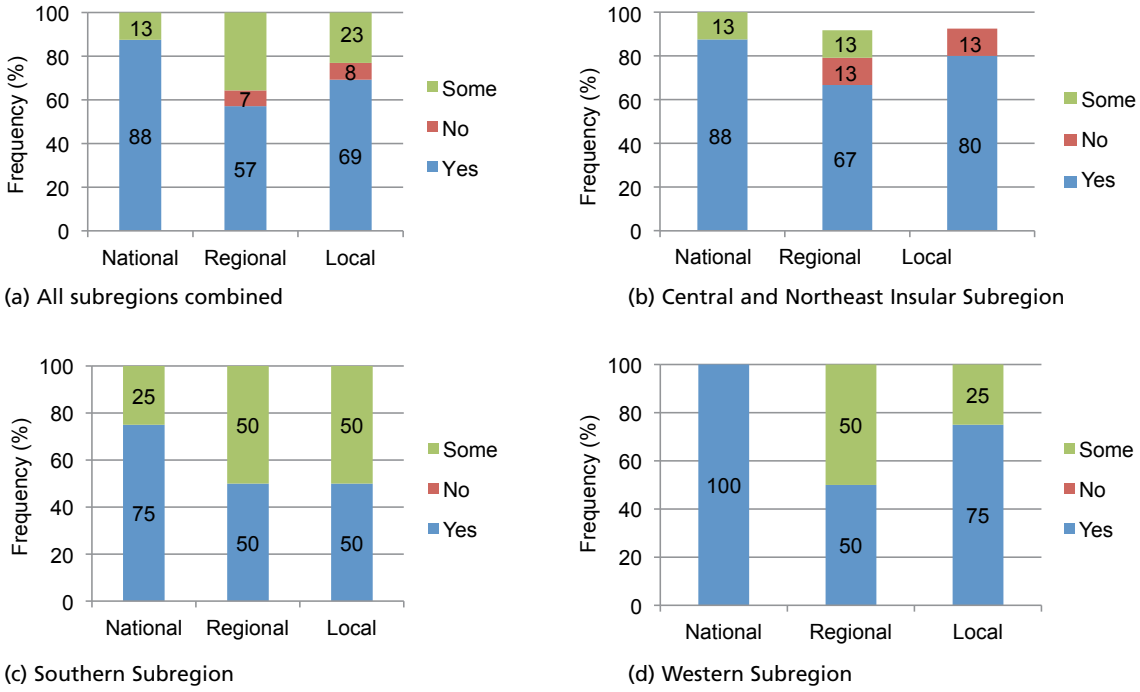
3.2 COSTS AND FUNDING OF FISHERIES MANAGEMENT

Generally, the costs of fisheries management at the national level were covered, for the most part (full coverage for 88 percent of all 16 countries), by government funding (Figure 3a). Government funding continued to predominate for local-level activities, but in the case of regional-level activities, only 57 percent of 14 responding countries indicated that their governments provided funding support. Such outlays included funding for research and development (R&D), monitoring and enforcement, and daily administrative management.

In the Central and Northeast Insular Subregion, all countries confirmed government funding support for national-level activities, with 88 percent of all 8 countries depending solely on government funding (Figure 3b). Also, 67 percent of 6 responding countries and 80 percent of 5 responding countries confirmed total dependence on government funds for regional and local-level activities, respectively. In comparison, all four surveyed countries in the Southern Subregion depended mostly on government support for national-level activities, with three out of four countries relying solely on such support (Figure 3c). In two countries, government funds were also being used to support all management activities at the regional and local levels, while in the other two responding countries, only some government funds were available for such support. The dependence on government funds to support management activities was highest overall for countries in the Western Subregion, where all four countries provided responses for each category (Figure 3d).

FIGURE 3

Frequency of allocation arrangements in respect of fisheries management budgets to activities at the national, regional and local levels



Notes: The figures show the frequency (given as a percentage of responding countries) of allocation arrangements in respect of fisheries management budgets to activities at the national, regional and local levels. The information is illustrated for: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion. Refer also to Table 2 for the list of countries by subregion.

All 16 country respondents agreed that the costs of national fisheries management had increased over the past ten years. At the regional and local levels, costs were also primarily perceived to be increasing in 80 and 87 percent, respectively, of 15 responding countries. Despite increasing costs, budgets for fisheries management had not increased to the same extent; rather, a notable percentage had either decreased or remained unchanged (national – 44 percent of all 16 countries, regional – 50 percent of 14 responding countries, local – 57 percent of 14 responding countries). Moreover, in the same time span, the number of fisheries requiring attention by managing bodies had increased, and by a comparatively greater percentage compared with perceived budget increases (national – 60 percent of 15 responding countries, regional – 67 percent of 12 responding countries, local – 54 percent of 13 responding countries) (Figure 4a). A minority of country correspondents indicated that the number of managed fisheries was decreasing (national – 20 percent of 15 responding countries, regional – 8 percent of 12 responding countries, local – 8 percent of 13 responding countries). This could be an issue for concern if it reflects a deteriorating situation in respect of fisheries management in the instances identified.

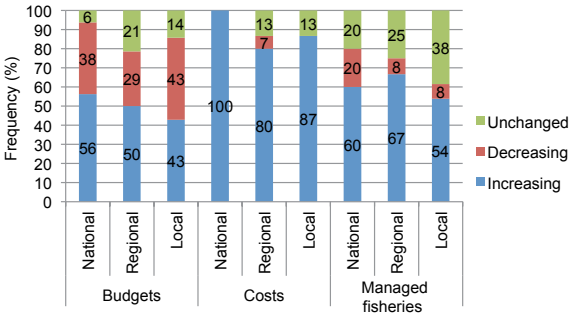
This general pattern in national respondent perceptions was again observed for the Central and Northeast Insular Subregion, with the exception that regional- and local-level costs had increased more or less equally, and management responsibilities for new fisheries were the least for the whole region (Figure 4b). The latter result is perhaps not unexpected in view of the small size of the countries involved and the comparatively greater multispecies nature of their fisheries, in which many species and fishing methods would have already been taken into account, at least generally, throughout their development.

In the Southern Subregion, while the management costs increased at the national and local level in all four countries, and also at the regional level in three out of four of these countries (unchanged in one country), budgets were considered to have increased in only two out of four countries at all levels (national, regional, local). The number of managed fisheries also increased in three-quarters of the four responding countries at both the national and regional levels, and in half of the four responding countries at the local level (Figure 4c), with 25 percent of responding countries (one out of four countries) actually indicating a decrease in the number of fisheries managed at the national and local levels.

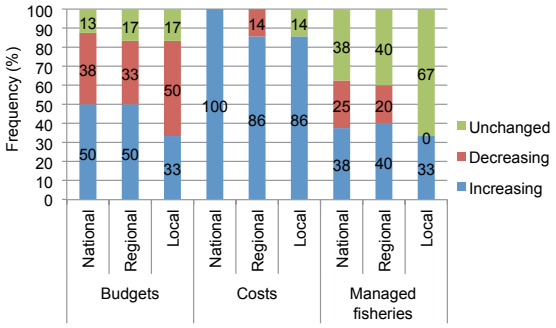
However, in the Western Subregion, management costs had increased at the national level in all four responding countries, and also in 75 percent of these (three countries) at the regional and local levels (Figure 4d). Management budgets were believed to have increased in 75 percent of all 4 responding countries at the national level, with 50 percent of 4 countries noting budgetary increases also at the regional and local levels of management. All four responding countries also confirmed that the number of managed fisheries had increased at all levels (national, regional, local).

FIGURE 4

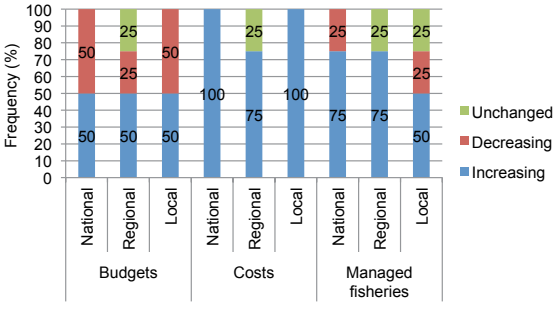
Frequency of perceived changes to budgets and costs for fisheries management over the last ten years, along with the number of fisheries managed



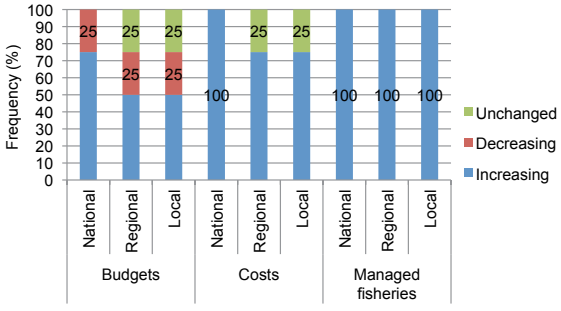
(a) All subregions combined – number of responding countries for each category listed on x-axis: budgets (national – 16, regional & local – 14); costs (national – 16, regional & local – 15); managed fisheries (national – 15, regional – 12, local – 13)



(b) Central and Northeast Insular Subregion – number of responding countries for each category listed on x-axis: budgets (national – 8, regional & local – 6); costs (national – 8, regional & local – 7); managed fisheries (national – 8, regional – 5, local – 6)



(c) Southern Subregion – number of responding countries was four for each category listed on x-axis



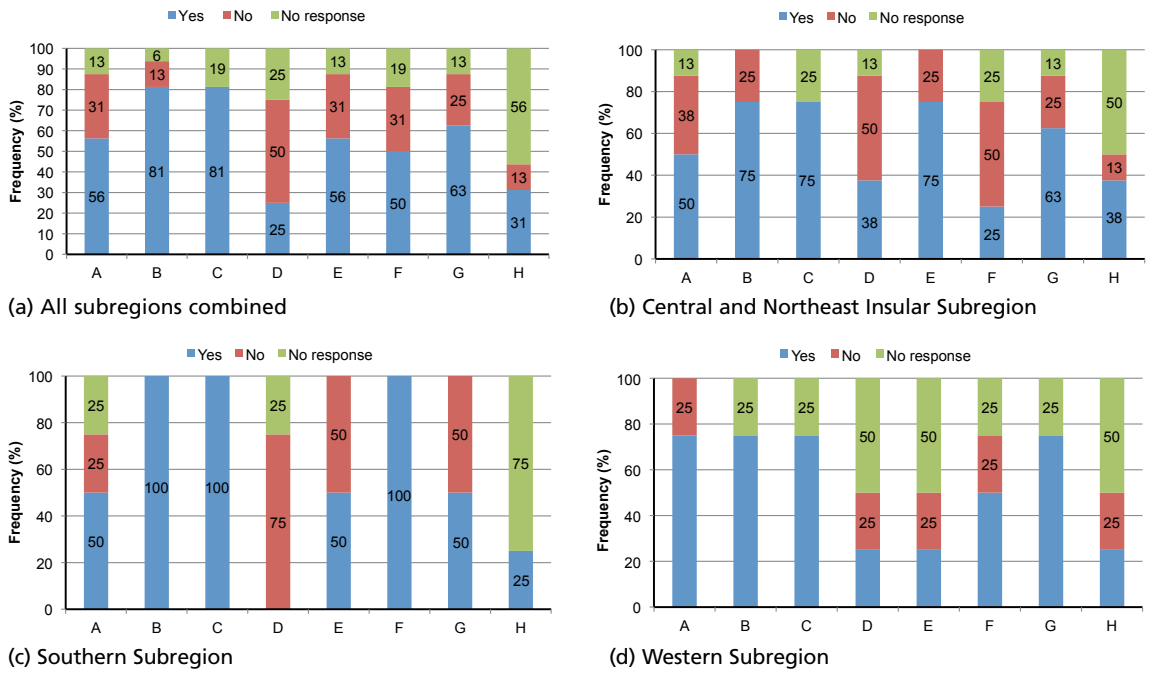
(d) Western Subregion– number of responding countries for each category listed on x-axis: budgets (national, regional & local – 4); costs (national, regional & local – 4); managed fisheries (national, regional & local – 3)

Notes: The figures show the frequency (given as a percentage of responding countries) of perceived changes to budgets and costs for fisheries management over the last ten years, along with the number of fisheries managed: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion. Refer also to Table 2 for the list of countries by subregion. Data labels indicate percentages, and data on number of responding countries are given below each individual template.

When asked about the causes of increasing costs for fisheries management, all responses received indicated that enforcement activities in the previous ten years had increased the expenditures. A majority (81 percent of 16 countries) also felt that increased monitoring requirements were responsible for higher costs, with the third-most important contributor being obligations to regional initiatives (63 percent of 16 countries) (Figure 5a). Increased stakeholder consultations have also increased costs for 56 percent of the 16 countries surveyed. Increased litigation was identified as the component that least contributed to increasing costs (25 percent of 16 countries). Regarding "other" reasons for higher costs, four countries specifically cited increasing fuel costs, increasing salaries, and costs associated with the expansion and updating of data collection and management systems (Figure 5a). In the specific subregions examined, the link of increasing costs to monitoring and enforcement needs was equally apparent. Apart from these two activities, comparable contributions to increased management costs were reported to result from increased conflict management in the Central and Northeast Insular Subregion (Figure 5b), increased activity in amending regulations in the Southern Subregion (Figure 5c), and increased stakeholder consultation and obligations to regional initiatives in the case of the Western Subregion (Figure 5d).

Regarding cost-recovery options employed, the charging of licence fees was the most common one applied. In the Central and Northeast Insular Subregion, governments were receiving revenues from licences and, to a much smaller extent, resource rentals. However, licence fee revenues were generally small and did not cover the costs of managing fisheries. When asked where the funding for increasing costs in fisheries management came from, only two countries indicated fisheries participants. Although fisheries controlled primarily by stakeholders existed, fisheries in the Central and Northeast Insular Subregion still appeared to rely on government and donor

FIGURE 5
Frequency of responses identifying sources of increased costs in fisheries management



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage) of responses identifying sources of increased costs in fisheries management: A – stakeholder consultation; B – monitoring requirements; C – enforcement activities; D – litigation; E – conflict management; F – modification of regulations; G – member country obligations to regional fisheries initiatives; H – other. The information is illustrated for: (a) all subregions combined (see Table 2 for explanation); (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion.

funding. In comparison, in the Southern Subregion, the use of legislation to recover the costs of fisheries management was very limited. Two of the four responding countries indicated that some cost recovery was conducted through licensing fees, but such fees were normally received as general government revenues. Venezuela (Bolivarian Republic of) reported that increased costs were being covered by a mix of contributions from government, fishery participants and external donors, while in the case of Brazil, government contributions were crucial to support additional management costs. The other two southern countries, Suriname and Trinidad and Tobago, were relying on both government contributions and donor funds to cover their additional management costs.

Similarly, the legislation in all four responding countries in the Western Subregion allowed for recovery of management costs using licence fees. Except for Mexico, the increased costs for marine capture fisheries management in the western countries examined were being funded partly by increased government funding, increased fishery participant contributions, and also financial contributions obtained via donor-funded projects. In the case of Mexico, the additional fisheries management costs were being funded by increased government contributions only.

3.3 COMPLIANCE AND ENFORCEMENT FOR FISHERIES MANAGEMENT

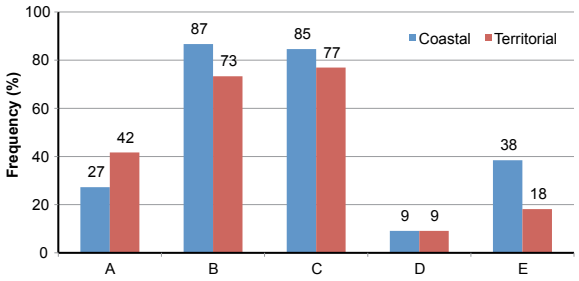
Throughout the region, it was most common for the coast guard (territorial waters: 73 percent of 15 responding countries; coastal waters: 87 percent of 15 responding countries) and the national fisheries agency (territorial waters: 77 percent of 13 responding countries; coastal waters: 85 percent of 13 responding countries) to conduct fisheries patrols, monitoring and enforcement in territorial and coastal waters (Figure 6a). Apart from these two agencies, other patrol/monitoring groups were also important, particularly in the Central and Northeast Insular Subregion, and included scientific institutes and non-governmental organizations (NGOs) (Figure 6b). However, in the Southern Subregion and for both coastal and territorial waters, the navy was the most important agency involved in respect of compliance and enforcement responsibilities (100 percent of responding countries in each case), followed by the coast guard and then the national fisheries agency (Figure 6c). For the responding countries in the Western Subregion, the coast guard and the national fisheries agency were used equally frequently for compliance and enforcement in the coastal waters. For activities in territorial waters, however, the national fisheries agency was most important (75 percent of responding countries) and was supported equally by the navy and coast guard for countries in the Western Subregion (Figure 6d).

As explained above, the increased costs of monitoring and enforcement appeared not to be matched by corresponding increases in budgets. In fact, the majority, 73 percent of 15 responding countries, believed that budgets for monitoring and enforcement had diminished or remained unchanged over the past five years (Figure 7a). Linked to costs and budget outlays, was the perception that, over the last five years, the level of detection effort had predominantly decreased or remained unchanged (only 40 percent of respondents felt that detection efforts had increased). As a result, the relatively higher frequency of a perception of a drop in the number of marine fisheries offences, 53 percent of 15 responding countries in the previous five years, may indicate failures in fisheries management rather than improved compliance outcomes. Compared with the perceptions for the past ten years, the support for management, in terms of budget increases and decreases, and also the confidence in the detection system reflect a deteriorating situation in the most recent five-year period (Figure 7a).

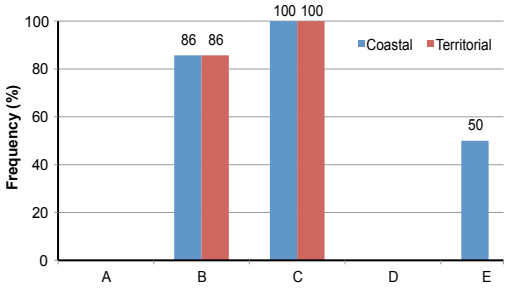
In considering the subregional trends, perceived trends for the Central and Northeast Insular Subregion showed that, compared with the past ten-year period, there were fewer cases reporting increases in compliance and enforcement budgets over the past five years (13 percent of 8 responding countries), more frequent reports of increased detection efforts (50 percent of 8 responding countries) and more frequent

FIGURE 6

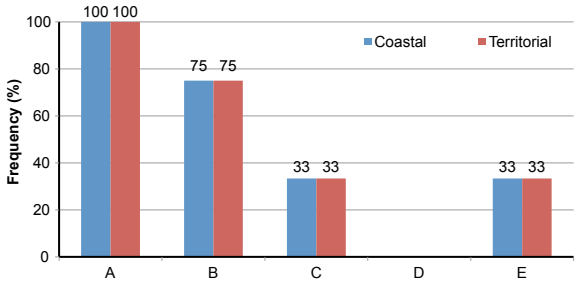
Frequency of responsibility allocations among agencies/authorities for at-sea fisheries patrols, monitoring and enforcement work in coastal and territorial waters



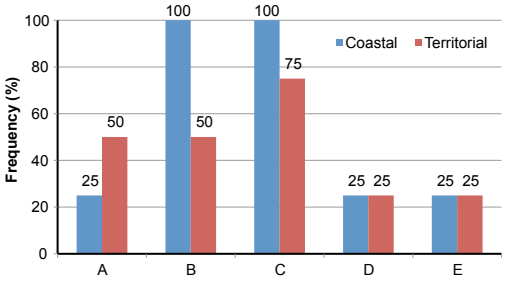
(a) All subregions combined – The number of responding countries for each category is: Coastal (A –11, B – 15, C – 13, D – 11, E –13); Territorial (A – 12, B – 15, C – 13, D – 11, E – 11



(b) Central and Northeast Insular Subregion – The number of responding countries for each category is: Coastal (A – 5, B – 7, C – 6, D – 5, E – 6); Territorial (A – 5, B – 7, C – 6, D – 5, E – 4)



(c) Southern Subregion – The number of responding countries for each category is: Coastal (A – 2, B – 4, C – 3, D – 2, E – 3); Territorial (A – 3, B – 4, C – 3, D – 2, E – 3)



(d) Western Subregion – The number of responding countries for each category is: four

Notes: The figures show the frequency (percentage of positive responses among responding countries) of responsibility allocations among agencies/authorities for at-sea fisheries patrols, monitoring and enforcement work in coastal and territorial waters (0–3 and 0–12 nautical miles offshore, respectively): A – navy; B – coast guard; C – fisheries agency; D – marine transport agency; E – other patrol, monitoring or enforcement groups. The information is illustrated for: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion. Data labels indicate percentages, and data on number of responding countries are given below each individual template.

reports of decreased offences (50 percent of 8 responding countries) (Figure 7b). This reflects an improving compliance and enforcement performance that is somehow not heavily dependent on a compliance and enforcement budget.

In the Southern Subregion, the situation of the past five years was reported to be the same also for the past ten years (Figure 7c). While the compliance and enforcement budget increased in two countries and remained unchanged in one country, all three responding countries noted that detection effort had decreased over the entire five-year and ten-year periods (Figure 7c). Hence, it is perhaps not surprising to note that of three responding countries, there was an equal mix of perception in the change regarding fisheries offences (Figure 7c). This reflects a deteriorating enforcement situation, which, in turn, does not inspire confidence in the reported situation regarding compliance (i.e. offences), and these are occurring in spite of a stable/improving supporting budget.

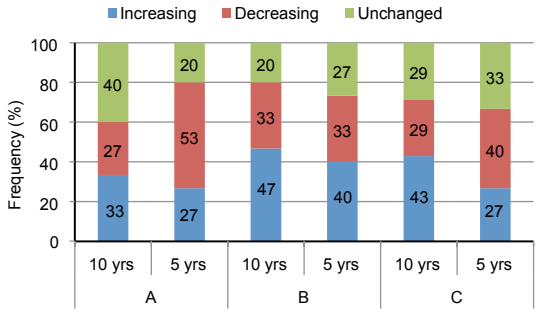
In the case of the Western Subregion, increases in both the compliance and enforcement budget and in detection efforts have occurred over the past ten and five years, with more countries noting increases for the earlier part of the ten-year time period (Figure 7d). This appears to support the observation by two (50 percent) of the four responding countries that the number of offences had decreased over the past

ten years, with more countries reporting decreases for the last five years (three of the four responding countries). This implies that the earlier increases in budget and also detection efforts may have directly contributed to improved compliance levels that became more obvious in the most recent five-year period, i.e. decreased number of offences.

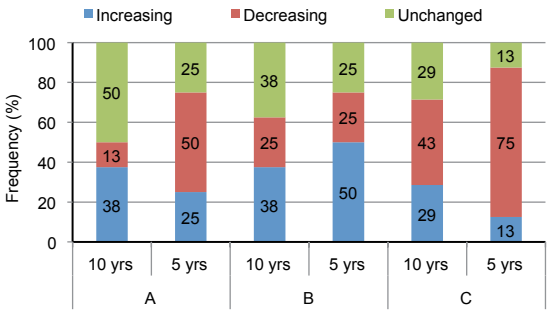
This picture was made clearer by the responses to three questions measuring the effectiveness of enforcement on fisher compliance (Figure 8a). In this instance, 81 percent of all 16 countries surveyed felt that funding was insufficient to support the enforcement of all regulations. In addition, 63 percent of these countries felt that penalties were not severe enough to be an effective deterrence for non-compliance, and as a compounding factor, 88 percent felt that the risk of detection was not high enough to encourage compliance with fisheries regulations. This trend was commonly perceived at the subregional levels as well, with the most pessimistic situation reflected in the perceptions noted by countries in the Southern Subregion (Figures 8b–d). While responding countries in the Western Subregion indicated concerns about budget and detection capacity levels, they were more confident about the severity of their penalties applied for acts of non-compliance.

FIGURE 7

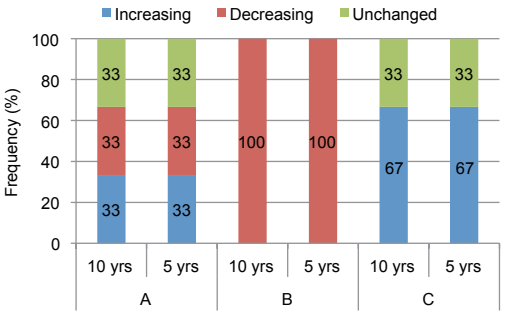
Frequency of responses indicating change in offences, detection effort and budget for monitoring and enforcement



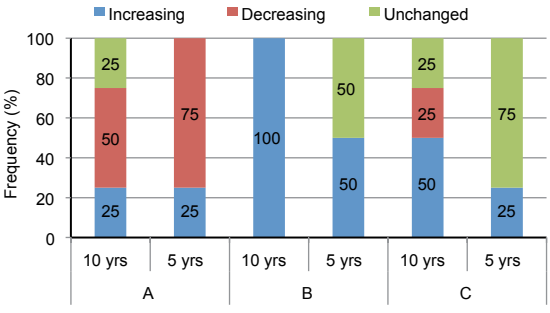
(a) All subregions combined – number of responding countries was 15 for all categories, except C – ten years, for which there were 14 responding countries



(b) Central and Northeast Insular Subregion – number of responding countries was eight for all categories, except for C – ten years, for which the number was seven



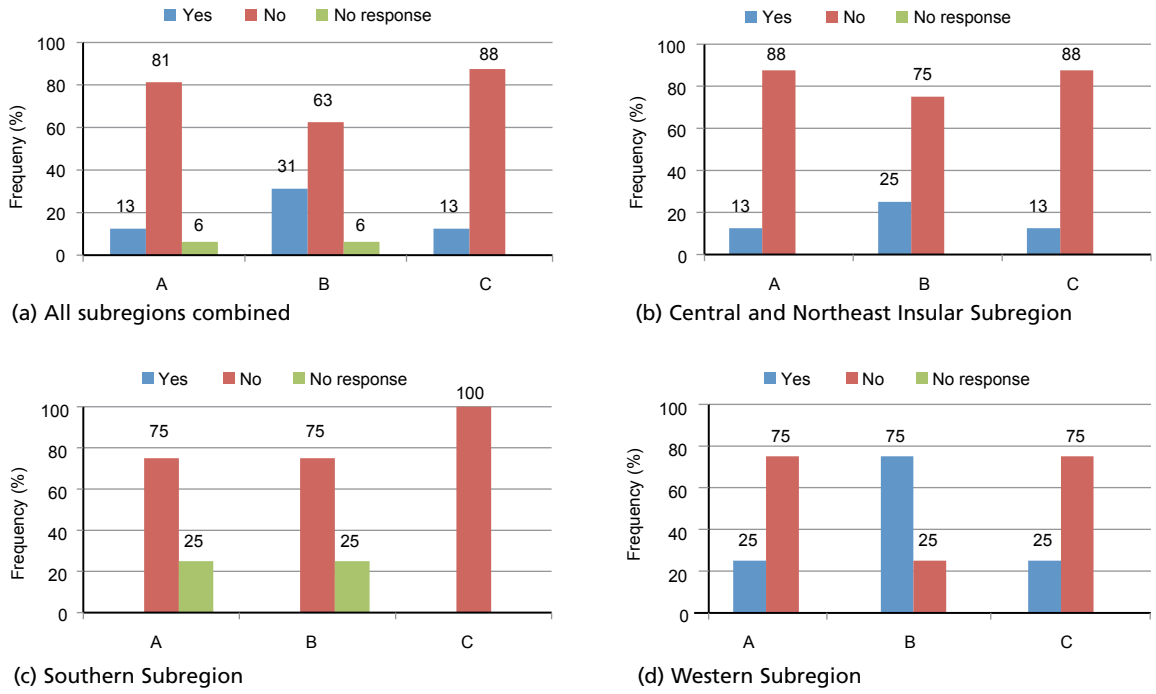
(c) Southern Subregion – number of responding countries was three for all categories



(d) Western Subregion – all four countries provided non-blank responses for all categories

Notes: The figures show the frequency of responses (percentage of responding countries), indicating change in the: A – number of marine fisheries offences over the previous ten and five years; B – level of detection effort over the previous ten and five years; C – budget for monitoring and enforcement over the previous ten and five years. This information is shown for: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion.

FIGURE 8
Frequency of all responses to three questions measuring the effectiveness of enforcement on fisher compliance



Notes: The figures show the frequency (percentage of countries surveyed, by subregion) of all responses to three questions measuring the effectiveness of enforcement on fisher compliance: A – adequacy of funding for allowing enforcement of all regulations; B – severity of penalties to serve as a deterrence to non-compliance; C – the effectiveness of the risk of detection to stimulate regulation of compliance. The information is illustrated for: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion.

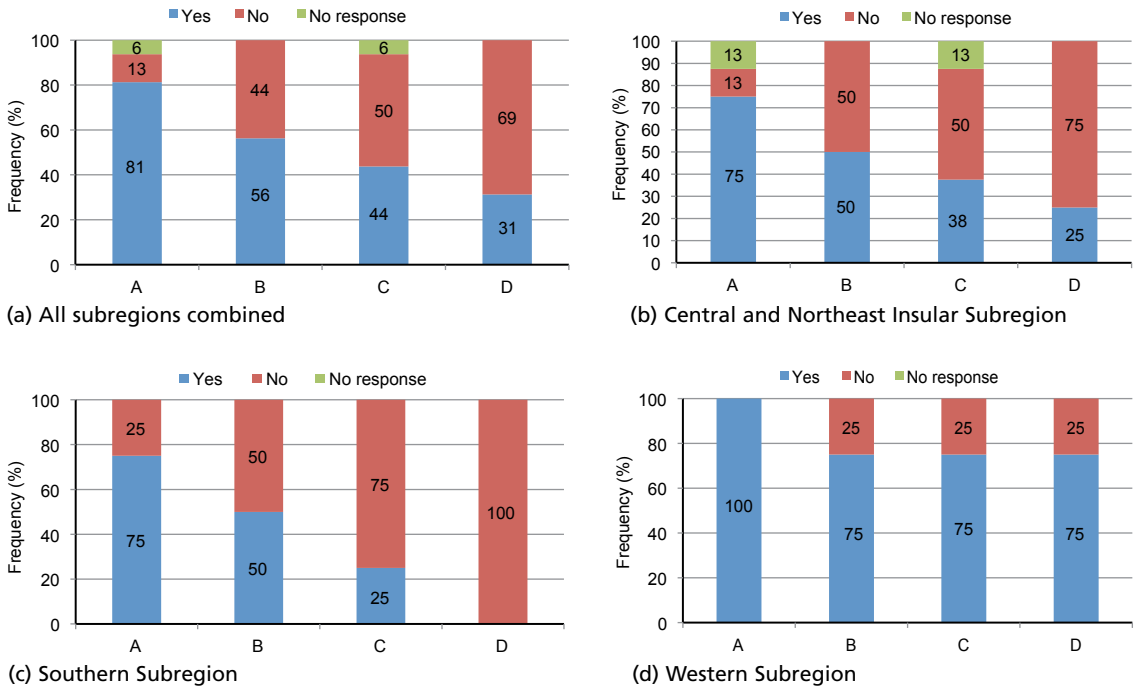
3.4 STAKEHOLDER INVOLVEMENT AND TRANSPARENCY IN FISHERIES MANAGEMENT

Overall, the majority of country respondents indicated that stakeholders were formally involved in the management of marine capture fisheries at all levels (national – 75 percent of 16 responding countries, regional – 62 percent of 13 responding countries, local – 82 percent of 11 responding countries). However, participatory processes were less often a formally required part of fisheries management and also used routinely (57 percent of 14 responding countries in both instances), and even fewer countries (43 percent of 14 responding countries) explicitly defined the stakeholders in their legislative frameworks.

Consultative management, in which stakeholders were consulted but had no management responsibility, was most commonly practised (81 percent of 16 countries) (Figure 9a). Management strategies in which government involvement was limited were also practised, although increasingly less common as the following arrangements increased stakeholders' management responsibility, that is: co-management with stakeholders sharing some responsibility (56 percent of 16 countries), followed by co-management with stakeholders sharing significant responsibility (47 percent of 16 countries), and then devolution of management in which there was full stakeholder control (31 percent of 16 countries) (Figure 9a).

Among the subregions examined, a similar pattern and frequency were indicated for the Central and Northeast Insular Subregion (Figure 9b), with a more pessimistic pattern in respect of stakeholder participation indicated for the Southern Subregion (Figure 9c). The best reported progress in stakeholder involvement was indicated by

FIGURE 9
Frequency of occurrence of management arrangements for stakeholder involvement

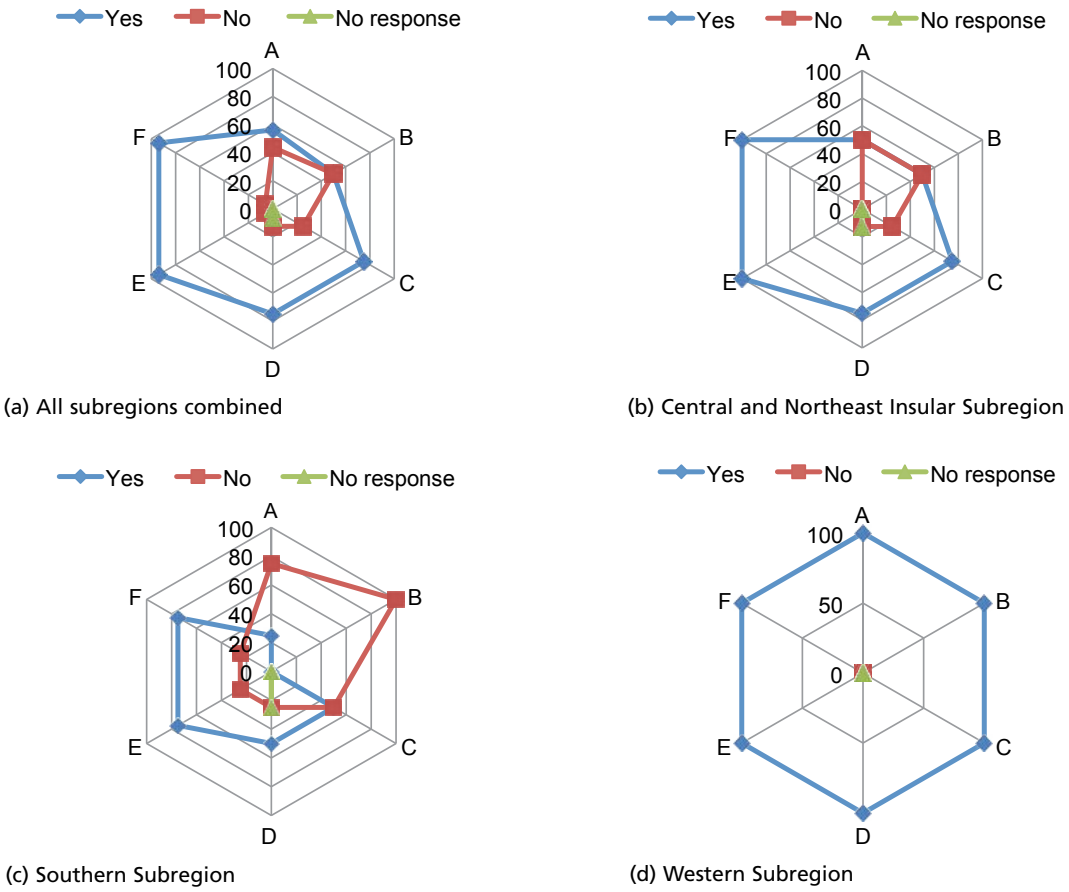


Notes: The figures shows frequency (percentage of countries surveyed by subregion) of occurrence of management arrangements for stakeholder involvement: A – consultative, with stakeholders having no management responsibility; B – consultative, with stakeholders having some management responsibility; C – co-management, with stakeholders actively participating and sharing significant management responsibility; D – devolution of management, with stakeholders having full management responsibility. The information is illustrated for: (a) all subregions combined; (b) surveyed countries comprising the Central and North Insular subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion.

countries in the Western Subregion, where there were higher frequencies of occurrence of the full range of stakeholder participation (Figure 9d). These results suggest that, except for the Western Subregion, the level of organization and possibly also education among stakeholders, political will, and/or legislation are not yet sufficient to support the transfer of notable fisheries management responsibilities to stakeholder groups.

More than half of the 16 countries surveyed (56 percent) considered their management process to be fully transparent, with 75 percent (12 countries) confirming that meetings were advertised and publicized in advance and, with equal frequency, were also open to all stakeholders. While almost all 16 countries (94 percent) confirmed that opportunities were provided for fishery participants and other stakeholders to contribute to the decision-making process, only about 50 percent (8 countries) stated that management information was clearly documented and easily available to the public (Figure 10a). This general pattern was also reported in the Central and Northeast Insular Subregion, with similar percentages of performance noted as well (Figure 10b). In the Southern Subregion, a far less optimistic picture was apparent, with all four surveyed countries indicating the absence of full documentation and the availability of this to the public (Figure 10c). In addition, only one country of the southern group reported all parts of its management process as being transparent. In contrast, all transparency criteria for the management process were perceived to be satisfactory in all four surveyed countries of the Western Subregion, that is: all parts of the process were transparent; documentation was clear and easily available; meetings were advertised, publicized and open to all stakeholders; and all stakeholders had good opportunity to contribute inputs (Figure 10d).

FIGURE 10
Frequency of conditions of transparency in management



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage of all countries surveyed, by subregion) of conditions of transparency in management: A – all parts of process transparent; B – information clearly documented and easily available to the public; C – meetings open to all stakeholders; D – meetings advertised and publicized in advance; E – fishery participants contribute to decision-making through public comments; F – other stakeholders contribute to decision-making through public comments. The information is illustrated for: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries comprising the Western Subregion.

Internet mail and fax were the more common methods used to disseminate information (93 percent of 14 responding countries and 85 percent of 13 responding countries, respectively), followed by other methods such as meetings (82 percent of 11 responding countries), direct mail (80 percent of 15 responding countries) and printed materials (73 percent of 15 responding countries). There was notably less use of radio (53 percent of 15 responding countries), television (40 percent of 15 responding countries) and Internet websites (58 percent of 12 responding countries) to transmit information, suggesting that these methods required resources, financial or otherwise, that were not commonly available within national fisheries authorities.

3.5 CONFLICT MANAGEMENT

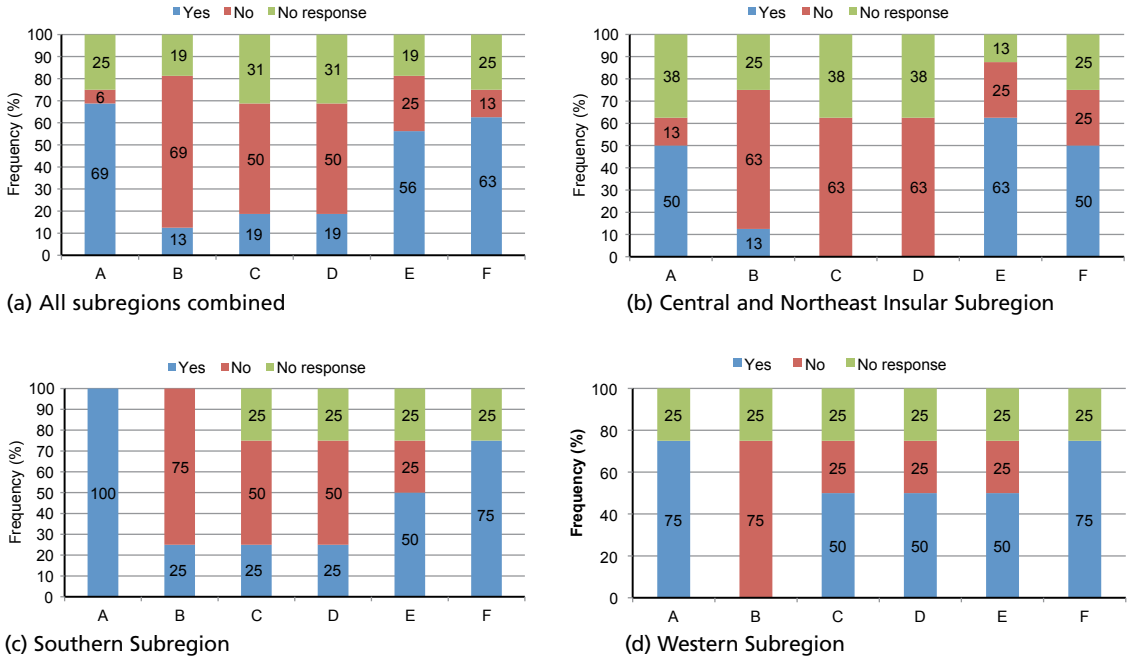
In only 19 percent of the 16 surveyed countries were steps for conflict resolution included in the legislation, and just 25 percent of all countries noted legal provisions for use of alternative dispute resolution mechanisms. In addition, 44 percent (of 16 responding countries) and 40 percent (of 15 responding countries) of legislative frameworks incorporated the consideration of multiple uses and users within the fishing sector, and uses and users across all economic sectors, respectively.

To address conflicts, the most common management tools utilized included: zoning areas for various uses (69 percent of all 16 countries); limiting the access of fishers depending on the target species or gear utilized (63 percent); and stakeholder education programmes (56 percent). Less often, conflict management tools included: resource allocation for fishery participants (19 percent); resource allocation between fishers and other sectors (19 percent); and stock enhancement (13 percent) (Figure 11a). Besides this general pattern, education was found to be the most common tool applied in the Central and Northeast Subregion (63 percent of all four countries surveyed), with zoning and limiting fisher access being second and equal to each other in importance (50 percent in each case) (Figure 11b). In this subregion, no country reported use of resource allocation for conflict management (Figure 11b).

Zoning of areas was universally applied by all four surveyed countries in the Southern Subregion, followed by limited access (75 percent) and then education (50 percent) (Figure 11c). There was only a 25 percent level of usage of resource allocation and stock enhancement tools for conflict management purposes in the Southern Subregion. Zoning and limiting access by fishers were used frequently and equally in the Western Subregion (each tool being used by 75 percent of all four countries). Resource allocation and education had the second-highest reported frequency of usage (50 percent for each tool). In contrast, stock enhancement was not used at all for conflict management purposes in the Western Subregion (Figure 11d).

The overall regional, as well as the subregional, patterns in the use of conflict resolution tools appear correlated with the level of stakeholder involvement discussed earlier in this report. That is to say, the Western Subregion reported greater success for more advanced forms of the participatory approach and also reported the most use of

FIGURE 11
Frequency of responses concerning use of various tools to manage conflict



Notes: Frequency (percentage of all countries surveyed, by subregion) of responses concerning use of various tools to manage conflict: A – zoning of different areas for different users; B – stock enhancement; C – resource allocation among participants of the fishery; D – resource allocation between fisheries & other sectors; E – education about sharing of resources; F – limited access to certain areas for different types of fishers. The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries comprising the Western Subregion.

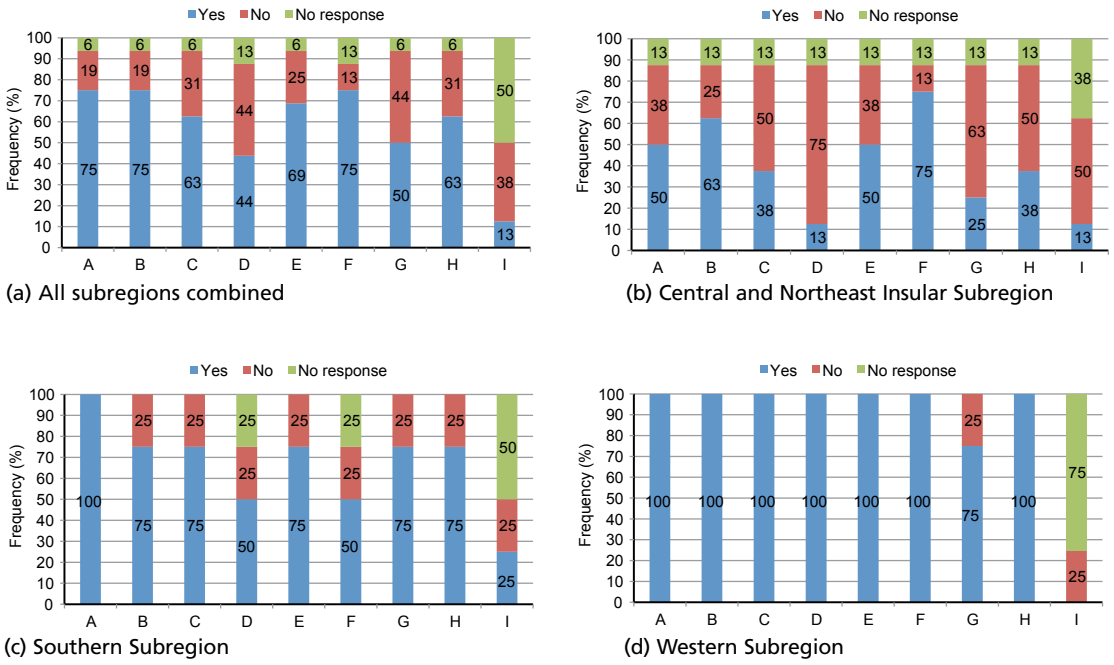
resource allocation tools that would be expected to require stakeholder negotiation, trust and cooperation. Similarly, the comparatively higher usage of education in the Central and Northeast Insular Subregion may be a key factor in explaining the improved stakeholder cooperation in compliance despite management budgetary constraints, which was already indicated earlier for this subregion.

3.6 INDIRECTLY RELATED LEGISLATION AFFECTING MARINE CAPTURE FISHERIES MANAGEMENT AND PARTICIPATION IN RFBS

Fisheries management was affected by various other non-fishery laws and regulations. Endangered species legislation, trade legislation, port management legislation and marine protected area (MPA) legislation were most often cited as indirectly affecting fisheries management (Figure 12a). Specific legislation that countries most often indicated as "having the most impact on marine capture fisheries management" included CITES regulations, wildlife and natural resource protection acts and protected areas legislation (e.g. national parks acts). Also important were coastal planning/zoning acts, in addition to marine navigation/seaport legislation. In terms of specific subregional variations in this pattern, countries in the Central and Northeast Insular Subregion reported that impacts by port management (75 percent of 8 countries) and trade legislation (63 percent of 8 countries) were most common (Figure 12b). Endangered species legislation was universally identified (100 percent of four countries surveyed) in the Southern Subregion (Figure 12c). However, except for port management legislation, the impacts of the range of non-fishery legislation examined were more frequently reported by countries in both the Southern and Western subregions, compared with those noted for the Central and Northeast Insular Subregion (Figure 12b, c, d).

FIGURE 12

Frequency of responses indicating national legislation instruments that indirectly affect the management of marine capture fisheries



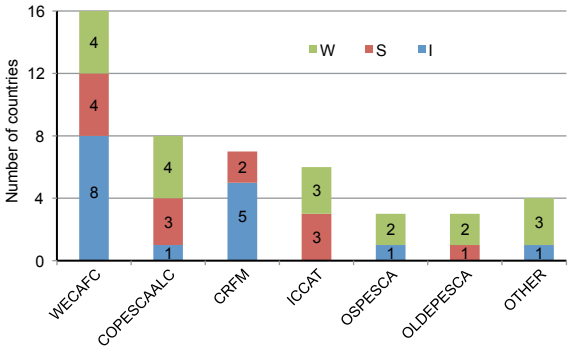
Notes: Frequency (percentage of all countries surveyed, by subregion) of responses indicating national legislation instruments that indirectly affect the management of marine capture fisheries: A – endangered species legislation; B – trade legislation; C – biodiversity legislation; D – oceans policy legislation; E – marine protected area legislation; F – port management legislation; G – coastal zone management; H – forestry legislation; I – other. The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

These trends may be due to a combination of influencing factors, namely the scale and nature of the major fishery operations in the larger southern and western countries, where artisanal fisheries involve many more participants, large-scale commercial/industrial operations are more common, and bycatch issues are particularly important, especially in the case of the shrimp trawl fisheries. In view of the sizes of the countries involved, there would also be other equally large-scale activities of other sectors of the economy taking place in the same coastal zone areas, such as maritime transport and oil exploration and drilling, and, hence, also the related laws governing the practices of such activities that could indirectly affect fisheries management.

3.7 INTERNATIONAL LEGISLATION AFFECTING MARINE CAPTURE FISHERIES MANAGEMENT AND RFB PARTICIPATION

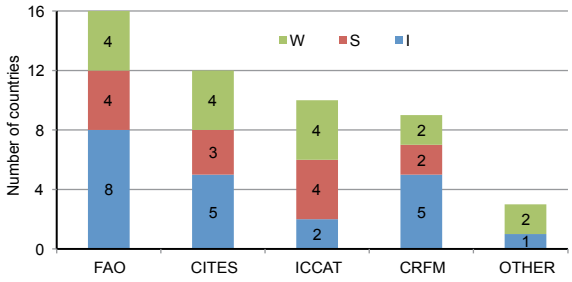
Throughout the 16 surveyed countries, WECAFC was the international organization of which all countries were members, followed by the Commission for Inland Fisheries and Aquaculture of Latin America and the Caribbean (COPESCAALC), the Caribbean Regional Fisheries Mechanism (CRFM) and the International Commission for the Conservation of Atlantic Tunas (ICCAT) (Figure 13). The comparatively lower level of membership in the Central American Integration System – Fisheries and Aquaculture Organization for Meso-America (SICA–OSPESCA) reflected the relatively limited geographical coverage of this organization (only Central American countries and the Dominican Republic). In most countries (88 percent), a formal mechanism for compiling and passing fisheries data to the regional/international organizations was in place. Most frequently, information was shared with FAO. However, a majority of countries also shared information with CITES (12 countries), ICCAT (10 countries), and the CRFM (9 countries) (Figure 14). Other organizations and major data- and information-gathering initiatives that were indicated included: OSPESCA, the Caribbean Large Marine Ecosystem (CLME) project and the National Oceanic and Atmospheric Administration (NOAA) (Figure 14).

FIGURE 13
Number of countries with confirmed membership in various regional fisheries organizations



Note: The number of countries that confirmed membership in various regional fisheries organizations of: a total of 8 countries sampled in the Central and Northeast Insular Subregion (I), a total of 4 countries sampled in the Southern Subregion (S), and a total of 4 countries sampled in the Western Subregion (W).

FIGURE 14
Number of countries providing fisheries-related data to the regional/international organizations identified



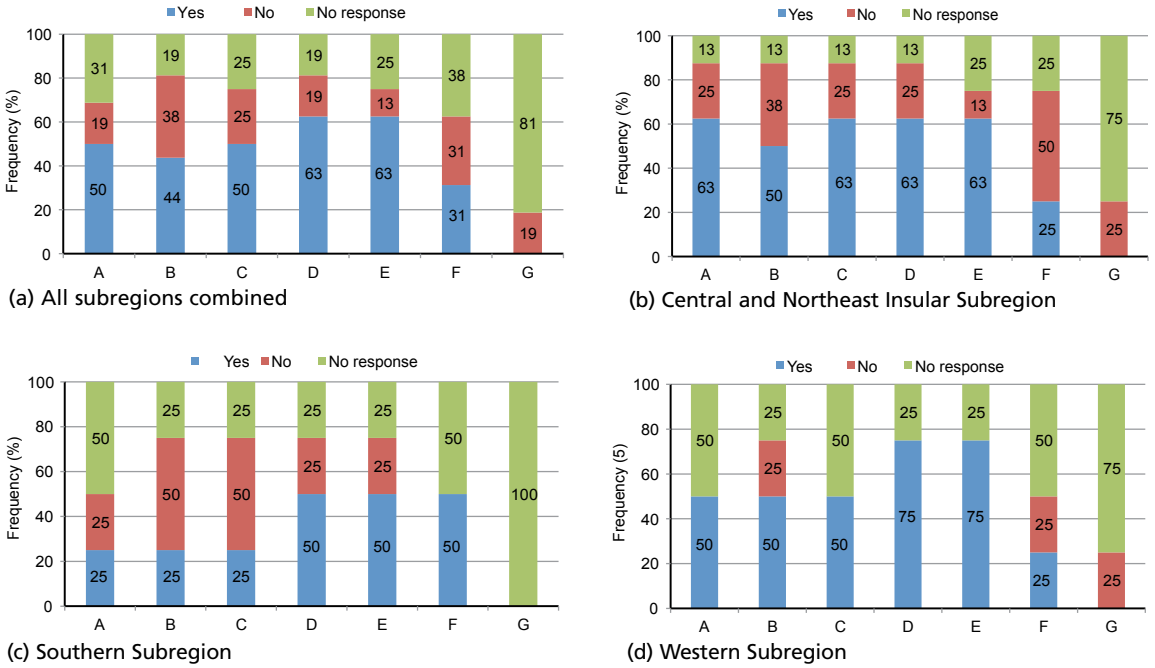
Note: Number of countries providing fisheries-related data to the regional/international organizations identified. Responses to "Other" specifically identified: OSPESCA, the CLME project and NOAA.

3.8 MANAGEMENT OF FISHING CAPACITY

In most countries (67 percent of 15 responding countries), efforts had commenced to measure fishing capacity. Despite this, a thorough understanding of the levels of fishing capacity was lacking in most countries, and only 13 percent of 15 responding countries reported that they had completed the measurement of fishing capacity for all their marine capture fisheries. The greatest obstacles to completing this task, as perceived by national respondents, were: lack of stakeholder support and education (63 percent of all 16 countries surveyed) and lack of human resources (also 63 percent of 16 countries), with budget and data constraints also reported with notable

FIGURE 15

Frequency of responses identifying the primary obstacles preventing completion of measurement of fishing capacity in marine capture fisheries



Notes: Frequency (percentage of all countries surveyed, by subregion) of responses identifying the primary obstacles preventing completion of measurement of fishing capacity in marine capture fisheries: A – budget constraints; B – lack of political will; C – lack of supporting data to make measurements; D – lack of human resources; E – lack of stakeholder support and education; F – other more urgent fisheries priorities; G – other. The information is illustrated for: (a) all subregions combined; (b) countries of the Central and Northeast Insular Subregion; (c) countries of the Southern Subregion; (d) countries of the Western Subregion.

frequency (50 percent of 16 countries for both constraints) (Figure 15a). Besides these more common limitations, lack of political will was also frequently reported in the Central and Northeast Insular and Western subregions (50 percent of 8 countries and 50 percent of 4 countries, respectively), while countries in the Southern Subregion reported that other more-urgent fisheries management priorities were just as important a constraint (50 percent of 4 countries) as lack of stakeholder support and human resource limitations (Figures 15b–d). These results suggest a lack of full appreciation by countries of the usefulness of fishing capacity information and knowledge at the level of the primary stakeholder and/or at the level of senior management decision-making. Thus, the importance of this task may not have been promoted at the political and stakeholder levels sufficiently to obtain the necessary support.

3.9 MARINE CAPTURE FISHERIES UNDER MANAGEMENT – GENERAL CHARACTERISTICS

In 50 percent of all 16 countries, more than two-thirds of the marine capture fisheries were considered "managed in some way" at the national level, with a lower frequency of this level of management, less than 67 percent of fisheries managed in some way, occurring at the regional (31 percent of 16 countries) and local (38 percent of 16 countries) levels. For those fisheries considered managed, 19 percent of all 16 surveyed countries had formally documented management plans for national-level management of more than 67 percent of their fisheries (Figure 16a). While 38 percent of the 16 countries reported having regulations governing the majority (more than 67 percent) of managed fisheries at the national level, for more than 67 percent of fisheries regulated at the national level, the regulations were informed by methodical

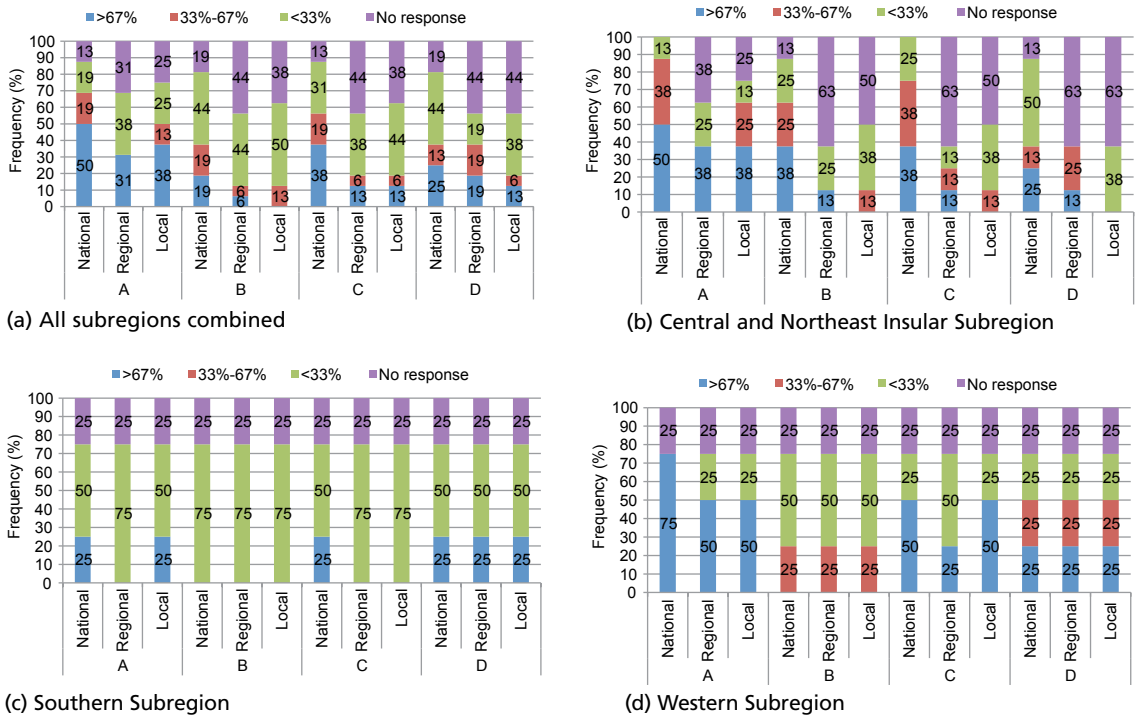
scientific monitoring and evaluation in only 25 percent of the 16 countries. The corresponding figures for management achievements at the regional and local levels were less optimistic, in that order.

The situation for the Central and Northeast Insular Subregion seemed to be the most balanced, especially in view of the small size of the islands concerned, and hence an expected natural greater emphasis on national-level activities in terms of plans and regulations (Figure 16b). The situation appeared worst in the Southern Subregion, where management in some form, plans, regulations and monitoring were identified most frequently for less than 33 percent of the fisheries (Figure 16c). While the Western Subregion appeared to show comparatively higher-level achievement frequencies regarding fisheries regulations, these were not equally matched with achievement levels in development of fisheries management plans and scientific monitoring and evaluation of management performance (Figure 16d).

There was a strong perception by the surveyed countries that the number of fisheries managed had increased over the past ten years (national level – 60 percent of 15 responding countries, regional – 67 percent of 12 responding countries, local – 54 percent of 13 responding countries), but 31 percent of 13 responding countries felt that there were major fisheries (in terms of weight of landings) that were not currently being managed. Moreover, 87 percent of 15 responding countries did not have a formal definition of overfishing within their management frameworks.

FIGURE 16

Frequency of responses identifying various management achievements at the national, regional and local levels



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency of responses, by percentage category of all countries surveyed, by subregion, identifying various management achievements at the national, regional and local levels, specifically: A – percentage of fisheries managed in some way; B – percentage of fisheries with formal management plans; C – percentage of fisheries with published regulations; D – percentage of fisheries for which regulations are based on methodical scientific monitoring and evaluation. The information is illustrated for: (a) All subregions combined; (b) countries of the Central and Northeast Insular Subregion; (c) countries of the Southern Subregion; (d) countries of the Western Subregion.

4. Review of fisheries management tools in use within the largest marine capture fisheries

All the country respondents were asked to identify up to three major commercial/ industrial, small-scale and recreational fisheries for their country. A list of these fisheries, by name, is given in Appendix 1. Among the major fisheries identified by all 16 countries surveyed, there were 25 commercial/large-scale, 39 small-scale and 19 recreational fisheries (Table 3). Table 3 also provides the numbers of major commercial/large-scale, small-scale and recreational fisheries by subregion. As countries did not always identify three major fisheries in each subsector (commercial/ large-scale, small-scale and recreational), charts in this section of the report illustrate the frequency of occurrence of criteria as a percentage of the number of major fisheries actually identified by fishery subsector and by subregion, as noted in Table 3.

TABLE 3
Numbers of major fisheries identified by country respondents, by fishery subsector and by subregion

Fishery Subsector	All subregions combined	Central and Northeast Insular Subregion	Southern Subregion	Western Subregion
Commercial/ Large-scale	25	3	10	12
Small-scale	39	20	10	9
Recreational	19	9	3	7

4.1 General Characteristics of Fishery and Activity Trends

Based on data and information from the survey, there were many more vessels involved in small-scale fishing compared with commercial/large-scale operations (Table 4). Notwithstanding, reported landings by the commercial/large-scale subsector were more than three times higher than known landings for the major small-scale fisheries of the region. The complex and extensive distribution of small-scale artisanal fishing operations is known to pose challenges for sampling these fisheries (Bahri, 2011) and, hence, the reported small-scale fish landings may be under-reported.

TABLE 4
Recent annual total landings by major fisheries and total number of current fishing vessels in the region, based on country estimates provided during survey

	Commercial / Large-scale[a]	Small-scale	Recreational
Total landings (tonnes)	1.2 million[b]	369 298[c]	No data from most countries
Number of vessels	3 031[d]	63 254[e]	2 358[f]

[a] Seven of the 16 countries indicated that no commercial fisheries exist.

[b] Estimated recent annual landings provided for and totalled over 15 major commercial/large-scale fisheries operating in six countries (Brazil, Mexico, Nicaragua, Suriname, Trinidad and Tobago and Venezuela [Bolivarian Republic of]).

[c] Estimated recent annual landings provided for and totalled over 36 major fisheries operating in 13 countries (no estimates available for Caribbean Netherlands, the Dominican Republic and Panama).

[d] Estimated recent number of fishing vessels in 18 major commercial/large-scale fisheries operating in 7 countries (Colombia, Mexico, Nicaragua, Panama, Suriname, Trinidad and Tobago and Venezuela [Bolivarian Republic of]).

[e] Estimated recent number of fishing vessels in 31 major small-scale fisheries operating in ten countries (no data available for Brazil, Caribbean Netherlands, Dominica, the Dominican Republic, Suriname and Trinidad and Tobago).

[f] Estimated recent number of fishing vessels in 11 major recreational fisheries operating in 7 countries (Aruba, Mexico, Nicaragua, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago, and Venezuela [Bolivarian Republic of]).

In 57 percent of 21 major commercial/large-scale fisheries, the number of vessels was reported to have decreased over the most recent ten-year period, while this number remained unchanged or increased for 24 percent and 19 percent of these 21 fisheries, respectively. In contrast, the small-scale and recreational fisheries reported increases in numbers of vessels more often than not: the number of vessels increased in 51 percent of cases based on data of 35 of the major small-scale fisheries and in 100 percent of cases based on data of 12 major recreational fisheries.

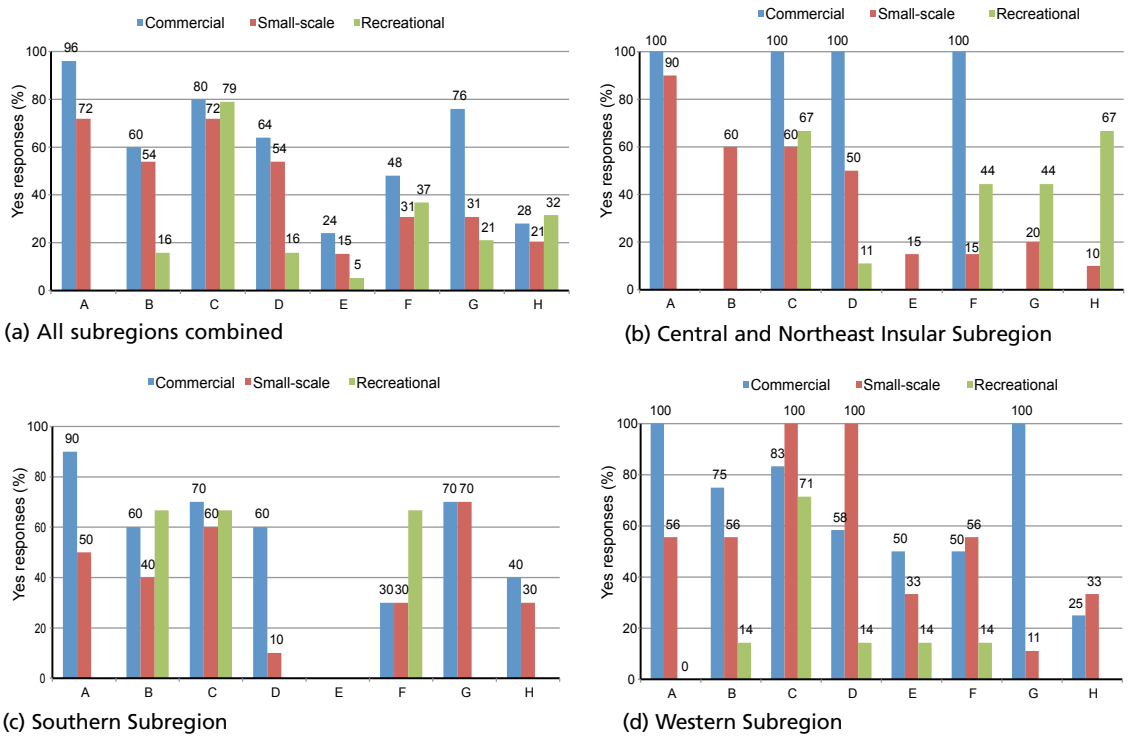
In most cases (96 and 72 percent of 25 major commercial and 39 major small-scale fisheries, respectively), the fisheries with highest catch levels were also the fisheries yielding the highest value (Figure 17a). Fisheries-specific management plans were in place for about 60 and 54 percent of the 25 major commercial and 39 small-scale fisheries, respectively, while in the recreational subsector, they were very uncommon (16 percent of 19 major fisheries). Most of the major fisheries were also multispecies in nature (80 percent – commercial fisheries, 72 percent – small-scale, 79 percent – recreational), but this aspect was not exactly accounted for within the management schemes (64 percent – commercial fisheries, 54 percent – small-scale fisheries, 16 percent – recreational fisheries). Explicit inclusion of ecosystem considerations was only occasionally made (highest was 24 percent for commercial fisheries), but there was comparatively better apparent application of the precautionary approach (48 percent – commercial, 31 percent – small-scale, 37 percent – recreational). The major commercial fisheries were much more likely to provide the sole source of income for their participants (76 percent). In addition, fish products provided an important food source in 28, 21 and 32 percent of the major commercial, small-scale, and recreational fisheries, respectively (Figure 17a). The 32 percent level reported for the recreational fisheries was dominated by the situation of the Central and Northeast Insular Subregion, where recreational fishing is known to provide both a source of recreation and to supplement food supplies in an opportunistic way.

The prevalence of the multispecies nature of all types of fisheries in the three subregions was evident, and this was also mirrored in management plans at comparable levels of occurrence with certain exceptions: the recreational fisheries for the Central and Northeast Insular and Western subregions, and the small-scale fisheries in the Southern Subregion (Figure 17b–d). Generally, countries reported better progress in implementing the precautionary approach compared with the ecosystem approach, with relatively little or no application success for the ecosystem approach in the Central and Northeast Insular and the Southern subregions. It should be noted though that in terms of the explanations provided in several cases, as certain regulations had been adopted without scientific information, these were considered precautionary actions by the countries concerned. Similarly, the one country in the Central and Northeast Insular Subregion that reported three major commercial fisheries indicated that, where several species were being harvested and specific regulations such as minimum size, measures were in place to control harvests of each of the species concerned; this management approach was considered an application of the ecosystem approach, resulting in the corresponding 100 percent-level illustrated in Figure 17b.

The dependence on the fishery as a sole source of income and a sole source of food varied by subregion. In the Central and Northeast Insular Subregion, the recreational fishery participants had the highest dependence for income purposes (44 percent of 9 major fisheries), followed by the small-scale fisheries (20 percent of 20 major fisheries) (Figure 17b). In contrast, in the Southern Subregion, both the commercial and small-scale fisheries were equally important in providing a sole source of income for the participants (70 percent of 10 major commercial fisheries and 70 percent also of 10 major small-scale fisheries) (Figure 17c). In the Western Subregion, participants in all seven major commercial fisheries (100 percent) were dependent on the fishery as a sole source of income (Figure 17d). Participants of both the major commercial and small-scale fisheries

FIGURE 17

Frequency of occurrence (of additional characteristics of the top three fisheries from each subsector



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency of occurrence (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of additional characteristics of the top three fisheries from each subsector: A – also the top-value fisheries; B – have management plans; C – are multispecies fisheries; D – multispecies characteristic is reflected in management plans; E – ecosystem considerations are provided for in management plans; F – precautionary approach addressed in specific ways; G – provide the sole source of income to participants; H – provide the sole source of food for participants. The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

of the Southern and Western subregions had a higher dependence on these fisheries as a source of food than the corresponding major fisheries of the islands. Finally, the recreational fisheries of the Southern and Western subregions did not provide either a sole source of income or food for the fishery participants concerned. It is not unreasonable to assume that these subregional differences in terms of income and food dependence are likely to be linked to similar subregional differences in social and economic factors affecting overall human and social well-being.

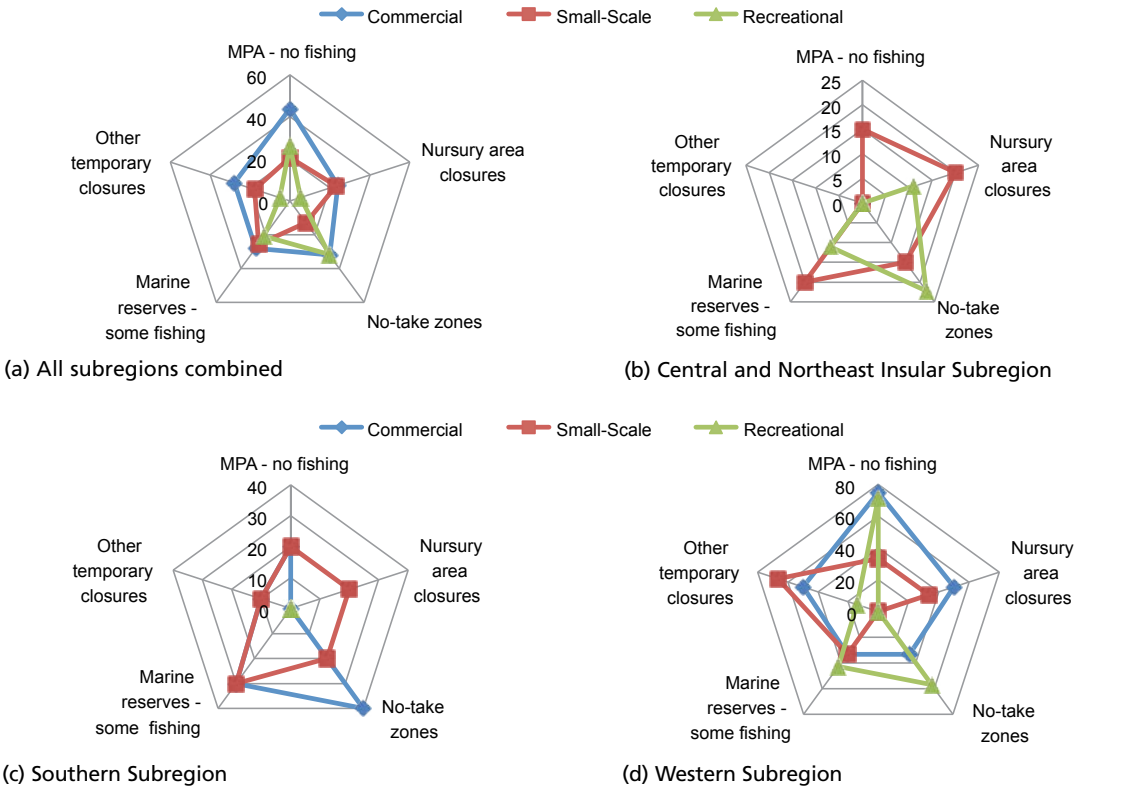
4.2 Management Tools in Use Within the Major Fisheries

The technical measures utilized to manage fisheries were categorized under five themes: (i) spatial restrictions; (ii) temporal restrictions; (iii) gear restrictions; (iv) rights and participatory restrictions; and (v) catch and size restrictions (Figures 18–22).

Spatial restrictions were popular, especially MPAs, no-take zones, nursery closures and marine reserves (Figure 18a). Generally, a broad range of spatial measures was applied to small-scale fisheries in the three subregions examined, with the highest frequency of such application indicated by countries of the Western Subregion (Figures 18b–d). In the Central and Northeast Insular and the Southern subregions, the use of marine reserves and nursery area closures had the highest reported frequencies for small-scale fisheries compared with other subsectors in these subregions. In respect of commercial fisheries, the no-take zone was the most popular spatial measure in the Southern Subregion, while MPAs, nursery area and other temporary closures

FIGURE 18

Frequency of the use of spatial restrictions for management of the major fisheries identified in three subsectors



Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of the use of spatial restrictions for management of the major fisheries identified in the three subsectors (blue = commercial, red = small-scale, green = recreational) for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

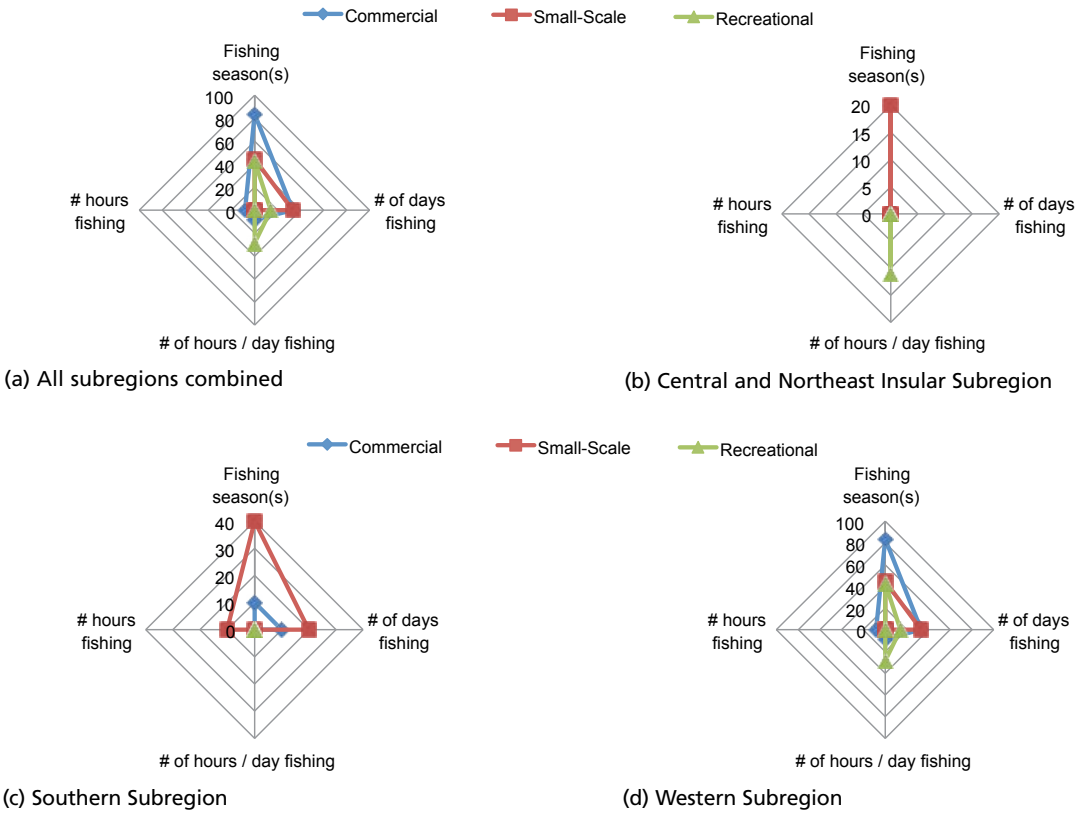
were more common in the Western Subregion. In this instance, it should be noted that terminology, as well as application, of the measure varied by country, e.g. use of the terms MPA and marine reserves, as well as levels of fishing allowed in these areas. In the case of recreational fisheries, no-take zones were used most in the Central and Northeast Insular Subregion, while both no-take zones and MPAs were equally popular in the Western Subregion. Spatial measures did not appear to be used to any measurable amount for recreational fisheries in the Southern Subregion.

Generally, fishing season was the most popular temporal measure applied for both the commercial and small-scale subsectors (Figure 19a). Regarding small-scale fisheries, fishing season was the most popular temporal measure of the Central and Northeast Insular and the Southern subregions (Figure 19b, c). In comparison, limitation of the number of fishing days was also indicated for the commercial and small-scale fisheries of the Southern and Western subregions, although this measure was less frequently applied in all cases (Figure 19c, d). There was a general low level of use of temporal measures for managing recreational fisheries. While fishing season was most used (43 percent) for these fisheries of the Western Subregion, notable applications of hours per fishing day (29 percent) and number of fishing days (14 percent) were also reported. Hours per fishing day was also the main measure indicated for the recreational fisheries of the Central and Northeast Insular Subregion, when used (11 percent of the major fisheries identified) (Figure 19b, d).

Gear restrictions were very popular, with gear size measures showing highest overall frequency of usage for the commercial and small-scale fisheries (56 and 51 percent of major fisheries, respectively), and hook-and-line measures most frequent in the case

FIGURE 19

Frequency of the use of temporal restrictions for management of the major fisheries identified in three subsectors



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

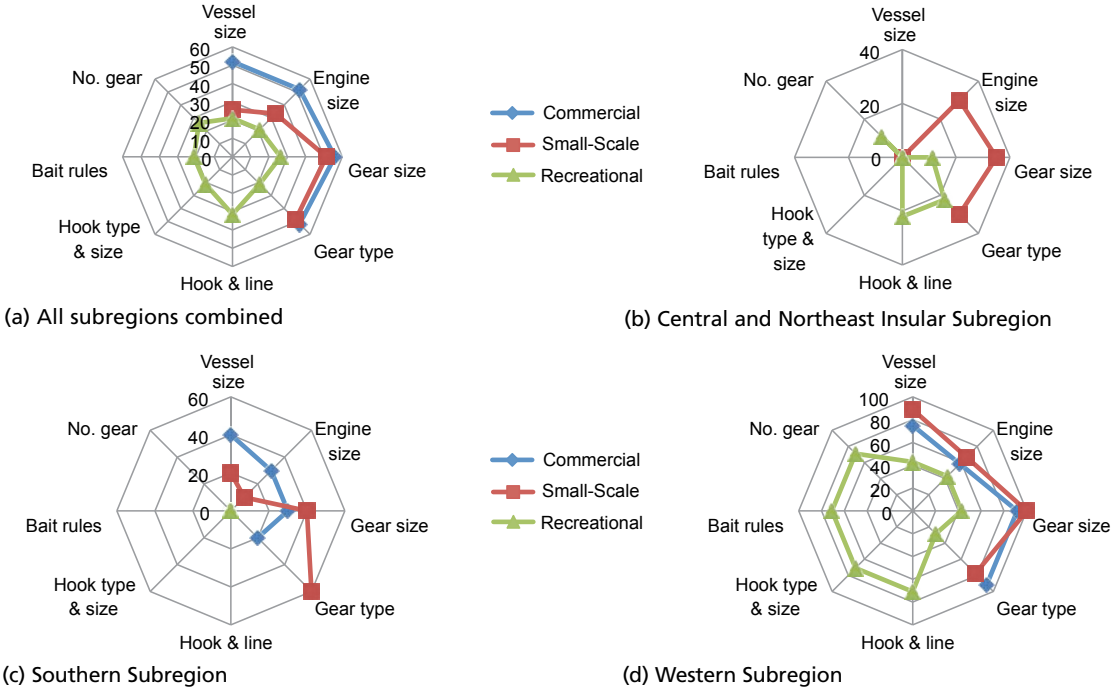
Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of the use of temporal restrictions for management of the major fisheries identified in the three subsectors (blue = commercial, red = small-scale, green = recreational) for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

of the recreational fisheries (32 percent of major fisheries) (Figure 20a). Regarding subregional differences, vessel size measures were most popular for commercial fisheries (40 percent of major fisheries) in the Southern Subregion, followed by engine size and gear size (30 percent of major fisheries in each case) (Figure 20b). In the case of small-scale fisheries in the Southern Subregion, gear type was the most frequent measure (60 percent of major fisheries), followed by gear size (40 percent of major fisheries). In the Western Subregion, gear size and type were the most frequently used fishing effort restriction for commercial fisheries (92 percent of major fisheries in each case), and gear size and vessel size were the most used for small-scale fisheries (100 and 89 percent of major fisheries, respectively) (Figure 20c, d). The broadest range and highest usage of fishing effort measures for the recreational fisheries occurred in the Western Subregion (Figure 20b–d).

For regulating participation levels, a licensing system was the most common tool used, followed by use of limited entry, in both commercial and small-scale fisheries across the region, while commercial sale restrictions was the most popular of such measures in respect of the recreational fisheries (Figure 21a). This pattern was generally reflected in each of the subregions, with generally a higher frequency usage of licensing systems reported for commercial fisheries compared with small-scale fisheries (Figure 21b–d). Among the subregions, the Southern Subregion reported the lowest application of licensing for small-scale fisheries. In addition, a few other rights and participatory restriction measures were also in use: in the Southern Subregion, territorial use rights

FIGURE 20

Frequency of the use of fishing effort restrictions for management of the major fisheries identified in three subsectors



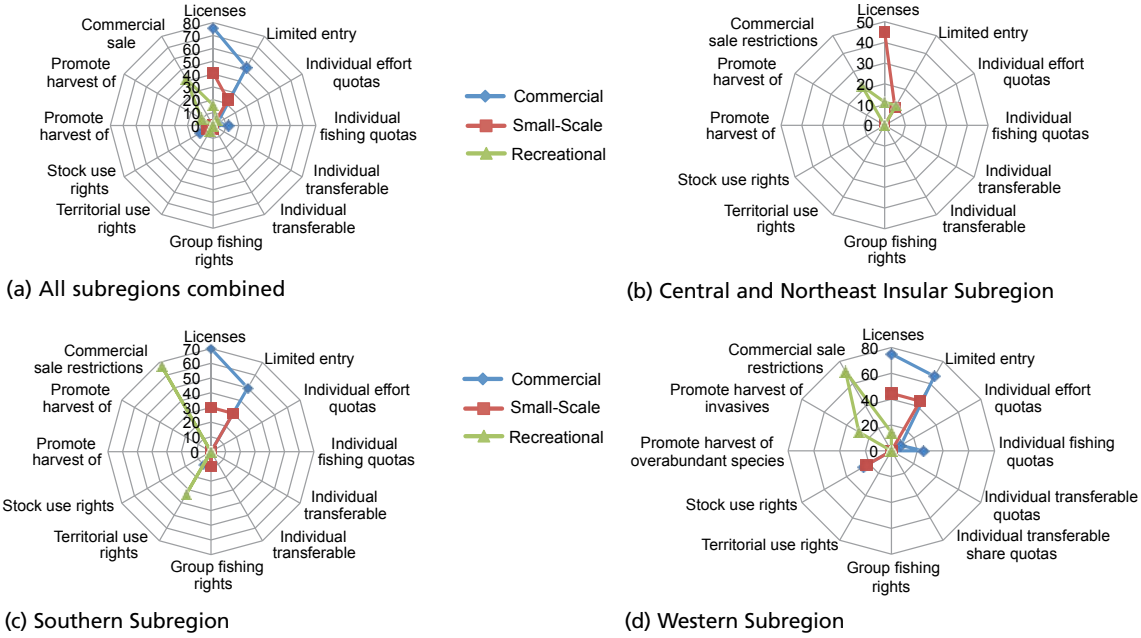
Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of the use of fishing effort restrictions for management of the major fisheries identified in the three subsectors (blue = commercial, red = small-scale, green = recreational) for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

for recreational fisheries (33 percent of major fisheries) and group fishing rights for both commercial and small-scale fisheries (in each case, 10 percent of major fisheries); in the Western Subregion, stock use rights for commercial and small-scale fisheries (25 and 22 percent of major fisheries, respectively), individual fishing quota allocations for commercial fisheries (25 percent of major fisheries) and promotion of harvest of invasive species for recreational fisheries (29 percent of major fisheries) (Figure 21c, d).

Generally, regarding catch/harvest restrictions, total allowable catch (TAC) and size restrictions were the most common for commercial and small-scale fisheries, and the broadest range of measures was indicated for recreational fisheries (Figure 22a). In the Central and Northeast Insular Subregion, size restrictions was the most commonly indicated, being applied in 25 percent of the major small-scale fisheries identified (Figure 22b). However, TAC, size and vessel catch limits appeared to be used more or less equally in the Southern Subregion for small-scale fisheries, being applied in about 10 percent of the major fisheries identified in each case. In this subregion, size restrictions were more frequently applied to commercial fisheries (30 percent of major fisheries) compared with the use of TAC (20 percent of major fisheries) (Figure 22c). In the case of the Western Subregion, TAC was the most commonly applied catch restriction measure for both commercial (75 percent of major fisheries) and small-scale fisheries (56 percent of major fisheries) (Figure 22d). To a much lesser extent in the Western Subregion, size restrictions and individual vessel quotas (each used in 25 percent of major fisheries) were applied to commercial fisheries, and individual vessel quotas were applied to small-scale fisheries (11 percent). In contrast, recreational fisheries in the Western Subregion were subjected to a broad range of catch restriction measures, with 71 percent of major fisheries identified as using bag limit measures (Figure 22d).

FIGURE 21

Frequency of the use of rights/incentive adjusting restrictions for management of the major fisheries identified in three subsectors



(a) All subregions combined

(b) Central and Northeast Insular Subregion

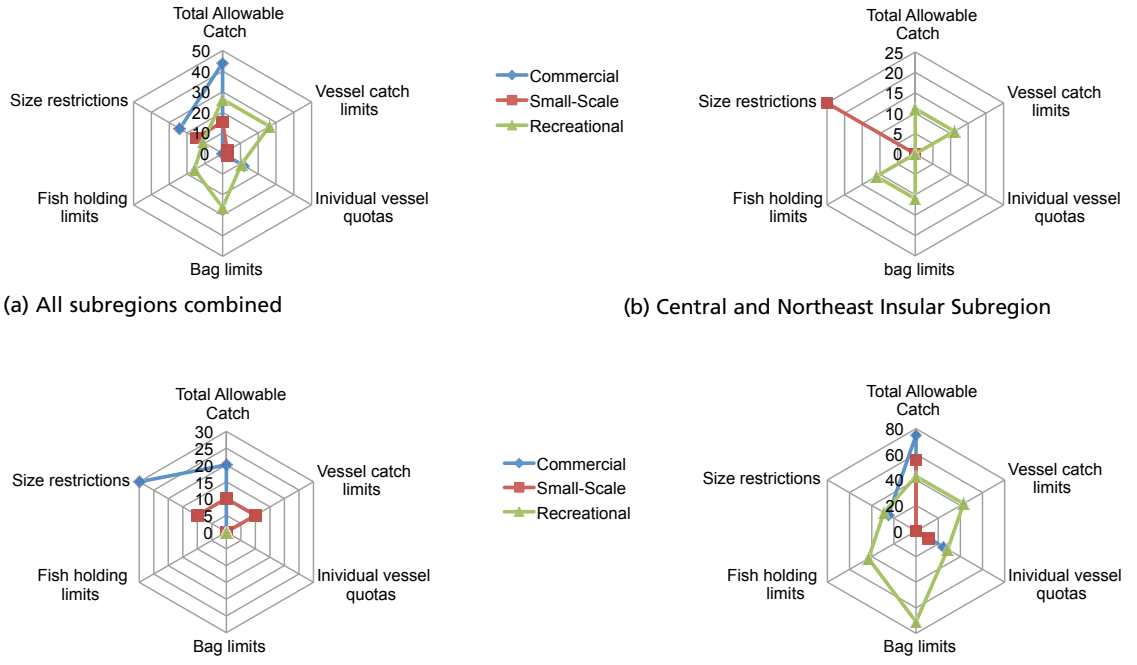
(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of the use of rights/incentive adjusting restrictions for management of the major fisheries identified in the three subsectors (blue = commercial, red = small-scale, green = recreational) for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

FIGURE 22

Frequency of the use of catch and size restrictions for management of the major fisheries identified in three subsectors



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of the use of catch and size restrictions for management of the major fisheries identified in the three subsectors (blue = commercial, red = small-scale, green = recreational) for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

In the last ten years, the measures that have been used with increasing frequency by commercial/large-scale fisheries have been international regulations (16 percent of the 25 major commercial fisheries identified), followed by spatial measures (14 percent of major fisheries) and then use of size restrictions and taxes (increases in 12 percent of major fisheries in each case). On the other hand, in the small-scale subsector, tools that have grown the most in usage in the past ten years have included spatial and gear measures (in each case, increases reported by 19 percent of the 39 major small-scale fisheries identified), followed by size measures being used increasingly in 15 percent of these fisheries. For recreational fisheries, few applications of measures were indicated. Where indicated and over the past ten years, there has been the most increased usage of spatial measures, reported for 12 percent of the 19 major recreational fisheries identified, followed by gear measures, with increased usage reported for 9 percent of cases.

4.3 FUNDING OUTLAYS AND COST-RECOVERY IN FISHERIES MANAGEMENT WITHIN THE MAJOR FISHERIES

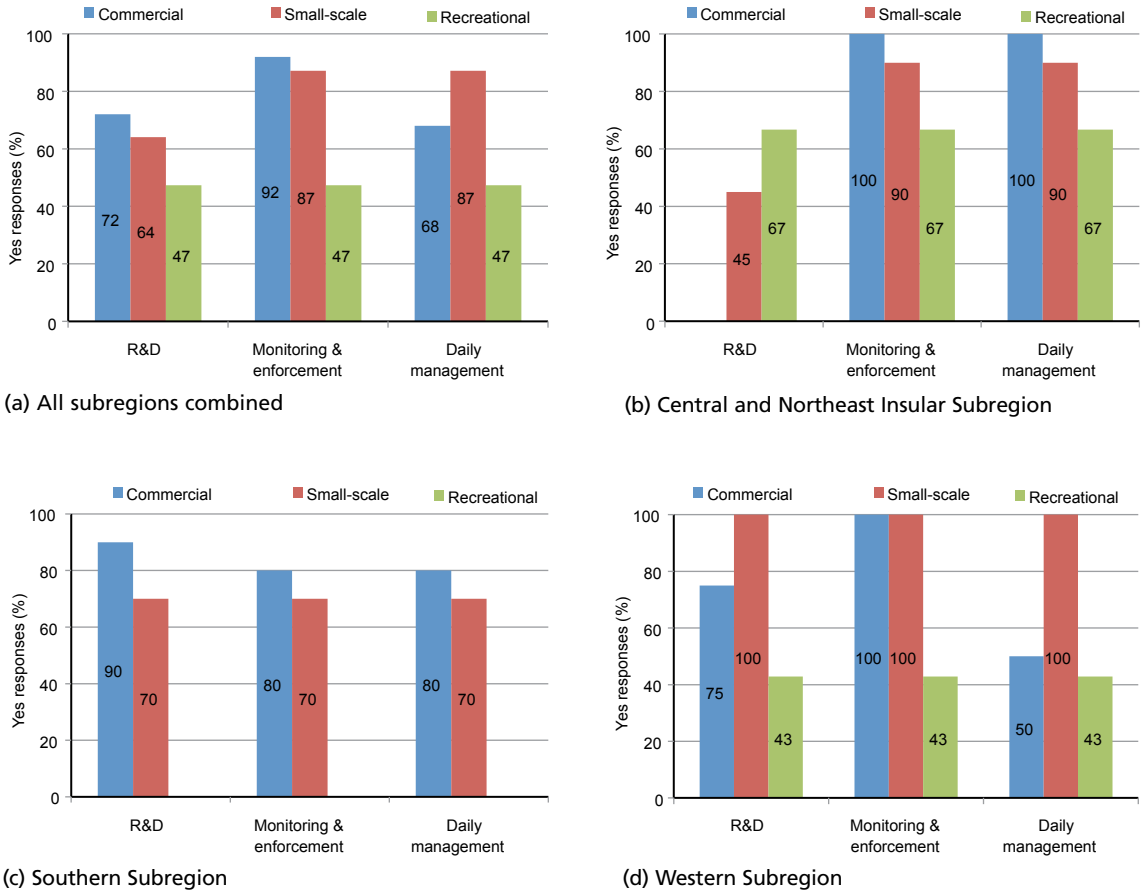
Government funding for management of the major fisheries included, *inter alia*, R&D, monitoring and enforcement, and daily management. Generally, the available funding targeted commercial and/or small-scale fisheries more heavily than recreational fisheries (Figure 23a). In addition, monitoring and enforcement and daily management activities consumed most of the budget allocations. In the Central and Northeast Insular Subregion, where only three major commercial fisheries were identified, management funds were used entirely for monitoring and enforcement and daily management activities for these fisheries (Figure 23b). The highest number of major small-scale fisheries was identified for this region (20), and available funds were also being spent mostly on monitoring and enforcement and daily management (90 percent of major fisheries identified), with 50 percent of these fisheries also receiving funds for R&D activities (Figure 23b). In comparison, funds were equally divided among the various management activities in the case of the 9 major recreational fisheries identified in the Central and Northeast Insular Subregion (67 percent of fisheries covered for each activity) (Figure 23b).

In the Southern Subregion, management funds were slightly more frequently allocated to the 10 main commercial fisheries than the 10 main small-scale fisheries in all three aspects (Figure 23c). Moreover, R&D activities for commercial fisheries were also more frequently supported than monitoring and enforcement and daily management tasks (Figure 23c), while small-scale fisheries enjoyed equally distributed funding among the three types of management activities. In contrast, no government funding was indicated for the three major recreational fisheries identified in the Southern Subregion.

In the Western Subregion, availability of government funding was indicated for all fishery types (commercial, small-scale and recreational fisheries), although least frequently for recreational fisheries (Figure 23d). While 100 percent of the 12 major commercial fisheries received funding for monitoring and enforcement, 75 percent were being covered for R&D tasks and 50 percent for daily management. In comparison, government funds were used to cover equally the 3 management tasks for all 9 major small-scale fisheries and for 43 percent of the 7 major recreational fisheries identified for this subregion (Figure 23d).

Generally, on average across the major fisheries, management cost-recovery mechanisms were not applied in all such fisheries. Where applied, such mechanisms most often involved collection of licence fees, usually from the same fishery or other fisheries of the same subsector (Figure 24a). Management cost-recovery for 23 percent of the 39 major small-scale fisheries and for 5 percent of the 19 major recreational fisheries also depended also on licence fees paid by fisheries in other subsectors.

FIGURE 23
Frequency of application of government management budget outlays for the major fisheries identified across all surveyed countries



(a) All subregions combined

(b) Central and Northeast Insular Subregion

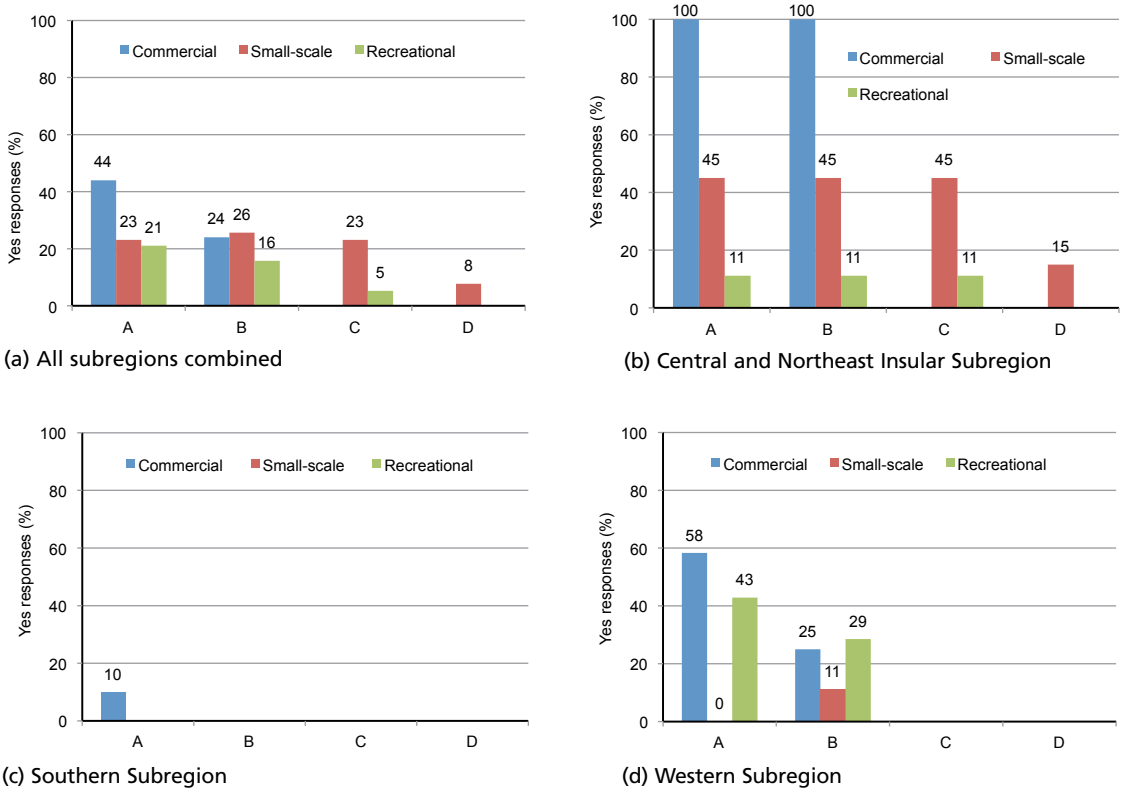
(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of application of government management budget outlays for the major fisheries identified (commercial (blue), small-scale (red) and recreational (green) across all surveyed countries for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

Resource rents were also applicable for 8 percent of the major small-scale fisheries (Figure 24a). This general pattern of highest dependence by commercial and recreational fisheries on licence fees obtained from the fisheries directly affected was apparent in all the subregions (Figure 24b–d). However, some differences should be noted. The very high use of licensing for commercial fisheries in the Central and Northeast Insular Subregion could be explained by the fact that this reflected data for the three fisheries operated within one country; besides this difference, the pattern seen for the Central and Northeast Insular Subregion is similar to the general pattern for the overall region. The lowest application of any management recovery mechanisms was reported in the Southern Subregion: applied in 10 percent of the major commercial fisheries identified, and no application for small-scale and recreational fisheries (Figure 24c). Moreover, in the Western Subregion, there was low application of cost-recovery efforts for the small-scale fisheries: only 11 percent of major fisheries used licence fees, and these were from similar small-scale fisheries (Figure 24d). These observations reflect management systems in which public resources are managed mostly using public funds controlled by governments. This may, in turn, reflect a desire to retain top-down management arrangements and/or a lack of will by stakeholders to share more management costs.

FIGURE 24
Frequency of usage of fisheries management cost-recovery sources provided for in national legislation covering the top three fisheries in each subsector



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of usage of fisheries management cost recovery sources provided for in national legislation covering the top three fisheries in each subsector: A – licence fees in the fishery; B – licence fees in other fisheries of the subsector; C – licence fees in other fisheries of other subsectors; D – resource rents. The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (c) surveyed countries of the Western Subregion.

These mechanisms have not facilitated recovery of the full management costs. Hence, in the commercial subsector, increasing costs of fisheries management were predominantly being funded by increased government spending (52 percent of 25 major fisheries) rather than through participants in the fishery (32 percent) or other sources (24 percent). Government funding was also primarily relied upon to cover increasing costs in the small-scale subsector: 28 percent from government, compared with 20 percent obtained through fishery participants. However, other sources were almost as important as government funding for covering increasing costs in 27 percent of the 39 major small-scale fisheries identified. This trend was not apparent in the recreational subsector, with government funding at 12 percent of the 19 major fisheries identified, compared with 10 percent of fisheries receiving funding from participants and 9 percent of fisheries being covered also by other sources. In the commercial and small-scale fishery subsectors, heavy reliance on government funding reinforces the earlier interpretation that management remains primarily top-down (i.e. government controlled), rather than bottom-up. These observations suggest that either national governments do not want fishery participants to contribute financially, which would also support a shared management responsibility arrangement, and/or fishery participants feel that they have no control and thus are reluctant to share management costs. This creates a situation in which other/external sources can contribute to costs, and this provides such contributors opportunity to influence management progress within the countries concerned.

4.4 PARTICIPATORY MECHANISMS AND CONFLICT MANAGEMENT WITHIN THE LARGEST FISHERIES

Stakeholder involvement in the fisheries management process is considered essential for its success and is thus a key principle contained in the FAO Code on Conduct for Responsible Fisheries, which gives some recognition to multiple objectives, roles and responsibilities within each fishery and the need to foster compliance among stakeholders with any agreed upon management measures (De Young, 2006).

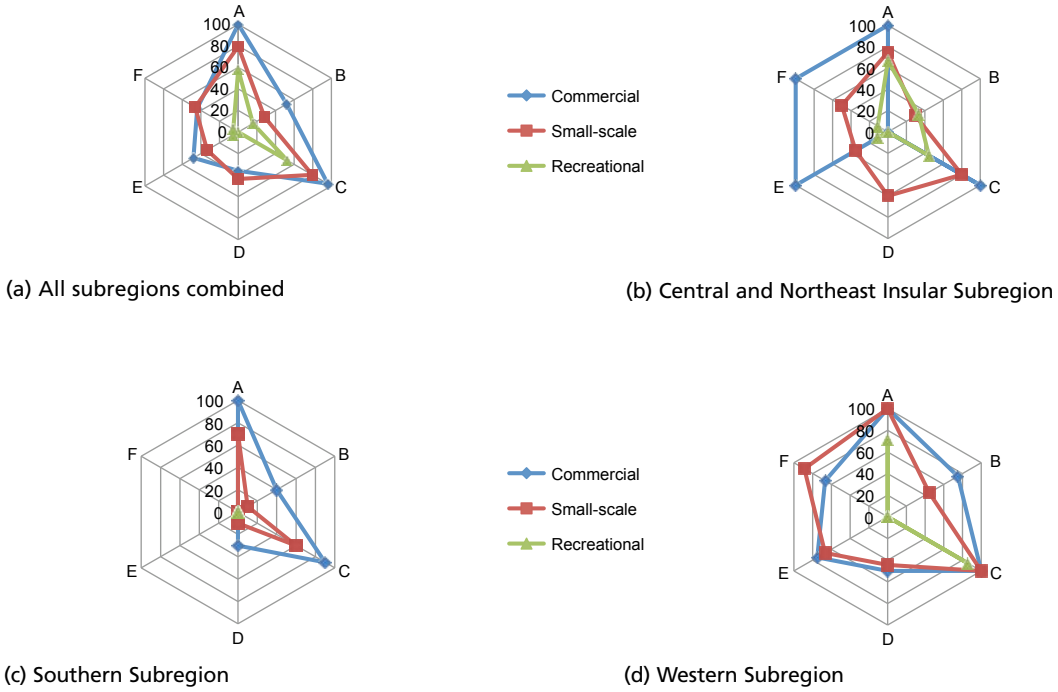
Overall, a formal definition of stakeholders in management plans was not common for commercial fisheries, was less common for small-scale fisheries and least common for recreational fisheries. Generally, in all three major subsectors, efforts to engage stakeholders focused mostly on identifying such stakeholders and consulting with them, with the frequency of both actions decreasing in the following order: commercial, small-scale and recreational (Figure 25a). However, consultation with stakeholders resulted in a faster management process in about 48 percent of the 25 major commercial fisheries and in 33 percent of the 39 major small-scale fisheries, but only 5 percent of major recreational fisheries. The success rate of the participatory approach, as currently practised, in helping to reduce conflict was reported to be 44 and 46 percent for the commercial and small-scale subsectors, respectively, while it was minimal for the recreational subsector (5 percent of major fisheries). In terms of creating incentives and reasons for stakeholders to voluntarily practise "responsible" fisheries stewardship, the success rate was highest for the small-scale subsector at 44 percent, followed by a 36 percent success rate for the commercial subsector. However, a 0 percent rate was reported in terms of incentives for voluntary stewardship among major recreational fisheries (Figure 25a).

Compared with the general overall regional pattern, slightly higher levels of stakeholder definition, consultation, achievement of voluntary stewardship, expediting the management process and conflict reduction were reported for the 20 small-scale fisheries in the Central and Northeast Insular Subregion, where such fisheries are the most common and largest (Figure 25b). The achievements in stakeholder participation for the recreational subsector were also slightly better than the general regional picture in all aspects except consultation, where it was slightly less (44 percent of 9 major fisheries compared with 53 percent of 19 fisheries, which was the overall regional level of performance), and the nurturing of voluntary stewardship, in which it was equal to the general pattern, i.e. remaining at 0 percent. In the case of the three major commercial fisheries identified in only one country, there was a 100 percent success rate recorded for stakeholder identification, consultation, quickening the management process and conflict reduction.

In the Southern Subregion, participatory management achievements were more frequently reported only for stakeholder identification (100 percent of the 10 major commercial fisheries identified for the Southern Subregion and 70 percent of the 10 major small-scale fisheries) and consultations (90 and 60 percent of the major commercial and small-scale fisheries, respectively) (Figure 25c). Defining stakeholders in management plans and achieving voluntary stewardship were reported for about 40 and 30 percent, respectively, of the 10 commercial fisheries, with only a 10 percent success rate reported for both actions for the 10 small-scale fisheries. In addition, no aspects of participatory management were apparently occurring to any measurable extent for the three major recreational fisheries identified in the Southern Subregion (Figure 25c). In the Southern Subregion, the performance levels for stakeholder involvement were usually less than the levels indicated for all subregions combined (overall regional levels), except for stakeholder identification performance in respect of the major commercial fisheries, where it was the same.

Similar to the other subregions, stakeholder identification and consultation were most frequently practised in the Western Subregion (Figure 25d). These activities were

FIGURE 25
Frequency of reported participatory mechanisms in the major fisheries identified among three subsectors



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of reported participatory mechanisms in the major fisheries identified among the three subsectors (commercial – blue diamond, small-scale – red square and recreational – green triangle): A – efforts to identify stakeholders; B – definition of stakeholder in management plans; C – consultation with stakeholders; D – participants' confidence that the management system creates incentives for voluntary stewardship; E – stakeholder participation has made the management process faster; F – stakeholder consultation has helped reduce conflict. The information is illustrated for: (a) all subregions combined; (b) surveyed countries comprising the Central and Northeast Insular Subregion; (c) surveyed countries comprising the Southern Subregion; (d) surveyed countries of the Western Subregion.

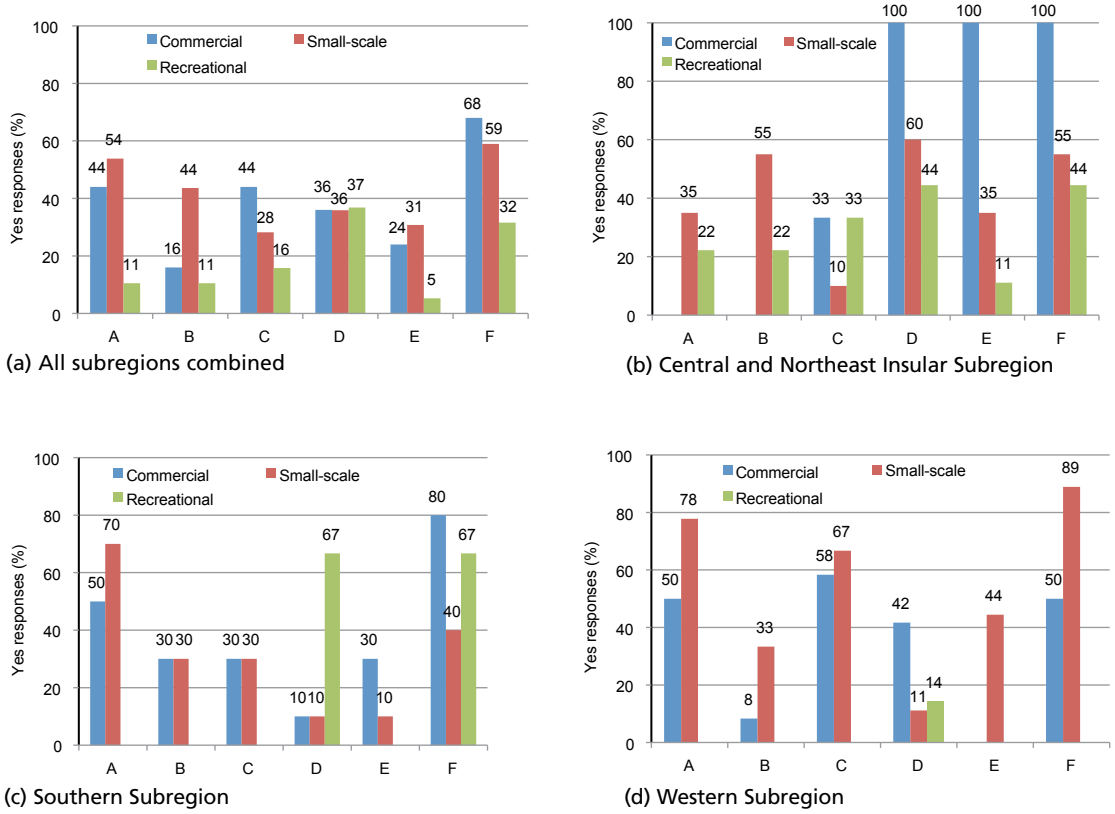
taking place in all (100 percent) of the 12 major commercial and 9 major small-scale fisheries. In the 7 major recreational fisheries, stakeholder identification had taken place in 71 percent of these fisheries, and consultations in 86 percent of cases. There was also a high frequency of reports on achievements in defining stakeholders in management plans, creating voluntary stewardship, quickening the management process and conflict reduction for both commercial and small-scale fisheries, with slightly higher frequencies generally noted for commercial fisheries as compared with small-scale fisheries, except for conflict reduction, where a higher success rate was noted for small-scale fisheries. Besides stakeholder identification and consultation, other areas and benefits of participatory management were not reported for recreational fisheries (Figure 25d). Compared with the performance levels for the various participatory approach indicators observed at the wider regional level for all subregions combined, the corresponding performance levels were usually higher in the Western Subregion for all three major subsectors.

Generally, although it was found that participatory measures had assisted in reducing conflict within and among fisheries, conflicts were found to be increasing in 40, 44 and 21 percent of the 25 major commercial, 29 major small-scale and 19 major recreational fisheries, respectively. Decreases in conflict were reported in 24, 21 and 0 percent of cases, respectively. Conflict within the commercial and small-scale subsectors appeared to be primarily the result of conflicts: with other fisheries (68 and 59 percent of the major fisheries, respectively); with other types of vessels (44 and

54 percent of the major fisheries, respectively); competition for use of the same sea areas (44 and 28 percent of the major fisheries, respectively); and competition among the same types of vessels, in the particular case of the small-scale fisheries (44 percent of the major fisheries) (Figure 26a). The main source of conflict in recreational fisheries was competition with other fisheries, commercial or otherwise.

In the Central and Northeast Insular Subregion, where small-scale fisheries predominated, a variety of conflicts occurred with notable extent, with the most important sources of conflict being: competition between small-scale and recreational fisheries (60 percent of 20 major fisheries), followed closely by both competition among the same types of vessels and with other fisheries in general (55 percent of major fisheries for both sources) (Figure 26b). Conflict with other industries was reported for 35 percent of the major small-scale fisheries and for all three major commercial fisheries identified. Similar to the general regional pattern, conflict with other fisheries was prominent for the commercial and recreational subsectors (Figure 26b). In contrast to the general pattern, competition for use of the same sea areas was less of a problem in this subregion for the commercial and small-scale subsectors. For the recreational fishery, there were also some reported conflicts among the same and different vessels and between the recreational fisheries and other industries.

FIGURE 26
Frequency of occurrence of sources of conflict for fisheries within three subsectors



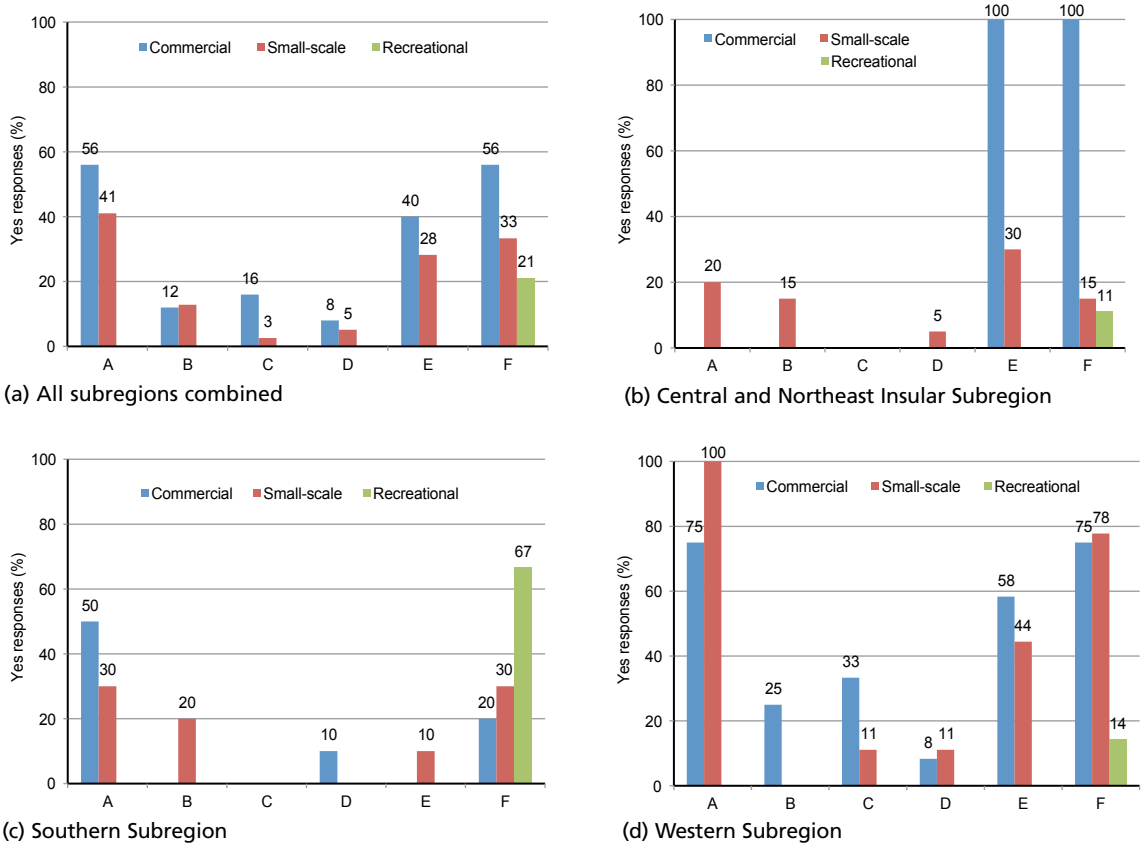
Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of occurrence of sources of conflict for fisheries within the three subsectors: A – between different types of vessels; B – among the same types of vessels within the subsector; C – competition for gear deployment in the same area; D – between the commercial and recreational subsectors; E – with the other industries; F – with other fisheries. The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

Responding countries of the Southern Subregion also indicated a variety of conflicts. However, the most common source of conflict for the 10 major commercial fisheries identified was competition with other fisheries (80 percent), followed by competition between different types of vessels (50 percent) (Figure 26c). In comparison, competition between different vessels was the most frequent problem (70 percent) for the 10 major small-scale fisheries, followed by competition between different fisheries (40 percent). Of the 3 major recreational fisheries in this subregion, 67 percent experienced conflict with other fisheries only (Figure 26c).

In the Western Subregion, both the 12 major commercial and 9 major small-scale fisheries were experiencing similar sources of conflict, with the most important being: competition with other fisheries (50 and 89 percent of cases, respectively), between different types of vessels (50 and 78 percent of cases, respectively), and for use of the same sea areas (58 and 67 percent of cases, respectively) (Figure 26d). Competition with recreational fisheries was also reported for 42 percent of the major commercial fisheries, but was much less of a problem for the small-scale fisheries (11 percent of cases). Additional important conflicts reported for the major small-scale fisheries of the Western Subregion included: conflicts with other industries (44 percent of cases) and conflicts among the same types of vessels (33 percent of cases). The 7 major recreational fisheries also noted the occurrence of conflicts with commercial fisheries (14 percent of cases).

FIGURE 27

Frequency of use of conflict resolution methods within three subsectors



Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of use of conflict resolution methods within the three subsectors including: A – zoning for different users: B – stock enhancement; C – resource allocation within the fishery; D – resource allocation among subsectors; E – education about sharing resource; F – limited access to certain areas for certain types of fishers. The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

Conflict resolution processes that were most commonly being utilized across the region for both commercial and small-scale fisheries included zoning for specific users (most popular for small-scale fisheries), limited access to areas for certain types of fishers, and educational methods to sensitize users regarding the multiple-use nature of certain resources (second-most important approach for both the commercial and small-scale subsectors) (Figure 27a). In the case of the recreational subsector, limited access was the only tool being applied. This general pattern was also observed in the subregions, with some notable differences. In the Central Northeast and Insular Subregion, education was used the most for the small-scale subsector (30 percent of major fisheries), which was also the largest subsector, while both education and limited access by fisheries was applied to all three major commercial fisheries identified by one country (Figure 27b). In the Southern Subregion, education was used comparatively little compared with other subregions and only for the small-scale subsector (10 percent of major fisheries), while limited access was a relatively widely applied approach for the three major recreational fisheries identified (Figure 27c). Besides the more popular approaches already mentioned, the Western Subregion also reported notable use of resource allocation within the fishery (33 percent of 12 major commercial fisheries and 11 percent of 9 major small-scale fisheries), followed by stock enhancement approaches (25 percent of the major commercial fisheries), and resource allocation between the fishery and other sectors (8 percent of major commercial fisheries and 11 percent of 9 major small-scale fisheries) (Figure 27d).

4.5 FLEET CAPACITY MANAGEMENT AND ENFORCEMENT METHODS IN USE WITHIN THE LARGEST FISHERIES

Overcapacity is the factor known to contribute most significantly to failures in fisheries management (e.g. Gréboval and Munro, 1999; Cunningham and Gréboval, 2001, Pauly *et al.*, 2002). For this reason, emphasis has been placed on the implementation of the International Plan of Action (IPOA) for the Management of Fishing Capacity (FAO, 1999). To do this, the current level of fishing capacity must first be established, and each fishery should be analysed for signs of excessive fishing inputs and overcapitalization. Once the level of fishing capacity is known and understood, national fishing capacity management plans should be developed as part of a management strategy in fisheries requiring such actions (De Young, 2006).

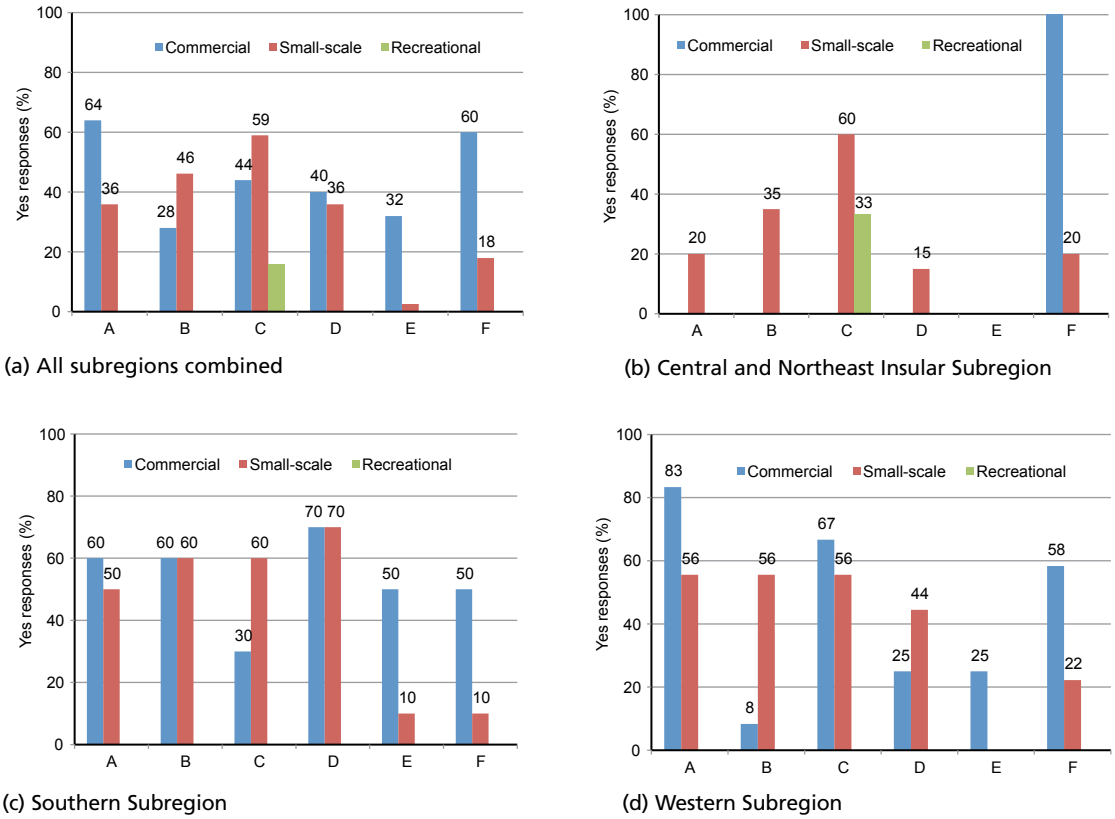
Among the major fisheries of the WECAFC area considered in the present study, fleet capacity was being measured in 64 percent of the 25 major commercial fisheries and in 36 percent of the 39 major small-scale fisheries identified, but in none of the recreational fisheries (Figure 28a). Across the region, overfishing was believed to be present in 28 and 46 percent of the major commercial and small-scale fisheries, respectively. In terms of reported constant/decreasing catch rates, however, higher percentages of occurrence, compared with overfishing, were reported: 44, 59 and 16 percent of the major commercial, small-scale and recreational fisheries, respectively. Despite a "sense" that overcapacity existed in 36–40 percent of the commercial and small-scale subsectors and even higher percentages of occurrence quoted above in respect of decreased/constant catch rates, capacity reduction programmes were being applied with less frequency, especially to small-scale fisheries (only 3 percent of major fisheries). In addition, regulations that were aimed at reducing fishing effort impacts were indicated more often for commercial fisheries, even higher than the corresponding perceived levels of overcapacity and overfishing (60 percent of major fisheries) than were indicated for the small-scale fisheries (18 percent of major fisheries). Reported levels of application of regulations to reduce fishing effort in the major small-scale fisheries were half and less than half of the corresponding reported levels of overcapacity and overfishing, respectively (Figure 28a).

In the Central and Northeast Insular Subregion, where there was a predominance of small-scale fisheries, fishing capacity measurement was being conducted in 20 percent of the fisheries, slightly less than the overall level for the region (Figure 28b). Similar to the overall regional pattern, there was a comparatively higher reported occurrence of decreasing or constant catch rates (60 percent of 20 major small-scale fisheries and 33 percent of 9 major recreational fisheries) compared with the reported confirmation of overfishing (35 percent of cases in the small-scale subsector and 0 percent of the major recreational fisheries) or sense of overcapacity (15 percent of major small-scale fisheries and 0 percent of major recreational fisheries). No capacity reduction programmes have been implemented for any fishery type. However, regulations to reduce fishing effort were identified for 20 percent of the small-scale fisheries, a figure comparable with the overcapacity indication level. All three commercial fisheries identified by one country were also subjected to regulations to reduce fishing effort (Figure 28b).

In the Southern Subregion, the major commercial and small-scale fisheries reported similar levels of performance in respect of fishing capacity measurements, as well as perceived problems of overfishing and overcapacity (Figure 28c). However, the small-scale fishery was perceived to be experiencing a much higher incidence of constant or decreasing catch rates (60 percent of 10 major fisheries) compared with the major commercial fisheries (30 percent of 10 major fisheries). Despite this, capacity reduction

FIGURE 28

Frequency of reported fishing capacity management indicators based on five questions asked of respondents



(a) All subregions combined

(b) Central and Northeast Insular Subregion

(c) Southern Subregion

(d) Western Subregion

Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of reported fishing capacity management indicators based on five questions asked of respondents: A – Is fleet capacity measured?; B – Does overfishing exist officially?; C – Is catch per unit area constant or decreasing?; D – Is there a sense that overcapacity exists?; E – Have capacity reduction programmes been used?; F – Have regulations in last two to three years focused on reducing fishing effort or harvest? The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries comprising the Western Subregion.

programmes and regulations to reduce fishing effort were directed more frequently at the commercial fisheries (50 percent in each instance) than at the small-scale fisheries (10 percent in each instance). The situation within the recreational fisheries appeared to be unknown.

In comparison, in the Western Subregion, fishing capacity had been measured for a majority of the major commercial fisheries (83 percent of 12 fisheries). For these fisheries, a constant or decreasing catch rate was reported for 67 percent of cases, and probably linked to this, regulations to reduce fishing effort had occurred in 58 percent of the fisheries (Figure 28d). Overcapacity was believed to be a problem for only 25 percent of the major fisheries, and only 25 percent of such fisheries had been subjected to capacity reduction programmes. However, fishing capacity measurements had been measured for 56 percent of the major small-scale fisheries, a lower percentage compared with that reported for commercial fisheries. In addition, there was a higher incidence of overfishing and perceived overcapacity in the small-scale fisheries (56 and 44 percent of cases, respectively) compared with the major commercial fisheries (8 and 25 percent of cases, respectively). Despite this, capacity reduction programmes had not been implemented for any small-scale fishery in the subregion. Moreover, despite the fact that there was a constant or decreasing catch rate reported for 56 percent of the small-scale fisheries, effort-reducing regulations were applied with less frequency (22 percent) (Figure 28d).

These trends suggest that, compared with commercial fisheries, small-scale fisheries have been posing real challenges with regard to fishing capacity measurement, as well as achieving fishing capacity and effort reductions. As small-scale fisheries can often include participants with lower income levels in society, such management challenges may be related to other societal challenges linked to overall poverty alleviation, food security and lack of alternative livelihood opportunities.

Generally in the region, a range of monitoring, control and enforcement mechanisms was being applied to commercial fisheries, the most popular of which included the use of a vessel monitoring system (VMS) and landing-site inspections in 76 percent of the 25 major fisheries, followed closely by the use of dockside inspections and observer programmes in 64 and 60 percent of cases, respectively (Figure 29a). Routine landing-site and random-dockside inspection schemes comprised the main form of monitoring, control and enforcement mechanism for small-scale fisheries: 69 and 54 percent of 39 major fisheries, respectively. To a much lesser extent, recreational fisheries were monitored and controlled using random-dockside inspections (16 percent of 19 major fisheries noted), at-sea boarding and inspections (11 percent of cases), as well as VMS and routine landing-site inspections (5 percent of cases in each instance) (Figure 29a). The general overall difference between commercial and small-scale fisheries may have been due to the higher investment required to implement VMS and observer programmes, which would have restricted their use to higher-value fisheries, especially in less-developed States. In addition, the small open-decked vessels that may be more frequently engaged for small-scale fishing operations would have limited space for additional equipment and personnel who were not also serving as crew.

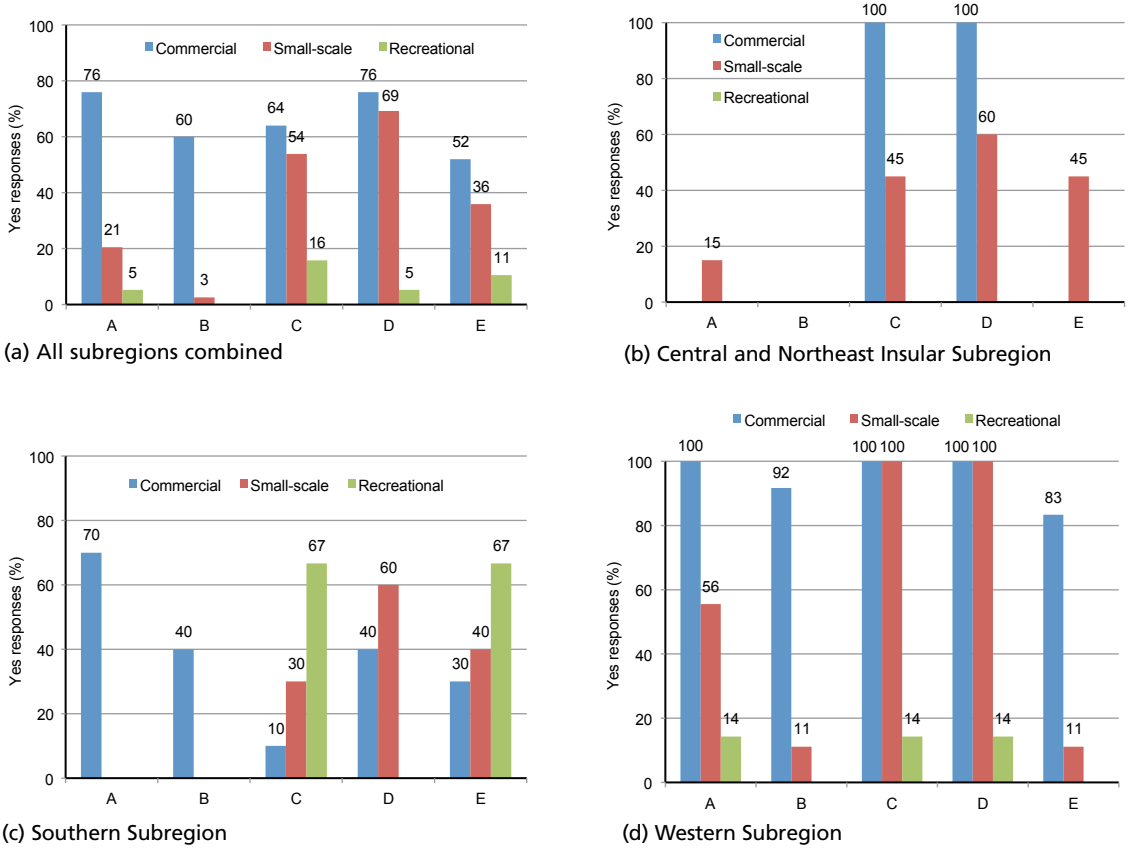
The pattern and frequency of the monitoring, control and enforcement mechanism applied in the Central and Northeast Insular Subregion were the same as those already noted for the region in general, especially for the small-scale fisheries that dominate in this subregion (Figure 29b). Perhaps driven by the tools and practices adopted for the dominant fishery type, it is not surprising that land-based schemes were also most common for the three major commercial fisheries identified by one country in the Central and Northeast Insular Subregion. Similarly, the tools for monitoring, control and enforcement in the Southern Subregion were consistent with the general regional pattern. That noted, VMS was notably the most popular tool applied for commercial fisheries (70 percent of the 10 major fisheries), and routine landing-site inspections were

the most popular for the small-scale subsector (60 percent of the 10 major fisheries). In addition, VMS and routine landing-site inspections were not used at all for recreational fisheries in the Southern Subregion (Figure 29c).

Countries within the Western Subregion reported a high level of usage of the full range of monitoring, control and enforcement tools for their commercial fisheries (Figure 29d). All 12 major commercial fisheries were using VMS and subjected to random dockside and routine landing-site inspections, with the latter two tools applied also to all 9 major small-scale fisheries. Moreover, VMS was used for small-scale and recreational fisheries more frequently than in the other two subregions (56 percent of 9 major small-scale fisheries and 14 percent of 7 major recreational fisheries, respectively), while at-sea boarding and inspections were used comparatively little for small-scale fisheries (11 percent of cases) and not at all for recreational fisheries (Figure 29d).

FIGURE 29

Frequency of compliance and enforcement mechanisms in use, by subsector



Notes: Frequency (percentage of the total number of major fisheries identified by subsector and subregion, as noted in Table 3) of compliance and enforcement mechanisms in use, by subsector: A – VMS; B – on-board observers; C – random dockside inspections; D – routine inspections at landing sites; E – at-sea boarding and inspections. The information is illustrated for: (a) all subregions combined; (b) surveyed countries of the Central and Northeast Insular Subregion; (c) surveyed countries of the Southern Subregion; (d) surveyed countries of the Western Subregion.

5. Status of stocks

In 2011, FAO published the latest version of the *Review of the State of the World Fishery Resources*, and separate chapters were devoted to fishery resources in the different FAO Statistical Areas (FAO, 2011). The WECAFC area includes Statistical Area 31 and the northern part of Area 41, and the state of marine fishery resources in these two FAO areas was addressed by Bahri (2011) and Vasconcellos (2011), respectively.

Bahri (2011) found that few quantitative and reliable stock assessments had been completed for Area 31, and in fact the region had not shown an improvement in the number of assessed stocks since the publication of the previous similar review by FAO (2005). Of 37 stocks or species groups in Area 31 for which data were reported routinely by FAO, 17 stocks/species groups were found to be fully fished to overfished, while the status of others remained unknown. Only in seven instances was there low uncertainty associated with the assessment results, suggesting that the data and information base for supporting fisheries management remained rather weak. Assessment efforts had been directed at commercially important species such as Atlantic menhaden (*Brevoortia tyrannus*), Gulf menhaden (*B. patronus*), Caribbean spiny lobster (*Panulirus argus*), queen conch (*Strombus gigas*), Atlantic seabob (*Xiphopenaeus kroyeri*), northern brown shrimp (*Farfantepenaeus aztecus*) and round sardinella (*Sardinella aurita*). Moreover, most of the country-led assessments had been done for stocks fished by the United States of America (e.g. ASMFC, 2010; Vaughan and Merriner, 1991; Vaughan, Shertzer and Smith, 2007), Mexico, and Venezuela (Bolivarian Republic of) (e.g. Mendoza, Freón and Guzman, 1994; Gonzalez and Eslaya, 2000). Some other assessments, especially of fourwing flyingfish (*Hirundichthys affinis*) and some shrimp species (*Penaeus* spp.) in the southern Caribbean were completed by WECAFC technical working groups established by FAO for this purpose (e.g. FAO, 1999, 2000, 2001, 2010). In the case of several countries that were members of the CRFM, assessments of various stocks had been facilitated by annual CRFM scientific meetings since 2004 (e.g. CRFM, 2005, 2010a, 2011, 2012a). Assessments of the large highly migratory tunas and billfishes were completed by ICCAT and represented stock conditions that spanned beyond the WECAFC area (e.g. ICCAT, 2010, 2013).

In Area 41, data on 29 stocks or species groups were reported routinely to FAO. Vasconcellos (2011) reported the availability of status information for 16 stocks/species groups, with 14 of these indicating a state of being fully fished or overfished and two stocks considered being below fully fished. Brazil was a major fishing country of only five of the stocks/species groups occurring in Area 41: Argentine croaker (*Umbrina canosai*) and whitemouth croaker (*Micropogonias furnieri*), which were reported to be fully fished to overfished; Brazilian sardinella (*Sardinella brasiliensis*), which was reported to be overfished; weakfishes (*Cynoscion* spp.) and swordfish (*Xiphias gladius*), for which there was no stock status information according to Vasconcellos (2011). The stock status information for whitemouth croaker and Brazilian sardinella in Area 41 was considered to be most reliable.

From a geographic standpoint and based on the data and information in Bahri (2011) for the majority of the WECAFC area, there were many stocks/species groups, countries and maritime jurisdictions for which no reliable, quantitative stock assessments had been undertaken or reported. The overfished/overfishing state of several top-predator fish stocks, stocks of two large invertebrate species (spiny lobster and pink conch) that are distributed throughout the region, and the few assessed stocks

of major reef and small pelagic fish groups suggest that several key trophic component levels are being negatively affected sufficiently to have broad-scale impacts at the regional-scale ecosystem level. In addition, the situation of those fisheries and stocks assessed is likely to be representative of other unassessed but similar fisheries operating under similar circumstances and ecosystem conditions in the region. Hence, there is cause for overall concern at the level of fisheries management performance being achieved in actual practice, both at the national level and at the level of the WECAFC area, and particularly the data and information base supporting such management.

6. Summary and conclusions

Countries in the WECAFC area were facing several challenges with regard to successful sustainable fisheries management:

- Legislation existed in all countries for the management of marine capture fisheries at the national level, which included both legal and administrative frameworks, but the legal framework appeared to be limited and often did not specify a formal management process with identified roles, responsibilities, information needs, and timeframes for activity completion and evaluation.
- Monitoring and enforcement responsibilities were often shared between a national fisheries administration and a navy or coast guard. In the case of the national fisheries administration, there were challenges for cooperation with stakeholders with regard to acquisition of data and information on a routine basis. In the case of the navy or coast guard, fisheries enforcement patrols were lower in priority compared with other enforcement needs, e.g. controlling illegal shipments.
- Scientific information and knowledge support for the management process were not usually a formal part of the process, but were often dependent on the inputs of interested research institutions and organizations. Certain countries, such as Mexico and Venezuela (Bolivarian Republic of), appeared to have a strong network of supporting fisheries research institutions, which have helped them to achieve more quantitative understanding of selected key fishery and stock status situations.
- Fishery-specific management plans were in place for about 60 and 54 percent of major commercial and small-scale fisheries, respectively, but only 16 percent of major recreational fisheries had such plans.
- Multispecies fisheries were common, but this aspect and ecosystem considerations were often not taken into account in fisheries management plans.
- Stakeholder identification and participation in the management process was not a formal requirement in all countries, but most countries promoted collaboration with stakeholders via open meetings and provision of opportunity for public comments. However, government still retained responsibility for management in most cases. Only about 50 percent of the countries stated that management information was clearly documented and easily available to the public, which is a key step in the management process for building trust and guaranteeing transparency. Less-expensive and less-skilled forms of information dissemination were more popularly used, such as e-mail, ordinary mail and fax.
- Conflict resolution provisions were not included in the legislation of most countries and in less than half of cases did the legislation identify multiple user needs. Management tools used to minimize conflict most often included zoned usage, access limitations and stakeholder education programmes.
- Fishing capacity measurements had begun for about two-thirds of the countries. However, only 13 percent of countries had completed this task for all their marine capture fisheries, with other countries prevented from doing so, mostly owing to lack of stakeholder support and education, lack of human resources and budget constraints.
- Only half of the countries considered that more than two-thirds of their fisheries were being "managed in some way at the national level, with 19 percent of countries indicating that they had national-level fisheries management plans, with 38 percent having regulations governing national fisheries, and 25 percent being

supported by routine scientific monitoring. The corresponding performance levels for regional and local levels of management were generally less optimistic. Moreover, almost one-third of the countries noted that there were major fisheries (in terms of weight of landings) that were not currently managed. Moreover, even in instances where overfishing and overcapacity were suspected, fishing capacity and effort reductions were being applied comparatively much less to small-scale fisheries than to commercial fisheries. As the participants of small-scale fisheries were often from lower income levels in society, such management challenges may be related to other societal challenges linked to overall poverty alleviation, food security and lack of alternative livelihood opportunities.

- Management tools and measures were applied more frequently to commercial-scale fisheries. Application of spatial restrictions and gear restrictions were most common. Temporal, user restriction and catch limitation measures were less popular and were probably related to the more active systems having higher costs associated with monitoring, control and enforcement of such measures.
- Fisheries management costs were largely supported by governments. Such costs had increased over the past ten years, primarily owing to increasing demands for monitoring and enforcement activities. Despite this, and the fact that an increasing number of fisheries were requiring more management attention, the available national budgets had not increased correspondingly. This suggests that the actual quantity and/or quality of monitoring and enforcement would have declined in the face of increasing costs that were not being met.

The following actions could assist countries to address these challenges:

- **Legislation** – Strengthening of legislation that specifies a formal management process, with identified roles and responsibilities of all partners for every component of the process, and fixed time frames for activity completion and evaluation. The legislation should define and identify the stakeholders and make provisions for good governance arrangements. The legislation should make provisions for the adoption and implementation of sustainable management practices consistent with international instruments to which the country is a signatory. The legislation would therefore also have to include provisions on the information requirements to meet these needs; such information requirements would be expected to take into account internationally agreed paradigms for application of the precautionary and ecosystem-based approaches, with the latter outlining a process for addressing multiple user needs and conflict resolution.
- **Management process and plans** – It is important to establish and adhere to a formal management process, which should involve establishment and implementation of management plans that identify prioritized objectives, activity steps and time frames for completion and evaluation. This process should be carried out in partnership with all relevant stakeholders, and the management plans should identify the roles and responsibilities of all parties concerned. Where not legislated or enforced, the management agency should consider establishing subsidiary bodies to represent stakeholder inputs formally in the decision-making process and also to manage multiple user concerns and conflicts. The management process needs to be supported by an effective communication and reporting strategy that considers the range of communication and reporting needs throughout the management process. Special attention should be given to the overall process of collection, analysis and dissemination of data and information, especially to guarantee transparency in management and to nurture stakeholder trust and support.
- **Monitoring and enforcement** – The legislation and management process should identify separate agencies for monitoring and enforcement. This may already be noted in the legislation, but in practice the enforcement responsibility is shared.

As such, fisheries budgets need to be expanded to give formal regular support to the different partner agencies involved, if fisheries enforcement issues are to receive their due attention. Most countries indicated that monitoring and enforcement activities had increased and were the primary reasons for increased management costs. Hence, without additional investment by government and stakeholders alike, both monitoring and enforcement would remain limited and render all other fisheries management efforts ineffective. Establishment of limited-entry fisheries, together with good stakeholder cooperation, would help to minimize monitoring and enforcement costs.

- **Scientific information and support** – The review of the stock status information showed clearly that only very few countries were able to report the actual status of major fish stocks being managed by them. To rectify the situation, there is a need to strengthen and maintain a quality statistical monitoring system, which is also relevant to immediate fisheries management needs. This requires constant investment, for which continued support will only be sustained if it is clearly linked to tangible benefits, i.e. generation of applicable and regular management advice. Similarly, additional and more specialized scientific research support in various disciplines is required, such as that obtainable from professional researchers. The requirements for both sources of information need to be given formal recognition in the legislation and management process, where this is not yet so. Moreover, the scientific groups concerned should also be recognized formally as stakeholders and be nurtured as permanent partners in the management process.
- **Participatory approach** – Assistance to some stakeholder groups may be required, especially within the small-scale fisheries subsector, in order to build their capacity to contribute effectively to the management process, with the ultimate aim of attaining shared investment and responsibility for achieving desired management objectives. The need to improve and expand methods of communication and consultation with stakeholders also warrants additional attention by countries, and consideration should be given to developing a formal strategy to achieve this. More modern communication and consultation tools should also be introduced as soon as possible, and especially if these are being adopted and being used readily by stakeholders. This noted, the national fisheries management framework needs to equip the agencies concerned with a good range of expertise to support the participatory approach and the demands of good governance, i.e. expertise not only in fisheries biology and conservation, but also administration and business skills.
- **Fisheries management costs** – Cost-effective monitoring, inspection and enforcement strategies are crucial, and stakeholder cooperation should inform and support this process. In fact, an assessment of overall management costs and benefits would help to inform any cost-recovery programmes and, in so doing, contribute to meeting the increasing costs of monitoring and enforcement. Licence fees and penalty fines may need to be reviewed to determine whether they satisfy their aims. In addition, users from other sectors should probably be charged for their usage of the marine ecosystem as well, e.g. revenues from marine parks and extractive activities, especially if these activities affect fisheries management performance, whether from the biological/ecological or socio-economic standpoint. By these means, fisheries management cost-recovery programmes will achieve a balance in terms of recovering costs for the opportunity to harvest fish resources, as well as costs incurred from the loss of such opportunities.
- **Public education and awareness** – The work of the fishing industry should be promoted in order to improve understanding of the industry's contributions to overall national social and economic development objectives. Hence, formal advocacy and communication strategies are essential investments to ensure

effective delivery and uptake of the information and promotion of the industry's needs and interests. This action is crucial for changing public opinion and government policy, and all the benefits that would flow from this.

Identifying key cross-cutting issues, and possible specific actions for addressing the proposed recommendations outlined previously and related to these key issues, leads to the following considerations.

Legislation

(i) Improvements in legislation may be implemented through amendments or protocols in accordance with present provisions. FAO international guidelines need to be taken into account. Regional fisheries bodies, such as WECAFC, CRFM and OSPESCA have been involved in assisting countries with drafting new legislation, as well as regional agreements and declarations (e.g. OSPESCA, 2009, 2011; CRFM, 2010b; FAO, 2012) and are able to provide the regional and global connectivity required to enrich the process and guarantee that new fisheries legislation is equipped to meet the range of demands at all levels.

(ii) However, review, endorsement and enactment of the legislation are really government-controlled actions, and so national governments must deem this a priority. Education of government in respect of fisheries and marine ecosystem management benefits would be essential to allow government to understand the reasons for updating legislation.

(iii) Where non-fishery legislation has an impact on fisheries management, these provisions could be used to support the fisheries management process.

Participatory approach

The performance levels observed fell short of a proper formal management partnership arrangement and/or of a good governance arrangement, especially in respect of transparency, equitability and accountability. Much research and many projects have been completed and are still ongoing in the region with the intention of promoting the participatory approach as an essential part of achieving good governance (e.g. Berkes *et al.*, 2001; Fanning, Mahon and McConney, 2009, 2011; CLME, 2013). However, response actions at the national levels and even at the regional levels have been slow, probably because most initiatives have focused predominantly on problem analysis so far. Some of the research studies (e.g. CRFM, 2012b, 2012c), as well as the survey results, clearly show that all potential fisheries management partners are not fully appreciative or fully skilled for their role in management, i.e. both the private and public sectors. In addition, the cooperative management arrangements will require good governance practices to guarantee the success these approaches promise.

(i) If legislation is not yet in place, efforts could still be made to improve the quality of communication and information exchange among the partners and to make this a routine process. Apart from the usual fisheries meetings and reports that countries already attempt, national fisheries authorities may have to employ skilled communicators as permanent staff and/or nurture the attention of the news media to assist this process.

(ii) National fisheries authorities already make much effort with stakeholder identification and consultations, but these efforts have not had the full desired impact on improving trust and cooperation in many instances. For greater success in the future, national fisheries authorities should consider making use of professional meeting facilitators and negotiators for stakeholder consultations. In addition, a business approach to fisheries management will provide the necessary focus on social and economic performance, which is essential for stakeholder trust and cooperation. If funds for employing permanent staff having such skills

and expertise are restricted, then such personnel could be accessed on a part-time basis as needed from other government ministries. Such an arrangement should be formalized if routine and consistency in the process and support are to be guaranteed.

(iii) National fisheries authorities also need to involve stakeholders at all levels of the process, from planning and data gathering to analysis, interpretation and decision-making. Hence, communication and information exchange, and the consultation and negotiation/decision-making processes described above need to be two-way processes, i.e. from national fisheries authorities to industry and from industry to national fisheries authorities. While there are now many donor-supported initiatives to educate and strengthen fisherfolk to improve their involvement in the management process (e.g. CRFM, 2013a, 2013b; FAO 2013; Roopchand, 2013), there are some outstanding gaps that could benefit from additional government or donor support: institutional and capacity building for allowing fisherfolk and other industry stakeholders to understand and know how best to communicate their data, information and knowledge; institutional and human resource capacity building for national fisheries authorities to obtain and make the best use of stakeholders' data, information and knowledge; and institutional and human resource capacity building for national fisheries authorities to be able to provide feedback to stakeholders on management performance routinely and in user-friendly formats. Such institutional and human resource capacity-building efforts should consider the needs outlined above for use of professional communicators, facilitators and negotiators, as well as business skills by national fisheries authorities.

Management process

FAO's definition of fisheries management recognizes this to be a process of multiple steps: planning, data gathering, analysis, interpretation, consultations, decision-making, actions, monitoring and evaluation (FAO, 1997). By implication, each step in the management process could be treated as discrete, but all steps are connected and essential for success. The survey showed that countries were performing reasonably in one or more steps and were also probably adequately funded for one or more steps. However, in all cases, not all the steps were performing at sufficient levels and, as a result, fisheries management performance appeared to be notably compromised.

(i) Addressing legislation and participatory approach issues, as described above, will help to improve the management process, especially the educational, communication and capacity-building aspects noted.

(ii) There should be skilful management of available fisheries management funds. In other words, whatever financial resources are available, these should be allocated to ensure that all steps of the management process receive the best attention possible, in terms of time and quality of effort, so as to produce the best-possible quality outputs possible. This is essential to ensure that all steps of the process are linked effectively and moving at a similar pace towards agreed goals.

(iii) Information and knowledge on the value of the region's fisheries and associated ecosystems, especially regarding social and economic benefits, need to be quantified and routinely made available to those making the decisions on national policies, fisheries legislation, fisheries management investments and management cost-recovery programmes. The importance of this was captured during the Caribbean Sea Ecosystem Assessment initiative (CARSEA, 2007), and some efforts began during the CLME project (McIvor, 2012; CLME, 2013). It is expected that future related initiatives will continue to give due attention to this aspect, without which countries and the region may not appreciate fisheries management priorities sufficiently.

(iv) Few quantitative fish stock assessments have been completed in the region to support national fisheries management actions. As most countries collect basic fisheries data, this may reflect poor communication/consulting and reporting among the management partners (industry and government) and/or political preference for inertia rather than an active management process that would require more active investments. However, without quantitative evidence, it is perhaps not surprising that the region was not performing very well in terms of conflict resolution and voluntary stewardship, in spite of the fact that a significant share of the management costs were allocated to monitoring and enforcement tasks. If good governance and the participatory approach are improved, these should help to promote greater use of all forms of available data and information and to demand eventually a more active and meaningful management process.

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Appendix I

THE TOP THREE FISHERIES

The tables list the top three fisheries, where these exist and have been identified, for each of the commercial, small-scale and recreational subsectors within the WECAFC countries. In some instances, the top fisheries were multispecies in nature. In the case of Caribbean Netherlands, no information was provided for specific types of fisheries.

COMMERCIAL / INDUSTRIAL			
Anguilla	n/a*	n/a	n/a
Antigua and Barbuda	n/a	n/a	n/a
Aruba	n/a	n/a	n/a
Brazil	Stripped weakfish (*Cynoscion* spp.)	Croakers: whitemouth croaker (*Micropogonias furnieri*), Atlantic croaker (*M. undulatus*)	Tunas: skipjack tuna (*Katsuwonus pelamis*), frigate tuna (*Auxis thazard thazard*), little tunny (*Euthynnus alletteratis*)
Caribbean Netherlands	n.a.	n.a.	n.a.
Colombia	Tunas: yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*), skipjack tuna (*Katsuwonus pelamis*)	Shallow-water shrimp (*Litopenaeus*, *Farfantepenaeus*, *Xiphopenaeus*, *Trachypenaeus*, *Protrachypene*, *Solenocera*, *Heterocarpus* spp.)	Deep-water shrimp (*Solenocera* spp., *Heterocarpus* spp.)
Dominica	n/a	n/a	n/a
Dominican Republic	Snapper	Grouper	Lobster
Mexico	Sardine	Shrimp	Tuna
Nicaragua	Caribbean spiny lobster (*Panulirus argus*)	Shrimp – Noted for Pacific & Caribbean coasts (*Farfantepenaeus*, *Litopenaeus* spp.)	Caribbean queen pink conch (*LobatusStrombus gigas*)
Panama	Small pelagic	Tuna	Large pelagic species
Saint Kitts and Nevis	n/a	n/a	n/a
Saint Lucia	n/a	n/a	n/a
Suriname	Finfish	Atlantic seabob (*Xiphopenaeus kroyeri*)	Shrimp
Trinidad and Tobago	Trawl	Fishpot & line	Longline
Venezuela (Bolivarian Republic of)	Tuna	n.a.	n.a.

* n/a = not applicable; n.a. = not available.

SMALL-SCALE, ARTISANAL, LIFESTYLE, SUBSISTENCE, INDIGENOUS, CUSTOMARY			
Anguilla	Reef fish	Lobster	Conch
Antigua and Barbuda	Shallow shelf & reef fish	Queen conch (*LobatusStrombus gigas*)	Caribbean spiny lobster (*Panulirus argus*)
Aruba	Wahoo	Grouper	Snapper
Brazil	Stripped weakfish (*Cynoscion* spp.)	Atlantic seabob (*Xiphopenaeus kroyeri*)	Lobsters: Caribbean spiny lobster (*Panulirus argus*); smoothtail spiny lobster (*P. laevicauda*)
Caribbean Netherlands	n.a.*	n.a.	n.a.
Colombia	Shallow water shrimp	Marine finfish	Continental finfish
Dominica	Migratory pelagic	Coastal pelagic	Demersal reef
Dominican Republic	Grouper	Lobster	n.a.
Mexico	Shrimp	Shark	Octopus
Nicaragua	Coastal artisanal fisheries – Pacific & Caribbean coasts	Lobster	
Panama	Multispecies		
Saint Kitts and Nevis	Coastal pelagic	Reef & bank	Conch
Saint Lucia	Tuna	Dolphinfish	Wahoo
Suriname	Mixed species		
Trinidad and Tobago	Monofilament (transparent) gillnet	Fillet (green twine) gillnet	Live bait line fishing
Venezuela (Bolivarian Republic of)	Turkey wing (*Arca zebra*)	Round sardinella (*Sardinella aurita*)	Blue crab (*Callinectes* sp.)

* n/a = not applicable; n.a. = not available.

RECREATIONAL FISHERIES (INCLUDING NON-CONSUMPTIVE USE)			
Anguilla	n.a.*	n.a.	n.a.
Antigua and Barbuda	n.a.	n.a.	n.a.
Aruba	Wahoo	Dolphinfish	Barracuda
Brazil	n.a.	n.a.	n.a.
Caribbean Netherlands	n.a.	n.a.	n.a.
Colombia	Billfish, dolphinfish, tuna	n/a	n/a
Dominica	n.a.	n.a.	n.a.
Dominican Republic	Marlin, wahoo, needlefish	Tuna	Dolphinfish
Mexico	Marlin, sailfish	Shad	n/a
Nicaragua	Billfish, dolphinfish	n.a.	n.a.
Panama	Billfish	Pelagic	Bottomfish
Saint Kitts and Nevis	Large pelagic	Reef	
Saint Lucia	Offshore pelagic (rod and reel from power boat)	n.a.	n.a.
Suriname	n.a.	n.a.	n.a.
Trinidad and Tobago	Multispecies		
Venezuela (Bolivarian Republic of)	Large pelagics – billfish	Large pelagics – dolphinfish, wahoo, serra Spanish mackeral, tuna	n/a

*n/a = not applicable; n.a. = not available.

Appendix II – Country Reports

COUNTRY REVIEW

Anguilla

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December 2012

INTRODUCTION

Anguilla is a flat low-lying island in the Eastern Caribbean island chain. The most northerly of the Leeward Islands, Anguilla has a total land mass of about 91 km^2. The coralline limestone island is dominated by shrub, with no rivers or streams. Anguilla is surrounded by approximately 4 660 km^2 of coralline marine habitats and eight small uninhabited cays. It has an Exclusive Fishing Zone of approximately 85 500 km^2, of which just over 2 000 km^2 is submerged shelf. Anguilla currently has a population of just over 13 000 persons, of which about 300 are directly involved in fishing.

Fishing has always played an important role in the lives of many Anguillians, providing a steady source of protein and forming the basis of a healthy diet (Gumbs and Rawlins, 2007). Anguilla's fishing industry is concentrated within a 40-mile radius of mainland Anguilla, with the main harvested marine capture resources being reef fish, lobster and conch. The fishing industry in Anguilla is essentially artisanal, with the majority of the fishing vessels being open boats or pirogues. Currently, the fishing industry contributes approximately 1.8 percent to Anguilla's Gross Domestic Product, which was estimated to be about EC$ 738.79 million in 2010.

POLICY FRAMEWORK

Specific legislation for marine capture fisheries management exists at the national level and has been put in place under the Fisheries Protection Act of 1986, the Fisheries Protection Regulations of 1988, and their subsequent amendments in 2000. Such legislation serves to provide both a legal and administrative framework for the management of marine capture fisheries in Anguilla, and is focused primarily on the national system. However, the legislation does not provide a definition of the term "fisheries management", nor does it list objectives for the management of marine capture fisheries. It also does not grant the fisheries management authority with the legal power to meet the priorities and obligations of international (global) agreements and conventions, regional agreements, or other multilateral arrangements. This situation may be related to Anguilla's status as a British Overseas Territory.

Several pieces of non-fishery legislation exist and are known to impact fisheries management in Anguilla. Among these, the major ones include the Trade in Endangered Species Act (for compliance with CITES), the Biodiversity and Heritage Conservation Act, the Air and Sea Ports Act, The Marine Parks Act and its regulations, and the Cruising Permit Act and its regulations.

LEGAL FRAMEWORK

Regarding roles and responsibilities, the lead agency responsible for marine capture fisheries management is the Department of Fisheries and Marine Resources. This responsibility is shared with the Attorney General's Chambers and Judicial Office. The Marine Branch of the Royal Anguilla Police Force also assumes responsibilities as an enforcement authority for marine fisheries-related issues. Currently, fisheries

research is conducted by the Department of Fisheries and Marine Resources, and no other institution has been given formal responsibility for scientific support in fisheries management.

The current legislation does not provide specific guidance to shape fisheries management plans (e.g. specific guidance on management tools and approaches, a formal process and fixed timeframe for implementation). Furthermore, no management measures and regulations for individual fisheries are specified, and the legislation does not stipulate that management decisions be based on information derived from: biological analyses or stock assessments, economic analyses, social impact analyses, ecosystem analyses/assessments, or monitoring and enforcement activities. The roles and responsibilities for the consultation and decision-making components of the framework are also not formally defined. As a result, the management agency, the activities/ measures adopted by other countries and/or RFBs and RFMOs are all able to influence management decisions. This situation is not ideal and might be expected to threaten transparency and accountability in the absence of a defined management process and fixed steps.

For enforcement purposes, prosecutions, whether involving local or foreign fishing activities, are currently handled by the Magistrate Court System, where vessels and catch can be seized by the court. Specific provisions for illegal fishing by foreign vessels include seizures and fines.

As already mentioned, the legal framework for contributions to regional and international fisheries management activities is limited in scope, as the legislation does not make specific reference to international convention and agreement obligations. Management objectives are currently not included, and the objectives of RFBs and RFMOs are also not formally incorporated. However, Anguilla is a member of CRFM, and in the absence of the relevant provisions in the current legislation, required administrative and procedural measures are adopted.

As stated in the previous section, several pieces of non-fishery legislation exist and are known to impact fisheries management in Anguilla. Among these, the major ones include the Trade in Endangered Species Act for compliance with CITES, the Biodiversity and Heritage Conservation Act, and the Air and Sea Ports Act.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of fisheries

In Anguilla, large-scale commercial/industrial fisheries do not exist. In the case of the small-scale fishery, the vessels used are pirogues, 5–15 m in length, using Antillean fish traps and hand lines as the main gear. Scuba gear is used for conch, and rigs or bottom long-lines are used to target deep-water snappers and groupers.

Fish are marketed locally, involving sales to hotels, and nearby St. Martin. Little data are available for the recreational fishery in Anguilla, but the typical sport fishing vessels are utilized, with rod and reel as the predominant gear. All fishery activities were reported to be active within Anguillan territorial waters and/or in the EEZ, with the primary area being within 40 nautical miles of shore.

Fish production and value

Fisheries for reef fish, lobster, and conch are the top three small-scale fisheries in terms of landings, with the current annual production levels reported to be 300–450, 100 –150, and 30–60 tonnes, respectively (Anguilla Statistics Department, 2012). Data are not available for prior years, and so it is not possible to determine how landings have changed over the last five and ten years. In addition to having the greatest landings, the reef fish, lobster and conch fisheries also represent the most valuable fisheries in terms of gross value of catch in Anguilla, with gross earnings of $5 million, $2 million and $600 000, respectively (Anguilla Statistics Department, 2012). Annual landings

for the recreational subsector along with gross earnings are not well documented and understood. In the small-scale subsector, none of the three fisheries provided the sole source of income or the sole source of food for the participants.

Fishing effort and impacts

In the small-scale fishery, there are currently approximately 300 participants: 200 reef fish fishers, 75 lobster fishers, and 25 conch fishers. It is estimated that 50 to 55 vessels are operating in the reef fish fishery, 20 to 25 vessels are involved in the lobster fishery, and six vessels are involved in the conch fishery. Over the past ten years, the approximate numbers of participants and fishing vessels have remained unchanged. In contrast, the level of and trend in recreational fishing effort are not known.

Overall, overfishing appears to be a problem, although the proportion of fisheries which are believed to be overfished in Anguilla is unknown. In the small-scale subsector, all three fisheries are considered overfished. This is supported by the fact that catch per unit of fishing effort has been observed to be constant or in decline.

Although fleet capacity has not been measured in any of the fisheries, overcapacity is not believed to be the cause of overfishing. As a result, fisheries management has not made efforts to reduce fishing capacity in these fisheries.

MANAGEMENT ACTIVITY

General nature and extent of management

At the national level in Anguilla, less than 33 percent of marine capture fisheries are being managed. None of the major small-scale fisheries that appear to be the most important fisheries in Anguilla has management plans. That said, a general agreed management objective involves ensuring that the catch level is not reduced further. Additionally, less than 33 percent of managed fisheries have published regulations. In the case of fisheries that are being regulated, less than a third of the regulations have been established based on scientific monitoring and evaluation. Despite the overall low level of management for marine capture fisheries in Anguilla, and the fact that the number of managed fisheries has remained unchanged in the past ten years, all the major fisheries are considered to be managed in some way. However, without formal management plans and a strong scientific basis for monitoring the achievement of management objectives, this implies that the management process is incomplete and also lacks accountability. Interestingly, the Trade in Endangered Species Act makes provisions for the conch fishery to be regulated in accordance with agreed CITES measures. Besides this, the management process does not appear to incorporate formally the obligations under international legislation.

Management approaches and tools

The reef fish and lobster fisheries are known to be multispecies in nature, but current fisheries management practice does not take this into account for either fishery. Similarly, all recreational fisheries are multispecies in nature, but it is unknown if this is taken into account in the management process. Related to this, the management process does not include specific ways of applying either the ecosystem approach to fisheries (EAF) management or the precautionary approach.

In terms of specific management tools, such as time/area restrictions, catch limits and so on, size limits are in place for lobster and conch. The small-scale fisheries are not managed against performance standards, and there are also no major fisheries that are managed based solely on regional/international management measures. In Anguilla, no marine protected areas that may exist were indicated to have fisheries management listed as one of the objectives or reasons for establishing the area.

Stakeholder involvement and transparency in management

Although stakeholder consultation is described as a formal and required part of fisheries management in Anguilla at the national level, there is no formal definition of what groups are considered to be stakeholders. This suggests that the consultation process, though formal, lacks transparency, as well as accountability. In terms of the extent of stakeholder involvement, the process is consultative, and so the stakeholders do not share management responsibility. Specifically, in the small-scale subsector, all three major fisheries have arrangements for stakeholder consultation which can be described as informative, communicative and advisory.

Regarding efforts to ensure transparency, meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery, and are usually publicized in advance of the meeting dates. In addition, the process does provide opportunity for fishery participants and other stakeholders to contribute to the decision-making process by providing public comments. Notwithstanding, all aspects of the management process are not transparent, and information about the process is not clearly documented and made available to the public. Information dissemination is effected through the use of radio broadcasts, newspapers, Internet and fax communication, but does not utilize communication via printed material such as pamphlets or Internet websites.

Management of conflict and fishing effort

Conflict exists in the reef fish, lobster and conch fisheries that primarily arises from competition among similar vessels and from competition among different fisheries for use of the same fishing areas. The level of conflict has not changed in the past ten years. That said, dispute resolution and conflict management processes are not an integral part of the routine fisheries management process for these fisheries. Furthermore, legislation does not include conflict resolution tools such as: zoning, stock enhancement, resource allocation, education or limited access. Thus it appears that the governance framework of Anguilla has not yet taken an active role in dispute resolution and conflict management. No information is available about the management conflict for the recreational fisheries.

On the subject of management of fishing effort, overfishing appears to be a general problem, although the proportion of fisheries affected is not known. In the small-scale subsector, all three fisheries are considered to be overfished, and this may be related to the fact that catch per unit of fishing effort has been reported to be constant or in decline. However, capacity reduction programmes have not been put in place for these fisheries. No information has been made available to determine if overfishing exists for the recreational fisheries. Additionally, fishing capacity is not being measured for the fisheries in Anguilla. Several constraints exist that hinder the measurement and assessment of fishing capacity, including: a lack of budget or funding for such work; a lack of political will to undertake such work; a lack of the supporting data for making such measurements; a lack of human resources to do the assessments; and a lack of stakeholder support and education.

Management of monitoring, compliance and enforcement

Both the Fisheries Department and the Marine Police Unit are responsible for conducting at-sea fisheries patrols, monitoring and enforcement in both the coastal and territorial waters. On the other hand, the Fisheries Department has sole responsibility for conducting on-shore fisheries monitoring work, which usually involves checking dock-side landings and logbooks. However, the Fisheries Department is not responsible for enforcing penalties.

For the small-scale fisheries, the system used to support compliance and enforcement includes random dockside inspections, routine inspections at landing sites and at-sea

boarding and inspection. While the number of offences has remained unchanged over the past five and ten years, it is believed that the capacity to detect these offences has decreased over the same timeframe. Trends in offences and detection capacity applicable to the recreational fisheries are unknown.

In Anguilla, the overall budget for enforcement has decreased over the past five and ten years. Furthermore, the enforcement funding that is available is not considered to be sufficient to allow for the enforcement of all fisheries regulations. On the other hand, over the past ten years, more of the available budget has been directed at management of the three most important fisheries in Anguilla, which are the small-scale reef fish, lobster and conch fisheries.

Generally, the usual penalties for breaking marine capture fisheries management regulations and rules include large fines for additional offences and the revocation/suspension of fishing licences. More specifically, in all three major small-scale fisheries, all of the following penalties are possible: larger fines for additional offences, fixed fines for specific offences, revocation or suspension of fishing licences, refusal of the opportunity to fish for the rest of the season or year, and exclusion or removal from the fishery.

In conclusion, in all fisheries addressed, funding is generally not sufficient to allow the enforcement of all fishery regulations. When penalties are enforced, they are not effective at deterring non-compliance. Moreover, the risk of detection is too small to be an effective means of ensuring compliance.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

The government provides funding for 100 percent of fisheries management at the national level. Such funding is intended to cover research and development, monitoring and enforcement and daily management activities. In terms of legislative provisions for the recovery of costs associated with fisheries management, these include the collection of license fees from participants across all fisheries.

Over the past ten years, the budget has increased alongside an increase in management costs, and this applies generally, as well as for the small-scale fisheries. The increase in management costs is associated with increased monitoring requirements and increased enforcement activities. Such increasing costs are currently being met by both fishery participants and the Anguillan Government.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

In terms of membership in subregional fishery organizations, agreements, and/or arrangements, Anguilla is a member of the CRFM, and WECAFC (the latter, through United Kingdom membership). As noted earlier, the legislative framework does not provide the fisheries management agency with the authority to meet the priorities and obligations of any international/regional or multilateral agreements. This may be due to its status as a British Overseas Territory. Thus the legislative framework of Anguilla appears to be nationally focused and somewhat limited in scope.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Anguilla is a member of only the CRFM and WECAFC, but is most directly and actively involved in CRFM activities. Anguilla does not participate with regional/subregional fisheries organization of which it is not a member. Regarding participation in CRFM activities, participation can be hindered owing to budgetary and human resource constraints, along with a lack of political will. Anguilla does provide fishery-related data to the FAO in a timely fashion.

CONCLUSIONS AND RECOMMENDATIONS

- The legislation appears very limited, as it does not satisfy a number of basic criteria: it does not provide a definition of the term fisheries management; it does not provide guidance to shape fisheries management plans and related management objectives; it does not stipulate a formal logical stepwise process for fisheries management; it does not facilitate the identification of stakeholder groups or make provisions for transparency in stakeholder involvement and decision-making; it does not make provisions for a formal process for conflict resolution; there is a limited provision for recovering management costs; and it does not grant the fisheries management authority with the legal power to meet the priorities and obligations of international (global) agreements/conventions, regional agreements or other multilateral arrangements.

  The current fisheries legislation predates many international fisheries agreements, including the CCRF and, the United Nations Fish Stocks Agreement, and so requires revision to take into account the provisions of these agreements. In taking into account such provisions, many of the deficiencies noted above will likely be addressed. All aspects of good governance should also be considered in any revisions of the legislation. In addition, Anguilla needs to explore options for more proactive participation in the activities of the three RFBs in which it holds membership, especially WECAFC and CRFM, which focus on fisheries of interest to Anguilla, so that such interests can be taken into account in regional and international planning and decision-making.
- Stakeholder involvement is consultative, but this appears ad hoc, as stakeholder groups are not formally defined. Also, information about the process is not clearly documented and made available to the public. These two situations will subtract from achieving full transparency and accountability. That said, information dissemination is effected through the use of some traditional methods, as well as the Internet, and this is a positive sign. The legislation should be revised, as already noted. In the meantime, it is important to develop and regularize steps and procedures for stakeholder involvement at all levels in the process, and to document all consultations and decisions.
- Basic systems are in place for monitoring, compliance and enforcement, but these appear insufficient and also unconnected. For example, the trend in fisheries performance over time could not be determined from the available basic data. Also scientific data and analyses are not used to inform management decisions and regulations, including the application of management tools such as time/areas restrictions, and hence the management process is unable to provide proper accountability in terms of fisheries performance.

  The legislation should be revised as noted above, to make provisions for science-based management and for monitoring and evaluating fisheries management performance as it relates to management objectives. Such management objectives should consider the health of the resource, the ecosystem, and the required social and economic contributions. The management objectives, once identified, can inform monitoring and reporting needs.
- Penalties are not effective at deterring non-compliance, and the risk of detection is too small to be an effective means of ensuring compliance. Penalties can be modified through amendments to the legislation. However, enforcement will likely require some additional financial investment, and so management cost-recovery options should be explored. An economic evaluation of the fishery and marine ecosystem goods and services can provide useful information for this.
- Overfishing is considered a problem, but there is no active management response to address the situation, and fishing capacity has not been measured due to constraints in many areas: lack of human and financial resources; lack of political

will and stakeholder support; lack of data. Data and information and analyses based on these will help to improve knowledge and subsequently, appreciation of the issues and possible solutions. An improved and adequately maintained data and information system is necessary to achieve this. If it is a priority, then the value of investment is a national responsibility and should be given due attention.

- Recent increasing costs are being covered by contributions from both the government and from fishery participants, and this is a positive sign. An economic evaluation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs.
- Anguilla's direct participation in the activities of RFBs and RFMOs is limited owing to its status as a British Overseas Territory, and this is hindering appreciation, as well as implementation of fisheries management commitments and obligations at the regional/international level, e.g. EAF and the precautionary approach. Despite this and in the absence of the relevant provisions in the current legislation, required administrative and procedural measures are adopted to ensure compliance with any measures adopted by the CRFM.

  As already noted, Anguilla needs to explore options for more proactive participation in the activities of the two RFBs in which it holds membership. WECAFC and CRFM both focus on fisheries of interest to Anguilla, so that such interests could be taken into account in regional and international planning and decision-making.

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COUNTRY REVIEW

Antigua & Barbuda

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INTRODUCTION

Antigua and Barbuda is located in the Leeward Islands, part of the Lesser Antilles, east of St. Kitts and Nevis and northeast of Montserrat at 17° 03´ N and 61° 48´ W. The twin-island nation established itself as an archipelagic state in 1982 with a 12 nautical mile territorial sea, an exclusive economic zone (EEZ) and a fishery zone of 200 nautical miles. The full extent of the EEZ is unknown, since negotiations with neighbouring states have not been completed. The country's coastline is 153 km. Antigua and Barbuda's GDP (PPP) is USD 1.605 billion, with a real growth rate of 1.6 percent (2012) (Central Intelligence Agency, 2013). Agriculture, which includes fisheries, contributes 2.3 percent to GDP. The country's population is 90 156 (July 2013).

It is estimated that Antigua and Barbuda has a total shelf area of 3 568 square kilometres. This includes the Antigua and Barbuda shelf (3,400 km^2), South Bank (40 km^2), a section of Anguilla shelf (7 km^2), Redonda shelf (98 km^2), Havers Shoal (5 km^2) and a section of St. Christopher and Nevis shelf (18 km^2). The Antigua and Barbuda shelf from which both islands emerge is one of the largest in the Eastern Caribbean. These relatively extensive fishing grounds support a substantial demersal resource of reef fish, Gastropoda (e.g. queen conch) and Crustacea (e.g. Caribbean spiny lobster). Based on the most conservative of estimates from various sources including the Fisheries Division, these resources could provide an annual sustainable yield of between 3 409 and 6 585 tonnes (JICA, 2012). Current production is in line with the previously mentioned maximum sustainable yield estimates; in 2010, the demersal resource yielded 2 183 tonnes and accounted for 94 percent of the total ex-vessel value of production (USD12.03 million). For the same period, the fisheries sector contributed to 55 percent of the agricultural GDP of USD21.39 million or 1 percent of the national GDP (in current prices) according to the Eastern Caribbean Central Bank.

In addition to these demersal resources, seasonal large pelagic species, (e.g. tunas, dolphinfishes, wahoos and billfishes) pass through the waters of Antigua and Barbuda. Preliminary estimates indicate that these migratory fish could yield an additional 3 000–4 000 tonnes annually. Even though the extent of these resources is not fully known, the consensus of opinion is that most are not fully utilized. In 2010, production of large pelagics was conservatively estimated at 17 tonnes. The large pelagics not only offer great potential for the expansion of the capture fishery, but also the sport fishing or recreational fishery. The Antigua and Barbuda Sport Fishing Association sponsors an international billfish tournament annually, which attracts about 30 to 40 entrants from neighbouring islands. To-date, no valuation of the socio-economic contribution of the sport fishery has been conducted.

At the end of 2010, there were 1 521 registered fishers engaged in the sector, with 707 (approximately 46 percent) classified as full-time. Of the registered fishers, 944 were actively fishing, which is about 2 percent of the national labour force. An additional 50 individuals were employed in an underdeveloped processing sector.

The high energy cost associated with processing and storage, and inadequate access to capital has curtailed the development of this area. In terms of employment, values should be taken as conservative estimates, since the fisheries sector acts as a "safety-net" for other economic activities; a large proportion of fishers are also employed in the construction and tourism sector. Thus, downturns or upturns in these other areas of employment can impact on fishing effort and ultimately the status of fishery resources. For this reason, the Fisheries Division has conducted an annual census of active fishing vessels since 2001. The Fisheries Division is also implementing schemes for limited fishing effort to ensure the long-term sustainability of fishery resources, given the role the sector plays in the national economy.

POLICY & LEGAL FRAMEWORK

The management of marine capture fisheries activities at the national, regional/international and local levels in Antigua and Barbuda is currently accommodated by the following pieces of legislation: the Fisheries Act, 1983, which is an act to provide for the development and management of fisheries and matters incidental thereto; Fisheries Regulations of 1990; the Barbuda Local Government Act of 1976; the Barbuda Shooting and Fishing By-Law of 1959; the Territorial Waters Act of 1982; the Maritime Areas Act of 1982; and the Marine Areas (Preservation and Enhancement) Act of 1972. The Act applies to: an EEZ and a fisheries zone (of 200 nautical miles); a territorial sea (of 12 nautical miles); archipelagic waters and internal waters as defined in the Territorial Waters Act of 1982 and any other waters over which Antigua and Barbuda claims fisheries jurisdiction. The act also makes provisions for the state to take action against citizens, or persons ordinarily resident of Antigua and Barbuda, or any person aboard any local vessel involved in fisheries offences outside of Antigua and Barbuda waters. The offence is subject to the provisions of the act and regulations, and persons shall be triable in any court of Antigua and Barbuda as if such offence had been committed in Antigua and Barbuda within local limits of the jurisdiction of such court. The new fisheries legislation, the Fisheries Act, 2006 that has already been passed by parliament, retains the fore mentioned provision and is expected to be enacted shortly along with the draft Fisheries Regulations, 2013. The new regulations will transition the sector from an "open access" to "limited entry" management regime through the use of special permits for certain fishery resources, e.g. queen conch, Caribbean spiny lobster, etc..

A draft High Seas Fishing Act and Regulations are still pending. The legislation serves to provide both a legal and administrative framework for implementing two important international fisheries agreements, namely the FAO Compliance Agreement and the UN Fish Stocks Agreement. Antigua and Barbuda has a unique approach to treaty adoption by passing the Ratification of Treaties Act of 1987. The act requires most conventions, specifically those potentially affecting national security, sovereignty or relationships with international organizations/agencies to receive parliamentary approval through resolution or implementing legislation, before the Minister of Foreign Affairs may deposit an instrument of formal acceptance. This approach ensures public information and democratic discussion on treaty obligations and implications. The Fisheries Act of 2006 includes a general goal that speaks to the promotion of responsible fisheries, i.e. '"to promote the sustainable development and responsible management of fisheries and aquaculture activities in Antigua and Barbuda waters and in the territory of Antigua and Barbuda so as to ensure the optimum utilisation of the fisheries resources for the benefit of Antigua and Barbuda and to ensure the conservation of the fish resources and the ecosystems to which they belong" and makes provisions for the fisheries management plan to specify the objectives of each fishery. This act also stipulates that the management plan shall adopt a precautionary approach and shall specify the objectives of each fishery.

The current national legislation provides the fisheries management authority with the legal framework to meet the priorities and obligations of regional and international agreements. At present, some of the major international agreements related to fisheries that Antigua and Barbuda is a party to include the United Nations Convention on the Law of the Sea, the Convention on Fishing and Conservation of Living Resources of the High Seas, the Convention on the International Trade in Endangered Species of Wild Flora and Fauna, the Convention on Biological Diversity, the Convention on the Conservation of Migratory Species of Wild Animals, the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, and the International Convention for the Regulation of Whaling. Regarding these and other international agreements, there have been efforts to put measures in place to respond to the growing list of multilateral environmental agreements.

Finally, several pieces of non-fishery legislation indirectly affect fisheries management in Antigua and Barbuda: biodiversity legislation, national parks legislation, port and coastal zone management legislation, maritime legislation, forestry legislation and pollution control legislation. Most specifically, these are titled: the Importation of Live Fish Act (1975), the Beach Protection Act (1957), the Beach Protection (Amendment) Act (1993), the National Parks Act (1984), the National Parks (Amendment) Act (2004), the Port Authority Act (1973), the Physical Planning Act (2003), the Antigua and Barbuda Merchant Shipping Act (2006), the Forestry Act (1941), the Dumping at Sea Act (1975), and the Oil Pollution of Maritime Areas Act (1995).

In terms of regional environmental initiatives, member states of the Organisation of the Eastern Caribbean States (OECS) – including Antigua and Barbuda – have committed themselves to a sustainable approach to the development of their economies. The St. George's Declaration of Principles for Environmental Sustainability in the OECS (SGD) was signed by the OECS Ministers of Environment in April 2001 (OECS, 2001). The declaration, which is based on the Barbados Programme of Action for the Sustainable Development of Small Island Developing States, sets out 21 principles for environmental sustainability in the OECS region. This regional initiative is set to become a mandatory agreement shortly, with the passage of the Revised Treaty of Basseterre establishing the Organisation of Eastern Caribbean States Economic Union (OECS, 2010). Member States agree to collaborate with national, regional and international institutions to assist the governments and their national partners to secure and maintain the technical, financial and human resources required to achieve the goals and targets of the declaration. The Revised Treaty of Basseterre establishing the Organisation of Eastern Caribbean States Economic Union Act, 2011 has been passed by the Lower House of Antigua and Barbuda's Parliament and is currently scheduled to be placed before the Upper House.

INSTITUTIONAL FRAMEWORK

The lead agency legally responsible for marine capture fisheries management is the Fisheries Division for local, national and international activities, while at the regional level some activities are led by the CRFM. Management responsibility is shared with: the Antigua and Barbuda Defence Force Coast Guard, Royal Police Force of Antigua and Barbuda, Customs & Excise Division, the Environment Division and Department of Marine Services and Merchant Shipping. At the local level, the Barbuda Council is the local fisheries management authority for the island of Barbuda. The Barbuda Council Sea Wardens also takes on the role of an enforcement authority for marine fisheries related issues up to three nautical miles from the shores of Barbuda. Currently, fisheries-related research is conducted by the Fisheries Division, and permission to conduct fisheries research in Antigua and Barbuda waters requires the approval of the head of the national fisheries authority, the Chief Fisheries Officer.

Current legislation provides specific guidance to shape fisheries management plans and sets up a process for the implementation of these management plans. In the preparation and review of a fisheries management plan, the Chief Fisheries Officer is legally required to consult with the fishermen, local authorities and other persons affected by the plan. Also, according to the legislation, the Minister of Fisheries may appoint a Fisheries Advisory Committee, which is to include the Chief Fisheries Officer and such other persons as the minister may consider capable of advising on the management and development of fisheries. This has been broadened to include "responsible management and sustainable development" in the Fisheries Act (2006).

In addition, the current legislation makes provisions for the fisheries management plan to develop appropriate management measures. At present, there are regulations for specific management measures for individual fisheries: minimum size regulations, closed seasons and gear restrictions for Caribbean spiny lobster, queen conch and turtles, among other species.

The legislation has also been informed by RFBs and RFMOs. This is demonstrated by national legislation which makes provisions for regional cooperation in management. Such provisions include consideration of harmonized systems for collection of statistics and procedures for assessing the state of fisheries resources, as well as harmonized control, surveillance and enforcement systems.

In the area of prosecutions, this requires that the onus of proof is on the defendant to prove that at the time, authority or permission was duly held. Offences are triable as if committed within limits of local jurisdiction, in the case of a local fishing vessel or citizen or person ordinarily resident in Antigua and Barbuda. In cases involving foreign vessels, these are liable on summary conviction to a fine not exceeding USD185 185.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

In Antigua and Barbuda, large-scale commercial/industrial fisheries do not exist. In the case of small-scale fisheries, the vessels used are typically 7 m fibre-reinforced plastic (FRP) pirogues with outboard engines to 10 m FRP launches with inboard engines, which are generally operated by their owners. The typical fishing gear is the fish pot or trap, followed by hand line and gill net; most vessels have GPS and large vessels have pot haulers. Fishers normally market their catch, although some marketing is done via middlemen (i.e. vendors). In terms of recreational fisheries, 35 ft fiberglass launches or cabin cruisers with inboard diesel engines are the popular choice for sport fishing charters. For other recreational activities, 8 to 10 m fiberglass open boats with canopies using outboard engines are primarily used. Marketing is generally not conducted, but may occasionally occur with fish retailers; most fish is for personal consumption but may also be donated to charity.

In terms of fishing areas, all three small-scale fishery operators utilize the Antigua and Barbuda shelf. Additionally, the shallow shelf and reef and lobster fishery operators utilize the South Bank, Havers Shoal, a section of Nevis Bank. No data are available on the specific locations of the recreational fishery.

Fish production and value

Fisheries for shallow-shelf and reef fishes (Lutjanidae, Serranidae, Haemulidae, Acanthuridae, Scaridae, Balistidae, etc.), queen conch, and Caribbean spiny lobster are the top three small-scale fisheries in terms of landings, with 2010 annual production levels reported to be 1 168 tonnes, 764 tonnes (whole weight including shell) and 175 tonnes, respectively. Landings for the shallow shelf and reef fishery have dropped by approximately 42 percent in the last five years (2007), and by 31 percent when compared to landings ten years ago (2002). In the case of the queen conch fishery, current landings are at their highest levels in ten years, with gross landings showing a 48 and 139 percent

increase from landings five and ten years ago (2002 and 2007), respectively. Landings for the lobster fishery are at their lowest levels in ten years, down by 45 and 37 percent from landings of five and ten years ago (2002 and 2007), respectively. This decrease in landings for shallow-shelf and reef fishes and the Caribbean spiny lobster has been due to the impact of Hurricane Earl in 2010, where 14.8 percent of the fish pots or traps in operations were lost (Horsford, 2010). The sector sustained total damages in the range of USD 130 640 with respect to vessels, gear and infrastructure. This coincided with an already reduced demand for lobster and "high-valued" reef fish (e.g. snappers and grouper) as a result of a major decline in stay-over visitor arrivals starting in 2008 with the global economic downturn. Tourism is the main driver of Antigua and Barbuda's economy as well as fisheries production, particularly for luxury goods such as the Caribbean spiny lobster. With a resident population estimated at only 89 000 and total visitor arrivals (sea and air) approaching 1 million, its impact on fishing effort cannot be underestimated. It should be noted that trend analysis for all three fisheries (using data for 1994 to 2010) indicated an increasing trend with respect to landings; however, it was only statistically significant in the case of the queen conch. The highest recorded landings for queen conch occurred in 2008, and coincided with decreased landings for spiny lobster, as lobster divers switched their effort to address the decreased demand for lobster from the tourism sector.

In addition to their importance in terms of production, these three fisheries are also the most valuable in the subsector. The shallow-shelf and reef fishery (USD 8.70 million) is more than eight and four times as valuable as the conch and lobster fisheries, respectively. In the most recent year, the annual gross value of the shallow-shelf and reef fishery is estimated to be USD 8.7 million, showing a decrease of 16 percent over the last five years, but still more lucrative than ten years ago when the gross value was approximately USD 8.47 million. The value of the conch fishery (USD 0.79 million) has approximately doubled every five years since values of USD 0.28 million ten years ago, in parallel with observed increases in landings over the same time period. In the case of the lobster fishery, a gross value of USD 1.92 million is reported for the most recent year, a decrease over the past five and ten years (USD 3.5 million and USD 2.25 million, respectively). The overall value of all three fisheries has shown an increasing trend, mirroring landings trends when all data from 1994 to 2010 are taken into consideration. Also in the small-scale subsector, none of the three fisheries provide the sole source of income or food for the participants. Information on the landings and the value of the recreational fisheries is not available.

Fishing effort and impacts

In the three small-scale fisheries, there are currently a total of approximately 1 388 licensed participants: 75 772, and 559 participants are in the shallow-shelf and reef, conch, and lobster fisheries, respectively. An estimated 302 vessels are operating in the shallow-shelf and reef fishery, 19 in the conch fishery and 388 vessels in the lobster fishery. Over the past ten years, the approximate number of participants and vessels utilized has remained unchanged in all small-scale fisheries. It is important to note that most of the participants in the shallow-shelf reef fishery and Caribbean spiny lobster fishery are participating in both fisheries due to the primary gear used (fish pots); exceptions are fishers using hand line in the shallow-shelf reef fishery and those fishers using fish pot to target deep-water snappers and groupers outside the normal depth range for the Caribbean spiny lobster. Similarly, gill nets can be used to target coastal pelagics as well as reef fishes, depending on method of setting. Most of the fisheries overlap due to the fact that the same gear can be utilized to target different species. Levels of and trends in fishing effort are not available for the recreational fishery.

The proportion of fisheries estimated to be overfished is unknown. However, in the small-scale fisheries, overfishing is not considered to be a problem in any of the

fisheries. That noted, catch per unit effort (CPUE) and mean size landed have remained constant in the shallow-shelf and reef and lobster fisheries but, as suggested by the increasing landings with constant effort, CPUE is increasing in the conch fishery. Fleet capacity has been measured for all the small-scale fisheries and overcapacity is not believed to be a problem at present. As a result, capacity reduction programmes have not been initiated in the country. Despite this, initiatives have been undertaken to limit fishing effort in the conch fishery (where CPUE is increasing), before the most conservative estimates of MSY are reached. Furthermore regulations in the last two to three years in all small-scale fisheries have had an effort reduction focus. No data are available for the recreational fisheries.

MANAGEMENT ACTIVITY

General nature and extent

More than 67 percent of marine capture fisheries, whether addressed at the national, regional/international or local levels, are currently managed through legislating individual fisheries, establishing management plans and by regulations, including rules established by fishing organizations or traditional rules/customs. Of the fisheries that are managed at the national and regional levels, more than 67 percent have formal management plans or published regulations, and the corresponding figure for local level management is 33–67 percent. Furthermore, for the fisheries that are regulated, more than 67 percent of regulations have been established based on scientific monitoring and evaluation at the national and regional levels (only <33 percent at the local level). Additionally, the number of fisheries being managed at the national, regional and local levels has been increasing in the past ten years. It should be noted that all major fisheries are currently managed.

As already described in the section on Legal Framework, the legislative provisions for the management process strive to take into account the provisions of the various international agreements (UNCLOS, CCRF, UN Fish Stocks Agreement, etc.).

The three major fisheries in the small-scale subsector all have management plans which were established between 2005 and 2006. Objectives for each of these separate fisheries include: 1) maintaining populations at levels that can produce the maximum sustainable yields; 2) preserving rare or fragile ecosystems, especially coral reefs, mangroves, seagrass beds and other spawning and nursery areas; and 3) ensuring effective monitoring and enforcement with respect to fishing activities. Additionally, in the shallow-shelf and reef fishery a unique management objective exists to promote the development and use of selective fishing gear and practices that minimize waste of non-target species.

Management approaches and tools

It should be noted that the shallow-shelf and reef fisheries, along with the lobster fisheries are multispecies in nature, and this aspect is captured in the management plans. Multispecies concerns are taken into account in both of these fisheries by: 1) selecting management measures that have a wide-ranging effect on multiple species (e.g. marine reserves); 2) designing marine reserves that have a wide range of habitats that support the various development stages of the various species (e.g. mangroves, seagrass beds and coral reefs); 3) monitoring broad indicators of multiple-species health (trend in mean size for the various species landed by gear, trend in species composition by gear, etc.); 4) using management measures to protect certain non-target species affected by the fishery (e.g. restrictions on the length and the soak time of gill nets in the case of turtles in the Regulations 2012).

The management process also includes specific ways of applying the ecosystem approach to fisheries (EAF) management and the precautionary approach. The EAF approach is applied to all three major fisheries in Antigua and Barbuda. Similar to

the previously mentioned initiatives intended to address the multispecies nature of fisheries, applying the EAF approach is ensured by designing marine reserves that have a wide range of habitats that support the various development stages of the various species, i.e. mangroves, seagrass beds and coral reef habitats. Other initiatives include mitigating the impact of fishers on other stakeholders, e.g. zoning to separate areas of fishing operations from those used by recreational dive tour operators. In the shallow-reef and shelf and lobster fisheries, a key initiative includes mitigating gear impacts on the environment, e.g. installment of biodegradable panels for fish pots, which has been included in the Regulations 2012. In the case of marine protected areas (MPAs)/ marine reserves, in at least one or more of the MPAs that exist in Antigua and Barbuda, fisheries management concerning the three small-scale fisheries is listed as an objective/ reason in establishing the area(s).

Regarding other management tools, spatial, temporal, gear, size and participatory restrictions are applied for the shallow-shelf and reef, conch and lobster fisheries, but catch and fishing rights regulations are not common. More specifically, spatial restrictions in the three fisheries include: MPAs, nursery area closures, no-take zones and marine reserves with controlled harvesting. Temporal restrictions are limited to defined fishing seasons, while gear restrictions include limits on size and type characteristics. Catch-at-size restrictions and limited entry (i.e. limited vessels or participants) are not utilized in the shallow-shelf and reef fishery but are applied in the conch and lobster fisheries. A licensing system has also been established in all three small-scale fisheries. Furthermore, all of the above mentioned management tools are being increasingly utilized in all of the small-scale fisheries.

Additionally, regionally/internationally agreed restrictions and performance standards are utilized as management tools. In particular, the relevant international restrictions/performance standards (e.g. CITES measures) are used to boost fisher compliance with size restrictions for queen conch and to give greater weight to ensuring that fishers are complying with the catches allowed under licensing agreements.

Stakeholder involvement and transparency in management

Stakeholder consultation is a formal and required part of all fisheries management activities occurring at the national, regional and local levels. The formal definition of what groups are considered stakeholders is noted as follows: "Stakeholders are fishermen, local authorities, and other persons affected by the fisheries management plan". Consultation occurs with stakeholders and generally, this has been a useful process for contributing to a sense of stewardship among stakeholders. As such, stakeholder involvement has resulted in a stabilization of stock levels, reduced conflict and in the case of the conch fishery, it has also made the management process faster, with compliance rates averaging 88 percent over the past decade. In the shallow-shelf and reef and lobster fisheries, the management process has not been made faster because of competing interests among those concerned. More specifically, the management process can be described as consultative co-management (where government consults but has the final decision) for the shallow-shelf and reef fishery, and collaborative co-management (where government and stakeholders share decisions) for the conch fishery (Horsford and Lay, in prep; Van der Meerin, 1998)). In the lobster fishery, different levels of stakeholder involvement are reported for the two islands: in Antigua, this has been described as consultative co-management with some stakeholder control, whereas in Barbuda, delegated co-management is practiced in which stakeholders have full management responsibility for the resource through the local council. Barbuda has a long history of community-based natural resource management dating back to the communal land rights of the Barbuda Act of 1904.

Overall, the management process in Antigua and Barbuda is considered to be transparent. All information is clearly documented and available to the public.

Moreover, meetings to discuss the management of specific fisheries are open to all stakeholders, are publicized, and during meetings, there are opportunities for all stakeholders to contribute to the discussions. Information dissemination is effected through several means, including the use of radio and television broadcasts, website(s), printed material, mail and fax communication.

Management of conflict and fishing effort

Conflict exists in the shallow-shelf and reef and lobster fisheries, primarily arising from competition for the same fishing areas among different fisheries, recreational users and other industries such as tourism. That said, the level of conflict has decreased in the past ten years. Dispute resolution and conflict management processes are part of the marine capture fisheries management process for these fisheries. Furthermore, legislation sets up a process to deal with conflict, including specific steps to follow, and identifies the need to consider both the fisheries sector and other sectors that may be affected. At present also, the legislation incorporates conflict resolution tools such as: zoning, resource allocation (for direct and indirect participants), education and limited access. On the other hand, stock enhancement is not utilized to manage conflict.

With regard to management of fishing effort, overfishing is not believed to be occurring in any of the three major small-scale fisheries. In two of the three fisheries, CPUE has remained stable, as well as the other performance indicators (mean size of species landed, net cash flows, rate of returns on investment, etc.) Only the conch fishery has experienced increasing CPUE. In this instance, a conservative MSY has been estimated and new regulations have been enacted to limit effort before the MSY level is attained. Fishing capacity is being measured in all the major small-scale fisheries, but this task has not yet been completed. Completion of both the measurement and assessment of fishing capacity in all marine capture fisheries has been constrained by: a lack of budget or funding for such work, a lack of the supporting data for making such measurements, a lack of stakeholder support and education, and other more urgent fishery management priorities.

Management of monitoring, compliance and enforcement

In terms of monitoring, control, surveillance and enforcement, the Fisheries Division collaborates with the Antigua and Barbuda Defence Force Coast Guard and the Royal Police Force of Antigua and Barbuda. In addition to enforcing domestic fisheries legislation and patrolling EEZ waters, the Defence Force Coast Guard participates in search and rescue as well as assists the Fisheries Division with respect to inspecting fishing vessels, environmental monitoring and training of fishers in areas such as vessel safety, navigation and engine repairs. The Royal Police Force assists with the enforcement of fisheries legislation pertaining to land-based activities. In Barbuda, the patrol activities of the Coast Guard, Fisheries Division and the Police Force are complemented by the Barbuda Council Sea Wardens up to three nautical miles from the coast of Barbuda.

Compliance and enforcement of fisheries management (small-scale subsector) are supported through the use of the following systems: random dockside inspections, routine inspections at landing sites and processing establishments, at-sea boarding and inspection, and market-related measures, i.e. catch certification for approval of exports. In addition, the Fisheries Division maintains a database of violations of the fisheries legislation to: improve overall monitoring of IUU fishing; readily identify repeat offenders; track changes in the types of violations; geo-reference “hot spots” for IUU fishing; and guide monitoring, control, surveillance and enforcement strategies. Broadly speaking, the number of offences has decreased over the past five and ten years, with the exception of the lobster fishery, for which an increase in offences has been reported. These have occurred alongside increasing efforts to detect non-compliance. Antigua

and Barbuda's Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing outlines the most recent strategies employed to combat IUU fishing (Anon., 2010). Specific strategies have been developed for all major fisheries (including the Caribbean spiny lobster and the queen conch). Other proposed measures include the development of a coastal watch network through collaboration with the Antigua and Barbuda Defence Force Coast Guard and other stakeholders (e.g. fisherfolk organizations, NGOs, marine tour operators).

Generally, the budget for enforcement has remained unchanged from ten and five years ago, but has decreased within the last five years. Furthermore, the available funding is not sufficient to allow for effective surveillance of offshore fishing areas, particularly for foreign fishing vessels, given that Antigua and Barbuda has one of the largest EEZ in the Eastern Caribbean (estimated at 110 089 km^2). One problem highlighted was the low severity of fines which does not seem to inhibit non-compliance. However this issue has been addressed in the proposal of new regulations, in which higher fines are to be applied, and together with detection efforts, will be sufficient to inhibit non-compliance. However, there is still concern about the sufficiency of the detection effort to cope with IUU fishing by foreign fishing vessels.

At present, penalties for breaking marine capture fisheries management regulations and rules, applicable to all fisheries, include: increasing fines for repeat offenders, fixed maximum fines for specific offences, revocation or suspension of fishing licenses, refusal of the opportunity to fish for the rest of the season or year, exclusion or removal from the fishery, and forfeiture and imprisonment in certain cases.

The signing of the Organisation of Eastern Caribbean States (OECS) Agreement Establishing Common Fisheries Surveillance Zones improved subregional cooperation among Member States in 1991 (OECS, 1991). This agreement was aimed at rationalizing the deployment of coast guard and/or marine units at the national and subregional levels. The agreement also allowed for the arrest for fishing violations in any of the waters under the jurisdiction of an OECS member state. Joint air and sea surveillance exercises were conducted annually which lead to several arrests of illegal foreign fishing vessels. Limitations in the endurance of surveillance due to high cost and the geographical composition of the region hindered the long-term sustainability of the joint air and sea surveillance exercises and ultimately the success of the subregional initiative. For these reasons, the agreement was never fully implemented as agreed by the OECS Heads of Government (Prime Ministers and Chief Ministers).

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Currently, the government provides 44 percent of the funding required for fisheries management across all subsectors. Such funding is intended to cover research and development, monitoring and enforcement and also daily management activities. Despite a level of reliance on government, it is interesting to note that, with respect to the conch fishery, in 2010 the fisheries authority and the conch fishers collaborated to conduct a morphometric study. In this instance, the fishers provided the manpower and assisted with logistics. Legislative provisions for the recovery of costs associated with fisheries management include: license fees from participants in the fishery, participants in other fisheries in the same sector, participants in other fisheries in different sectors and resource rentals. With the enactment of Fisheries Act 2006, these fees will vary according to the category of sector (commercial, sport fishing, recreational, etc.). It should also be noted that government still subsidizes resource retails and fees, due to the role the sector plays as an economic "safety net".

In general, while the budget for fisheries management has been decreasing for all levels of activity (local, national and regional) and for all fisheries, costs have been increasing. The increasing costs are associated with: improved stakeholder consultation, increased monitoring requirements, increased enforcement activities, increased

litigation, increased conflict management, and increased obligations to international organizations/agreements. In the small-scale fisheries, increasing costs are also due to a number of developments in the administrative framework and management process. For instance, there has been the creation of an additional local fisheries management authority which is not self-sufficient in terms of funding. Costs have also increased as a result of the introduction of management tools such as EAF which generally requires additional data collection efforts. Related to this is also the fact that as Antigua and Barbuda lacks a coastal management unit and hence, the responsibility of coastal zone management is handled by the national fisheries authority. Furthermore, while the fisheries sector is moving to implement an ecosystem-based approach to management, other sectors, such as tourism, are not. This is incurring increasing costs owing to a constant need and effort to preserve fish habitats, especially as tourism and coastal development activities have drastically altered the coastal environment of Antigua. Currently, the increasing costs of management are being met by the government, fishery participants and also other sources.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

In terms of membership in subregional fishery organizations, agreements, and/or arrangements, Antigua and Barbuda is party to the United Nations Convention on the Law of the Sea, the Convention on Fishing and Conservation of Living Resources of the High Seas, the Convention on the International Trade in Endangered Species of Wild Flora and Fauna, the Convention on Biological Diversity, the Convention on the Conservation of Migratory Species of Wild Animals, the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, and the International Convention for the Regulating of Whaling. The country is also a member of two RFBs operating in the Caribbean region: CRFM and WECAFC. The legislative framework provides the fisheries management agency with the authority to meet the priorities and obligations of regional agreements and international agreements/conventions.

Regarding other international agreements there have been efforts to put measures in place to respond to the new paradigms proposed. To implement the FAO Code of Conduct for Responsible Fisheries (CCRF), the most important actions undertaken so far by Antigua and Barbuda include: inclusion of some of its principles into recent fisheries legislation, which acknowledges the need for promotion of responsible fisheries, conservation of the ecosystem, and the precautionary approach, as well as others; development and implementation of a NPOA IUU, and ongoing examination of the need to develop a NPOA on sharks; and education of fishers, in partnership with the Caribbean Network of Fisherfolk Organization (CNFO) on the CCRF.

Similarly, regarding the 1995 UN Fish Stocks Agreement, Antigua and Barbuda has drafted the High Seas Act and Regulations to facilitate implementation of the relevant provisions. It should be noted that the policy of the government is not to flag foreign fishing vessels until the legislative framework and infrastructure for regulating these are in place. Antigua and Barbuda does not have a home=based high-seas fleet.

In the case of the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (EAF) (2003), the three most important implementation steps undertaken by Antigua and Barbuda are: education of fishers in partnership with the CNFO on the EAF concept; involvement in a GEF-funded demonstration project (SIRMM) on the southwest coast of Antigua that utilizes an integrated management approach from forest reserve to surrounding reefs; establishment of the North East Marine Management Area (NEMMA), which will eventually be managed by a group consisting of a broad spectrum of stakeholders representing various user groups (fishers, hoteliers, tour operators, dive operators, etc). In respect of the FAO International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999), this is not considered relevant, as Antigua and Barbuda does not have any significant pelagic longline fishery.

As already noted, Antigua and Barbuda has begun to assess whether a NPOA on sharks is required, an activity being sponsored by the FAO and which represents the first step in implementing the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999). Regarding implementation of the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999), the most important achievements to date for Antigua and Barbuda are: the enactment of the Fisheries Act 2006, which will allow Antigua and Barbuda to move from an open-access arrangement to a limited entry arrangement for certain species; improved monitoring of fishing effort by conducting an annual census of active fishing vessels; and preliminary assessment of the use of fisheries subsidies in the context of WTO and fisheries management.

In the case of the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated (IUU) Fishing (2001), development and implementation of a NPOA-IUU has already been mentioned. In addition, new legislation is being drafted to strengthen the powers of authorized officers, as well as the responsibility of fishers. MCS has also been improved, and educational programmes have been developed and delivered to provide mandatory training for fishers, e.g. in new regulations. Concerning the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), efforts have also been made towards implementation. The new Fisheries Regulations 2012 sets limits on the length of gill nets, as well as the length of time the gear can remain in the water. Also, the recently adopted Fisheries Act 2006 places a ban on large driftnet fishing in Antigua and Barbuda waters. These measures are intended to improve management of bycatch and discards. As mentioned previously also, several pieces of non-fishery legislation indirectly affect fisheries management in Antigua and Barbuda.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

As noted earlier, Antigua and Barbuda is currently a member of the CRFM and WECAFC and actively participates in the activities of these two RFBs. However, the country does not participate in the activities of regional/subregional fisheries organization of which it is not a member. The three primary ways in which Antigua and Barbuda supports regional/international obligations through national legislation is by legislating for cooperative measures, harmonized enforcement measures (regional), and harmonized systems for collection of statistics and procedures for assessing the state of resources. At present, Antigua and Barbuda provides fishery-related data to the FAO, CITES, and the CRFM. There is a formal national mechanism in place to facilitate this, and the country is able to meet the stipulated data reporting deadlines.

SUMMARY AND CONCLUSIONS

- The current relevant fisheries legislation is the Fisheries Act, 2006, and Fisheries Regulations, 2012 have been proposed. As the legislation has been recently updated, it incorporates several principles of major international fisheries instruments, such as the CCRF. It gives recognition to the need for responsible fisheries management, implementation of the ecosystem approach to fisheries management and the precautionary approach. It also makes provisions for regional cooperation in management. The legislation specifies the need for fisheries management plans and for these to address several issues, including the development of objectives, establishment of measures, and establishment of a Fisheries Advisory Committee expected to facilitate representation of stakeholder interests. However, the recently proposed legislation has not been fully enacted. The new legislation offers an opportunity to revise licence fees, penalty fines and other sources of cost recovery. Consideration should also be given to obtaining resource rental service fees from other sectors that make use

of the marine ecosystem and even the resources for other activities, e.g. whale watching, snorkelling and dive tours. This is consistent with adopting an ecosystem-based approach, in which all sectors should contribute to sustainable management of the marine ecosystem and the associated living resources.

- Stakeholder involvement has been described as co-management ranging from consultative to delegated co-management for the major small-scale fisheries, and depending on the fishery, stakeholder responsibility for management ranges from some responsibility to being fully responsible for management decision-making and implementation. Information dissemination is already effected through the use of various traditional methods, as well as the Internet, and this is a positive sign. Moreover, stakeholder consultation is believed to have had a positive impact in creating a sense of stewardship and also making the management process faster for some fisheries. In the case of the conch fishery, stakeholders have been involved in all aspects of management from collaborative research to decision-making. Perhaps the greatest challenge to the future of stakeholders' involvement involves identifying "who is a stakeholder"; with the incorporation of EAF in fisheries management approach, the definition of a stakeholder may have to be broadened to include other resource users such as the recreational tour and dive sectors. This has implications for the composition of future Fisheries Advisory Committees, since the actions of fishers impact the quality of product provided by these service providers. More crucially, the dominant sector, tourism, needs to adopt an "ecosystem approach" to its development, given its significant impact on the coastal and marine environment.
- Systems are in place for monitoring, compliance and enforcement, and basic data for examining fishery trends and evaluating the status of resources are available. That noted, it appears that the Fisheries Department has a very broad suite of responsibilities, including fisheries management tasks ranging from monitoring vessels both in port and at sea to scientific research and enforcement tasks, and also more general coastal zone management tasks. While the legislation does not make provisions for use of specific information in management decision-making, the major fisheries appear to be monitored and managed based on scientific information to the extent possible. No doubt, there are gaps in the monitoring system. In most cases, however the required scientific information is being generated at the national level; in a few cases, scientific information has been borrowed from the experiences of other countries with similar fisheries. The nature, extent and performance of the recreational fishery are unknown and are not currently monitored.
- Regarding management costs, the management budget has not kept pace with management costs, and the available funds are insufficient to cover all aspects of management (research, stock assessment, MCS, etc.). Penalty fines need to be increased to be effective in deterring compliance, and there is concern about the country's capacity to handle IUU fishing by foreign fishing vessels. Related to the enactment of the new legislation, recent increasing costs of managing the fisheries are being covered by contributions from the government and from fishery participants, as well as increased fines, and these are positive signs. The legislation makes provisions for the fisheries management plan to elaborate the management process. An economic evaluation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs. Penalty fines are expected to be increased with the enactment of Fisheries Act 2006 and Fisheries Regulations 2012, and the introduction of the proposed High Seas Act and Regulations may be expected to equip the country better to deal with IUU fishing.

- Antigua and Barbuda is party to the United Nations Convention on the Law of the Sea, the Convention on Fishing and Conservation of Living Resources of the High Seas, the Convention on the International Trade in Endangered Species of Wild Flora and Fauna, the Convention on Biological Diversity, the Convention on the Conservation of Migratory Species of Wild Animals, the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, and the International Convention for the Regulating of Whaling. The country is also a member of two RFBs operating in the Caribbean region (CRFM and WECAFC) and submits data, as required, to FAO, CITES and the CRFM. The Ratification of Treaty Act (1987) provides the legislative framework for meeting obligations under international agreements. The country has made clear efforts to incorporate into its management process, certain internationally agreed principles of responsible fisheries management, to the extent that these apply.

NOTE: The Fisheries Regulations No. 2 of 2013 made under the Fisheries Act No. 22 of 2006, came into force on 01 February 2013.

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COUNTRY REVIEW

Aruba

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INTRODUCTION

Aruba is a small island, 33 km long located in the southern Caribbean Sea, 27 km north of the coast of Venezuela at 12° 30' N and 69° 58' W. Together with Bonaire and Curaçao, it forms a group (the ABC islands of the Leeward Antilles) in the southern island chain of the Lesser Antilles. Collectively, Aruba and the other Dutch islands in the Antilles have been commonly referred to as the Netherlands Antilles or the Dutch Antilles. Although still a constituent country of the Kingdom of the Netherlands, Aruba obtained full autonomy in internal affairs in 1986, upon separation from the Netherland Antilles (Central Intelligence Agency, 2013). The Dutch Government however, still maintains responsibility for defense and foreign affairs. Aruba has a land area of 180 km^2 and a coastline of 68.5 km. Its maritime claim is a Territorial Sea of 12 nm. Aruba's GDP (PPP) is estimated at USD2.516 billion (2009) with a real growth rate of 2.4 percent (2005) (Central Intelligence Agency, 2013). Agriculture, which includes fisheries, contributes 0.4 percent to GDP (2002 estimate). The country's population is estimated at 109 153 (July 2013).

Aruba's fisheries are mainly small-scale and recreational, i.e. there are no commercial fisheries, as these have been prohibited under policy since 1990. Both fisheries are confined to the territorial waters of Aruba. The major small-scale fisheries target wahoo, grouper and snapper using handlines (with a move towards electric or hydraulic reels) and small wooden or fibreglass pirogues (16 to 30 ft) with outboard gasoline engines. The recreational fishery targets wahoo, dolphinfish and barracuda using various sized fibreglass and wooden boats, ranging from 16 to over 29ft, and handlines, rod and reel gear, aided by electric and hydraulic winches. Recreational catches are generally not marketed, but donated to charity. Some catch sales do occur at the landing sites, and some recreational fishers have contacts with local restaurants and hotels to deliver incidental catch.

POLICY FRAMEWORK

There is specific legislation that makes provisions for marine capture fisheries management activities at the national level, the regional/international level, (i.e. to facilitate fulfillment of member-country obligations to regional/international agreements/conventions) and the local level. In particular, there are three instruments of legislation that relate to fisheries management: the 1992 LV Visserijverordening (AB 1992 no. 116), which is the Fisheries Ordinance; the 1992 LB Sleepnetten (1992 no. GT 17), which addresses prohibition of trawling nets; and the 1993 LBHAM visserijbesluit (1993 no.15).

Fisheries management is not defined in the legislation. However, the legislation provides both legal and administrative frameworks for governing the management process at the national, regional/international and local levels. The legislation also identifies a single authority for marine capture fisheries management at all levels.

Fisheries management objectives are listed in the legislation, but are not prioritized. That noted, fishing permits are issued only if it is established that existence of the fishery itself and the natural development of the fish population in question are not threatened. This implies a priority for knowledge of resource status and fishing operations. The management objectives noted in the legislation are also incorporated into fisheries management plans.

In the case of shared resources, management objectives are currently not informed by the activities of RFBs. The country is not a party to any major international marine fisheries management conventions. Notwithstanding, efforts to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995) include: legislative provisions for the preservation of fisheries and fish populations, promotion of stakeholder participation, and monitoring of the health of fisheries via the monitoring of fish populations.

It should be noted that there is additional national non-fishery legislation that indirectly, but significantly, affects the management of marine capture fisheries in Aruba. These include: endangered species legislation, export/import/trade legislation and port management legislation. Of particular importance are the following legal instruments: the Nature Protection Ordinance (CITES) and Navigation and Maritime Safety Legislation.

LEGAL FRAMEWORK

The legislation identifies a single authority with the responsibility for marine capture fisheries management matters at the national, regional/international and local levels: the Department of Agriculture, Animal Husbandry and Fisheries. Furthermore, fisheries management activities at the regional/international level are carried out under the supervision of the Dutch Government. Issues are therefore handled through Aruba's office of foreign affairs and Dutch representatives. There is no separate fisheries science agency or institution to share the scientific responsibilities of management. However, a separate fisheries enforcement agency/authority, the Coastguard of the Dutch Caribbean Region and Police, is responsible for all fisheries enforcement matters concerning Aruba's fishing operations.

The fisheries legislation is designed as a framework that shapes fisheries management and management plans, i.e. it provides specific guidance on management approaches and tools. The legislation also sets up a series of steps or a process for developing, organizing and implementing fishery management regulations and fishery management plans. The legislation also requires management decisions to be based on information coming from: biological analyses, economic analyses, environmental analyses, and monitoring and enforcement options. Specific management measures and regulations for individual fisheries are included, e.g. it makes provisions for a permit system with possibilities to regulate species fished, fishing seasons, sizes harvested, fishing method, catch quotas, etc.. That noted, the legislation does not prescribe steps for setting up the management process itself, nor does it make provisions for the management process to be completed in a given timeframe.

In the case of shared resources, the work of RFBs and RFMOs do not appear to inform the objectives of the legislation, and the national legislation does not appear to implement internationally agreed measures that have been adopted by RFMOs. In addition, the legislation currently does not give the fisheries management authorities the legal power to meet the priorities and obligations of: international agreements/ conventions (global), regional agreements, and other multilateral arrangements. The country is not a party to any major international marine fisheries management conventions, but is a member of WECAFC. Notwithstanding, in an effort to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), Aruba's legislation makes provisions for the preservation of fisheries and fish

populations; promotion of stakeholder participation, and monitoring of the health of fisheries via the monitoring of fish populations.

In the area of prosecutions, the Office of the Prosecutor General handles all punishable offences. The legislation makes provisions for confiscation, fines and imprisonment. The ordinance of criminal law takes precedence when not defined. Foreign fishing vessels must have a permit to operate in Aruban waters. As noted in the previous section, several instruments of non-fishery legislation influence the management of marine capture fisheries in Aruba, with the key instruments being the Nature Protection Ordinance (CITES) and Navigation and Maritime Safety Legislation.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

Aruba does not have commercial fisheries at the moment, as its fisheries policy prohibits commercial fishing since 1990. The small-scale/artisanal fishery of Aruba is characterized by small (16–30 ft) wooden or fibreglass boats, mostly with outboard gasoline engines. Handline fishing is also performed, but fishers are moving steadily more towards the use of electric or hydraulic reels. In the recreational fishery, yachts greater than 29 ft are common, and these typically cater to the needs of tourists. On the other hand, hobbyists use various sized fibreglass and wooden boats, ranging from 16 to over 29 ft, and fish with handlines, rod and reel gear, aided by electric and hydraulic winches. Recreational catches are generally not marketed, but donated to charity. Some catch sales do occur at the landing sites, and some recreational fishers have contacts with local restaurants and hotels to deliver incidental catch. Both small-scale and recreational fishing operations take place in the territorial waters of Aruba.

Fish production and value

At present, the three most important small-scale fisheries are: the wahoo fishery, harvesting about 48 tonnes annually; the grouper fishery harvesting about 15 tonnes annually, and the snapper fishery, harvesting about 45 tonnes yearly. These are also among the top-value fisheries. The harvest levels decreased significantly between ten and five years ago, after which the snapper fishery harvests increased again recently. The trends in value mirror the harvest level trends (Table 1).

TABLE 1
Annual gross landings (tonnes) and value (USD) of the three major small-scale fisheries in Aruba

A. Annual Gross Landings of Catch (whole weight in tonnes)			
Fishery	**Most recent year**	**5 Years Ago**	**10 Years Ago**
Wahoo	48	50	74
Grouper	15	15	38
Snapper	45	40	78

B. Annual Gross Value of Catch (USD)			
Fishery	**Most recent year**	**5 Years Ago**	**10 Years Ago**
Wahoo	356 640	371 500	550 000
Grouper	111 450	111 450	300 000
Snapper	334 350	297 200	600 500

In the recreational subsector, the three major fisheries which are important are the wahoo fishery, harvesting about 15 tonnes annually, the dolphinfish fishery, harvesting about 10 tonnes per year, and; a 15 tonnes/year barracuda fishery. These species are usually consumed, and there is no recreational fishing for non-consumptive use, as the recreational fishers generally eat what they catch. Recreational landings of the three major species have decreased over the past ten-year period (Table 2), although the value in each fishery has increased in the same period.

TABLE 2
Annual gross landings (tonnes) and value (USD) of the three major recreational fisheries in Aruba

A. Annual Gross Landings of Catch (whole weight in tonnes)			
Fishery	**Most recent year**	**5 Years Ago**	**10 Years Ago**
Wahoo	15	20	25
Dolphinfish	10	13	15
Barracuda	15	20	20

Food security and employment

The small-scale fishery does not provide the sole source of income or the sole source of food for the majority of participants. However, in the case of the recreational fishery, the fishery provides the sole source of income for 25 percent of the vessel owners in all three fisheries identified. This is presumably linked to the fact that the recreational subsector is providing a service for the tourism industry. The recreational fishery, however, also provides an important source of food for the participants.

Fishing effort and impacts

Fishing effort

The approximate current levels of fishing effort for the three major small-scale fisheries are indicated in Table 3. While the vessels are licensed, individual participants are not. In all cases, the levels of fishing effort, both in terms of vessels and participants, have increased over the past ten years (Table 3).

TABLE 3
Approximate current level of fishing effort in each of the three major small-scale fisheries and how these levels have changed (i–increased, d-decreased, u-unchanged) over the past ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Wahoo	1 000	no	I	400	yes	i
Grouper	900	no	i	500	yes	i
Snapper	900	no	i	500	yes	i

In the case of the recreational fisheries, the numbers of participants are similar to those operating in the small-scale subsector, but the numbers of vessels are much less (Table 4). It should also be noted that 50 percent of the recreational fishery participants are foreign tourists, and only the vessels are currently licensed. The levels of fishing effort, both in terms of participants and vessels, have increased in the past ten-year period in all three fisheries (Table 4).

TABLE 4
Approximate current level of fishing effort in each of the three major recreational fisheries and how these levels have changed (i–increased, d-decreased, u-unchanged) over the past ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Wahoo	900	no	i	250	yes	i
Dolphinfish	900	no	i	250	yes	i
Barracuda	900	no	i	250	yes	i

Overfishing and fishing capacity

There is currently overfishing in all three major small-scale fisheries identified. This is supported by the fact that a constant or decreasing CPUE has been observed in these fisheries. On the other hand, no overfishing is believed to exist in the recreational fisheries, despite the fact that a constant or decreasing CPUE has also been observed in the major fisheries.

The country has begun work towards the measurement of capacity in all of its marine capture fisheries. However, the measurement and assessment of fishing capacity has not been completed in all marine capture fisheries. The delay in doing so is due to: a lack of budget or funding for such work, a lack of political will to undertake such work, a lack of the supporting data for making such measurements, a lack of human resources to do the assessments and a lack of stakeholder support and education.

Overcapacity is believed to exist in all major small-scale fisheries. However, small-scale fishery regulations in the last two to three years have not focused on reducing fishing effort (e.g. limited entry, times, seasons) and/or reducing the harvest in any of the major fisheries. Moreover, no capacity reduction programme has ever been put in place. In the case of the recreational fisheries, overcapacity is not believed to be a problem. Hence, the regulations in the last two to three years for these fisheries have not focused on reducing fishing effort (e.g. limited entry, times, seasons) and/or reducing the harvest in any of the major fisheries.

MANAGEMENT ACTIVITY

General nature and extent

More than 67 percent of marine capture fisheries in Aruba are managed in some way at the national, regional and local levels. However, the number of managed fisheries at the national, local and regional levels has remained unchanged over the last ten years. That noted, there are no major fisheries (in terms of weight of landings) that are not currently managed. At the national level, the management process has been informed by: legislation about individual fisheries, management plans for specific fisheries, published regulations or rules for specific fisheries, and traditional rules or customs that affect the harvest of marine fisheries. The national management level process has not included: interventions/actions to support specific management objectives, and rules established by fishing organizations.

Aruba is not a party to any major international marine fisheries management conventions. As noted earlier, Aruba has made some efforts to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), such as establishment of legislative provisions for the preservation of fisheries and fish populations, promoting participatory management practices and monitoring of fish stock status.

Management approaches and tools

The major small-scale fisheries, as well as the recreational fisheries, are not multispecies in nature. Therefore this aspect does not need to be taken into account in the management process. At present, the management of both types of fishery also does not include specific ways for applying the ecosystem approach to fisheries (EAF) management, nor for applying the precautionary approach.

Although the primary management tools have not been specified, the tools being used in these major marine capture fisheries, both small-scale and recreational, are confirmed to be the same type as used in other fisheries of the same category. There are no marine capture small-scale fisheries that are managed using performance standards. Also, none of these fisheries are managed based solely on regionally/internationally agreed restrictions. Similarly, in the case of the recreational fisheries, there are no voluntary regulations/codes of conduct in place to support management of these fisheries. Like the small-scale fisheries, none of the major recreational fisheries are managed based solely on regionally/internationally agreed restrictions.

Regarding the use of marine reserves, fisheries management is not listed as one of the objectives or reasons for establishing marine protected areas or reserves and in fact, marine protected areas or reserves do not affect the management of the fishery.

Stakeholder involvement and transparency in management

Generally, stakeholders are formally involved in the management of all marine capture fisheries at the national and local levels. However, there is no formal definition of groups to be included as "stakeholders". In terms of the participatory process, the legislation enables consultative management, where fisheries management stakeholders are consulted but do not share management responsibility. However, in practice, this participatory process is not a formal and required part of the management of all marine capture fisheries. Additionally, there are no steps in these processes that are routinely followed as part of fisheries management.

Small-scale subsector – Efforts have been made to identify the stakeholders who have an interest in the use and management of the resources for all three major fisheries identified. However, the management plan does not include a definition of the stakeholders in these fisheries. It should also be noted that the fishery stakeholders are not organized into distinct groups. Notwithstanding, arrangements have been made to consult these stakeholders and to work with them on the management of all three major fisheries identified. The management process, as it relates to the small-scale fishery stakeholders, could be described as: authoritarian management (top-down), as well as consultative management in all three cases; co-management, where fisheries management stakeholders are consulted and share some management responsibility (i.e. decision-making). The participation of stakeholders in decision-making can be rated as: informative, consultative, communicative, advisory, and participative, but not under community control. In all three major fisheries, the participants find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. In those cases where stakeholders are part of the fisheries management decision-making process, the management measures have resulted in stable stock levels over the last five years. Such stakeholder involvement has also made the management process faster, and helped to reduce conflict.

Recreational subsector – Efforts have been made to identify the stakeholders who have an interest in the use and management of the resources for the three major fisheries identified. Furthermore, the management plan of the fishery includes a definition of the stakeholders in each fishery. As noted for the small-scale subsector, the recreational fishery stakeholders are not organized into distinct groups. Nonetheless, arrangements have been made to consult these stakeholders and to work with them for the management of the fisheries concerned. The management process in all three recreational fisheries is similar and as it relates to stakeholders, could be described as: authoritarian management (top-down), but also consultative management. The participation of stakeholders in decision-making can be rated as: informative in the case of the dolphinfish and barracuda fisheries; and consultative, communicative, advisory and participative in all three fisheries. In all cases, the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship.

All parts of the fisheries management process are not considered to be transparent. That noted, information about the fisheries management process is clearly documented and easily available to the public, and meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery. Moreover, such meetings are advertised and publicized in advance of the actual meeting dates, and there is the opportunity for fishery participants to contribute to the decision-making process by providing public comments. There is also the opportunity for other stakeholders to contribute to the decision-making process by providing public comments. If information about management measures and meetings is shared

with fishery participants and other stakeholders, the information is disseminated using: radio announcements or talk shows; television broadcasts; printed materials, such as brochures or information packages; fax; Internet mail; Internet website, and social media.

Management of conflict and fishing effort

Generally, the fisheries management legislation does not set up any particular process to manage disputes or conflict and also does not require the use of particular tools such as zoning of areas, resource allocation among users, use of education, etc..

Small-scale subsector – At present, conflict is not considered to be a problem in the three major fisheries identified, as the level or amount of conflict in these fisheries has decreased over the last ten years. The reason for conflict has usually been due to competition between different types of vessels in the grouper and snapper fisheries. All three fisheries have also recorded conflict as a result of: competition among the same type of vessels, competition with other uses for the same marine space, and competition with other fisheries for the same marine space. As already noted, overfishing is occurring in all three major small-scale fisheries identified. CPUE has been constant or in decline for the past few years. However, fishing capacity has not been evaluated, and capacity reduction programmes have not been attempted.

Recreational subsector – At present, conflict is not considered to be a problem in the three major fisheries identified. Moreover, the level or amount of conflict in these fisheries has remained unchanged over the last ten years. The reasons for the conflict are typically due to: competition between different types of vessels, competition among the same type of vessels, competition with other fisheries for the same area of water, and competition with other industries for use of the same area of water. It has already been mentioned that overfishing is not considered to be a problem in the recreational fisheries, despite the fact that a constant or decreasing CPUE has also been observed. Similar to the small-scale fisheries, there has been no measurement and assessment of fishing capacity, nor the implementation of capacity-reduction programmes.

Management of monitoring, compliance and enforcement

The country has a coastguard, a marine police enforcement unit and a fisheries department that does fisheries enforcement. All three agencies listed are responsible for at-sea fisheries patrols, monitoring and enforcement work in the coastal waters (0–3 nautical miles) of the country. On the other hand, only the coastguard and the Fisheries Department are responsible for at-sea fisheries patrols, monitoring and enforcement work occurring in the territorial waters (0–12 nautical miles). Additionally, the Fisheries Department is the only agency with responsibility for fisheries monitoring work such as checking dock-side landings and is also the only agency responsible for enforcing penalties.

Penalties are applied for incidents of non-compliance and include: small fines for first offences, larger fines for additional offences, fixed fines for specific offences, the revocation or suspension of fishing licences, the refusal of the opportunity to fish for the rest of the season or year, the exclusion or removal from the fishery, confiscation of equipment and catch, and imprisonment.

In terms of incidents of non-compliance, the number of offences remained constant between ten and five years ago, but has been decreasing since then. On the other hand, detection efforts have been increasing over the same ten-year period. At the same time, the available budget for monitoring and enforcement has been decreasing. It does not appear that the funding provided to the Fisheries Department allows it to enforce all fisheries regulations, and that the risk of detection is high enough that participants in

marine capture fisheries try not to cheat. However, the penalties for non-compliance are considered to be sufficiently severe or expensive enough to deter cheating.

Small-scale subsector – Penalties are scarcely applied in the small-scale fisheries. Moreover, promotion of compliance and enforcement of fisheries management do not include the use of any of the usual systems/tools, such as vessel monitoring systems (VMS), on-board observer programme, random dockside inspection scheme, routine inspection scheme at landing sites, at-sea patrol scheme, etc.. Over the last ten years, the number of offences has remained unchanged in the three major fisheries identified. This may be related to the fact that the budget for monitoring and enforcement has also remained unchanged over the same time period. The funding provided is not considered adequate to allow fisheries managers (and others) to enforce all fisheries regulations fully. Where penalties are enforced, they are not effective at deterring actions of non-compliance, and the risk of detection is also not high enough that the participants in these fisheries try not to cheat.

Recreational subsector – In the recreational fisheries, there are penalties for non-compliance with the regulations, and these are applied as already mentioned. As noted for the small-scale fisheries, compliance and enforcement are not promoted via specific systems and tools, such as VMS, observer and inspection schemes. The number of offences that are taking place in the recreational fisheries has been increasing over the past ten years, as also has been the budget for monitoring and enforcement. Notwithstanding, the funding provided does not allow fisheries managers to enforce all fisheries regulations fully. Although penalties, where enforced, are effective at deterring actions of non-compliance, the risk of detection is not high enough that the participants in these fisheries try not to cheat.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Government funding is essential in order to carry out fisheries management activities in Aruba. At present the government funding pays for fisheries management activities related to: research and development, monitoring and enforcement and daily management.

In real terms, the budget for all fisheries management activities has decreased over the last ten years. At the same time, the costs have increased, and depending on the fishery, this is believed to be due to an increase in enforcement activities, an increase in litigations, or owing to general inflation.

Small-scale subsector – Apart from the general description provided, it should be noted that the legislation does not allow for any options to recover the costs associated with managing small-scale fisheries. In the case of the small-scale fisheries as well, the increasing costs are due only to increases in enforcement activities and litigations.

Recreational subsector – Like the small-scale fisheries, the legislation does not allow for costs to be recovered. In addition, in the case of the recreational fisheries, the real costs of management have increased simply because of regular inflation. However, as noted earlier, the additional costs are not being met by any agency or stakeholder group.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Aruba is not a party to any major international marine fisheries management conventions, but is a member of WECAFC. Notwithstanding, in an effort to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), Aruba's legislation makes provisions for the preservation of fisheries and fish populations; promotion of stakeholder participation, and the monitoring of the health of fisheries via the monitoring of fish populations.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Aruba is not a party to any major international marine fisheries management conventions, but is a member of WECAFC. In addition, Aruba does not participate in or cooperate with any regional and/or subregional fishery organizations, agreements and/or arrangements in which it is not a member. In the case of shared resources, the work of RFBs and RFMOs do not appear to inform the objectives of the legislation, and the national legislation does not appear to implement internationally agreed measures that have been adopted by RFMOs.

In addition, the legislation currently does not give the fisheries management authorities the legal power to meet the priorities and obligations of: international agreements/conventions (global), regional agreements, and other multilateral arrangements. Notwithstanding, in an effort to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), Aruba's legislation makes provisions for the preservation of fisheries and fish populations, promotion of stakeholder participation, and the monitoring of the health of fisheries via the monitoring of fish populations.

In the area of statistical contributions to organizations that adopt fisheries management regulations, Aruba collects and provides data to CITES and FAO. There are formal national mechanisms in place so that fishery-related data are compiled and provided to regional or international organizations. The regional and subregional agreements to which the country belongs do not contain specific timetables for countries to provide fisheries-related data.

SUMMARY AND CONCLUSIONS

- The fisheries legislation identifies the roles and responsibilities of the agencies for different components of the fisheries management process and makes a number of good provisions for supporting responsible and sustainable fisheries management practices. It provides guidance on management plans, objectives, management measures and the process for implementing regulations. However, it does not stipulate a formal process for management or that the management process should be completed in a given timeframe. The legislation also does not set a formal process for conflict management. Additionally, the various instruments of fisheries legislation also precede a number of important international fisheries agreements and hence, the objectives are not informed by the work of RFBs that would take globally agreed legal provisions into account, and the legislation does not recognize the need for fulfilling such international obligations. The legislation should be revised to address the gaps noted, particularly to stipulate a formal overall management process, a formal process for conflict management, and to make provisions for fulfilling obligations under later international agreements.
- No commercial fisheries exist. Landings of the major small-scale and recreational fisheries have decreased over the past ten years, while fishing effort levels have increased. Overfishing and overcapacity are considered to be a problem for the small-scale fisheries but not the recreational fisheries, despite the fact that CPUE has either remained constant or declined in all major fisheries. Fishing capacity has not been evaluated, and perhaps because of this, there has also been no attempt to reduce fishing capacity. It is clear that the measurement and assessment of fishing capacity should be completed in the near future, in view of the increasing fishing effort, decreased landings and constant/declining CPUE trend.
- The management process is informed by legislation, management plans and regulations. However, less than 33 percent of those with regulations are supported by routine scientific monitoring and evaluation. Given that the legislation stipulates the use of technical data and information for decision-making, this suggests that the overall management process is lacking formal steps

that should include routine scientific monitoring and evaluation, and the usage of such evaluations for management planning and review.

- There has been some success with stakeholder involvement in management. Stakeholders are not defined in the small-scale fisheries, but are defined in the management plan for recreational fisheries. Although stakeholders are not organized into groups, there have been efforts to consult with stakeholders, and this effort also helped the management process to become stronger in achieving its aims of nurturing stewardship and cooperation. That noted, the participatory process is not formal and required in all cases, and because it is not defined, steps of the process are not routinely followed for every fishery. Amendments to both the legislation and management plans are required to give formal recognition to the roles and responsibilities of stakeholders in the management process. Capacity-building initiatives may also be essential to help stakeholders to organize themselves into groups for effective participation in management.
- Conflict is reported to exists in all fisheries, but has decreased or remained unchanged for the past ten years. Although it appears that the levels of conflict have not increased, there is no formal process for conflict management. This should be addressed through amendment of the legislation and inclusion in the overall management process, although it appears to be currently under control.
- In the area of monitoring, compliance and enforcement, penalties are applied, but appear to be scarcely used in the small-scale fisheries and considered only sufficiently severe in the recreational fisheries. Over the past ten years, offences have been increasing in the recreational fisheries, but appear to have remained unchanged in the small-scale fisheries. That noted, the budget for these activities, and detection efforts are not considered to be adequate for the purposes intended. Also, overall management costs are supported by government funding, and cost-recovery options have not been well-developed for specific fisheries. In recent years, the management costs have increased, mostly due to increased enforcement activities and litigations in the case of the small-scale fisheries, and inflation in the case of the recreational fisheries. However, in reality, these additional costs are not being met. An economic evaluation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs. Consideration should also be given to increasing penalty fines in the small-scale fisheries.
- In terms of contributions to the work of RFBs and RFMOs, Aruba makes contributions to the work of WECAFC. It also reports data to FAO and CITES. At present, there is no legal obligation to implement the provisions of many international fisheries agreements. Legislative amendments are required to incorporate the provisions of the various international fisheries instruments, as these are increasingly being incorporated into the regional management processes advocated by RFBS such as WECAFC.

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COUNTRY REVIEW

Brazil

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INTRODUCTION

Brazil's fishing activities are considerable, even though there is a relatively low abundance of marine fisheries resources, a result of poor oceanographic conditions of Brazilian waters, a situation exacerbated by environmental degradation of coastal habitats. Problems have increased due to inappropriate fishing methods, with a high incidence of catches of juveniles and poor enforcement of management measures, in some cases incompatible with accepted sustainable practices. On the other hand, the maximum sustainable yield of many fish stocks is simply unknown, as are their biological characteristics and other basic information essential for the proper management for their sustainable exploitation (Vasconcellos, 2011). Fishing resources in Brazil have been historically exploited without active and organized management. Besides the existing high biodiversity, the low biomass of traditional fishing resources concentrated on a narrow continental shelf led to an excessive fishing effort. As a result, most coastal stocks are currently fully exploited or overfished, and the fishing sector is facing a serious economic and social crisis. Lack of statistical data on the fishing activity constitutes a serious problem for its diagnosis and for the implementation of management measures.

Brazil, despite its long coastline (about 8 500 km) and large marine area (nearly 4.0 million km^2 of exclusive economic zone (EEZ), produces about 500 000 tonnes from marine fisheries, which represents only 0.5 percent of world fish production. The artisanal and small-scale fisheries contribute the largest share of production for direct consumption by the local population (Diegues, 2006), as the industrial segment is dedicated mostly to satisfy the export market. The over exploitation of coastal ecosystems on the one hand, and significantly decreased productivity and individual income per fisher/boat on the other hand, have been pushing the semi-industrial and industrial fishing fleet to expand their activities to more distant waters, including oceanic areas.

In some areas, particularly in the north and northeast regions of Brazil, deficiencies in infrastructure (e.g. harbours, ice factories, storage and processing facilities) hinder or even prevent the development of coastal fishing, compromising the fish quality and reducing competitiveness. The extent to which fish has to be marketed fresh tends to increase the involvement of middlemen in the value chain, consequently reducing fishers' profitability. The traditional fishing communities have, in general terms, a low human development index, lacking basic services such as education, health and sanitation. As a result, fishers have generally a low level of education that demands specifically customized programmes for capacity building, training and conservation, which are not readily available. Furthermore, deficiencies in training and qualification of skilled labour to perform tasks on-board hamper the introduction of new and modern fishing technologies.

According to the data provided by The Ministry of Fisheries and Aquaculture, the Brazilian fish production in 2010 reached 1 264 765 tonnes, an increase of 2 percent over 2009, when 1 240 813 tonnes of fish were produced. Marine fishing remained the main source of national fish production, accounting for 536 455 tonnes (42.4 percent of the total catch). In 2010, the Northeast Region was the area with the largest fish production (fishing and aquaculture) in the country with 410 532 tonnes, accounting for 32.5 percent of national production, basically from the small-scale fisheries. In the North Region of Brazil, where the shrimp and groundfish fisheries are the major fisheries, the marine fishing production reached 93 450 tonnes of fish in 2010 (17.4 percent of the total catch), followed by the Northeast (195 842 tonnes, 36.5 percent) and the South Regions (156 574 tonnes, 29.2 percent), and then the Southeast Region (90 589 tonnes, 16.9 percent). Such production was generated by activities of over 500 000 fishermen licensed through the Registro General da Pesca – RGP (General Fisheries Registration – www.mpa.gov.br) of the Ministry of Fisheries and Aquaculture and by 63 868 fishing vessels. Of these vessels, 41 838 vessels were propelled by oars and/or sail (65.5 percent), 20 287 were small motorized vessels with a wooden hull (31.8 percent) and 433 vessels were medium-sized or large motorized boats with steel hull. It can be appreciated, therefore, that the fleet that operates in Brazilian waters is predominantly artisanal and small-scale in nature (Instituto do Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA & Secretaria Especial de Aquicultura e Pesca da Presidência da República – SEAP/PR).

POLICY FRAMEWORK

There is specific legislation for marine capture fisheries management, at the national, regional/ international and local levels. There are two main instruments of legislation that relate to fisheries management. Firstly, Act No. 11959 on Sustainable Development of Fishery and Aquaculture provides the main guidelines for the development of fisheries and aquaculture, with the view to ease access to the required structures and instruments. There is also Decree No. 6981, implementing Act No. 10683 on the synergy between the Ministry of Fisheries and Aquaculture and the Ministry of Environment regarding the sustainable management of fishery resources. This institutionalizes the Technical Commission on Shared Management on Fishery Resources and sets its competences on the regulation of fishery seasons, limits and criteria. Additionally, Brazil enforces those recommendations and resolutions adopted by the International Commission for the Conservation of Atlantic Tunas (ICCAT), aimed at maintaining the populations of ICCAT-managed species at levels which will permit maximum sustainable catch.

The FAO definition of "fisheries management" is included in Brazil's fisheries legislation. The legislation also includes definitions of the terms, "sustainable use of fishery resources" and "fishing regulation". Sustainable use of fishery resources is defined as use that enables the present generation meet their needs by fishing without compromising the ability of future generations to meet their own needs based on social, environmental, technological and economic criteria. Fishing regulation is defined as a set of rules and actions that allow management of the fishing activity, based on current knowledge of biological, fisheries, ecosystem, economic and social components.

The fisheries legislation provides both legal and administrative frameworks for the management of marine capture fisheries at the national and regional/international level, i.e. to facilitate fulfillment of member country obligations to regional agreements/ conventions. While the legal framework also covers fisheries management at the local level, there is no specific administrative framework in place for addressing needs at this level.

The legislation lists the following fisheries management objectives:

(i) Sustainable development of fisheries and aquaculture as a source of food, employment, income and leisure, ensuring the sustainable use of fisheries

resources, as well as optimizing the resulting economic benefits, in harmony with the preservation and conservation of the environment and the biodiversity;
(ii) The regulation, promotion and inspection of the fishing activity;
(iii) The preservation, conservation and recuperation of the fisheries resources and the aquatic ecosystems; and
(iv) The socio-economic, cultural and professional development of those involved in the fishing activities, as well as of their communities.

These objectives are not prioritized in the legislation, but are incorporated into fisheries management plans, and in the case of shared resources, have also been informed by the work of RFBs and RFMOs.

To implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), the most important actions undertaken so far are: consideration of the rights of small-scale fishers to fish, efforts aimed at implementing marine protected areas and marine reserves for fishing communities, and implementation of management measures that ensure better socio-economic conditions for small-scale fishing communities. In the case of the FAO Compliance Agreement (1993), major actions have included: deterrence of and combating IUU Fishing, maintaining updated records related to the international list of IUU fishing vessels, and refusal of vessels implicated in IUU Fishing to be leased by Brazilian fishing companies.

It should be noted that many instruments of non-fishery legislation impact fisheries management in Brazil, including, *inter alia*: endangered species legislation, biodiversity legislation, oceans policy legislation, marine park/sanctuary/reserves legislation, port management legislation, coastal zone management legislation, and forestry (mangroves) legislation. The Marine Extractive Reserves (Resex), defined as a Conservation Unit under the National System of Conservation Unit, established through the Act No. 9985, are marine protected areas in the marine biome created to protect the livelihoods of peoples and traditional communities and the natural resources associated with fishing. The Ministry of Environment recognizes species of endangered Brazilian flora and fauna that are at high risk of extinction in the wild in the near future, based on the scientific documentation available. Also, the National Coastal Management Plan provides for the zoning of uses and activities in the coastal zone and gives priority to conservation and protection, among other objectives.

LEGAL FRAMEWORK

The Ministry of Fisheries and Aquaculture is the lead agency responsible for management at the national level. Brazil is a member of ICCAT, and its legislation recognizes ICCAT's lead authority for fisheries management at the regional/international level as it pertains to tuna and tuna-like fishery resources. At the national level only, the Ministry of Fisheries and Aquaculture shares legal responsibility for marine capture fisheries management with the Ministry of Environment. A separate fisheries science agency/authority, the Brazilian Enterprise of Agricultural, Fisheries and Aquaculture Research, addresses the scientific responsibilities for national-level activities. In terms of fisheries enforcement, the Ministry of Fisheries and Aquaculture has sole responsibility for matters arising at the national and regional/international levels. At the local level, fisheries enforcement is handled separately by designated authorities under the governmental structures of many Brazilian states, especially coastal states.

The fisheries legislation is designed as a framework that shapes fisheries management and management plans, i.e. it provides specific guidance on management approaches and tools. The legislation also sets up a series of steps or a process for developing, organizing and implementing fishery management regulations and fishery management

plans. Specific management measures and regulations for individual fisheries are included. There are several examples of this, as follows.

(i) The Interministerial Normative Instruction No. 14 of 31 October 2011. This measure prohibits fishing for queen shrimp (*Farfantepenaeus subtilis* and *F. brasiliensis*), white shrimp (*Litopenaeus schmitti*) and seabob shrimp (*Xiphopenaeus kroyeri*), in the area between the border of French Guiana with Brazil (a line that has the true bearing of 41°30', from the point defined by latitude 4°30'30"N and longitude 51°38'12"W) and the border between the states of Piauí and Ceará (41°12'W).

(ii) Normative Instruction No. 206 of 14 November 2008. This measure prohibits, in waters under Brazilian jurisdiction, the fishing for spiny lobsters (*Panulirus argus* and *P. laevicauda*) annually in the period from December 1 to 31 May.

(iii) Interministerial Normative Instruction No. 12, of 22 August 2012. This measure provides criteria and standards for the planning of fishing with the use of gill netting in Southeast and South Brazilian territorial waters.

(iv) Inter-ministerial Normative Instruction No. 4, of 15 April 2011. This establishes mitigation measures for reducing the incidental catch of seabirds by fishing vessels using pelagic longline authorized to operate in waters under Brazilian jurisdiction, south of latitude 20ºS.

The legislation prescribes specific steps for setting up the management process itself, as shown in Figure 1. These steps are not always followed for every fishery, but the legislation stipulates that the management process be completed in a given timeframe. It also requires management decisions to be based on information coming from: biological analyses, economic analyses, social impact analyses, environmental analyses, ecosystem analyses/assessments and monitoring and enforcement options.

In the case of shared resources, the work of RFBs and RFMOs inform the objectives of the legislation. The national legislation implements internationally agreed measures that have been adopted by regional fisheries management organizations in which

FIGURE 1
Specific steps for setting up fisheries management process in Brazil

Brazil is a member. This is achieved by establishing Standing Committees of Fisheries Management, stakeholder consultation, and enforcement, which is supported by the legislation. It should be noted that the national fisheries management legislation gives the relevant authorities the legal power to meet the priorities and obligations of international agreements/conventions (global), regional agreements and other multilateral arrangements. Three major international marine fisheries management conventions to which Brazil is a party are: the United Nations Convention on the Law of the Sea (UNCLOS); 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 (in force as from 11 December 2001); and the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing – IPOA IUU Fishing. Additionally, Brazil is a member of three RFBs: COPESCAALC, WECAFC and ICCAT.

Apart from any formal management process, other ways in which marine capture fisheries management can occur are by: decisions made by the management agency; decisions made by stakeholders other than participants in the fishery; decisions made by the participants in the fishery; decisions made by other parts of government; decisions made by other countries with similar species stock and fishery situations; and decisions made by RFBs, RFMOs or organizations concerned with human rights, labour or trade, e.g. CITES. As already mentioned in the previous section, several instruments of non-fishery legislation impact fisheries management in Brazil; these are directed mostly at conserving resources, although marine park/sanctuary/ reserves legislation and coastal zone management legislation address livelihood and user conflict issues.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

Commercial fisheries

Brazil uses the following definition of commercial fishing: Commercial fishing occurs when practiced by individuals or legal entities and involving fishermen, employed or in partnership by partial quotas, and using small, medium or large vessels, with commercial purposes. The regime of employment defines the characteristic of the fishery, as industrial or artisanal. The commercial fisheries employ vessels mainly over 15 m and 20 GWT, usually with an iron hull, equipped with a freezer or with ice. Typical fishing gear and equipment can include: mid-water and bottom long-lines, purse seine, trawl net, drift and bottom gillnet, echo-sounder, GPS, radar, autopilot vessel monitoring system, etc.. The harvest is marketed locally in the largest cities and/ or capital of Brazilian states, and also exported mainly to the European Union, the United States of America and Japan.

Small-scale fisheries

Officially, small-scale and artisanal fishing operations have the same characteristics. The fishing vessels are usually up to 20 GWT, but can range from small canoes less than 4.0 m long to vessels that are 15 m in length. The vessels are mainly wooden and utilize low-impact fishing gear such as traps, lines (hook-and-line, small longlines, etc.), gillnets and small trawl nets. Very few operators use equipment such as GPS, echo-sounder and radar. Marketing arrangements are mostly informal, with many landings points and these having no infrastructure such as harbours. The small-scale fishing operators are among the poorest Brazilian workers and lead a very simple life characterized by poor housing conditions with no sanitation and no privacy at all. Access to health and education services by the persons involved remain a challenge for the local governmental authorities. The associated fishing communities have a low

level of HDI, as well as low organizational levels. Although there is a well-established top-down organizational system that includes a national confederation, 27 states' federations and more than 1 000 fishers unions, locally known as Fishers Guilds, true fishers hardly participate in the development of fishing policies and can be considered to be the least organized workers in Brazil. Subsistence is defined as fishing practiced with no commercial purpose and for own consumption or interchanging of goods, but utilizing legal fishing gears. There are also indigenous fishers and fishing communities who live and exert their fishing activities in the Brazilian basins, especially those that inhabit the margins of the Amazon River. Although some fishers along the Brazilian coast still maintain some characteristics of their Indian ancestors, i.e. those that inhabit the north coast (Amazon Region), Bahia State and Rio de Janeiro, São Paulo and Paraná states (caiçaras), they are still considered artisanal fishers.

Recreational fisheries

The types of vessels are the usual sportfishing vessels (power boats), and some recreational fishing uses scuba diving gear. Catch and release is commonly practiced. When catches are landed, these are usually donated to charity, although some commercial sale can take place. At present, there are no management measures for the marine recreational fishery in Brazil, but some regulations have been defined to categorize workers, stakeholders, boats and equipment. There is some less important conflict between recreational and artisanal marine fisheries. The scientific community, to some extent, utilizes biological data for scientific purposes. A management plan is being studied, aiming at applying responsible fisheries management practices and to enable monitoring and evaluation of the activity.

Fish production and value

Commercial fisheries

Brazil's three largest commercial/industrial marine capture fisheries in terms of the annual tonnage amount (whole weight in tonnes) of fish harvested are: striped weakfish (*Cynoscion* spp.) (45 000 tonnes/year); croaker (*Micropogonias furnieri and M. undulatus)* (43 500 tonnes/ year); and skipjack *(Katsuwonus pelamis, Auxis thazard and Euthynnus alletteratus)* (23 000 tonnes/ year). The striped weakfish and croaker are among the top most valuable fisheries in Brazil. Table 1 shows the estimated value of the three major commercial fisheries for three years over the past ten years. In all cases, the value of the fishery has steadily increased over time, while trends in catch weight over time are not currently well understood.

TABLE 1
Annual gross value of catch (USD) for each of the major commercial fisheries for the most recent year, five years ago and ten years ago

Fishery	Most Recent Year	5 Years Ago	10 Years Ago
Striped weakfish	135 000 000	120 000 000	100 000 000
Croaker	110 000 000	100 000 000	90 000 000
Skipjack	50 000 000	45 000 000	40 000 000

Small-scale fisheries

The three most important small-scale fisheries by weight are: striped weakfish (*Cynoscion* spp.) (43 000 tonnes), seabob shrimp (*Xiphopenaeus kroyeri*) (17 000 tonnes) and spiny lobsters (*Panulirus argus* and *P. laevicauda*) (7 000 tonnes). Spiny lobster is among the top most valuable fisheries. While the catches for the striped weakfish fishery have remained stable over the past ten years, seabob catches have increased slightly, and spiny lobster catches have decreased (Table 2). Except for spiny lobster, the catch value has increased over the same time period (Table 2).

TABLE 2
Gross landings (tonnes) and value (USD) of each of the three major small-scale fisheries in the most recent year, 5 years ago and ten years ago

A. Annual Gross Landings of Catch (whole weight in tonnes)			
Fishery	**Most recent year**	**5 Years Ago**	**10 Years Ago**
Striped weakfish	45 000 (2010)	45 000 (2005)	45 000 (2000)
Seabob shrimp	16 000 (2010)	15 000 (2005)	14 000 (2000)
Spiny lobsters	7 000 (2010)	7 500 (2010)	8 000 (2000)

B. Annual Gross Value of Catch (USD)			
Fishery	**Most recent year**	**5 Years Ago**	**10 Years Ago**
Striped weakfish	145 000 000	130 000 000	120 000 000
Seabob shrimp	100 000 000	85 000 000	70 000 000
Spiny Lobsters	140 000 000	145 000 000	150 000 000

Recreational
The three most important recreational fisheries are: coastal pelagic fish species such as snook (*Centropomus* spp.), weakfishes (*Cynoscion* spp.) and tarpon (*Megalops atlanticus*); reef fish species such as groupers and snappers; large pelagic fish species such as billfishes (including swordfish). No information on catch and value of these fisheries is available.

Food security and employment
The commercial fishery provides the sole source of income for the majority of participants and also the sole source of food. On the other hand, the small-scale fishery provides the sole source of income for the majority of participants but not the sole source of food. No information is available on the reliance on the recreational fishery as a source of income and food.

Fishing effort and impacts
Fishing areas
Commercial fishing operations for striped weakfish and croakers take place along the Brazilian coastal zone, on the continental shelf. On the other hand, commercial skipjack fishing is usually conducted in the southeastern and southern regions, between 20ºS to 36ºS (latitude), and mainly concentrated up to 100 nautical miles within the Brazilian EEZ. Small-scale fishing operations for striped weakfish also take place along all of the Brazilian coast, on the continental shelf. In the case of the seabob shrimp fishery, these operations also occur along the Brazilian coast and also on the continental shelf, from Amapá State, border with French Guyana, to Santa Catarina States (approximately 30ºS). Spiny lobster is fished along the coast and also on the continental shelf, but from Amapá State, border with French Guyana, to Espírito Santo State (approximately 21ºS). Recreational fishing areas range from south of Bahia State (approximately 18ºS) to São Paulo State (25ºS). General fishing areas for Brazil are shown in Figure 2.

Fishing effort
In terms of management of fishing effort, the levels of fishing effort in most commercial fisheries are unknown, and for the major fisheries are only known for skipjack (Table 3). However, these levels are believed to have remained unchanged over the past ten years. Both participants and fishing vessels are normally licensed. In the case of the small-scale fisheries, the level of fishing effort is not known for the striped weakfish fishery. However, the levels for the seabob and lobster fisheries are given in Table 4. Fishing effort is believed to have increased in all three fisheries over the past ten years. It should be noted that both participants and vessels are normally licensed (Table 4), the exception being the lobster fishery, where small unlicensed rafts are engaged in IUU fishing. Levels and trends in fishing effort for the recreational fishery do not appear to be known.

FIGURE 2
Chart of Brazil, showing the division of the macro-regions, the national EEZ and fishing areas

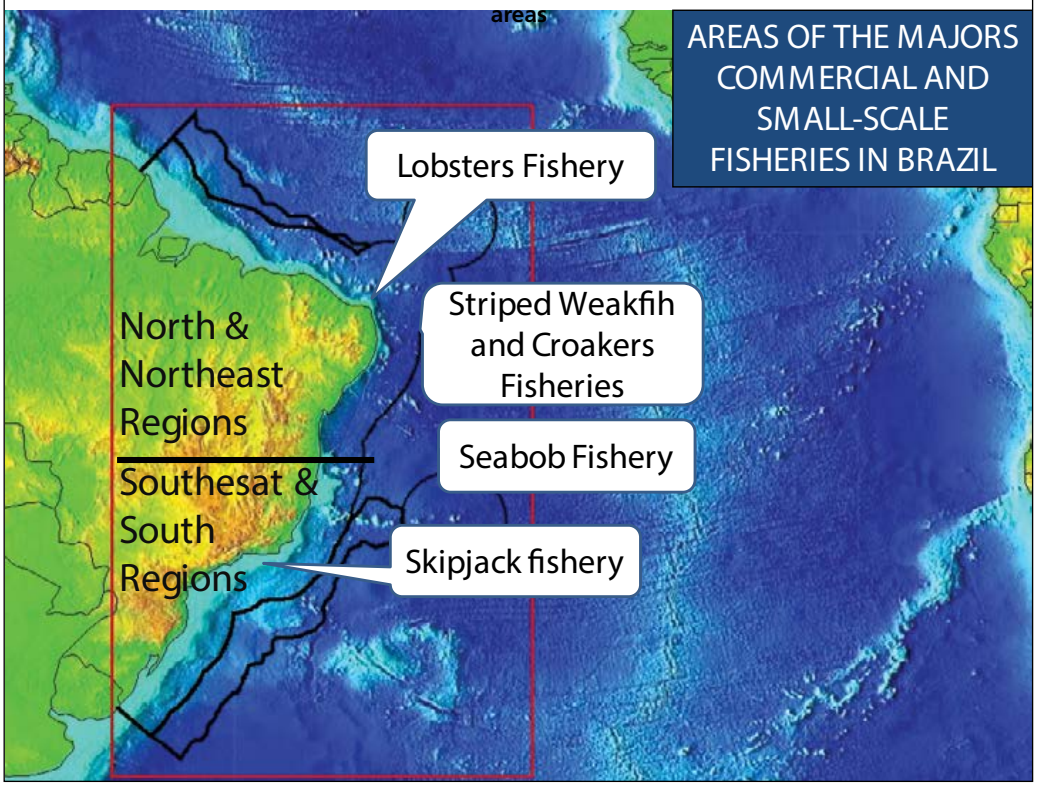

TABLE 3
The approximate current level of fishing effort for the three major commercial fisheries, licensing arrangements, and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Striped weakfish	No data	yes	u	No data	yes	u
Croaker	No data	yes	u	No data	yes	u
Skipjack	750	yes	u	50	yes	u

TABLE 4
The current approximate level of fishing effort for each of the major small-scale fisheries, licensing arrangements, and the perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Striped weakfish	–	Yes	i	–	yes	i
Seabob	6 000	Yes	i	3 000	yes	i
Spiny Lobster	15 000	Yes	i	50 00	yes	i

Overfishing and fishing capacity

Approximately 90 percent of the marine capture fisheries that have formal management are overfished. This is believed to be the case for several reasons: catches have exceeded the estimated MSY level, there has been a reduction in the catch per unit of effort (CPUE) index, there has been a reduction in the individual average size and weight of specimens, etc.. In addition, it is estimated that approximately 70 percent of all fisheries are considered to be overfished for the same reasons as provided for the managed fisheries. In the commercial fisheries, there is currently overfishing in the

croaker fishery (Vasconcellos and Haimovici, 2006). The overfishing situation in the commercial fishery for striped weakfish is unknown, but no overfishing is observed in the commercial fishery for skipjack (ICCAT, 2011). That said, a constant or decreasing CPUE has been observed in the commercial skipjack fishery. In comparison, there is currently overfishing in the small-scale fisheries for seabob and spiny lobster, and this is supported by the observations of a constant or decreasing CPUE in recent years in both cases (Fonteles-Filho, 2000: FAO/WECAFC, 2006; Almeida *et al.,* 2012). It is not known whether overfishing exists in the small-scale fishery for striped weakfish, a situation similar to that noted for the commercial fishery for the same species. Likewise, the status of the recreational fisheries are unknown.

Brazil has not begun work towards the measurement of capacity in all of its marine capture fisheries. The measurement and assessment of fishing capacity has therefore not been completed for these fisheries. The delay in doing so is primarily due to: a lack of budget or funding for such work, a lack of political will to undertake such work, a lack of stakeholder support and education, and other more urgent fishery management priorities. For the commercial fisheries, fishing capacity has been measured for the croaker fishery only. That said, the regulations in the last two to three years have focused on reducing fishing effort (e.g. limited entry, times, seasons) and/or reducing the harvest in the croaker and skipjack fisheries. There is a sense that there is overcapacity in the three major commercial fisheries identified.

In the case of the small-scale fisheries, fishing capacity has been measured in the seabob and spiny lobster fisheries only. That said, the regulations in the last two to three years have focused on reducing fishing effort and/or reducing the harvest in the spiny lobster fishery, but not the others. However, overcapacity is believed to be a problem in all three major small-scale fisheries identified.

MANAGEMENT ACTIVITY

General nature and extent

It is estimated that less than 33 percent of marine capture fisheries in the country are managed in some way at the national, regional and local levels. Over the past ten years, the number of managed fisheries at the national and local levels has decreased, while the number of managed fisheries at the regional level has increased. However, there are no major fisheries (in terms of weight of landings) that are not currently managed.

At the national, as well as local level, the management process has been informed by: legislation about individual fisheries, management plans for specific fisheries, interventions/actions to support specific management objectives, and published regulations or rules for specific fisheries. The national-level process is also influenced by rules established by fishing organizations. At the regional level, management plans and rules established by fishing organizations influence the management process. The management process has not included consideration, at any level (national, regional, local), of traditional rules or customs that affect the harvest of marine fisheries, although local fora, with fishers participation, has defined key issues, based on traditional knowledge, to support goals aimed at managing major coastal fisheries. Of the fisheries that are managed at any level, less than 33 percent have a formal, documented fishery management plan and published regulations or rules. However, of the fisheries having published regulations and rules, more than 67 percent of these rules have been informed by methodical scientific monitoring and evaluation.

As already mentioned, Brazil has taken actions to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), and the FAO Compliance Agreement (1993). Brazil has also taken specific actions to implement the United Nations Fish Stocks Agreement (1995), the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003), the FAO Port States Measures Agreement (2009), and several FAO International Plans of Action. Details of the status of progress

of actions in implementing these various international legal instruments are provided later in this report, and range from stakeholder education to assessment studies and the introduction of new regulatory measures.

In the commercial fisheries, a management plan has been formulated for the croaker fishery only, and came into effect in 2004. Similarly, only the croaker fishery has a documented management goal that is really a management measure. This measure establishes a fishing season for croakers from October to February of each year in the Patos Lagoon, Rio Grande do Sul State, Southern Brazil. In the cases of the small-scale fisheries, a management plan exists only for the spiny lobster fishery, and it came into effect in 2008. As for the croaker fishery, the management goals for the lobster fishery are in fact management measures, and include: fishing effort restrictions such as limited entry and licensing (3 073 licences), or 30 million trap-days; establishment of a closed fishing season every year from December 1 to May 31; establishment of a closed fishing area, a no-take zone, from the coastline up to 4 nm; establishment of minimum size limits for *P. argus* of 20.5 cm TL and for *P. laevicauda* of 17.5 cm TL; and approval of trap gear as the only legal gear allowed. Such measures are aimed at achieving a maximum sustainable yield (MSY) of 8 000 tonnes/year for both spiny lobsters species (*Panulirus argus* and *P. laevicauda*), taking into account the following points of reference: fishery-biological, ecological, social, economical, environmental education and legal. No management plan currently exists for the recreational fisheries.

Management approaches and tools

Multispecies aspects

The commercial fisheries for striped weakfish and croaker are multispecies in nature, but the skipjack fishery is not. The management of these fisheries takes into account the multispecies nature through the following actions: establishment of a fishing season, fishing tackle specifications, gear restriction measures (e.g. mesh size, net length and height, etc.), establishment of a minimum size of capture and fishing effort restrictions. All measures help to reduce the impact of fishing on other species. Although the small-scale fishery for striped weakfish is also multispecies in nature, the management of the fishery does not take this into account. A similar situation exists for the recreational fisheries: they are known to be multispecies in nature, but management does not take this into account.

EAF and precautionary approach

Management of the major fisheries identified does not yet include specific ways for applying the ecosystem approach to fisheries (EAF) management. On the other hand, under the Brazilian Fishing Policy and Fisheries Regulation, Act # 6981, of October 13, 2009, establishes that "*In the absence or inadequacy of scientific data, should be applied the precautionary approach*". Hence, the precautionary approach is supported by the legislation; however, only the small-scale seabob and spiny lobster fisheries management process includes specific ways for applying the precautionary approach. In the lobster fishery, decisions are taken after the Standing Committee on Management of Lobsters consultation that facilitates representation and participation by stakeholders, and consideration of scientific information from the Scientific Sub-Committee of the Standing Committee on Management. Every issue and/or demand for the establishment of management measures is decided by consensus and in the absence or inadequacy of scientific data, the precautionary approach is usually applied. In the seabob fishery also, although the Standing Committee on Management of Shrimps is not already established, the precautionary approach is applied in the absence or inadequacy of scientific data.

Management tools and trends in usage

The primary management tools for the commercial fisheries are shown in Table 5, with spatial, gear and participatory restrictions being most popular. It should be noted that management tools being used in the croaker fishery are the same as those used in other fisheries in this category. Furthermore, there have been no changes in the use of each management tool over the last ten years. In comparison, a broader range of management tools primarily used for the small-scale fisheries are given in Table 6, and are the same used for other small-scale fisheries. In all fisheries, there has been an increasing use over the past ten years of marine protected areas where fishing is prohibited. For the seabob fishery over the same time period, there has also been an increase in vessel and engine size restrictions. In the case of the lobster fishery, there has been an increase in the use of fishing days to regulate the fishery over the past ten years. Except for size measures, catch restrictions are not used in Brazil.

TABLE 5
Types of management tools used in the three major commercial fisheries identified

Type of Management Tool	Striped weakfish	Croaker	Skipjack
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)			
Temporal restrictions such as:			
Defined fishing season(s)		√	
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions		√	
Engine size restrictions			
Gear size restrictions		√	
Gear type restrictions		√	
Size restrictions (i.e. minimum or maximum sizes)		√	
Participatory restrictions such as:			
Licenses	√	√	√
Limited entry (limited vessels or limited fishers)		√	√
Catch restrictions such as:			
Total allowable catch (TAC) limits			
Vessel catch limits			
Individual vessel quotas			
Rights-/incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)		√	
Territorial use rights		√	
Stock use rights			
Regionally/internationally agreed restrictions			
Taxes or royalties	√	√	√
Performance standards			

TABLE 6
Types of management tools used in the three major small-scale fisheries identified

Type of Management Tool	Striped weakfish	Seabob shrimp	Lobster
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)			
Temporal restrictions such as:			
Defined fishing season(s)		√	√
Defined number of days fishing		√	√
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions		√	
Engine size restrictions		√	
Gear size restrictions			
Gear type restrictions		√	√
Size restrictions (i.e. minimum or maximum sizes)			√
Participatory restrictions such as:			
Licenses		√	√
Limited entry (limited vessels or limited fishers)		√	√
Catch restrictions such as:			
Total allowable catch (TAC) limits			
Vessel catch limits			
Individual vessel quotas			
Rights-/incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions			
Taxes or royalties	√	√	√
Performance standards			

International standards

None of the commercial fisheries are managed using performance standards. However, the commercial skipjack fishery is managed based solely on regionally/internationally agreed restrictions; catch and size restrictions are applied in this case. On the other hand, none of the small-scale fisheries are managed using performance standards or based solely on regionally/internationally agreed restrictions.

Role and impact of marine reserves

Fisheries management is listed as one of the objectives or reasons for establishing marine protected areas or reserves. At present, marine protected areas or reserves affect the management of the small-scale seabob and spiny lobster fisheries. In the case of the seabob fishery, it has reduced the fishing area available, while in the lobster fishery, it has created conflicts between fishing communities.

Stakeholder involvement and transparency in management

Stakeholders are formally involved in the management of all marine capture fisheries at the national, regional/international and local levels. There is also a formal definition of the groups that are included as "stakeholders". The group of stakeholders is noted to include, for both

small-scale and large-scale capture fisheries: fishers' organizations (fishers guilds, unions and associations); other fishing organizations (ship owners' or sportfishing unions); postharvest organizations (processing industry and commerce); and non-governmental organizations. The legislation enables a number of participatory processes, such as: consultative management, where fisheries management stakeholders are consulted but do not share management responsibility; co-management, where fisheries management stakeholders are consulted and share some management responsibility; and co-management, where fisheries management stakeholders actively participate in the management process and share significant management responsibility. Furthermore, these participatory processes are a formal and required part of the management of all marine capture fisheries, and the there are defined steps for the process that are routinely followed as part of fisheries management.

Commercial fisheries

In all three major fisheries noted, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources, and the existing management plan includes a definition of the local and national stakeholders. In these fisheries, stakeholders are organized into distinct groups (e.g. association, cooperative), and arrangements have been made to consult these stakeholders and to work with them on management issues. The participatory management process has so far achieved: consultative management, and also co-management, where fisheries management stakeholders are consulted and share some management responsibility (i.e. decision-making). To date, the involvement of stakeholders in decision-making can be rated as: informative, consultative, communicative, advisory and participative. Notwithstanding, the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship.

Small-scale fisheries

In all three major fisheries noted, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources, and in the case of the lobster management plan, it includes a definition of the stakeholders. Like the commercial fisheries, the small-scale fishery stakeholders are organized into distinct groups, and arrangements have been made to consult these stakeholders and to work with them on management issues. The participatory management process achieved to date can be described as: consultative management; co-management, where fisheries management stakeholders are consulted and share some management responsibility (i.e. decision-making) for the seabob and lobster fisheries; and co-management with significant management decision-making responsibility shared by the stakeholders for the lobster fishery. Stakeholder involvement in decision-making can be rated as: informative in all three fisheries; consultative, communicative, and participative for the seabob and lobster fisheries, and also advisory for the lobster fishery. Nonetheless, all small-scale fishery participants do not find that the management system creates incentives and reasons for them to practice "responsible" fisheries stewardship voluntarily. Moreover, such participation has not led to management measures resulting in stable stock levels over the last five years or made the management process faster or helped to reduce conflict.

Transparency in management

All parts of the fisheries management process are considered to be transparent. However, this statement could be challenged, as information about the fisheries management process needs to be better documented and easily available to the public, specially the most remote and hardly accessible fishing communities. Moreover, meetings to discuss the management of specific fisheries are only opened to stakeholders' representatives,

including the participants in the fishery. Fishery participants are, however, afforded the opportunity to contribute to the decision-making process by providing public comments, and such opportunity is also given to other stakeholders. When information about management measures and meetings is shared with fishery participants and other stakeholders, the information is usually disseminated using: printed materials, such as brochures or information packages; direct mail; fax; Internet mail; Internet website; and other (e.g. Brazilian Government Official Journal (Diário Oficial da União – DOU)).

Management of conflict and fishing effort

The fisheries legislation sets up particular processes for conflict management, such as: the use of alternative dispute resolution mechanisms, the need to consider multiple uses and users within the fisheries sector, and the need to consider multiple uses and users between the fisheries and other sectors. However, dispute resolution and conflict management processes are not properly put into practice during fisheries management implementation, mainly due to lack of governmental infrastructure such as budget, vehicles, qualified human resources, etc. In terms of conflict resolution, the fisheries management tools being used by user groups are: zoning of different areas for different users, education about sharing marine fisheries resources, and limited access to certain areas for certain types of fishers.

Commercial fisheries

All three major commercial fisheries have experienced conflict. However, the level or amount of conflict in these fisheries has remained unchanged over the last ten years. Conflict has occurred for a number of reasons: competition among the same, as well as different types of vessels in the croaker fishery; competition for gear deployment in the same fishing area in three fisheries; competition with other uses for the same area of water with other industries in the croaker and skipjack fisheries; and competition with other uses for the same area of water with other fisheries for all three fisheries.

Dispute resolution and conflict management processes are part of the fisheries management process for the three fisheries mentioned. Furthermore, the management of the croaker fishery includes particular processes such as: specific steps to follow to resolve conflicts, the use of alternative dispute-resolution mechanisms, and the need to consider multiple uses and users within the fisheries sector. It should be noted that the fisheries legislation for the croaker fishery requires: zoning of different areas for different users, resource allocation between the fisheries and other sectors, and limited access to certain areas for certain types of fishers.

In the commercial fisheries, there is currently evidence of overfishing in the croaker fishery and possible evidence of overfishing in the skipjack fishery as well. While fishing capacity measurement has only been completed for the croaker fishery, overcapacity is considered to be a problem in all three major commercial fisheries. Both the croaker and skipjack fisheries have been regulated in the recent past in an effort to reduce fishing pressure.

There have been capacity-reduction programmes set up and implemented for the croaker and skipjack fisheries. The measures for these two fisheries that have proven effective in immediately reducing the excess fishing capacity have been the purchase of fishing licenses, as well as the buyout of fishing vessels allowed to operate. As a result of these actions, the excess fishing capacity has not returned in these fisheries. It should be noted that the objectives of the capacity-reduction programmes in these two fisheries have specifically included: reducing or eliminating overfishing, reducing or eliminating conflicts, and increasing the profitability of the boats remaining in the fishery. For both fisheries, the programme has been paid for by the government and costs less than the current annual gross value of catch.

Small-scale fisheries

Conflict occurs in all three major small-scale fisheries. In addition, the level or amount of conflict in these fisheries has increased in the seabob and spiny lobster fisheries, but conflicts have likely remained unchanged in the striped weakfish fishery over the last ten years. The main reasons for the conflict are: competition between different types of vessels and competition for the same area of water with other fisheries in all three fisheries, competition among the same type of vessels in the lobster fishery, and competition for the same area of water with recreational users, as well as with other industries in the case of the seabob fishery.

Dispute resolution and conflict management processes are part of the marine capture fisheries management process for the lobster fishery. The management of both the seabob and lobster fisheries includes particular processes such as the need to consider multiple uses and users within the fisheries sector. The fisheries legislation makes the following provisions to address conflict issues: zoning of different areas for different users in the seabob fishery, stock enhancement in the seabob and lobster fisheries, resource allocation (indicated generally for the seabob and lobster fisheries), education about sharing marine fisheries resources in the lobster fishery, and limited access to certain areas for certain types of fishers in the seabob fishery.

Overfishing is a problem in the small-scale fisheries for seabob and spiny lobster, and fishing capacity has been measured for these two fisheries. While overcapacity is considered to be a problem in all three major small-scale fisheries, only the lobster fishery has been regulated in the recent past in an effort to reduce the fishing pressure. In comparison, in the seabob fishery, other measures, such as the establishment of an index-based boat GWT, engine power and size of the trawl net are being tested.

A capacity reduction programme has been set up and implemented for the seabob and lobster fisheries. For both fisheries, the programme has involved the purchase of fishing licenses. This measure has been effective in immediately reducing the excess fishing capacity for the seabob fishery but not the lobster fishery. However, in both fisheries, the excess of fishing capacity is a reality. It should be noted that the objectives of the capacity-reduction programme have specifically included: reducing or eliminating overfishing, reducing or eliminating conflicts, and increasing the profitability of the boats remaining in the fishery. The government has sponsored the capacity-reduction programme for both the seabob and lobster fisheries, the cost of which is estimated to be less than the current annual gross value of catch.

Management of monitoring, compliance and enforcement

To assist with monitoring, compliance and enforcement issues, Brazil has a navy, a coastguard, and a fisheries agency that does fisheries enforcement, the Brazilian Federal Police, and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA). The coastguard and IBAMA are the agencies responsible for at-sea fisheries patrols, monitoring, and enforcement work in the coastal waters (0–3 nautical miles). On the other hand, the navy, coastguard, and IBAMA share the responsibility for at-sea fisheries patrols, monitoring and enforcement work in the territorial waters (0–12 nautical miles). IBAMA has sole responsibility for fisheries monitoring work such as checking dock-side landings, and for enforcing penalties. Delivery of logbooks is compulsory for boats over 15 m in length and is now enforced by the Ministry of Fisheries and Aquaculture.

Penalties for breaking marine capture fisheries management regulations and rules include: fixed fines for specific offences, the revocation or suspension of fishing licences, the refusal of the opportunity to fish for the rest of the season or year, and the exclusion or removal from the fishery. These penalties are applicable to numerous fisheries in Brazil, e.g. mangrove crab, lobster, shrimp (queen, white and seabob), red snappers, catfishes, mullet, sardine, croaker, elasmobranches, tuna and tuna like

fishes. They are also applicable to gillnet, seine net and trawl fleets. Systems to support compliance and enforcement of fisheries management include the use of: VMS, on-board scientific observers, and random dockside inspections. However, the funding provided to the relevant agencies is not considered to be adequate for enforcement of all fisheries regulations. Also, it does not appear that the risk of detection is high enough that participants in these fisheries try not to cheat. No information has been made available concerning the number and trend in offences.

Commercial fisheries

Penalties for non-compliance with the regulations are applied in the croaker fishery. Such penalties include, *inter alia*: fixed fines for specific offences, revocation or suspension of fishing licenses, refusal of the opportunity to fish for the rest of the season or year, and exclusion or removal from the fishery. In all three major commercial fisheries, VMS and routine inspections at landing sites are used to support compliance and enforcement of fisheries management. Over the last ten years, the budget for monitoring and enforcement for these fisheries has been decreasing, and the funding provided does not allow fisheries managers (and others) to enforce fully all fisheries regulations. Moreover, where penalties are enforced, they are not effective at deterring actions of non-compliance, and also the risk of detection is not high enough that the participants in these fisheries try not to cheat.

Small-scale fisheries

Penalties for non-compliance with the regulations are applied in all three major fisheries. These penalties include small fines for first offences and revocation or suspension of fishing licenses. Fixed fines for specific offences and exclusion or removal from the fishery are also applied in the seabob and lobster fisheries. Compliance and enforcement of fisheries management includes the use of: routine inspections at landing sites in the seabob and lobster fisheries, and at-sea boarding and inspections in all three fisheries. Unfortunately, the funding provided does not allow fisheries managers (and others) to fully enforce all fisheries regulations in these fisheries. Moreover, where penalties are enforced, they are not effective at deterring actions of non-compliance, and also the risk of detection is not high enough that the participants in these fisheries try not to cheat.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Government funding is essential to support fisheries management activities in Brazil. The national government provides funding for fisheries management activities at the national level and some funding for such activities at the regional/international and local levels. This support is intended to pay for activities in research and development, monitoring and enforcement. At present, the fisheries legislation does not allow for the costs associated with managing fisheries resources to be recovered through the normal methods (charging licensing fees, resource rentals, etc.). In real terms, the fisheries management budget has not sufficiently increased at the national and local levels over the last ten years to support the corresponding increased costs in the same time period for enforcing fisheries regulations. That said, both the budget and costs for regional activities appear to have remained unchanged in the past ten years. The real costs are considered to have increased because of: increased/improved stakeholder consultation, increased monitoring requirements, increased enforcement activities, increased conflict management, and increased rate of amending fisheries management regulations. These additional costs are being met through government contributions.

Commercial

The general pattern of management funding and costs is the same for the situation of the commercial fisheries, i.e. government support, no cost recovery options, decreasing

budget with increasing costs, reasons for increase in costs, and additional costs being met by the government.

Small-scale

The general pattern of management funding and costs is the same for the situation of the small-scale fisheries in the areas of: government support, no cost recovery options, and decreasing budget with increasing costs. In the case of the small-scale fisheries, the reasons for increase in management costs over the last ten years include: increased/ improved stakeholder consultation, enforcement activities, and conflict management in the seabob and lobster fisheries; and increased monitoring and litigation requirements in all three fisheries. In addition, it appears that the government has supported the additional costs only for the seabob and lobster fisheries.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Brazil is a member of three RFBs: COPESCAALC, WECAFC and ICCAT. As noted earlier, three major international fisheries management conventions to which Brazil is a party are: UNCLOS; 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 International Plan Of Action To Prevent, Deter And Eliminate Illegal, Unreported And Unregulated Fishing - IPOA IUU Fishing.

To date, Brazil's main efforts to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995) include: consideration of the rights of small-scale fishers to fish, efforts to implement marine protected areas and marine reserves for fishing community livelihood protection, and implementation of management measures that ensure better socio-economic conditions for small-scale fishing communities. The FAO Compliance Agreement (1993) has also been implemented so far in the following main ways: efforts to deter and combat IUU fishing, constant referral to the international list of vessels caught practicing IUU fishing, and prohibition of the leasing vessels implicated in IUU Fishing by Brazilian fishing companies. Regarding the UN Fish Stocks Agreement (1995), major actions have included: conducting stock assessment studies on straddling fish stocks and highly migratory fish stocks that inhabit Brazilian and adjacent waters; cooperation with regional and international fishing bodies and organizations to implement this and other regional and international agreements; and cooperation in conducting stock assessment studies with other countries which exploit the same fishing resources. Brazil has also begun to implement the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003) through efforts primarily intended to: identify and define key-actions in relation to human and ecological well-being, identify and analyze the national institutional and legal framework, and identify and analyze key stakeholders.

Work has also progressed on implementation of relevant FAO International Plans of Action. In the case of the FAO International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999), the Albatross Project (Projeto Albatroz Brasil), as well others, have afforded stakeholders consultation, which has helped to build awareness and appreciation of the issues and needs. Brazil has also developed a Seabirds National Plan of Action (Plano de Ação Nacional de Conservação de Albatorzes e Petréis – PLANACAP), and there has been enforcement of a regulation to prevent catches of seabirds through certain fishing gear modifications, e.g. use of torilines by longline fishing vessels. This regulation has been implemented in accordance with international agreements and resolutions. The first steps to implement the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999) have been similar. That is, the Brazilian Elasmobranches Society (SBEEL) and other stakeholders have been engaged in consultations on the issues

and the needs for the construction of a Sharks National Plan of Action, and measures have been enforced to prevent catches of sharks in accordance of international agreements and resolutions. Implementation of the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001) has also proceeded, beginning with stakeholder consultations, development and implementation of VMS, and agreements with other agencies/authorities for monitoring, control and surveillance.

Finally, in the case of the FAO Port States Measures Agreement (2009), Brazil has undertaken to heighten awareness about the benefits of implementing the agreement. There have also been efforts to highlight the role of regional fisheries management organizations (RFMOs) and arrangements in the implementation of the agreement, and to identify opportunities for regional cooperation to implement port state measures. To deter the activities of vessels that have reflagged to avoid regional conservation and management measures, Brazil's major response actions have included: maintaining an updated national record, consistent with the list of illegal vessels provided by international and regional organizations; establishing programmes and subsidies to lease legal foreign vessels to operate in Brazilian waters under international instruments enforced by national laws; and monitoring and control of the Brazilian EEZ.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

It has been noted that Brazil is a member of COPESCAALC, WECAFC and ICCAT. In the case of COPESCAALC and WECAFC, Brazil is not actively carrying out or otherwise undertaking activities. The apparent lack of participation is due to: budgetary or funding issues, a shortage of human resources to cover issues, poor stakeholder support and education, a lack of political priority, and other more immediately critical fisheries management issues. Brazil does not participate in regional and/or subregional fishery organizations, agreements and/ or arrangements when it is not a member. That noted, in a broad sense, if international agreement and/or arrangement take places globally, Brazil undertakes to comply with the measures and put these into practice, as needed. Furthermore, the national fisheries management legislation gives the relevant authorities the legal power to meet the priorities and obligations of international agreements/conventions (global), regional agreements and other multilateral arrangements.

The country collects and provides fishery-related data to CITES, FAO and ICCAT to inform the establishment of regulations affecting fisheries management. There are formal national mechanisms in place so that these data are compiled and provided, as required. While the regional/international organizations concerned have specific timetables for data provision, Brazil is not able to meet these timetables. This is believed to be due to a number of factors, including: a lack of budget or funds, a lack of political will, poor stakeholder support and education, and a lack of the supporting data; a lack of human resources to do the reporting.

SUMMARY AND CONCLUSIONS

- The fisheries legislation for Brazil appears fairly complete and comprehensive. It includes the relevant definitions, and makes provisions for a formal stepwise approach to the management process and for it to be completed in a given timeframe and be informed by scientific information. In addition, the legislation makes provisions for Brazil to implement those international agreements to which it is a party. Objectives and regulations adopted by RFBs can also be accommodated. However, the steps for setting up the management process are not followed for every fishery, and it appears that decisions can be influenced by fishery participants, as well as non-participants. This suggests that the legislation is not rigidly enforced, and some flexibility is facilitated putting into

practice the legislative provisions. While such an arrangement could be arguably innocuous for practical purposes, it poses risks for achieving full transparency and accountability.

- Less than one-third of the Brazil's fisheries are managed in some way. Of the major fisheries described in this report, management plans exist only for the commercial croaker fishery and the small-scale lobster fishery. These management plans list goals that really reflect management measures, and so it is assumed that there is scientific monitoring and evaluation of the performance of these measures. The multispecies nature of the commercial striped weakfish and croaker fisheries is take into account to some extent, by the regulations adopted that serve to reduce overall fishing pressure and also to minimize bycatch to the extent possible. In the case of the small-scale lobster fishery and the recreational fisheries, multispecies aspects are not yet addressed through active management. EAF is also not yet incorporated into the management process, but the precautionary approach is adopted in the absence of adequate data and information. A range of management tools is applied, and these are mostly focused on restricting fishing effort inputs, e.g. spatial (zoned usage), temporal (fishing seasons), gear, participatory, and rights-based measures. A fisheries management plan for the recreational fisheries is being developed, and is expected to include scientific monitoring and evaluation steps, and so this should address the data and information gaps apparent for these fisheries. Consideration should be given to developing management plans for all fisheries, whether of social or economic importance. The use of a range of input restrictions can benefit multispecies and EAF concerns, but these should be guided by appropriately considered management objectives and the relevant supporting scientific monitoring and evaluation.
- An estimated 90 percent of managed fisheries and 70 percent of all fisheries are believed to be overfished, including the commercial fishery for croaker and the small-scale fisheries for seabob and spiny lobster. In the case of each of the three fisheries just noted, a constant or declining CPUE has been observed. Fishing capacity has been measured only for the commercial croaker fishery and for the small-scale fisheries for seabob and spiny lobster. However, although overcapacity is believed to be a problem in all major commercial and small-scale fisheries identified, regulations have been adopted to reduce fishing effort only in the commercial croaker and skipjack fisheries and in the small-scale spiny lobster fishery. Recreational fishing operations do not appear to be monitored at present. Although there is legislation and two management plans in place, it appears that statistical monitoring activities need further improvement, as some basic catch and effort data on current and past fishing operations are not available, e.g. number of participants and vessels operating in the major commercial fisheries. A fisheries management plan for the recreational fisheries is being developed and is expected to include scientific monitoring and evaluation steps, and so this should address the data and information gaps apparent for these fisheries.
- In terms of stakeholder involvement and transparency, the legislative provisions appear adequate, and the participatory process is defined and implemented. That said, the participatory process does not appear to nurture responsible fisheries management stewardship and in the case of the small-scale fisheries, it has not helped to improve the management process and outputs. In addition, the management process needs to be clearly documented and easily available to the public, and management meetings are only open to stakeholders representatives. This suggests that although a participatory process is established and followed, the supporting framework and system may not always adhere to good governance practices. The legislative provisions for the participatory process should be implemented routinely and consistently. The supporting framework and agencies

concerned should, in turn, put in place measures to guarantee and also demonstrate that good governance practices are followed, and that the system is also able to address and rectify incidents of malpractice.

- The legislation makes provisions for conflict management, and conflict occurs in all major fisheries. Over the past ten years, the levels of conflict have increased in the small-scale seabob and lobster fisheries. Conflicts occur because of competition among fishing vessels, among fisheries and among industries for use of the same marine space. A range of tools is applied to address these conflicts. However, overcapacity is a key problem, and this has been addressed through capacity reduction programmes in the commercial croaker and skipjack fisheries and the small-scale seabob and lobster fisheries. While both licences and vessels have been purchased in the case of the commercial fisheries' capacity reduction programme, the small-scale programme has involved only the purchase of fishing licences. This may explain why the fishing capacity has returned to the small-scale fisheries. Many tools are being used for the purpose of conflict management, and these should help to address the full range of conflicts described. If excessive fishing capacity is addressed, this will contribute notably to conflict management and resolution in the long term. Hence, efforts to assess and regulate fishing capacity should be strengthened.
- A number of agencies share the responsibility of monitoring and enforcement tasks. Also, more than one monitoring system is used to support compliance and enforcement in the major fisheries. Penalties for non-compliance include: fixed fines for specific offences, the revocation or suspension of fishing licences, the refusal of the opportunity to fish for the rest of the season or year, and the exclusion or removal from the fishery. The main challenges appear to be the actual enforcement of the penalties in practice and also, the available funds for enforcing the regulations. Management without enforcement is ineffective. For success, there has to be sufficient investment in enforcement. When such investments are made, it is also important to ensure that the supporting framework has a formal plan for monitoring, compliance and enforcement, and that such a plan is routinely reviewed and evaluated.
- All management costs are supported by government funding, but cost-recovery options are not pursued. In recent years, the management costs have increased for several reasons, but are not sufficiently being met. An economic evaluation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Consideration should also be given to increasing penalty fines.
- Brazil is a member of COPESCAALC, WECAFC and ICCAT, but it level of participation in COPESCAALC and WECAFC is limited. Lack of stakeholder support, shortage of appropriately skilled human resources, funding and political will and priority have been cited as reasons for this. Likewise, there is less than adequate fulfillment of data obligations to the various regional organizations requiring data, and the reasons provided are the same as those for low-level participation. The need to pursue always a formal management process for good transparency and accountability, and the need for management plans that are reviewed and evaluated using routine statistical and scientific support have been highlighted earlier in this summary and will also help to address the challenges noted in respect of RFB participation.

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COUNTRY REVIEW

Caribbean Netherlands

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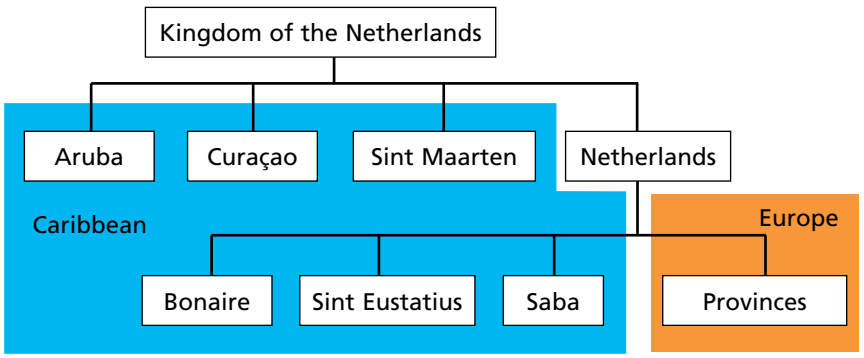
INTRODUCTION

The Caribbean Netherlands are a group of three islands of the Kingdom of Netherlands that are located in the Caribbean Sea: the islands of Bonaire (located at 12° 9′ N and 68 ° 16′ W), St. Eustatius (located at 17° 29′ N and 62 ° 59′ W), and Saba (located at 17° 38′ N and 63 ° 15′ W). Bonaire is part of the ABC islands within the Leeward Antilles island chain situated off the coast of Venezuela while Saba and St. Eustatius are part of the SSS islands located towards the east of Puerto Rico and the Virgin Islands. Although they are part of the Netherlands, these public entities remain overseas territories and do not form part of the European Union (Figure 1). The three islands gained their current status following the dissolution of the Netherlands Antilles on 10 October 2010. The Caribbean Netherlands have a collective population of 21 000 and a total area of 328 km^2 (127 sq miles).

Fisheries in the Caribbean Netherlands contribute less than 3 percent to the GDP but are nevertheless very important socio-culturally. These fisheries are artisanal and differ on the three islands in respect of the fleet composition, target species and gear used. Pelagics are the main species caught with handlines in Bonaire, while reef fish and lobster are the main species caught in pots in St. Eustatius and Saba, respectively. Each island also has its own fishery legislation.

FIGURE 1
Kingdom Structure of the Netherlands



POLICY FRAMEWORK

There is specific legislation that makes provisions for marine capture-fisheries management activities at the national and the regional/international levels, i.e. to facilitate fulfillment of member-country obligations to regional/international agreements/conventions, and the local level. The relevant instruments of legislation governing the national management process are the BES Maritime Management Act 2010 and the Fisheries Decree BES 2010. Local-level management is governed by the

following instruments of legislation: the 2010 Island Marine Park Decree of Bonaire, the 1984 Island Marine Environment Regulation, the 1996 Fisheries Regulation of Saba, the 1966 St. Eustatius Lobster Ordinance, and the 1996 St. Eustatius Marine Environment Ordinance. Fisheries management is not defined in the legislation, and management objectives are also not included. However, the legislation provides both legal and administrative frameworks for governing the management process at the national, regional/international and local levels. The legislation also identifies a single authority for marine capture fisheries management at all levels.

Regarding efforts to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), the Caribbean Netherlands has established no-take zones. However, it appears that no actions have yet been taken to support the FAO Compliance Agreement. Export/import/trade legislation is non-fishery legislation that significantly impacts fisheries management. The CITES regulations are noted to be the most important in this regard. Conservation legislation is also important, e.g. Nature Conservation Island Ordinance Bonaire (www.stinapa.org/legislation.html).

LEGAL FRAMEWORK

The Ministry of Economic Affairs is the agency with primary responsibility for marine capture fisheries management. For the execution of this responsibility, the ministry works together with the Fisheries Committee representing the public entities of Bonaire, Saba and St. Eustatius. Management responsibility is also shared at the local level with the island government of Saba, the island government of St. Eustatius and the island government of Bonaire National Marine Park. No separate fisheries science agency is identified in the legislation. In terms of responsibility for enforcement, the ministry is assisted at the national level by the coastguard for the Kingdom of the Netherlands in the Caribbean. At the local level, some enforcement activities are also carried out by the National Park Foundation Bonaire (STINAPA), the St. Eustatius National Park Foundation (STENAPA) and the Saba Conservation Foundation (SCF).

The fisheries legislation does not provide a framework that shapes fisheries management plans, and does not provide specific guidance on management approaches and tools. The legislation also does not prescribe steps for setting up the management process itself, nor does it make provisions for the management process to be completed in a given timeframe. Similarly, it does not set up a series of steps or a formal process for developing, organizing and implementing fisheries management regulations and associated management plans. However, specific management measures and regulations for individual fisheries are included in the legislation, e.g. minimum size and catch restrictions for egg-bearing or molting lobsters, mesh-size regulations and biodegradable hatches for traps. Despite these specific regulations, the legislation does not require management decisions to be based on information coming from any type of technical or scientific analyses. Apart from any formal management process, marine capture fisheries management can occur by decisions made by the management agency.

In the case of shared resources, the work of RFBs and RFMOs do not appear to inform the objectives of the legislation. That said, the national legislation implements certain specific management measures proposed by RFBs, e.g. minimum size limits for lobster and conch and prohibition of catch of egg-bearing females. The national fisheries management legislation gives the fisheries management authorities the legal power to meet the priorities and obligations of: international agreements/conventions (global), regional agreements, and other multilateral arrangements. Caribbean Netherlands is a party to the WECAFC Convention and hence a member of WECAFC.

In the area of prosecutions, minimum and maximum fines are imposed for specific offences. Regarding provisions for handling illegal fishing by foreign vessels, fines are imposed and the catch is impounded. As noted in the previous section, CITES

regulations, which regulate trade, are non-fisheries regulations that also affect fisheries management in the Caribbean Netherlands.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Although the fishery only contributes to a few (< 3) percent of the national GDP, it has an important cultural aspect within society of the Caribbean Netherlands and is also a valuable source of protein. Fisheries on all islands are done in an artisanal manner with boats not bigger than 12 m.

The fishing sector of each of the three islands is different. This can be seen in the composition of the fleets, the gear being used and the species being targeted. For Bonaire, the main focus lies on pelagics; for St. Eustatius, on reef fish; and for Saba, on lobster. Where on Bonaire mainly hand lines are used, on Saba and St. Eustatius pots are the main gear. Each island also has its own fishery legislation.

Facilities for fishers such as piers, docks, ice machines, freezers, cold storage etc. are mainly absent or, if available, poorly maintained. A lack of space, financial means and political will, in combination with poor maintenance, is the cause of this.

The offset of products from the fishery sector usually takes place on neighboring islands. This is due to the small scale of the internal markets, and a lack of infrastructure, storage capacity and marketing. In the recreational fishery, catch is retained for personal consumption, although there is some commercial sale.

Concerning the fisheries sectors of the Caribbean Netherlands, different problems can be identified. One of the foremost is the presumption that the fish stocks are declining. Since catch data have been collected continuously in the past, a monitoring programme has been set up recently. Other challenges being faced are the lack of capacity within the fishery departments, as well as the lack of enforcement of rules and regulations.

It should be noted that the country has not begun work towards the measurement of capacity in all of its marine capture fisheries. Fishing capacity has therefore not been assessed. The delay in doing so is due to: a lack of political will to undertake such work, a lack of the supporting data for making such measurements, a lack of human resources to do the assessments, a lack of stakeholder support and education, and other more urgent fishery management priorities.

MANAGEMENT ACTIVITY

General nature and extent

An estimated 33–67 percent of marine capture fisheries in the Caribbean Netherlands are managed in some way at the national and local levels. Moreover, over the past ten years, the number of managed fisheries has increased at the national and regional levels, but there has been no change in the number managed at the local level. The management process has been informed by legislation that makes the relevant provisions about individual fisheries at the local level. In addition, an estimated 33–67 percent of the fisheries that are managed at the national and local levels have published regulations or rules. However, such management is not guided by a formal, documented fishery management plan, and the use of methodical scientific monitoring and evaluation.

As noted earlier, no-take zones have been established as part of an effort to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995). On the other hand, no actions have yet been taken to support the FAO Compliance Agreement or others.

Stakeholder involvement and transparency in management

Stakeholders are considered to be formally involved in the management of all marine capture fisheries at the local level only. However, there is no formal definition of the groups included as “stakeholders”. The legislation does not enable

particular participatory processes, such as consultative management or some form of co-management.

All parts of the fisheries management process are considered to be transparent. For instance, information about the fisheries management process is clearly documented and easily available to the public. Meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery. Such meetings are advertised and publicized in advance of the actual meeting dates. There is the opportunity for fishery participants to contribute to the decision-making process by providing public comments. There is also the opportunity for other stakeholders to contribute to the decision-making process by providing public comments. That said, if information about management measures and meetings is shared with fishery participants and other stakeholders, the information is disseminated by word of mouth. This implies that at least some information is not documented, and so the process may not be fully and adequately transparent.

Management of conflict and fishing effort

In general, the fisheries management legislation does not set up any particular processes for conflict resolution, such as specific steps for certain mechanisms or consideration of multiple-user needs. In terms of conflict resolution, the primary fisheries management tool being used among user groups is zoning of different areas for different users. As noted earlier, fishing capacity measurements have not been undertaken.

Management of monitoring, compliance and enforcement

The agencies responsible for at-sea fisheries patrols and enforcement work in the coastal waters (0–3 nautical miles) of the country include the coastguard and the Marine Park Management Patrols (NGOs). At-sea fisheries patrols and enforcement work in the territorial waters (0– 12 nautical miles) of the country are conducted by the coastguard and the Marine Park Management Patrols (NGOs). On the other hand, the fisheries departments are responsible for at-sea fisheries monitoring work regardless of location of sea operations, as well as fisheries monitoring work such as checking dock-side landings and logbooks. That noted, the fisheries department is not responsible for enforcing penalties.

Penalties are applied for incidents of non-compliance. In such instances, the penalties include: fixed fines for specific offences and the revocation or suspension of fishing licenses. Systems to support compliance and enforcement of fisheries management involve the use of at-sea boarding and inspection schemes, and these are applicable to the lobster and snapper trap fisheries on Saba Bank. Over the past ten years, the number of offences that are taking place has remained unchanged. In comparison, while detection efforts remained about the same between ten and five years ago, such efforts have been increasing since then. Fortunately, the budget for monitoring and enforcement continued to increase in the same time period. Hence, it appears that the funding provided allows the relevant agency to enforce all fisheries regulations. That said, the penalties for non-compliance do not appear to be sufficiently severe or expensive so that participants in the fisheries avoid cheating. Moreover, it does not appear that the risk of detection is high enough to deter cheating among participants.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Government funding is essential to support fisheries management activities at all levels, and such funding is currently provided to cover activities in: research and development, monitoring and enforcement, and daily management. At present, the legislation allows for some of the costs associated with managing fisheries resources to be recovered using: license fees to participants in a fishery and license fees from participants in other fisheries such as participants in other fisheries of the same category of sector.

In real terms, the budget for fisheries management at all levels (national, regional, local) has increased over the last ten years, while at the same time, all management costs have increased. The increased costs are primarily a result of: increased/improved stakeholder consultation, increased monitoring requirements, increased conflict management, and inflation. These additional costs are being covered by increased government contributions and increased contributions from other sources, such as NGOS.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Netherlands Caribbean is a party to the WECAFC Convention, and hence a member of WECAFC. Regarding efforts to implement the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), the Caribbean Netherlands noted that it had established no-take zones. On the other hand, no actions were noted to support the FAO Compliance Agreement or others.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Netherlands Caribbean is a party to the WECAFC Convention, and hence a member of WECAFC. Caribbean Netherlands also participates in some of the activities of the CRFM, even though it is not a member. As already mentioned, in the case of shared resources, the work of RFBs and RFMOs do not appear to inform the objectives of the legislation. That said, the national legislation implements certain specific management measures proposed by RFBs, e.g. minimum size limits for lobster and conch, and prohibition of catch of egg-bearing females. The national fisheries management legislation gives the fisheries management authorities the legal power to meet the priorities and obligations of: international agreements/conventions (global), regional agreements and other multilateral arrangements.

In terms of statistical reporting, Caribbean Netherlands does not collect and provide any regional/international organizations that establish fisheries management regulations with fishery-related data. Moreover, there are no formal national mechanisms in place so that fishery-related data are compiled and provided to these organizations. While some of the regional and subregional agreements to which the country belongs contain specific timetables for countries to provide fisheries-related data, these reporting timetables are not met. This is the case for several reasons: a lack of political will, poor stakeholder support and education, a lack of the supporting data, and a lack of human resources to do the reporting.

SUMMARY AND CONCLUSIONS

- Fisheries legislation exists and provides a legal and administrative framework to guide fisheries management activities. The legislation also provides for the islands of the Caribbean Netherlands to fulfill obligations under international agreements. However, the legislation does not appear to make specific provisions concerning management plans, objectives, steps in and timeframe for the management process, and a formal process for implementation of regulations and for these to be informed on the basis of scientific monitoring. Specific regulations for lobster and conch are incorporated into the legislation, primarily because these have been proposed by RFBs. The legislative provisions, therefore, appear to fall short of defining a formal process to guarantee good governance practices, and this should obviously be rectified, because the present situation places at risk any efforts to nurture stakeholder trust in the overall management support system.
- Data and information on the fisheries and their performance appear not to be available. Although it is argued that up to 67 percent of fisheries are being managed and many of these carry regulations, the regulations are not informed

by scientific monitoring within the country. Fishing capacity has also not been evaluated. Lack of capacity to report data to RFBs has also been noted. Management objectives should be established for each fishery and a suitable statistical system should be developed to facilitate monitoring and evaluation of the performance of the fishery against the agreed objectives, and the of appropriate management regulations should be established. The efficiency of the management regulations should also be evaluated, and this can only be achieved through a scientific monitoring programme designed with this purpose in mind.

- The legislation does not make provisions for participatory management, and there is no formal definition of the groups included as "stakeholders". Stakeholders are involved in a formal way at the local level only. Although it appears that opportunities are provided for stakeholder inputs via meetings, making documentation clear and easily available to the public and facilitating receipt of comments, it appears that important management and meeting information is disseminated via word of mouth. This implies that the process may not be adequate to ensure full transparency. The legislation may require amendments to give due recognition to the need for stakeholder cooperation in management and to make provisions for ensuring accurate and complete identification of stakeholders. In addition, the amendments should make provisions to guarantee full transparency in the steps applied for communication and information exchange.
- The legislation also appears deficient in terms of making provisions for a formal conflict management process. Zoning of areas for different uses has been the main tool to manage conflict. Although responsibilities for monitoring, compliance and enforcement are clearly defined, there is concern that penalties and detection efforts remain insufficient to deter incidents of non-compliance. That noted, budgetary provisions to support the agencies involved appear adequate. Legislative amendments are required to make provisions for both a formal conflict management process and also sufficiently severe penalties.
- Management costs have increased, and the additional costs are being funded by the government and NGOs. There are also provisions for cost-recovery options from participant licence fees. Additional options for recovering costs from resource and ecosystem users alike should be explored.
- In terms of contributions to the work of RFBs and RFMOs, Caribbean Netherlands makes contributions to the work of WECAFC. It also participates in some CRFM meetings. At present, there appears to be minimal implementation of the provisions of many international fisheries agreements. Once the management process is made more formal, including formal processes for stakeholder involvement and conflict management, and is supported by a formal statistical system, the Caribbean Netherlands should be able to make the required contributions to the work of the relevant RFBs and RFMOs. The legislation and management process will also need to consider incorporating the provisions of the various international fisheries instruments, as these are also usually incorporated into the RFB/RFMO management processes and regulations.

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COUNTRY REVIEW

Colombia

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INTRODUCTION

Colombia is located at 4° north and 72° west, in northern South America. The country borders the Caribbean Sea, between Panama and Venezuela and the North Pacific Ocean, between Ecuador and Panama (Central Intelligence Agency, 2013). It has a land area of 1 038 799 km^2, a water area of 100 210 km^2 (which includes Isla de Malpelo, Roncador Cay and Serrana Bank) and a total coastline of 3 208 km, comprising 1 760 km on the Caribbean Sea side and 1 448 km on the side of the North Pacific Ocean (Central Intelligence Agency, 2013). Its maritime claims include a 12 nautical mile territorial sea, a 200 nautical mile exclusive economic zone (EEZ) and a continental shelf to 200 m depth or to the depth of exploitation. Colombia's GDP (PPP) is estimated at USD 497.3 billion, with a real growth rate of 4 percent (2012). Agriculture, which includes fisheries, contributes 6.5 percent to GDP (2012 estimate). The population is estimated at about 45.7 million (July 2013).

The most important commercial fisheries in Colombia target tropical tunas (65 vessels), shallow-water shrimp species (39 vessels) and deep-water shrimp species (27 vessels). Annual landings from these fisheries are estimated at 38 000 tonnes, 1 000 tonnes and 400 tonnes, respectively, with corresponding values of USD 200 million, USD 15 million and USD 5 million. The small-scale fisheries target shallow-water marine shrimp (7 000 vessels), marine finfish (10 000 vessels) and continental finfish (5 000 vessels). The corresponding estimates of annual landings are 600 tonnes, 20 000 tonnes and 7 000 tonnes, valued at USD 6 million, USD 130 million and USD 40 million, respectively. Recreational fisheries target pelagic species such as billfish, dolphinfish and tunas but are not as well documented as the commercial and small-scale fisheries.

POLICY FRAMEWORK

Specific legislation exists for marine capture fisheries management at the national, regional and local levels. In particular, the legal instruments of relevance are the General Fisheries Statute of Colombia – Act 13 of 1990 and the 1991 Regulatory Decree 2256, Act 579 of 2000, and Promulgated Decree 444 of 2012. These instruments of legislation provide both legal and administrative frameworks for the management of marine capture fisheries at all levels (national, regional, local).

The 1999 FAO definition of fisheries management is applied in the management of fisheries in Colombia. Specific fisheries management objectives are not listed in the legislation, but a general management objective is noted in Article 1 of Act 13 of 1990. This general objective states the need to ensure integrated management and exploitation of fisheries resources in a manner to guarantee their sustainable use. This general objective is incorporated into fisheries management plans, and in the case of shared resources, has been informed by the work of RFBs and RFMOs.

The development of the supporting fisheries management framework has also been informed by international fisheries agreements and standards. In particular, in accordance with the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), Colombia developed a National Action Plan for Sharks, Rays and Chimaeras, a national observer programme for its tuna fleet, and a prohibition on the use of Fish Aggregating Devices (FADs). Similarly, in the case of the FAO Compliance Agreement (1993), Colombia has established a Regional Vessel Register and a VMS to control fishing operations on the high seas, and has prohibited the use of FADs, as mentioned earlier.

Additionally, many other instruments of non-fishery legislation impact fisheries management in Colombia, including, *inter alia*: endangered species legislation, trade legislation, biodiversity legislation, oceans policy legislation, marine park/sanctuary/reserves legislation, port management legislation, coastal zone management legislation, and forestry (mangroves) legislation. The most important pieces of legislation in this regard are: Regulatory Decree 2324 of 1984, which re-organized the General Directorate of Maritime and Port Affairs; Regulatory Decree 2811 of 1974, which provided the National Code governing natural renewable resources and environmental protection; Regulatory Decree 622 of 1977, which was a partial regulation of Chapter V Title II Part XIII Book II of Regulatory Decree 2811 of 1974 on the national parks system, Act 23 of 1973 and the Second Act of 1959.

LEGAL FRAMEWORK

The legislation identifies a single lead authority with the responsibility for marine capture fisheries management matters at each of the national, regional/international and local levels. The National Aquaculture and Fisheries Authority (Autoridad Nacional de Acuicultura y Pesca (AUNAP) has legal responsibility at the national level. As Colombia collaborates in the work of several RFBs, the regional/international level of management responsibility is accepted to be under the leadership of the various relevant RFBs: the Inter-American Tropical Tuna Commission (IATTC), the Permanent Commission for the South Pacific (CPPS), and the International Commission for the Conservation of Atlantic Tunas (ICCAT). At the local level, in respect of the offshore Islands, the primary legal responsibility belongs to the Secretariat of Agriculture and Fisheries of the Department of the Archipelago of San Andrés, Providencia y Santa Catalina.

In terms of scientific leadership and responsibilities for management, different agencies are involved at each level. At the national level, several agencies share fisheries science responsibilities: the Institute of Marine and Coastal Research (INVEMAR), Alexander Von Humboldt Institute, the Institute of Hydrology, Meteorology and Environmental Studies (IDEAM), Cooperation for the Sustainable Development of the Archipelago of San Andrés, Providencia y Santa Catalina (CORALINA), and the Ministry of Environment and Sustainable Development. At the regional/international level, FAO and CPPS provide scientific leadership. At the local level, fisheries science matters are handled by the Amazonian Institute of Scientific Research (SINCHI), regional autonomous corporations, and the Peruvian Amazon Research Institute (IIAP).

Enforcement responsibilities rest with the National Aquaculture and Fisheries Authority in the case of national and regional-level issues. At the local level, other agencies are responsible for fisheries enforcement: the Secretariat of Agriculture and Fisheries the Department of the Archipelago of San Andrés, Providencia y Santa Catalina, the National Coastguard, Directorate of General Maritime Affairs (DIMAR), the National Environmental Police and the Harbormaster.

Although Act 13 of 1990 and Regulatory Decree 2256 of 1991 do not establish specific procedures for the fisheries management process, other administrative actions, such as board agreements, resolutions and management documents, are the means used to provide clear guidance. Similarly, while the legislation does not set up a series of

steps or a process for developing, organizing and implementing fishery management regulations and fishery management plans, the board agreements, agreed resolutions and documents can provide the necessary directions. Within the fisheries legislation, there are no specific fisheries regulations for individual fisheries and no framework for fisheries management plans, but booklets have been produced to address these needs. It should be further noted that Articles 5 to 11 of the Regulatory Decree specify the procedure for setting fishing quotas as one possible fisheries management measure. Specific steps for setting up the management process itself are not given in the legislation, but in the booklets as mentioned earlier, and an example would be the booklet produced for the Magdalena Basin. These steps are not always followed for every fishery, and the legislation does not stipulate that the management process be completed in a given timeframe.

The legislation requires management decisions to be based on information coming from: biological analyses, economic analyses, social impact analyses, environmental analyses, ecosystem analyses/assessments, monitoring and enforcement options, and analyses by regional fisheries bodies (RFBs) or regional fisheries management organizations (RFMOs) in the case of shared resources. Apart from any formal management process, marine capture fisheries management decision-making can be influenced by decisions made by the management agency or the participants in the fishery or decisions made by RFBs, RFMOs or organizations concerned with human rights, labour or trade (e.g. CITES).

In the case of shared resources, the work of RFBs and RFMOs inform the objectives of the legislation. The national legislation also facilitates implementation of internationally agreed measures that have been adopted by RFMOs in which the country is either a member or participant. For example, an agreed international regulation for shrimp trawlers to use TEDs, the regionally agreed shark finning ban, and specific fishing bans adopted by the IATTC have all been incorporated into national regulations.

The national fisheries management legislation also gives the fisheries management authorities the legal power to meet the priorities and obligations of international agreements/conventions (global) and regional agreements. In this regard, it should be noted that Colombia is party to the CITES Convention and is working with FAO to develop a NPOA on IUU, in accordance with the FAO IPOA on IUU elaborated within the context of the FAO Code of Conduct for Responsible Fisheries. In addition, Colombia is a member of several RFBs: WECAFC, IATTC, CPPS, and the Commission for Inland Fisheries and Aquaculture of Latin America and the Caribbean (COPESCAALC).

In terms of provisions for prosecutions, the legislation makes a number of provisions for handling prosecutions: written injunction; application of penalties; temporary suspension of the license, permit, grant or patent, as applicable; revocation of permit, authorization, concession or patent; forfeiture of vessels, equipment or fishery products; and temporary or permanent closure of the establishment. There are, however, no clear provisions in the law to address the issue of illegal fishing by foreign vessels, but general considerations are applied. As noted previously, several non-fishery instruments of legislation impact fisheries management in Colombia, especially instruments governing natural renewable resources and environmental protection and national parks management.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

Apart from the fact that commercial/industrial fisheries can be defined as fisheries conducted for the purpose of wide marketing, the commercial fishing industry in Colombia can be further characterized by the size of the fishing gear and if catches are

processed by a processing company or has an integrated infrastructure of processing in the permit granted. Commercial fishing vessels usually exceed 20 m in length, have a net registered tonnage capacity exceeding 3 tonnes, and use motor power greater than 80 hp. Typical fishing gears are: gillnet, purse seine, trawl, longline and hand lines. Industrial fishing provides many marketing opportunities at the local and national level, and products are also exported.

Colombia distinguishes several classes of small-scale fishing operations. In one class of operation that is referred to as small-scale, the fishing vessels are very small, 5– 8 m long, 0.8 m wide, are normally driven by an oar or paddle, and operated by a single fisher using small gear. The associated fishing operations occur very close to the coast. Some of the harvest is for the operator's own consumption and some is sold in the same community. A second class of small-scale operation is distinguished as artisanal in nature. Artisanal fishing vessels are usually 8 to 15 m in length and 1.2- 4 m wide. They are normally manned by a crew of two to four in number, use larger fishing gear, and operate at greater distances from the coast compared to small-scale vessels. The vessels are typically fitted with outboard engines, though a few use central diesel engines having up to 80 hp. All the catch is marketed. There is also a class of small-scale fishery distinguished as "lifestyle". This is practiced by fisherfolk who live in major cities and alternate fishing with other jobs. Similarly, in the small riverine populations, artisanal fishing operations are alternated with complementary activities such as subsistence crop agriculture and artisanal mining. Subsistence fishing is also practiced and is essentially an activity performed to obtain fish for the operator's own consumption. Indigenous fishing is also distinguished, conducted by the populations located primarily in the upper part of the rivers, and the activity is mainly subsistence, being alternated with activities of small-scale agriculture. In the case of those communities whose main activity is fishing, the fishery can also be classified as habitual.

In the recreational fisheries, the vessels used are yachts that can be almost 12 m long and 4 m wide and fitted with outboard engines up to 200 hp. The usual fishing gears are automatic harpoons and lines fitted with modern hooks. In terms of marketing, the fish are usually used for the operator's own consumption or donated for charitable needs. However, some catch may be sold commercially.

Fish production and value

Commercial fisheries

In Colombia, the three most important commercial fisheries are: (i) a fishery for major tropical tuna species (*Thunnus albacares* (yellowfin tuna), *Thunnus obesus* (bigeye tuna), and *Katsuwonus pelamis* (skipjack tuna) that harvests about 38 000 tonnes annually; (ii) a fishery for shallow-water shrimp species (*Litopenaeus* spp., *Farfentepenaeus* spp., *Xiphopenaeus* spp., *Trachypenaeus* spp., *Protrachypene* spp., *Solenocera* spp. and *Heterocarpus* spp.) that harvests about 1 000 tonnes annually; (iii) a deep-water shrimp fishery (*Solenocera* spp. and *Heterocarpus* spp.) with an annual harvest of around 400 tonnes. These are also among the top most valuable fisheries in the country, with recent estimated values of the tuna, shallow-water shrimp and deep-water shrimp fisheries being USD 200 million, USD 15 million, and USD 5 million, respectively.

Small-scale fisheries

The three most important small-scale fisheries are: a shallow-water marine shrimp fishery currently harvesting 600 tonnes per year, a marine finfish fishery currently harvesting 20 000 tonnes per year, and a scalefish fishery currently harvesting 7 000 tonnes per year. It should be noted that these three fisheries are also among the top most valuable small-scale fisheries in Colombia. The shallow-water shrimp fishery is valued at USD 6 million, while the marine finfish and scalefish are estimated to have a gross value of USD 130 million and USD 40 million, respectively.

Recreational fisheries

The most important species targeted by the recreational fisheries are mainly the pelagic species, consisting of billfishes, dolphinfish and tunas. These species are consumed and also important for non-consumptive recreational activities. No annual tonnage and value data are available on this fishery, as data on fishing activities are not captured precisely by the fisheries authority. As a result, no detailed descriptions have been provided on the recreational fisheries in later sections of this report.

Food security and employment

The commercial fishery provides the sole source of income for the majority of participants but not the sole source of food. In comparison, the small-scale fishery does not provide the sole source of income for the majority of participants. However, it provides the sole source of food for the majority of participants operating in the marine and continental finfish fisheries, but not in the shallow-water marine shrimp fishery. Additionally, it should be noted that the percentage of small-scale fishers engaged in fishing only (permanent fishers) is very low, but there is a higher percentage of fishers for whom fishing is a main activity and also a notable percentage of occasional fishermen. Hence, the dependence for food applies to fishermen whose main or only activity is fishing. In the case of the recreational fishery, this does not provide the only source of income for the majority of vessel owners. It is also not an important source of food for the participants.

Fishing effort and impacts

Fishing areas

The commercial tuna fishery is operated in the Colombian Pacific in the Eastern Pacific Ocean, while the shallow-water shrimp fishery is conducted in both the Colombian Pacific Ocean and the Colombian Caribbean Sea. The deep-water commercial fishery operates in the Colombian Pacific Ocean. In comparison, the small-scale fishery for shallow-water shrimp operates mainly all along the Colombian Pacific coast up to a distance of ten nautical miles from the coast and up to a maximum of ten fathoms, as well as in the marshes and bays of the Colombian Caribbean coast. The small-scale marine finfish fishery operations occur off both the Colombian Caribbean and Pacific coasts and up a distance of 15 nautical miles from the coast and depths of 100 fathoms. In the case of the continental finfish fishery, this takes place in the Magadalena Basin, made up of the Magdalena and Cauca rivers, in the valleys of eastern and central mountain ranges and between the central and western mountain ranges running from the south to the north. Recreational fishing operations occur mainly in the northern part of the Colombian Pacific and the zones of the Magdalena y Bolívar Departments in the Caribbean.

Fishing effort

In terms of management of fishing effort, the number of participants and fishing vessels operating in the three major commercial fisheries are known and given in Table 1. Currently, both participants and vessels are licensed. While the level of fishing effort, both in terms of number of participants and number of vessels, has remained unchanged over the past ten years in the case of the tuna fishery, the levels of fishing effort have decreased in the two other commercial fisheries over the same time period (Table 1).

The levels of fishing effort in the three major small-scale fisheries are also known precisely, and given in Table 2. While the continental finfish fishery has the highest number of participants, the marine finfish fishery has the highest number of operating vessels. Participants and vessels are not formally licensed, although the larger vessels are issued permits. Fishing effort, both in terms of number of participants and vessels, has decreased in the small-scale marine shrimp fishery over the past ten years, but has remained unchanged in the two finfish fisheries (Table 2).

TABLE 1
The approximate current level of fishing effort for the three major commercial fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Tuna	15	yes	u	65	yes	u
Shallow-water shrimp	45	yes	d	39	yes	d
Deep-water shrimp	45	yes	d	27	yes	d

TABLE 2
The approximate current level of fishing effort for the three major small-scale fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Shallow water shrimp	15 000	no	d	7 000	no	d
Marine finfish	10 000	no	u	10 000	no	u
scalefish	25 000	no	u	5 000	no	u

Note: While those using boats with capacity less than 3 tonnes do not having a fishing licence, the few boats that use 3 to 5 tonnes do have a permit for commercial fishing craft.

In contrast, the numbers of participants and vessels operating in the single major recreational fishery are not known, although licences are issued to individual fishers. Many foreign tourists participate in recreational fishing activities, and there are no precise data on the numbers involved. That noted, there is a sense that the number of participants have increased over the past ten years (Table 3).

TABLE 3
The approximate current level of fishing effort for the single major recreational fishery, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Mixed large pelagic species	No data	yes	i	No data	No response	No response

Overfishing and fishing capacity

Colombia does not apply a separate definition of overfishing. Overfishing is not considered to be an issue in the three major commercial fisheries identified. That noted, a constant or decreasing CPUE has been observed in these fisheries. In contrast, overfishing is believed to be occurring in all three major small-scale fisheries examined, and a constant or decreasing CPUE has been observed in these fisheries. It is not known whether overfishing is taking place in the recreational fisheries.

Colombia has begun work towards the measurement of capacity in all of its marine capture fisheries, but the measurement and assessment of fishing capacity have not been completed for all these fisheries. This is mainly due to: a lack of budget or funding for such work, a lack of political will to undertake such work, a lack of the supporting data for making such measurements, a lack of human resources to do the assessments, and a lack of stakeholder support and education.

Specifically, fishing capacity has been measured for the three major commercial fisheries examined. There is a sense of overcapacity in the commercial shallow-water shrimp fishery, but not so for the other two commercial fisheries. Interestingly, recent regulations have focused on reducing fishing effort and/or reducing the harvest in both the commercial shallow-water and deep-water shrimp fishery, but such regulations have not been applied for the tuna fishery. In the case of the small-scale fisheries,

fishing capacity has not been measured for the three major fisheries. Recent regulations have not focused on reducing fishing effort and/or reducing the harvest in any of these fisheries, despite the fact there is a sense of overcapacity in all three fisheries.

MANAGEMENT ACTIVITY

General nature and extent

In Colombia, fisheries management norms are usually informed by: legislation about individual fisheries at the national level, interventions/actions to support specific management objectives at the national level, published regulations or rules for specific fisheries at the national level, traditional rules or customs that affect the harvest of marine fisheries at the regional level, and rules established by fishing organizations at the regional level. Inter-generational sustainability of fisheries resources and associated ecosystems are taken into account in the management process.

It is estimated that more than 67 percent of marine capture fisheries in the country are managed in some way at the national, regional and local levels. In addition, over the past ten years, the number of managed fisheries has increased at all levels, and there are no major fisheries (in terms of weight of landings) that are not currently being managed. Moreover, of the managed fisheries, 33– 67 percent have a formal, documented fishery management plan, and more than 67 percent of these have published regulations or rules that have been informed by methodical scientific monitoring and evaluation. The management process, as well as several rules and regulations, have been informed by the provisions of several international fisheries agreements and guidelines. Among these, the most important developments include: improved controls on the harvesting and fishing for shark species, introduction of gear regulations to reduce bycatch in both the longline and trawl fisheries, efforts to control fishing capacity of major shrimp and pelagic fleets, and improved port measures and use of VMS for improved monitoring of fishing vessel movements in closed areas.

There are management plans in effect for the three major commercial fisheries noted. The management objective for the tuna fishery is to allow resource capture considering sustainability over time and also taking precaution in view of the potential impact that the fishing fleet may have on the fauna associated with schools of tuna. In the case of the shallow and deep-water shrimp fisheries, the management objective is focused on recovery of these two fisheries, which were found to be in a crisis during the end of the 1980s and in the early 1990s. Additionally, there are management plans in effect for the three major small-scale fisheries identified. The management plan for the small-scale shallow-water shrimp fishery came into effect in 1989, and the plan for the two small-scale finfish fisheries came into effect in 1992. A single management objective is applied to these three major small-scale fisheries, that is, rational use to allow the renewal of fish stocks with the aim of sustaining the activity over time for current and future generations. Currently, there is no management plan for the single major recreational fishery identified, and no management objectives were subsequently noted.

Management approaches and tools

Multispecies aspects

The major commercial fisheries are multispecies in nature, and their management takes this into account mainly in the form of monitoring the catch composition. In the case of the tuna fisheries, there is a national at-sea observer programme for tuna vessels of classes 5 and 6, and this programme is responsible for collecting and reporting data used for management planning and decision-making. On the other hand, in the shrimp fisheries, boat departures are authorized by the fishing authorities when the boats submit a registration form of their landings; the landings data are disaggregated by individual species. Similar to the commercial fisheries, the three major small-scale fisheries identified are multispecies in nature, and the management process takes this

into account, mainly through regulations aimed at reducing overall fishing impacts. In the shallow-water shrimp fishery, a seasonal closure is used as a protective measure for the recruitment process, and also catch quotas are applied to minimize overall fishing impacts. Fishing quotas are also applied in the marine finfish fishery. In the case of the continental finfish fishery, minimum size regulations, and in some cases, catch quotas, are applied. While the recreational fishery is also multispecies in nature, this is not taken into account in the management process for this fishery.

EAF and precautionary approach

The management of the three major commercial fisheries includes specific ways for applying the ecosystem approach to fisheries (EAF) management. In the case of the tuna fishery, each vessel has a limit of dolphin mortality and also an observer aboard vessels of classes 5 and 6 according to the specifications of the National Tuna Observer Action Plan. The two shrimp trawl fisheries use turtle excluder devices to reduce turtle bycatch. The management of these commercial fisheries also includes specific ways for applying the precautionary approach. In the tuna fishery, Colombia has established procedures to reduce the capture of dolphins, restricts fishing in areas of juvenile tuna occurrence, and there are closures to reduce fishing effort. In the case of the two shrimp fisheries, besides the use of turtle excluder devices which is regulated, Colombia has established closures to protect the juveniles when these enter the fishing areas, and also during the breeding seasons. Additionally, both shrimp fisheries are also closed with regard to any expansion. That is to say, no increase in fishing effort is allowed, as old vessels cannot be replaced by new ones, and new entrants to these two fisheries are not permitted.

In comparison, the management of the three major small-scale fisheries does not include specific ways for applying EAF management. However, management includes specific ways for applying the precautionary approach. In the shallow-water shrimp and marine finfish fisheries, in view of the difficulties in obtaining biological information, fish catch and effort data are used to apply surplus production models, and in this way, as a precautionary measure, fishing quotas are set at precautionary levels. In the case of the continental finfish fishery, as a precautionary measure, the fishery is controlled through establishment of legal minimum size limits for the major species exploited. EAF management and the precautionary approach have not yet been applied in the management of the single major recreational fishery.

Management tools and trends in usage

In Colombia, the primary management tools used for the three major commercial fisheries are given in Table 4. Table 4 shows that almost the full range of tools is applied, with spatial and temporal restrictions, gear controls, participatory/rights restrictions, and catch restrictions and taxation being the most popular. The fishery management tools being used in these fisheries are the same type as used in other commercial fisheries. Over the last ten years, there has been an increasing use of many spatial tools, except for nursery areas in the two commercial shrimp fisheries. This may be because the nursery areas are already well-defined and protected sufficiently for these fisheries. There has also been an increasing emphasis on the issue of fishing licences and the use of taxation in all three fisheries. In the two commercial shrimp fisheries, there has also been an increasing use of engine size restrictions over the past ten years, and simultaneously, a decreasing use of participatory/rights restrictions. Regional/international restrictions have also increased in the same time period in respect of management of the tuna fishery.

TABLE 4
Types of management tools used in the three major commercial fisheries identified

Type of Management Tool	Tuna	Shallow water shrimp	Deep water shrimp
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)	√	√	√
Temporal restrictions such as:			
Defined fishing season(s)	√	√	√
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions	√	√	√
Engine size restrictions	√	√	√
Gear size restrictions	√	√	√
Gear type restrictions	√	√	√
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses	√	√	√
Limited entry (limited vessels or limited fishers)	√	√	√
Catch restrictions such as:			
Total allowable catch (TAC) limits	√	√	√
Vessel catch limits			
Individual vessel quotas	√	√	√
Rights-/incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas	√	√	√
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions	√		
Taxes or royalties	√	√	√
Performance standards			

The primary management tools in the major small-scale fisheries are shown in Table 5. While spatial and gear restrictions together with certain participatory/rights restrictions are applied to the small-scale shallow-water shrimp and marine finfish fisheries, only gear type and size measures are used to regulate the continental fishing operations. Moreover, the range of tools applied to the small-scale fishery is less than that applied for the commercial fisheries. In terms of changes in the use of fisheries management tools over the last ten years, there is an increased use only of marine protected areas where fishing is prohibited.

TABLE 5
Types of management tools used in the three major small-scale fisheries identified

Type of Management Tool	Shallow water shrimp	Marine finfish	Continental finfish
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)			
Temporal restrictions such as:			
Defined fishing season(s)			
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions	√	√	
Engine size restrictions	√	√	
Gear size restrictions	√	√	√
Gear type restrictions			√
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses			
Limited entry (limited vessels or limited fishers)			
Catch restrictions such as:			
Total allowable catch (TAC) limits	√	√	
Vessel catch limits			
Individual vessel quotas			
Rights-/incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights	√	√	
Regionally/internationally agreed restrictions			
Taxes or royalties			
Performance standards			

International standards

The three major commercial fisheries are managed using performance standards. Although regionally/internationally agreed restrictions apply, management is not based solely on such restrictions. In contrast, the small-scale fisheries are not managed to meet any specific performance standards, nor are they managed based solely on regionally/internationally agreed restrictions.

Role and impact of marine reserves

Management of the commercial fisheries is listed as one of the objectives for establishing marine protected areas or reserves. Protected areas are well established and respected, as there are National Marine Parks, marine fauna and flora sanctuaries, and areas dedicated to artisanal fishing. As a result of industrial fishing, there has been a negative effect on other resources for artisanal fisheries, and so Colombia is working to establish concerted action to lower the impact.

For example, the tuna fishery had reported high catches around Malpelo Island, but this was due to an increase in the catch of juveniles. The relevant protected area was therefore expanded and is now no longer available to the fishers. The establishment of the Artisanal Exclusive Fishing Zone in the northwestern coast (northern part of Choco Department) stopped shrimp trawl fishing in several productive fishing grounds, and this has decreased the catch of this fleet.

Regarding the small-scale fisheries, fisheries management is not listed as one of the objectives or reasons for establishing marine protected areas or reserves. Nonetheless, marine protected areas/reserves do affect the management of the small-scale shrimp and marine finfish fisheries, but not the continental finfish fishery. This is because the national marine parks and wildlife sanctuaries do not allow commercial fishing operations; only subsistence fishing is allowed.

Stakeholder involvement and transparency in management

Stakeholders are formally involved in the management of all marine capture fisheries at the national, regional/international and local levels. While there is no formal definition of the term "stakeholder", the legislation enables particular participatory processes. In particular, the legislation makes provisions for the full range of participatory processes, i.e. consultative management, co-management with variable levels of stakeholder decision-making responsibilities and devolution of management. It should be noted that these participatory processes are a formal and required part of the management of all marine capture fisheries, and there are steps in these processes that are routinely followed as part of fisheries management.

Commercial fisheries

The fisheries management plans do not include a definition of the stakeholders in the three major commercial fisheries examined. Notwithstanding, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources. These stakeholders are organized into distinct groups, and arrangements have been made to consult and to work with them on management matters. So far for the commercial fisheries, the management process, as it relates to stakeholders, could be described as a consultative management process in all cases, with the participation of stakeholders in decision-making being rated as informative, consultative, communicative, and also advisory. Despite the participatory process achieved in all three major fisheries, the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. However, where stakeholders are part of the fisheries management decision-making process, the management measures have resulted in stable stock levels over the last five years. Additionally, the participatory process has also made the management process faster and has helped to reduce conflict in some cases.

Small-scale fisheries

Similar to the commercial fisheries, the management plans for the small-scale fisheries do not include a definition of the stakeholders. Also similar to the commercial fisheries, the fishery stakeholders are organized into distinct groups, and efforts have been made to identify those who have an interest in the use and management of the resources. Furthermore, arrangements have also been made to consult and to work with the stakeholders on management matters. Currently, the management process, as it relates to stakeholders, could be described as consultative management in all three instances, with the participation of stakeholders in decision-making being rated as informative, consultative, communicative and participative. Again similar to the commercial fisheries, the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship in

any of the three fisheries examined. Furthermore, in all cases where stakeholders are part of the fisheries management decision-making process, the management measures have not resulted in stable stock levels over the last five years. However, stakeholder participation in decision-making has been able to quicken the management process, and helped to reduce conflict in some fisheries.

Transparency in management

All parts of the fisheries management process are considered to be transparent. Certainly, information about the fisheries management process is clearly documented and easily available to the public. Also, meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery, and such meetings are advertised and publicized in advance of the actual meeting dates. Furthermore, opportunity is provided for both the fishery participants and other stakeholders to contribute to the decision-making process by providing public comments. Very importantly as well, if information about management measures and meetings is shared with fishery participants and other stakeholders, the information is disseminated using: radio announcements or talk shows printed materials, such as brochures or information packages; direct mail; fax; Internet mail; and Internet website.

Management of conflict and fishing effort

The fisheries management legislation sets up particular processes that include the need to consider multiple uses and users within the fisheries sector and also between the fisheries sector and other sectors. Although there is no specific procedure for conflict resolution, it is applicable under ordinary law (Administrative Code etc.) Currently, in terms of conflict resolution, the fisheries management tools being used among user groups are: zoning of different areas for different users, resource allocation between the different participants in the fishery, resource allocation between the fisheries and other sectors, education about sharing marine fisheries resources, and limited access to certain areas for certain types of fishers.

Commercial fisheries

Conflict occurs in all three major fisheries examined and has generally increased over the last ten years in these fisheries. The reason for the conflict is due to: competition between different types of vessels, competition for gear deployment in the same fishing area, and competition with other uses for the same area of water. Dispute resolution and conflict management processes are applied to the commercial fisheries and include particular processes such as: the use of alternative dispute resolution mechanisms and the need to consider multiple uses and users within the fisheries sector, and between the fisheries and other sectors. Currently, for conflict resolution, the management tools applied include: zoning of different areas for different users; resource allocation among the different participants; education about sharing marine fisheries resources; limited access to certain areas for certain types of fishers.

Small-scale fisheries

Conflict exists in all three major fisheries examined, and although conflict has decreased in the small-scale shrimp fishery over the last ten years, there has been an increase in the amount of conflict in the two small-scale finfish fisheries in this same time period. Competition between different types of vessels and also different types of fisheries are the main reasons for conflict in both the shrimp and marine finfish fisheries. Similar to the commercial fisheries, dispute resolution and conflict management processes are part of the marine capture fisheries management process for the three major small-scale fisheries. The relevant management processes include the use of alternative dispute resolution mechanisms, the need to consider multiple uses and users within

the fisheries sector, and in the case of the marine finfish only, also the need to consider multiple uses and users between the fisheries and other sectors. Additionally, the corresponding supporting management tools applied are zoning of different areas for different users, education about sharing marine fisheries resources and limited access to certain areas for certain types of fishers in the case of the marine finfish fishery.

Overfishing and fishing capacity

As noted previously, overfishing is not considered to be an issue in the three important commercial fisheries but is believed to be occurring in the three major small-scale fisheries. Although Colombia has begun work towards the measurement of capacity in all of its marine capture fisheries, this work is currently constrained by a lack of human and financial resources for gathering data, political will, and stakeholder support and education. Specifically, fishing capacity has been measured for the major commercial fisheries examined, and overcapacity is believed to be an issue for the commercial shallow-water shrimp fishery. In the case of the small-scale fisheries, fishing capacity has not been measured for the three major fisheries, but overcapacity is considered to be an issue in all three fisheries examined. Regulations have so far focused on reducing fishing effort in the two commercial shrimp fisheries only.

Capacity reduction programmes have been set up and implemented for the two commercial shrimp fisheries only. These programmes were aimed at reducing or eliminating overfishing, increasing the profitability of the boats remaining in the fishery and minimizing the impacts of adjustment on the fishery participants. Key elements of the programmes have involved the purchase of fishing licenses, a buyout of fishing vessels licensed to operate, limited licensing in which no new vessel licences permitted and no permitted replacement of vessels that leave these fisheries. These elements have all been effective in immediately reducing the excess fishing capacity included. However, the initial purchase of fishing licenses has been the single most important measure that has been successful in ensuring that the excess fishing capacity has not returned. Both capacity reduction programmes were paid for by the fishery participants themselves. The cost of the reduction was assumed by the same fishing industry, given that it developed an excessive fishing effort. The government, in its turn, established fixed (frozen) fishing quotas and no replacement of vessels that leave the fishery.

Management of monitoring, compliance and enforcement

In Colombia, the navy, coastguard and national fisheries agency share the responsibility of compliance and enforcement tasks. The coastguard and fisheries agency carry out at-sea fisheries patrols, monitoring and enforcement work in the coastal waters (0–3 nautical miles), while the navy assists the fisheries agency with these same tasks_in the territorial waters (0–12 nautical miles). On the other hand, the fisheries agency is responsible for fisheries monitoring work such as checking dock-side landings and logbooks and also for enforcing penalties. Penalties for breaking marine capture fisheries management regulations and rules include: small fines for first offences, larger fines for additional offences, the revocation or suspension of fishing licences, the refusal of the opportunity to fish for the rest of the season or year, and the exclusion or removal from the fishery. Currently, systems for supporting compliance and enforcement of fisheries management include the use of: VMS, on-board observers, random dockside inspections, routine inspections at landing sites, and at-sea boarding and inspections. This applies to the national and international tuna fleet and the national fleet participating in the shrimp, pelagic fish and demersal fisheries.

Over the last ten years, the number of offences has been decreasing or increasing depending on the specific fishery, while in the same time period, detection efforts (e.g. at-sea patrols, port monitors) have been increasing. That noted, there has been

no change in the budget for monitoring and enforcement in the past ten years. Inter-agency communications have improved, as well as in technology and management applied by the enforcement bodies, and these have contributed to a greater number of penalties being imposed. However, the funding provided for enforcement of all fisheries regulations is not considered sufficient for the purposes, as the risk of detection is not high enough that participants in marine capture fisheries try not to cheat. However, the penalties for non-compliance are considered sufficiently severe and expensive enough to deter incidents of non-compliance.

Commercial fisheries

In the specific case of the commercial fisheries, penalties for non-compliance include: small fines for first offences, larger fines for additional offences, revocation or suspension of fishing licenses, refusal of the opportunity to fish for the rest of the season or year, and exclusion or removal from the fishery. Also, the systems to support compliance and enforcement of the management of the commercial fisheries includes: VMS; on-board observers, random dockside inspections, routine inspections at landing sites, and at-sea boarding and inspections. In all cases, arrangements exist for the controls, but routine implementation is not achieved because of high costs and insufficient availability of funds and field personnel.

Over the last ten years, the number of offences has been increasing in the commercial tuna fishery but has been decreasing in the commercial shallow-water and deep-water shrimp fisheries. As noted for the general situation, the budget for monitoring and enforcement activities in the commercial fisheries has not changed in the past ten years, and the funding provided does not allow fisheries managers (and others) to fully enforce all fisheries regulations in these fisheries. Hence the risk of detection is not high enough that the participants in these fisheries try not to cheat, although where penalties are enforced, they are considered effective at deterring actions of non-compliance.

Small-scale fisheries

In the case of the three major small-scale fisheries examined, the penalties for non-compliance include: small fines for first offences, larger fines for additional offences and fixed fines for specific offences. Additionally, the systems to support compliance and enforcement activities include the use of: VMS, random dockside inspections and routine inspections at landing sites. While the number of offences has remained unchanged in the small-scale shallow-water shrimp fishery over the past ten years, offences have been on the increase in the two finfish fisheries in the same time period. Similar to the case for the commercial fisheries, the budget for monitoring and enforcement activities in the small-scale subsector has remained at the same level over the past ten years and is not sufficient for the purposes. Hence the risk of detection is not high enough that the participants in these fisheries try not to cheat, although where penalties are enforced, they are considered effective at deterring actions of non-compliance.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

The national government provides funding for fisheries management activities at the national and local levels, and some funding for the regional level of activities. The available funding is used for activities pertaining to research and development, monitoring and enforcement, and daily management. Currently, the legislation allows for management costs to be recovered through license fees charged to participants operating in the same type of fishery. In real terms, the budget for fisheries management has remained unchanged over the last ten years at the national, regional and local levels, but in real terms and at the same time, the costs for fisheries management have increased. The increased costs are because of increased monitoring requirements,

increased enforcement activities, increased litigation, increased conflict management and increased member country obligations to RFBs, and RFMOs. At present, the increased management costs are being funded partly by increased contributions from fisheries participants and increased funding/contributions from many national and international NGOs.

Commercial fisheries

In the specific case of the commercial fisheries, the legislation allows for recovery of costs associated with managing the tuna fishery only through the use of license fees charged to the fishery participants. In real terms, the budget for the management of the commercial fisheries has remained unchanged over the last ten years, while corresponding management costs have increased. For the commercial fisheries, the increased management costs are attributed to: increased monitoring requirements, increased enforcement activities, increased litigation, increased conflict management, and increased obligations under regional/international agreements/conventions to which the country is a party. At present, small increases in charges and fees paid by different licensees somehow has allowed the fisheries agency to address the additional management costs.

Small-scale fisheries

In the case of the small-scale fisheries, the legislation allows for management costs to be recovered using licence fees that are charged to participants in the small-scale scalefish fishery. Trends in the budget and management costs over the past ten years are similar to those noted for the commercial fisheries, including the reasons for the increasing costs. At present, the increased costs are being covered by mainly by revenues from market permits and from commercial industrial fishing.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Colombia is party to the CITES Convention, and also a member of several RFBs: WECAFC, IATTC, CPPS and COPESCAALC. Currently, the national fisheries management legislation makes provisions to facilitate implementation of obligations of international agreements/conventions (global), and regional agreements. In this regard, Colombia has taken a number of actions to implement global fisheries mandates and initiatives.

In accordance with the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995), Colombia has established and implemented a National Action Plan for Sharks, Rays and Chimaeras. A national observer programme for Colombia's tuna fleet is also now in place, as well as a prohibition on use of Fish Aggregating Devices (FADs). There have also been efforts to implement the FAO Compliance Agreement (1993). These have included the establishment of a Regional Vessel Register and a VMS to control fishing operations on the high seas, as well as the prohibition on the use of FADs already mentioned. In the case of the UN Fish Stocks Agreement (1995), the Advisory Board has established an agreement prohibiting industrial fisheries directed at billfishes, has implemented a national plan of action for sharks and related species, as already noted, and has established closed seasons to protect the tuna populations in the Eastern Pacific Ocean.

Taking into account the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003), Colombia has created an exclusive zone for artisanal fishing, has enforced the mandatory use of turtle excluding devices (TEDs) by the Colombian fishing fleet, and has taken firm actions to achieve progressive reduction of trawl fishing effort of its commercial shrimp fishery. In the case of the FAO International Guidelines for the Management of Deep Sea Fisheries in the High Seas (2008), Colombia controls shrimp trawl fishing effort, allowing vessels to operate in waters up

to 200 m deep on the continental shelf and not in deeper waters. Currently, Colombia is also evaluating the shrimp and fish fauna at 200–600 m depth in the Colombian Caribbean, including the biology of this fauna, as until now, the use of these species is authorized. In addition, activity in these fishing zones is monitored through the use of satellite tracking devices. In accordance with the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), key regulations have been introduced. In particular, there is a regulation for mandatory use of turtle-excluding devices. In addition, Colombia requires the full use of shark bycatch, through a resolution that bans finning of sharks and the use of steel cables to reduce the incidental catch of sharks. It should be noted that, these shark regulations, together with the implementation of the National Action Plan for the Conservation and Management of Sharks, Rays and Chimaeras, are also actions contributing to the implementation of the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999).

Although the measurement of fishing capacity remains incomplete, Colombia has made efforts to manage fishing capacity, as prescribed by the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999). For instance, shrimp trawl fishing effort in both the Colombian Caribbean and the Colombian Pacific is being reduced at present. Colombia has also limited the fishing effort directed at small pelagic species in the Pacific Ocean and currently controls fishing effort directed at tuna species. Concerning implementation of the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), it should be noted that in Colombia, fishing is authorized by fishery and for specified areas. Additionally, Colombia supports the tuna ban adopted by the IATTC and has established fishing quotas under the General Fisheries Statute of Colombia. Furthermore, Colombia is working with FAO to develop a NPOA on IUU.

Finally, there have also been some actions taken to comply with the FAO Port States Measures Agreement (2009). Firstly, there is coordination of meetings with the CPPS, in which the member countries share information about their fishing fleets and their activities Secondly, the Maritime Directorate has been strengthening its satellite tracking systems. Thirdly, boats are only allowed in Colombian waters which have previously requested the respective licence from the national fisheries authority and which comply with the provisions of Act 13 of 1990, its decree 2256 of 1991 and other related legal provisions.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Colombia is a member of several RFBs: WECAFC, IATTC, CPPS, and COPESCAALC. In addition, Colombia participates in ICCAT activities even though it is not a member of ICCAT at present. In terms of RFB contributions, Colombia considers that it is actively carrying out or otherwise undertaking activities required of its participation. Colombia collects and provides fishery-related data to CITES, FAO, ICCAT, IATTC and CPPS to inform the establishment of regulations affecting fisheries management. It should be noted that there are formal national mechanisms in place to facilitate the fulfillment of these statistical reporting obligations. Colombia is sometimes unable to provide fisheries-related data to the regional organizations according to their specific schedules, and this is due to a lack of budget, human resources for the purpose and the supporting data.

SUMMARY AND CONCLUSIONS

- The current fisheries legislation establishes both legal and administrative frameworks for fisheries management but does not outline steps for setting up the management process and does not prioritize management objectives. The legislation also recognizes the need for management to be informed by a broad

range of scientific information, although decisions can also be taken based on inputs from other sources, such as the work of external organizations (RFBs/RFMOs, and CITES). AUNAP is the agency with lead administrative responsibility for fisheries management, with activities in science and enforcement shared with several agencies and institutions. There are also specific legislative provisions for stakeholder participation, use of conflict management tools and handling prosecutions. Penalty fines, as applied to the major commercial and small-scale fisheries, are considered effective. In conclusion, the current fisheries legislation provides the administrative and legal framework for fisheries management. The legislation also makes general provisions for fisheries management and lists general management objectives. Board agreements and resolutions are used to facilitate the development of management plans and more specific management objectives to guide the process. While the legislation has made provisions for varying levels of stakeholder participation, this aspect of management may require further attention, as explained later.

- Over 67 percent of fisheries in Colombia are managed in some way, with 33–67 percent of these having management plans, and over 67 percent having regulations that are informed by scientific information. The legislation does not provide guidance about setting up the management process, but board agreements and resolutions are used to provide guidance for development of management plans etc. A specific management process is not followed routinely for all fisheries, and there is no provision for the management process to be completed in a given timeframe. That noted, management plans and objectives have been specifically formulated for the major fisheries. In conclusion, the management process is guided not by the legislation but by management plans and objectives developed for the major fisheries. Also, while the majority of fisheries management decisions appear to be supported by scientific information, decisions can be influenced by the managers, as well as the fishery participants. It is clear that there is monitoring of the progress in management. However, to ensure consistency and accountability in the process, the agreed process should be followed routinely for all fisheries, and be completed in a specified timeframe.
- All major fisheries are multispecies in nature. For the commercial fisheries, there is close monitoring of the catch composition, and this is disaggregated by species. In the case of the small-scale fisheries, the multispecies aspect is addressed through regulations to reduce overall fishing impacts, such as area and seasonal closures, catch quotas and minimum size regulations. Application of EAF management is mainly through the use of bycatch reduction measures. The precautionary approach is applied through the adoption of certain fishing effort controls that take into account uncertainty in the state of the stocks concerned and overall fishery impacts. In terms of management tools, a wide range of tools is used for the commercial fishery, but spatial and gear/engine/fishing equipment controls and certain participatory measures are more common for the small-scale fishery. Over the past ten years, there has been an increasing use of spatial and gear/engine restrictions and regional/internationally agreed measures in the commercial fisheries and spatial measures in the small-scale fisheries. The use of marine reserves appears to minimize the impacts of commercial fishery operations. The major commercial fisheries are managed against international performance standards. In conclusion, arguably, the use of spatial area closures provides a level of multispecies/ecosystem-level protection and refuge from the particular fishing impacts for both the range of species and habitats occurring in those areas, although the impact of this would be limited for the more migratory species such as the pelagic fishes. While a range of tools is applied to reduce fishing input impacts, participation restrictions, particularly limited entry, perhaps hold the

best potential to nurture good stakeholder cooperation in the long term, reduce conflicts, and reduce monitoring, compliance and enforcement costs. Also, if efforts could be made to inform the establishment of participation restrictions based on ecosystem health, impact and response data, this could provide a major step towards sustainability, with both precautionary and ecosystem concerns being addressed.

- The legislation makes provisions for a range of stakeholder participation arrangements, but stakeholders are not defined in the legislation or management plans. In practice, for all the major fisheries examined, stakeholders are organized into distinct groups, and efforts are made to involve them in the management process. The highest form of participatory management achieved to date is a consultative arrangement in all instances. Although stakeholder participation has helped to make the management process faster, it has not been able to nurture stewardship for responsible fisheries practices. Also, in the small-scale fisheries, the level of success is further limited, as stakeholder participation has not helped to stabilize the stock levels. All parts of the management process are conducted in a transparent manner, affording opportunity by all concerned to contribute. Information dissemination is conducted mainly via both physical and electronic distribution of printed documentation and use of radio. In conclusion, the consultative management arrangements have had some limited successes, and the management process facilitates transparency in all aspects. However, stakeholders should be defined at least in the management plans, so that their rights and obligations in the management process are formally documented and recognized. In view of the limited successes noted so far, especially in respect of stock health and nurturing stewardship for responsible practices, it is clear that the quality of cooperation between fisheries managers and operators needs to be improved. In this case, there needs to be investment in stakeholder education and in capacity-building activities to nurture a more fulfilling cooperation partnership of all concerned in the management process.
- In the past ten years, conflict levels have increased in most of the major fisheries. In general, the conflict is due to competition for access to fishing areas and resources. Current management practices take into account various users needs in these fisheries. To date, the tools used to support conflict resolution among user groups have included area and also resource allocations for different uses, limited access for certain users, and education. In conclusion, the conflict management process takes into account multiple user needs, and various tools are applied. However, these have not yet resulted in a decrease in conflict in most cases. A more effective and active partnership with stakeholders, as previously identified, as well as transparency in terms of monitoring, evaluation and reporting, should be nurtured to ensure that conflict issues are more effectively addressed.
- Overfishing is believed to be occurring in the three major small-scale fisheries only. However, fishing capacity has only been measured for the major commercial fisheries. Additionally, catch rates trends have become constant or shown decreases in both the commercial and small-scale fisheries. Overcapacity is considered to be an issue for the commercial shallow-water shrimp fishery and in all the major small-scale fisheries. That noted, capacity reduction programmes have been set up and implemented for the two commercial shrimp fisheries only. These capacity reduction programmes have been successful in their primary purpose of permanently reducing fishing capacity in the fisheries concerned. In conclusion, Colombia has put measures in place to reduce fishing effort and its impacts in the commercial shrimp fisheries, but parallel regulations are not in place where overfishing is currently occurring in the small-scale fisheries. As the small-scale fisheries have the highest number of participants and vessels,

there may be real concerns about the livelihood impact of certain fishing effort controls. In view of this and if not yet done, an economic valuation of the goods and services of the major small-scale fisheries should be used to inform required capacity-reduction programmes and fishing effort controls for these fisheries so as to have minimal impact on livelihood benefits.

- Several agencies share the responsibility of monitoring, compliance and enforcement activities. Also, more than one supporting system is in place, e.g. VMS, observer programmes and inspection schemes. That noted, the available budget to allow enforcement of all regulations is not adequate, and this is hindering the capacity to detect incidents of non-compliance. However, penalties are considered to be effective when applied. In conclusion, both the implementation of the various supporting systems and enforcement patrols are likely being affected by budgetary constraints, as explained. In view of the budgetary constraints, further investment in stakeholder education and nurturing stakeholder support and involvement is warranted. This will demonstrate a process designed to safeguard participants' interests, which should help to reduce the incidence of non-compliance, as well as enforcement costs.
- Management costs are primarily funded by the government, with some recovery of these costs facilitated through the payment of licence fees. Over the past ten years, the budget for fisheries management has remained unchanged for both the major commercial and small-scale fisheries. Over the same time period, management costs have increased as a result of increased activities mostly pertaining to monitoring, control and enforcement. The additional costs are being met partly by fishery participants and partly by extern donor assistance. In conclusion, options for cost recovery are limited. An economic valuation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Also, as stated previously, additional investments in stakeholder education and nurturing stakeholder support and involvement should help to limit the rising management costs.
- Colombia's legislation allows the country to incorporate and implement the provisions of regional/international agreements. Colombia has also taken actions to support compliance with certain international legal provisions. The most important actions so far have included implementation of a NPOA on sharks, rays and chimaeras; national implementation of regional/international measures for minimizing impacts on bycatch species such as sharks and turtles; prohibition of shark finning; adoption of measures to manage and limit fishing capacity in key fisheries; and improved port management controls. Colombia is a member of several RFBs and strives to fulfill those data reporting obligations required for development of fisheries management regulations. A lack of budget, data and human resources sometimes poses constraints for fulfillment of statistical reporting obligations to the RFBs noted. In conclusion, the current fisheries legislation makes provisions for compliance with regional/international agreements, and Colombia has begun to make efforts to address some of the key provisions. Priorities for participation in RFBs should be reviewed and evaluated, including from an economic standpoint, so as to generate the required active support for improved cooperation with the relevant RFBs, especially as this relates to statistical monitoring and reporting.

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COUNTRY REVIEW

Dominican Republic

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INTRODUCTION

The Dominican Republic is located at 48° N, 70° 40' W, in the Caribbean, occupying two-thirds of the island of Hispaniola, which it shares with Haiti. It has a land area of 48 320 km^2, a water area of 350 km^2, a coastline of 1 288 km and a total territorial area accounting for 48 670 km^2 (Central Intelligence Agency, 2013). Its maritime claims include a 12 nautical mile territorial sea, a 24 nautical mile contiguous zone, a 200 nautical mile exclusive economic zone and a 200 nautical mile continental shelf (or to the edge of the continental margin). The Dominican Republic's GDP (PPP) is estimated at USD 100.4 billion, with a real growth rate of 3.9 percent (2012). Agriculture, which includes fisheries, contributes 5.8 percent to GDP (2012 estimate). The country's estimated population for year 2013 is 10 257 724, based on data obtained from the National Statistical Office.

With more than 11 600 fishers and 4 000 small-medium size boats operating through nearly 200 landing sites, fishery is basically artisanal; however, some semi-industrial, larger vessels operate at the north coast at the country's offshore banks. Fisheries and aquaculture in the Dominican Republic accounts for less than 1 percent of the nation's GDP, but greater improvement of the sector is expected after the enactment of the Presidential Decree 40-13 declaring fisheries and aquaculture as national high priority.

POLICY FRAMEWORK

Currently, the primary instrument of fisheries management legislation in the Dominican Republic is the Fisheries and Aquaculture Act (Law 307-04) of 2004. The legislation does not incorporate a definition of fisheries management, but provides a legal framework for the management of marine capture fisheries at the national and regional/international levels, i.e. to facilitate fulfillment of member-country obligations to regional agreements/conventions, and also at the local level. The administrative framework provided by the legislation covers the national process only.

The legislation lists the following all-encompassing but general fisheries management objective. That is to say, Article 1 of the law states that the objective of the legislation is to establish, in the Dominican Republic, a system of sustainable fisheries and aquaculture production, based on the principles of responsible fishing and the rational and sustainable use of the environment. Towards this end, the legislative provisions, regulations and related administrative actions directed at the exploitation of fisheries resources must be guided by the best available scientific information, and use the best available technology and the best environmental practices, so as to guarantee the development of the sector, sustainable exploitation and maintenance of ecosystem integrity. This objective has been incorporated into fisheries management plans, and in the case of shared resources, has also been informed by the work of RFBs and RFMOs.

When the legislation was updated in 2004, it identified certain actions to implement the CCRF. In particular, the legislation was updated to make provisions for the ecosystem approach to fisheries management and sustainable exploitation of fisheries

resources. The 2004 legislation has also banned the use of fishing gear known to have major negative impacts on marine ecosystems. It is of interest to note that current development of a new fisheries policy has involved active participation of stakeholders and resource users in its formulation. In respect of the country's efforts to implement the Compliance Agreement, the Dominican Republic maintains a vessel register for its fishing fleet engaged in medium-scale operations. Also, although the legislation permits it, there is no flagging of foreign fishing vessels to operate on the high seas.

There are also several pieces of non-fishery legislation that impact fisheries management in the Dominican Republic. These include: endangered species legislation, export/import/trade legislation, biodiversity legislation, oceans policy legislation, marine park/sanctuary/reserves legislation, port management legislation, coastal zone management legislation, and forestry (mangroves) legislation. The instruments of legislation that have the most impact on marine capture fisheries management are: Act 64-00, General Law on Environment and Natural Resources Act; Act 202-04, the Sectoral Law on Protected Areas; and Act 66-07 that declares the Dominican Republic to be an Archipelagic State.

LEGAL FRAMEWORK

The Dominican Council on Fisheries and Aquaculture (Spanish title and acronym: Consejo Dominicano de Pesca y Acuicultura – CODOPESCA) is the lead agency responsible for fisheries management. At present, this responsibility is shared with: the navy at the national level; OSPESCA at the regional/international level, in view of the fact that the Dominican Republic is member of OSPESCA and has signed the Code of Ethics and also harmonization agreements for lobster and shark closures; and at the local level, with the local fisheries and administration branch offices of CODOPESCA and fisherfolk associations. On the other hand, control and enforcement responsibilities are shared with: the navy and port authority at the national and local levels and with FAO and OSPESCA at the regional/international levels. However, CODOPESCA has sole responsibility for the fisheries science activities.

The current fisheries legislation does not provide a framework that shapes fisheries management and management plans, i.e. it does not provide specific guidance on management approaches and tools. The legislation does not set up a series of steps or a process for developing, organizing and implementing fishery management regulations nor fishery management plans. Additionally, the legislation does not prescribe steps for setting up the management process itself, nor does it make provisions for the management process to be completed in a given timeframe.

That noted, specific management measures and regulations for individual fisheries are included in the legislation. For example, Article 42 of the legislation makes provisions for prohibition of fishing in breeding areas, spawning areas and hatcheries, natural or artificial, which are designated by CODOPESCA and any alteration of the associated ecosystem, and notes that CODOPESCA has responsibility, in coordination with the Ministry of Environment and Natural Resources, to establish the location and extent of the affected areas. In addition, Article 49 specifies that lobster catches must be made using traps that allow them to be removed alive and returned to their natural environment if they are smaller than the established minimum size and if they are egg-bearing females. Any other equipment and/or capture method requires authorization from CODOPESCA. Article 56 specifies that a license application for the capture of ornamental species must be submitted in writing and should indicate the species, sites, depths, capture methods and amounts to be collected. A CODOPESCA technical team evaluates the ecological risks of the activity, after which CODOPESCA determines whether or not a fishing license should be granted.

The legislation requires management decisions to be based on information coming from: biological analyses, economic analyses, social impact analyses, environmental

analyses, ecosystem analyses/assessments, and monitoring and enforcement options. In the case of shared resources, the work of RFBs and RFMOs inform the objectives of the legislation. Also, the legislation includes several provisions to implement internationally agreed measures that have been adopted by regional fisheries management organizations.

In particular, Chapter XV of Act 302-04 provides guidance in relation to the closed seasons, minimum size limits and other protective measures adopted by the Convention on Biological Diversity. Article 61 makes provisions for CODOPESCA to establish bans, closed seasons, limitations of size and quantity of catches and other measures necessary for the conservation and protection of aquatic biological resources. In any case, the act prohibits the capture of animals with eggs attached or during their spawning periods. Article 62 provides for The Board of Directors of CODOPESCA to determine, by resolutions, bans, closures, size limits and other measures that may become necessary at any given time, and these are sent to the executive authority to be enacted. In Article 67, paragraph C states that in no case should there be marketing, import or export of specimens or parts of specimens of species whose capture is prohibited under the laws of the Dominican Republic or international conventions to which the country is party. Similarly, Article 68 states that the import of specimens or parts specimens of species whose capture is subject to bans or other restrictions in the Dominican Republic will require the prior authorization of CODOPESCA, after consultation and approval of the institutions responsible for ensuring compliance with international conventions and agreements.

The national fisheries management legislation gives the fisheries management authorities the legal power to meet the priorities and obligations of regional agreements, but not specific international conventions and other multilateral arrangements. In this regard, it should be noted that the Dominican Republic is not a party to any major international fisheries management conventions. However, at the regional level, the Dominican Republic is a member of COPESCAALC, WECAFC and INFOPESCA; is an associate member of OSPESCA; and has a MOU with the CRFM.

Apart from any formal management process, marine capture fisheries management can occur by: decisions made by the management agency; decisions made by the participants in the fishery; decisions made by other parts of government; decisions made by RFBs, RFMOs or organizations concerned with human rights, labour or trade (e.g. CITES).

The current legislation includes several provisions for handling prosecutions. For instance, Article 87 of the current legislation states that in cases of recidivism, the established penalty could be doubled for each type of violation in the preceding articles. According to Article 88, in all cases of infringement, the competent authority is able to confiscate illegal catches, prohibited fishing gear and related equipment that are in possession of the offender. Article 89 addresses cases of very serious infringements, as well as cases of recidivism: in these cases, the CODOPESCA can terminate the relevant fishing license, permission or authorization of the vessel or aquaculture facility. Article 90 states that in instances of contravention of the preceding provisions, where applicable, the captain of the fishing vessel or facility manager is responsible for the infractions and is liable for financial penalties imposed. These people can also make use of their civil responsibility to submit to the courts of justice, their plea for damages that were caused by the offence. Following on this, Article 91 states that the owner of the vessel and, if applicable, the owner of the aquaculture facility can take joint action for the previous financial penalties imposed and any civil liability that might arise.

With regard to infringements committed by foreign vessels, it should be noted that Article 93 of the Fisheries Act establishes specific penalties. Firstly, the sanctions applicable to foreign vessels may include seizure of catches, fishing gear and other related equipment and resources. Also, the vessels and crews would be promptly

released upon provision of a reasonable bond or other security, except the boat captains to which the penalties of the relevant law are applied, according to the violation committed. Secondly, in cases of arrest or detention of foreign vessels, the Dominican Republic would promptly notify the flag state, through appropriate channels, of the measures taken and of any penalties subsequently imposed.

As already mentioned, several pieces of non-fishery legislation impact fisheries management in the Dominican Republic, with the most important of these being two major environmental laws (Act 64-00 and Act 202-04) and the law declaring the Dominican Republic as an Archipelagic State (Act 66-07).

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

In the Dominican Republic, vessels engaged in commercial fishing activities are usually deep-draft vessels and are over 23 feet in length, with an internal engine and in some cases, with refrigeration facilities. Furthermore, most of these vessels operate as motherships, but do not have processing facilities. Typically, the commercial fishing vessels support 20–30 individual fishing units, called "yolas" locally, which normally conduct SCUBA operations. The harvest of the commercial fishery is traded locally and also exported.

Small-scale and artisanal operations are considered to be more or less indistinguishable from each other. That noted, small-scale operations are characterized by the use of larger vessels than those used by artisanal fisheries, as well as by the use of outboard engines of 20 to 40 hp. Artisanal fishing operations generally have low capital and operating costs, are labour intensive, and use medium to large canoes, dinghies and boats. These vessels are usually powered with outboard engines, carry a crew of two to six persons, and operate in all waters of the island shelf and oceanic waters up to 40 miles from shore. Fishing trips can last from five to 5 hours or as much as two to four days in some cases, depending on the vessel size. The fishers can use twine traps and conduct scuba diving, and can also fish around rafts. Vessel operations are usually not supported by any port infrastructure. In the case of small-scale/artisanal operations, the equipment and fishing boats normally belonging to fishing or other business corporations, which then usually lend fuel to fishermen and deduct it from their payments when these are due. Artisanal fishers are considered to earn a medium income.

In the case of subsistence fishing operations in the Dominican Republic, this is characterized by small and non-motorized boats operating in coastal waters, and using line/string capture techniques. Such operations have very little capital and operating costs, and are labour intensive. Small non-motorized canoes are normally employed to carry a crew of one or two persons, and to conduct fishing trips lasting two to four hours in coastal waters (up to 1–2 km from shore). No port infrastructure is provided to support subsistence operations. In addition, these operations are not considered to be frequent, with less than 150 trips being conducted per year, and with an overall harvest of less than 1 tonne per year. Any income earned is not significant.

A recreational fishery also exists. Recreational fishing vessels vary in their design, but they are usually more than 25 feet in length. Additionally, the vessels are typically fitted with one or two engines of 40 hp or higher power and are equipped with electronic aids and security equipment. Fishing is done using fishing rods and trolling lines. Normally, the catch is not sold, but in some cases, it is donated for charity purposes.

Fish production and value

Commercial fisheries

The three most important commercial fisheries by weight are: (i) a fishery targeting a variety of snappers and which harvested 2 401 tonnes according to statistics collected in

2010; (ii) a fishery for groupers, with an annual harvest of about 1 583 tonnes; and (iii) a spiny lobster fishery with an annual harvest of 1 001 tonnes. These are also among the top most valuable fisheries for the commercial/industrial subsector. Catch and value data for determining trends over the past ten years are not available.

Small-scale fisheries

There are three major small-scale fisheries: (i) a fishery targeting scalefish (groupers, snappers, parrotfishes); (ii) a fishery for spiny lobster; and (iii) a fishery for shrimp. These fisheries are also among the most valuable for this subsector. The total small-scale fishery catch increased from 14 167 tonnes in 2009 to 14 486 tonnes in 2010, after which the catch decreased slightly to 14 004 tonnes in 2011. In comparison, over the same time period, the overall value of the total catch kept increasing.

Recreational fisheries

Three major recreational fisheries have been identified, and these are important for both consumptive and non-consumptive use. One fishery targets marlin and wahoo, a second fishery targets tunas and the third fishery is focused on dolphinfish. Catch and value data for determining trends over the past ten years are not available. Notwithstanding, although the value data are unknown, other economic information is available on recreational fishing costs in Punta Cana. For instance, the charter of a private boat for eight hours costs USD 1 240, and requires a deposit of USD 300, while the charter of a private boat for four hours costs USD 640 and requires a deposit of USD 200. Where the boat is shared by clients, the cost is USD 99 per angler and USD 60 per passenger, and the total payment is required immediately. A shared charter usually lasts four hours.

Food security and employment

The commercial fishery does not provide a sole source of income for the majority of the participants. This is because most fishermen are engaged in other activities, especially during seasonal closures, or they may fish for other resources. The commercial fishery is also not a sole source of food for the majority of the participants. In the small-scale fisheries, only the shrimp fishery provides the sole source of income and food for the majority of the participants, while this is not the case for the scalefish and lobster fisheries. The fact that recreational fishery catches are not sold and may be donated to charity suggests, as may be expected, that this fishery does not provide its participants with a sole source of food. Data are not available to determine if the recreational fishing charter companies are solely dependent on the fishery as a source of income.

Fishing effort and impacts

Fishing areas

Commercial fishing operations for snappers take place on La Navidad and La Plata Banks, situated off the north coast, as well as Jaragua National Park, which is located in the southwest of the country. In comparison, small-scale fishing operations are conducted throughout the country but especially on the submerged banks of La Navidad and La Plata and Jaragua National Park in the case of the lobster fishery. In the case of recreational fishing operations, these generally occur in Punta Cana on the east coast and Puerto Plata on the north coast.

Fishing effort

Levels and trends in fishing effort and licensing arrangements are shown in Tables 1, 2 and 3 for the major commercial, small-scale and recreational marine capture fisheries identified, respectively. There are no quantitative data available on actual numbers of participants and vessels for specific fisheries identified and currently, it appears that

only 40–50 percent of the participants in the commercial fishery are licensed. That noted, some estimated total numbers of fishers and vessels are provided in Table 2 for the small-scale fisheries. The numbers of participants in both the commercial and small-scale lobster fisheries are believed to have increased over the past ten years, as well as the number of participants in the recreational fisheries. The number of recreational fishing vessels is also believed to have increased in the same time period, in view of the increased number of tourists. In this regard, it should be noted that generally less than 80 percent of the recreational fishers are foreign tourists. Apart from the commercial and small-scale lobster fishery and the recreational fisheries, the level of participants in the other commercial and small-scale fisheries have not changed over the past ten years, though the number of vessels involved in the other small-scale fisheries has declined (Table 2).

TABLE 1
The approximate current level of fishing effort for the three major commercial fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?*	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Snapper	Not available	Yes	u	Not available		
Grouper	Not available	Yes	u	Not available		
Lobster	Not available	Yes	i (assumed, based on reported catches)	Not available		

* Close to 40–50 % of participants are licensed. The number of fishing boats in the semi-industrial subsector remains constant.

TABLE 2
The current approximate level of fishing effort for the major small-scale marine capture fisheries identified, licensing arrangements and the perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
scalefish	See note b		u	See note c		d
lobster			I			u
shrimp			u			d

a. For now, the statistics do not provide separately the number of fishermen for each fishery, except for the shrimp fishery in Samana. In Samana, some 2 500 fishermen registered for 1990.

b. The number of participants has not changed much in the last ten years, with an increase of about 5–10 %. We estímate a total of some 11 000 fishers.

c. About 4 000 boats in total in the small-scale fishery.

d. The number of fishing boats in the artisanal fishery seems to have fallen by 10–15 %, according to partial census surveys that are performed by CODOPESCA.

TABLE 3
The current approximate level of fishing effort for the major marine recreational fisheries identified, licensing arrangements and the perceived trend over the last ten years.

Fishery	Participants	Li-censed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Li-censed?	Increased (i)/ decreased (d)/ unchanged (u)
Marlin, wahoo	Not available	no	i	Not available		i – no statistical reports, but believed to have increased due to increases in the number of tourists.
Tunas		no	i			
Dolphinfish		no	I			

Overfishing and fishing capacity

No definition of overfishing is provided in the present fisheries legislation. There is also no information currently available on the occurrence and extent of overfishing in the country. That noted, overcapacity is not considered to be an issue for the commercial fishing fleet. Over-exploitation of some coastal resources is occurring,

but this is believed to be due to lack of resources allowing this fleet to operate further offshore or even on the high seas. For some species groups and families, the CPUE has remained constant over the years or has even increased, as is the case for lobster, while for other species groups/families, the CPUE has decreased over time, especially in reef fish and predator species.

In comparison, in the small-scale subsector, there is currently no overfishing of scalefish or lobster, but in the case of the shrimp fishery, it is possible that the shrimp fishery of Sanchez has excessive fishing effort. In general, the CPUE has begun to decrease, except in the lobster fishery, for which the CPUE appears to have remained stable. There is no information to determine if overfishing exists in the recreational fisheries. Also, there are no data to determine the trends in recreational CPUE.

Work has begun on the measurement of capacity in all marine capture fisheries, but remains to be completed. This task has been delayed by a lack of budget/funding, a lack of human resources to do the assessments, and also a lack of stakeholder support and education. In particular, fishing capacity has not yet been measured for the major commercial and recreational fisheries, but is being measured for the small-scale fisheries. In the case of the commercial fisheries, although overcapacity is not considered to be a present problem, regulations over the past two to three years have focused on reducing fishing effort and/or reducing the harvest in all three major fisheries identified. In contrast, there is a sense of overcapacity in the small-scale shrimp fishery. Notwithstanding, there have been no regulations imposed recently to reduce fishing effort or harvest in this or the other two principal small-scale fisheries. Likewise, regulations for the three major fisheries of the recreational subsector in the last two to three years have not focused on reducing fishing effort or harvest levels, but these fisheries are also not considered to be suffering from the problem of overcapacity.

MANAGEMENT ACTIVITY

General nature and extent

It is estimated that 33–67 percent of marine capture fisheries in the country are managed in some way at the national level, while less than 33 percent of these fisheries are managed at the regional/international and local levels. It should be noted that over the past ten years, the number of managed fisheries has increased at the national and regional levels, but there has been no change in the number managed at the local level. Some major fisheries (in terms of weight of landings) are not currently managed. These are: the fishery for shrimp (*Litopenaeus* spp.) in Sánchez, Samaná, the fishery for Scaridae in Puerto Plata, and the national fishery for grouper (*Epinephelus* spp.).

The management process has been informed by both rules and practices, including: legislation about individual fisheries at the national level; interventions/actions to support specific management objectives at the national and local levels, published regulations or rules for specific fisheries at the national and local levels, traditional rules or customs that affect the harvest of marine fisheries at the national and local levels, and rules established by fishing organizations at the national and local levels. However, the national and local management-level processes have not included management plans for specific fisheries. The local process is also not influenced by legislation for specific fisheries. The regional-level management process is influenced only by published regulations or rules for specific fisheries, and by rules established by fishing organizations, e.g. OSPESCA.

Of the fisheries that are managed at any level, fewer than 33 percent have a formal, documented fishery management plan. At the national and local levels, fewer than 33 percent of fisheries have published regulations or rules that have been informed by methodical scientific monitoring and evaluation. In comparison, at the regional level, 33–67 percent of the fisheries have published regulations and rules that are informed by scientific information.

International legislation impacts

The management process is affected in a number of ways by international legislation. For instance, the current legislation makes certain provisions to implement the CCRF by giving recognition to the need for the ecosystem approach to fisheries management and for sustainable exploitation of fisheries resources. The legislation also bans the use of fishing gear known to have major negative impacts on the marine ecosystems. Stakeholder participation is increasingly promoted; for example,. a new fisheries policy was developed that involved active participation of stakeholders and resource users in its formulation. There has also been progress in implementing the Compliance Agreement. That is to say, a vessel register is maintained by the Dominican Republic for the national fishing fleet engaged in medium-scale operations. Additionally, although the legislation permits it, there is no flagging of foreign fishing vessels to operate on the high seas.

Regarding the UN Fish Stocks Agreement (1995), the Dominican Republic has applied the prevention criterion when there is no reliable information about the resource. As noted already, foreign fishing vessels are not flagged to fish for straddling and highly migratory fish resources, and the harvest of migratory species is kept to artisanal levels established. There has also been some progress in implementing the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003). In this regard, the Dominican Republic has established a national system of registration and fishing information that is collected in the field and which is used to provide data to the FAO database and the databases of other parties (e.g. the Central Bank). Additionally, the use of certain fishing gears and fishing methods is restricted or banned, such as scuba diving and the use of trawl nets, and there are seasonal closures for spiny lobster and queen conch, as well as fish size-limit measures. These are considered to provide a complementary suite of regulations for ecosystem management. The law that prohibits use of trawl nets (Act 307-04; Arts..63, 64 y 98), arguably also contributes towards implementation of the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), although there is no specific measure for managing discards.

In the case of the FAO International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999), no corresponding NPOA has been developed. However, Article 64 of Act 307 makes a provision that prohibits, in reserved fishing areas, the use of surface and mid-water drifting or fixed longlines having over 100 hooks or 5 km in length, which indirectly has the intention of reducing the incidental catch of seabirds. On the other hand, a NPOA is currently being developed to guide implementation of the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999). In the meantime, Dominican Republic adheres to the OSPESCA regulation that bans shark finning, and national fisheries technical staff participate in the regional OSPESCA shark working group and also receive training in this area of work.

Concerning the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999), CODOPESCA is currently updating the fisheries information, including the collection and raising of data on the number of fishers, boats and gears across the country. Efforts are also being made to maintain and update the register of fishing vessels and to collect and record daily vessel operations and catches. To assist in implementation of the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), CODOPESCA has established fishery enforcement officers in ports and airports. These officers verify that imported and exported fish products have the proper authorization and meet the legal requirements established by the national law and international conventions to which Dominican Republic is a party. Illegal fishing merchandise is usually seized, and the responsible persons are prosecuted according to the national law. Additionally,

it should be noted that the Dominican Republic is working on the formation and operation of a network of monitoring, control and surveillance.

Finally, there has also been some progress in the implementation of the FAO Port States Measures Agreement (2009). Within the country, information is exchanged among the relevant agencies (CODOPESCA, the navy, the Environment and Foreign Affairs ministries) on vessels and fishers with possible involvement in IUU fishing. Additionally, as mentioned earlier, CODOPESCA has established fishery enforcement officers to verify the proper authorizations for fish products entering and leaving the country. Although it is not prohibited by law, Dominican Republic does not flag foreign fishing vessels.

Management plans

At present, there are no management plans for the major commercial fisheries identified. Notwithstanding, in respect of the commercial snapper and grouper fisheries, practical management measures are adopted with the aim of ensuring species viability, e.g. minimum size limits, and protecting berried females. In the case of the commercial spiny lobster fishery, although there is no national management plan, the Dominican Republic adheres to the management guidelines of OSPESCA established for the Central American region.

The current legislation (Law 307) also makes provisions for controlling fishing activities. Article 48 makes provisions for regulated harvest of several lobster species (*Panulirus guttatus*, *P. laevicauda*), rock or flat lobster (*Scyllarides* sp.) and Caribbean spiny lobster (*P. argus*), as well as various echinoderm species. In particular, the CODOPESCA, according to studies and biological sampling, can determine suitable closed seasons and catches for these species. Articles 49–52 prescribe how lobster may and may not be caught and landed. According to the provisions of these articles, lobster may be caught using traps that allow removal of lobsters while still alive, so that illegal-sized lobsters and berried female lobsters could be returned to their natural environment. The use of hooks and harpoons is prohibited. Any other equipment and/or capture method requires authorization from CODOPESCA. Furthermore, lobsters that do not meet the legal requirements for landing must be returned to the sea in the best possible condition for survival. Lobsters caught must be landed whole with heads attached. Current minimum landing sizes are also stipulated: 10 cm abdominal length for *P. guttatus* and 18 cm abdominal length for *P. argus*. The minimum landing sizes may be modified by the CODOPESCA on the basis of available scientific evidence. That noted, the Dominican Republic has adhered to the OSPESCA regulation applicable to the spiny lobster, and so the minimum landing size has been modified in accordance with that regulation.

Management plans have been developed for the major small-scale fisheries identified, and these have been in effect since 2000. However, management objectives have not been included in these plans. In the case of the recreational fisheries, management plans have not yet been developed, and no management objectives have been documented as a result.

Management approaches and tools

Multispecies aspects

The commercial fisheries are multispecies in nature, and this is taken into account in the management of these fisheries. For example, in the case of the spiny lobster fishery, the closure regulation is established for all reported species. The legislative provisions, as explained earlier, also make suitable provisions for addressing the multispecies nature of the fisheries.

Similarly, the small-scale fisheries are multispecies in nature, and the management of these fisheries takes this into account. In the scalefish fishery, the regulations are

species-specific, in order to address species-specific management and conservation needs, i.e. depending on their condition of health or if the species is listed as threatened or protected. Regulations also are made for groups of species. In the case of the lobster fishery, although the Dominican Republic adheres to the OSPESCA regional regulation for Caribbean spiny lobster, *P. argus*, the national regulation includes a closed season for other lobster species as well (e.g. *P. guttatus*, *Scillarides* sp.). Additionally, current efforts to control the use of trawls (at the artisanal level) include promoting a co-management arrangement involving government institutions, the community and an NGO working with the community of Sanchez.

On the other hand, although the recreational fisheries are multispecies in nature, this is not yet taken into account in the management of these fisheries. As noted earlier, management plans have not been developed, as such, for the recreational fisheries.

EAF and precautionary approach

The management of the three major commercial fisheries does not include specific ways for applying the ecosystem approach to fisheries (EAF) management or the precautionary approach. However, arguably, the management of the main small-scale fisheries incorporates an ecosystem approach. Although the management plans are not species-specific, there are strategic lines of action for management. A pilot project is currently developing an ecosystem approach for the management of the reef fisheries in Montecristi: this has involved collecting data on the entire ecosystem and the primary users of resources, and the integration of all information into the management process. A fisheries management plan for lobsters is also being developed so as to incorporate the ecosystem approach. A draft co-management plan for the shrimp fishery already exists and is under review: the plan addresses specific areas, including research, community integration into the management process and the search for economic alternatives to fishing. There have been no applications of the precautionary approach in the management of the small-scale fisheries.

In the recreational fisheries, EAF management is not yet applied, but there has been application of the precautionary approach. That is to say, the marlin fishery is a "catch and release" fishery. In addition, off the coast of Montecristi, there is an area of recruitment for the white marlin, and so commercial fishing has been banned in that area, with recreational fishing being the only type of fishing allowed.

Management tools and trends in usage

The primary management tools used for the three main commercial fisheries identified are shown in Table 4. These include nursery and other temporary area closures, seasonal closures, gear type and size restrictions and a licensing system. The fishery management tools being used in these three marine capture fisheries are the same type as used in other fisheries in this category. The use of the management tools listed in Table 4 has increased over the past ten years, except that there has been no change in the use of temporary closures for the lobster fishery. In the past ten years, additional management tools have been introduced and their application has also increased, such as the use of marine reserves, limited entry, catch quota allocations, group fishing rights and territorial use rights. This use of regional restrictions has also grown in importance for the spiny lobster fishery over the past ten years.

TABLE 4

Types of management tools used in the three major commercial fisheries identified

Type of Management Tool	Snappers	Groupers	Lobster
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)	√	√	√
Temporal restrictions such as:			
Defined fishing season(s)	√	√	√
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions			
Engine size restrictions			
Gear size restrictions	√	√	√
Gear type restrictions	√	√	√
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses	√	√	√
Limited entry (limited vessels or limited fishers)			
Catch restrictions such as:			
Total allowable catch (TAC) limits			
Vessel catch limits			
Individual vessel quotas			
Rights- /incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions			
Taxes or royalties			
Performance standards			

In the small-scale fisheries, the primary management tools are similar to those applied in the commercial fishery, with the exception that taxes/royalties are imposed for the scalefish and lobster fisheries, regional restrictions apply for the lobster fishery, and gear size measures are not applied to small-scale lobster fishing operations (Table 5). The fishery management tools being used in these three marine capture fisheries are the same type as used in other small-scale fisheries. The last ten years have seen an increase in the use of the following tools: licensing for all three fisheries, regional restrictions and a closed season for the lobster fishery, and gear type and nursery area closures in the case of the shrimp fishery. Engine size and vessel dimension limitations have also been introduced and their application has grown in importance over the past ten years. Added to this, tax/royalty payments have been introduced in the shrimp fishery over the past ten years.

TABLE 5
Types of management tools used in the major small-scale fisheries identified

Type of Management Tool	Scalefish (groupers, snappers, parrotfish)	Lobster	Shrimp
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)	√	√	√
Temporal restrictions such as:			
Defined fishing season(s)		√	
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions			
Engine size restrictions			
Gear size restrictions	√		√
Gear type restrictions	√	√	√
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses	√	√	√
Limited entry (limited vessels or limited fishers)			
Catch restrictions such as:			
Total allowable catch (TAC) limits			
Vessel catch limits			
Individual vessel quotas			
Rights- /incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions		√	
Taxes or royalties	√	√	
Performance standards			

The primary management tools used for two of the three recreational fisheries are given in Table 6. There are no management tools used to regulate the dolphinfish fishery. The management tools applied to the marlin/wahoo and tuna fisheries include area closures, restrictions on hours fished, gear type and configuration measures, vessel/angler catch limits and sale restrictions (Table 6). The fishery management tools are specific to the needs of each fishery, as there is no management plan specifically for the recreational fishery. Hence, management actions are determined when overfishing is detected. Over the past ten years, the Dominican Republic has continued to use these tools, and has also introduced specific fishing seasons and provided specific landing areas and piers.

TABLE 6
Types of management tools used in the major recreational fisheries identified

Type of Management Tool	Marlin & Wahoo	Tunas	Dolphinfish
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)			
Temporal restrictions such as:			
Defined fishing season(s)			
Defined number of days fishing			
Defined number of hours per day fishing	√		
Defined number of hours fishing	√		
Gear restrictions such as:			
Vessel size restrictions			
Engine size restrictions			
Gear size restrictions			
Gear type restrictions	√		
Hook and line restrictions	√		
Hook type/size restrictions			
Bait restrictions(e.g. use of artificial lures vs. fresh/ live bait)			
Method restrictions such as:			
Motor trolling			
Use of artificial light			
Use of scents			
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses			
Limited entry			
Number of rods/lines per vessel			
Catch restrictions such as:			
Total allowable catch (TAC) limits			
Vessel catch limits			
Individual vessel quotas			
Bag limits	√		
Fish holding limits	√		
Sales restrictions such as:			
Commercial sale restrictions	√		
Rights- /incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Encouragement of harvest of overabundant species			
Encouragement of harvest of invasive species (e.g. lionfish)			
User conveniences such as:			
Provision of landing sites/fish piers			
Provision of fish-cleaning stations			
Regionally/internationally agreed restrictions	√		
Taxes or royalties			
Performance standards			

International standards

None of the commercial or small-scale fisheries are managed using performance standards or are managed based solely on regionally/internationally agreed restrictions. In the recreational fishery for marlin/wahoo, there are voluntary regulations/codes of conduct in place to support management of the fishery. In the case of the blue and white marlin fishery, this is a catch and release fishery. Fishers also avoid capture of bluefin tuna and white marlin, as these species are considered vulnerable. That noted, none of the recreational fisheries are managed based solely on regionally/internationally agreed restrictions.

Role and impact of marine reserves

Management of the commercial fisheries is listed as one of the objectives or reasons for establishing marine protected areas or reserves. In the Dominican Republic, protected areas have been created to contain fishing communities. This is intended to retain a critical mass of fisheries resources, especially players, and also to preserve areas of recruitment. Within the Dominican Republic protected areas, there are areas designated for reproduction or for recruitment of various species of fish, molluscs and crustaceans. In addition, the restrictions on use in terms of number and size of fishing gear are higher in marine protected areas. In such areas, therefore, the precautionary principle is applied more frequently, and this will limit fishing operations.

In comparison, management of the small-scale fisheries is not listed as one of the objectives or reasons for establishing marine protected areas or reserves. Notwithstanding, marine protected areas or reserves affect the management of the fishery even if fisheries management is not listed as one of the objectives or reasons for establishing the areas. As noted earlier, Dominican protected areas have been created to contain fishing communities, and there are greater restrictions on fishing operations within the protected areas, which may be designated for reproduction or recruitment of various species of fish, molluscs and crustaceans. These conditions contribute to fisheries management aims.

Stakeholder involvement and transparency in management

Generally, stakeholders are formally involved in the management of all marine capture fisheries at the national, regional/international and local levels. That noted, there is no formal definition of groups included as "stakeholders" in the legislation. However, in a practical way, all involved in the sector are considered, including: fishermen, traders, ship owners, importers and exporters of fish products, farmers and representatives of municipalities etc. Regarding the participatory process, the legislation enables co-management, where fisheries management stakeholders are consulted and share some management responsibility. While these participatory processes are a formal and required part of the management of all marine capture fisheries, the steps in these processes are not routinely followed as part of fisheries management.

Commercial fisheries

In the major commercial fisheries, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources. Although there is no documented definition of stakeholder groups, the fishery stakeholders are organized into distinct groups, but the level of such organization is poor in the case of the snapper fishery. In addition, arrangements have been made to consult these stakeholders and to work with them on management issues. The management process, as it relates to stakeholders, has experienced a range of success, including: authoritarian management (top-down), consultative management, and co-management, where stakeholders share some management responsibility. Related to this, stakeholder participation in decision-making can be rated as: informative, consultative, advisory and participative. Despite

the levels of stakeholder involvement achieved, the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. However, stakeholder involvement in the fisheries management decision-making process, has made the management process faster and has helped to reduce conflict.

Small-scale fisheries

Similar to the commercial fisheries, there have been efforts to identify the stakeholders who have an interest in the use and management of the resources and to involve them in the management process. Also, although stakeholder groups are not formally defined, they are mostly organized into groups. The scalefish fishery stakeholders are organized only in some cases. A similar range of stakeholder participation successes has been achieved for the small-scale fishery management process, as noted for the commercial fisheries, i.e.: authoritarian management (top-down) for the scalefish and lobster fisheries, consultative management for the shrimp fishery, and co-management arrangements in progress for at least the scalefish and shrimp fisheries. At present, stakeholder inputs in decision-making are considered to be: informative, communicative and participative, but only partly so in the case of the scalefish fishery, and under community control in the case of the shrimp fishery. The levels of success from stakeholder involvement are similar to those noted for the commercial fishery. That is to say, the participants do not find that the management system creates incentives for promoting "responsible" fisheries stewardship. However, stakeholder involvement in the fisheries management decision-making process has made the management process faster and has helped to reduce conflict.

Recreational fisheries

In the recreational fisheries, stakeholders are also organized into distinct groups in some cases, and there have been efforts to involve them in the management process, which could be described as consultative for the three major fisheries. Notwithstanding, this system has not created incentives and reasons for the participants to voluntarily practice "responsible" fisheries stewardship, and the management measures applied have not resulted in stable stock levels over the last five years. Furthermore, stakeholder involvement in the fisheries management decision-making process has not made the management process faster nor helped to reduce conflict.

Transparency in management

All parts of the fisheries management process are considered to be transparent, and certainly, information about the fisheries management process is clearly documented and easily available to the public. Meetings to discuss the management of specific fisheries are advertised and publicized in advance of the actual meeting dates but are not open to all stakeholders. Despite this, there appears to be opportunity for fishery participants and other stakeholders to contribute to the decision-making process by providing public comments. Information about management measures and meetings are shared with fishery participants and other stakeholders, with information dissemination usually managed using printed materials, such as brochures or information packages, direct mail, fax, Internet mail and telephone.

Management of conflict and fishing effort

The fisheries management legislation makes provisions for addressing conflict, including identifying specific steps to follow to resolve conflicts, the use of alternative dispute resolution mechanisms ("ADR" mechanisms), and the need to consider multiple uses and users of the resources concerned. In particular, dispute resolution and conflict management processes are part of the marine capture fisheries

management process, according to the following legal provision. CHAPTER XXII, Article 73 of the legislation deals with settlement of disputes, and states that "The dispute between fishermen or fishing communities and other users of waters of the inland and coastal areas shall be settled preferably by agreement between them, with the intervention of CODOPESCA, which shall exercise its good offices and implement the relevant recommendations, provided that the disputes do not amount to criminal offences, in which case these will be treated by the Criminal Code of the Dominican Republic. Conflict resolution among user groups is managed using fisheries management tools such as: zoning of different areas for different users, education about sharing marine fisheries resources, and limited access to certain areas for certain types of fishers.

Commercial fisheries

Conflict occurs in the major fisheries noted, and the level of conflict has increased over the last ten years. This is mainly due to competition with other uses (recreational fishers and other industries) for the same area of water, and in the case of the snapper fishery, also competition for gear deployment in the same fishing area. However, dispute resolution and conflict management processes are not part of the marine capture-fisheries management process for any of these fisheries. Although there are no written formal processes, control measures are implemented and the Dominican Republic is also working on the application of marine zoning programmes to reduce user conflicts. Legislative provisions that help with conflict resolution require education about sharing marine fisheries resources, and limited access to certain areas for certain types of fishers.

Small-scale fisheries

Conflict occurs in the small-scale fisheries, particularly, the small-scale shrimp fishery, where the level has increased over the last ten years. The conflict occurs usually because of competition with other with other industries, and in the case of the shrimp fishery, competition also with other fisheries. For the small-scale shrimp fishery, dispute resolution and conflict management processes are part of the marine capture fisheries management process. The management of these fisheries includes particular processes such as: the use of alternative dispute resolution mechanisms (so-called "ADR" mechanisms) and the need to consider multiple uses and users. Regarding the small-scale fisheries, the management legislation requires: zoning of different areas for different users in the case of the shrimp fishery, for which a proposal is in progress; stock enhancement; and education.

Recreational fisheries

Conflict occurs in the major fisheries noted, and the level of conflict has increased over the last ten years. This is mainly due to competition with other fisheries for the same area of water. At present, however, dispute resolution and conflict management processes are not part of the marine capture fisheries management process, and no formal processes are therefore followed. In case of the recreational fisheries, the management legislation requires limited access to certain areas for certain types of fishers for the marlin/wahoo fishery.

Overfishing and fishing capacity

As noted earlier in this report, there is no information currently available on the occurrence and extent of overfishing in the country. Over-exploitation of some coastal resources is occurring, and declines in catch rates have been observed in some fisheries such as reef fisheries and the shrimp fishery. However, overcapacity is considered to be a problem only in the small-scale shrimp fishery. The measurement of fishing capacity

has begun with the small-scale fisheries, but has been constrained by a lack of human and financial resources and also poor stakeholder involvement.

A capacity-reduction programme has been set up and implemented only for the three major small-scale fisheries noted. This programme has involved the purchase of fishing licenses and also the establishment of co-management agreements in these fisheries. These measures have been effective in immediately reducing the excess fishing capacity and, as a result of these measures that are ongoing, the excess fishing capacity has not returned. It should be noted that the objectives of the capacity-reduction programme specifically included: the need to reduce/eliminate overfishing, the need to reduce or eliminate conflict and the need to empower users of a community or fishing area on the use of their resources. The programme has been funded partly by the government (20 percent), and by stakeholders in other non-fisheries sectors (10 percent) concerned with protection of the coast and sea to help tourism.

Management of monitoring, compliance and enforcement

The Dominican Republic has a navy, a coastguard, a marine police enforcement unit, a fisheries agency or department that does fisheries enforcement, and other marine patrol, monitoring and enforcement groups, such as the Environmental Police for surveillance and control of environmental assaults. However, it should be noted that fishing can affect the case of any species protected by CITES or other international or national convention. In the coastal waters (0–3 nautical miles), the coastguard, the marine police enforcement unit and the fisheries agency share responsibility for at-sea fisheries patrols, monitoring and enforcement work. In the case of monitoring, compliance and enforcement activities in the territorial waters (0–12 nautical miles), it is a joint responsibility of the coastguard and the fisheries agency. Specifically, Article 74 of Act 307-04 notes CODOPESCA's responsibility for monitoring, inspection and control of fishing activities and aquaculture, with the help of the police and the navy and civil society. Additionally, Article 75 notes that the CODOPESCA inspectors are to maintain a service of fishery and aquaculture inspectors, who should possess professional qualifications necessary for the performance of their duties and have the means necessary for their performance and determine by resolution, the required profile respectively, of fisheries inspectors and of inspectors of aquaculture. Moreover, the CODOPESCA has responsibility for coordinating with government authorities and the navy to obtain the required aid of these institutions to exercise the functions of surveillance and policing.

The fisheries agency has lead responsibility for fisheries monitoring work such as checking dock-side landings and logbooks. However, landings in the main commercial ports are monitored by fishery officers of CODOPESCA, experts from the Ministry of Public Health, Technicians of the Animal Health Department of the Ministry of Agriculture, Technicians of the Bureau of Customs and officers of the National Directorate for Drug Control. In the case of informal landings by artisanal fisheries, only CODOPESCA officers are involved in recording the landings.

The CODOPESCA is the agency that enforces penalties. Penalties for non-compliance with fisheries management regulations and rules commonly include: small fines for first offences, larger fines for additional offences, and the revocation or suspension of fishing licences. Moreover, several articles in Act 307-04 identify specific serious offences and the penalties that should be applied. At present, the systems to support compliance and enforcement of fisheries management include the use of: random dockside inspections, routine inspections at landing sites, and monitoring of market storage stocks prior to receipt of the statement of existence by the marketer. The third tool is used to monitor compliance with species seasonal closures.

In the last five years, generally, the number of offences that are taking place has decreased, and detection efforts (e.g. at-sea patrols, port monitors) have increased.

However, the budget for monitoring and enforcement has been decreasing in the last five years. Although specific records are not kept, some explanations are offered for observed trends in non-compliance. In those instances where there appear to have been an increase in violations, it may be due to improved citizen participation in making complaints. In the past five years, violations appear to have decreased due to certain developments: (i) CITES export ban for queen conch, *Strombus gigas*; (ii) the banning of capture and sale of sea turtles, after a lawsuit filed by a national NGO at the Humane Society's environmental secretary DR-CAFTA; and (iii) the accession of the Dominican Republic to OSPESCA, which has led the harmonization of closures for lobster and a shark finning ban, although in the latter case it is not really applicable in Dominican Republic because Dominican Republic has no developed shark fishery. Generally, available funding does not allow the fisheries agency to enforce all fisheries regulations. Moreover, the penalties for non-compliance are not considered to be severe or expensive enough that participants in the fisheries avoid cheating, and the risk of detection is not high enough to deter incidents of non-compliance.

Commercial fisheries

In the commercial fisheries, penalties for non-compliance with the regulations include: small fines for first offences, larger fines for additional offences, revocation or suspension of fishing licenses, refusal of the opportunity to fish for the rest of the season or year, and imprisonment. In this regard, it should be noted that Articles 81 and 83 of the legislation make specific provisions for penalty fines and for imprisonment terms for serious and very serious offences. For these fisheries, compliance and enforcement are facilitated by the use of: random dockside inspections, routine inspections at landing sites, and review of the catches in storage in business places prior to the closed season, so that sales during the closed season could be verified as legal.

Over the last ten years, the number of offences that are taking place in the commercial fisheries has shown an apparent increase. However, this apparent increase may not be a real increase but due to the improved reporting system of environmental crime, i.e. the complaints system is more efficient than in previous periods. Although the budget for monitoring and enforcement has been increased in recent years, it is still insufficient to support full enforcement of all fisheries regulations. The application of sanctions and the risk of imprisonment and confiscation of equipment are not fully effective mechanisms to deter violators.

Small-scale fisheries

In the small-scale fisheries, penalties for breaking marine capture fisheries management regulations and rules can take several forms: small fines for first offences, larger fines for additional offences, fixed fines for specific offences, revocation or suspension of fishing licenses in the case of the lobster and shrimp fisheries, refusal of the opportunity to fish for the rest of the season or year, exclusion or removal from the fishery, and imprisonment. In these fisheries, compliance and enforcement of fisheries management depend heavily on the use of routine inspections at landing sites. In the last five years, the number of offences in the small-scale fisheries has decreased. On the other hand, the budget for monitoring and enforcement has been unchanged over the most recent ten-year period, and the funding provided does not allow fisheries managers (and others) to enforce all fisheries regulations fully. Moreover, penalties, when enforced, are not effective at deterring actions of non-compliance, and the risk of detection is not high enough that the participants in these fisheries try not to cheat.

Recreational fisheries

The recreational fisheries are subjected to a range of penalties, as noted for the small-scale fisheries. However, compliance and enforcement of fisheries management does

not include the use of any formal monitoring system. No records are kept of violations, but the budget for monitoring and enforcement does not support full enforcement of all fisheries regulations. As there are no data on violations, it is difficult to know if they have been effective. It should be noted though, that recreational fishery participants are usually not of the poorer classes and arguably, could easily pay a fine and repeat the violation.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Government funding is required in order to carry out fisheries management. The national government provides some funding for fisheries management activities at the national level. Currently, government funding pays in part for monitoring and enforcement and for daily management activities. The legislation allows for some costs associated with managing fisheries resources to be recovered using: license fees charged to participants in a fishery; license fees charged to participants in other fisheries, such as participants in other fisheries of the same category of sector (e.g. commercial, recreational, artisanal etc.), and; charges for the issue of permits for import and export certificates for fishery and aquaculture products, licences for the marketing industry and operating licenses for fish farms.

In real terms, the budget for fisheries management has remained unchanged over the last ten years at the national level, while the costs for fisheries management, in real terms, have increased over the same time period at all levels. The increased costs are due to: increased monitoring requirements, increased enforcement activities, increased litigation, increased conflict management, increased rate of modifying/changing/amending fisheries management regulations, increased member country obligations to RFBs, and RFMOs, representation of the fisheries sector in trade negotiations and WTO missions, ACP initiatives, support to Dominican Republic diplomatic missions abroad, and support to multinational and bilateral projects. At present, the increased costs are being funded by contributions from specific projects supported by the private sector and from international projects.

Commercial fisheries

Regarding the commercial fisheries, government funding pays a limited amount to cover the fisheries management costs, and these cover activities associated with daily management and monitoring and enforcement. However, similar to the general case, the legislation allows for the costs associated with managing these fisheries resources to be recovered using licence fees (charged within the fishery of interest, as well as other fisheries) and also through the sale of fishing equipment and issuing no objection certificates for export and import of fishery and aquaculture products. In real terms, the management budget for the commercial fisheries has not changed over the last ten years, but real management costs have increased at the same time. In the case of the commercial fisheries, management costs have increased for the same general reasons noted previously, but also because of increased/improved stakeholder consultation and improvements in the identification and authentication of users. Donor-funded projects currently help to meet the additional management costs.

Small-scale fisheries

Government funding pays only part of the fisheries management costs associated with daily management activities, and activities for research and development, and monitoring and enforcement in fisheries. Similar to the commercial fisheries, there are legislative provisions allowing for management costs to be recovered through the collection of licence fees from these or other fisheries. The recent ten-year trend in management budget and costs, in real terms, is the same as noted for the commercial fisheries and for the same reasons. In addition to these reasons, small-scale fishery

management costs have increased as a result of the need to provide more realistic statistics on volumes of catch and fishing activity, and to provide a fishery management administration service across seven regional stations. Financial contributions from donor-funded projects are used to meet the additional management costs.

Recreational fisheries

In the case of the recreational fisheries, government funding is not made available to cover management costs, and unlike the other fisheries, the legislation does not make provisions for management cost recovery. In real terms, the budget for the management of these fisheries has remained unchanged over the last ten years, although the corresponding management costs have increased at the same time, mainly because of obligations under international conventions to which the country is a party. These increased costs are currently not being met.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

The Dominican Republic is a member of WECAFC, SICA-OSPESCA, COPESCAALC, and INFOPESCA. The Dominican Republic also has observer status within the CRFM, with which it has a memorandum of understanding.

As noted earlier in this report, the 2004 legislation and several management developments include elements associated with the provisions of international guidelines, conventions and agreements. The legislation acknowledges the need for the ecosystem approach to fisheries management, for sustainable exploitation of fisheries resources, bans the use of destructive fishing gear, and promotes participatory management. These provisions reflect concepts embraced in the CCRF and other international instruments. Consistent with the Compliance Agreement, a national vessel register for medium-scale vessels is being maintained. Related to this, as well as the UN Fish Stocks Agreement, the Dominican Republic does not flag foreign fishing vessels to operate on the high seas, although the legislation permits it. Also with respect to the UN Fish Stocks Agreement (1995), the Dominican Republic has applied the prevention criterion when there is no reliable information about the resource.

To address the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003), a national system of registration and fishing information has been established. These data are provided to international organizations, as required. Additionally, fisheries are managed using a suite of regulations that attempt to control the impacts of the fishing gear, while taking into account species-specific conservation and management needs. Regarding the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), there is no specific measure for managing discards, and structured approach, but trawl nets are banned by law and this regulation directly helps to minimize bycatch.

No NPOA has yet been developed to implement the FAO International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999). However, the legislation prohibits the use of surface and mid-water drifting or fixed longlines having over 100 hooks or 5 km in length, in certain fishing areas, and this tends to reduce the incidental catch of seabirds. On the other hand, a NPOA is being developed to guide implementation of the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999). It should be noted though that Dominican Republic participates in OSPESCA's shark management activities, including adoption of the OSPESCA regulation that bans shark finning.

Concerning the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999), there is an ongoing process to update the available information on fishers, boats and gears across the country. In combating IUU fishing activities, fishery enforcement officers are actively deployed at ports and airports to ensure that only legally caught fish are traded. Furthermore, a network of monitoring, control and

surveillance is being developed and operationalized. At present, information is being exchanged among the relevant agencies (CODOPESCA, the navy, the Environment and Foreign Affairs ministries) on vessels and fishers with possible involvement in IUU fishing. These developments, as well as the refusal to flag foreign fishing vessels, represent efforts towards implementation of both the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), and arguably also, the FAO Port States Measures Agreement (2009).

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

As noted previously, the Dominican Republic is a member of WECAFC, SICA-OSPESCA, COPESCAALC and INFOPESCA. The country also participates in the activities of CRFM, even though it is not a member. In terms of cooperation with RFBs, Dominican Republic has adhered to the OSPESCA regulations on shark finning, regional harmonized lobster closed season, and code of ethics in fisheries and aquaculture. Additionally, in view of many RFMO initiatives aimed at deterring the activities of vessels that have reflagged to avoid regional conservation and management measures, the Dominican Republic does not flag foreign vessels.

Concerning statistical contributions to RFBs, the Dominican Republic collects and provides fishery-related data to CITES, FAO, OSPESCA and the CRFM for consideration in the establishment of regulations affecting fisheries management. In the case of FAO, data are submitted on an annual basis. There are formal national mechanisms in place to support the compilation and provision of these data, as required and in accordance with agreed reporting timetables, although delays sometimes occur. In instances of delayed reporting of data and hence non-compliance with the reporting schedules, this is usually as a result of lack of supporting data, a lack of resources and other more urgent fishery management priorities. For instance, sometimes there is not enough computing equipment or personnel to digitize the information. At other times, there are problems due to lack of electricity.

SUMMARY AND CONCLUSIONS

- The current fisheries legislation for Dominican Republic is fairly recent, being adopted in 2004. The legislation provides a legal and administrative framework for fisheries management, and notes a single general management objective that recognizes the need for responsible management to ensure rational and sustainable use of the environment. CODOPESCA is the designated agency with responsibility for scientific aspects. CODOPESCA is also the main agency for administration, while enforcement responsibility is shared with other government arms, such as the navy and other agencies at the regional and international levels. The legislation does not outline the steps for setting up the management process or proposes the use of specific management approaches or tools. There is also no provision for the management process to be completed in a given timeframe. That noted, objectives and regulations adopted by RFBs/RFMOs are incorporated and implemented. The legislation also recognizes the need for management to be informed by a broad range of scientific information, and there are also legislative provisions for stakeholder involvement, conflict management, handling prosecutions and illegal fishing by foreign vessels. In conclusion, legal and administrative frameworks for fisheries management are in place. The legislation is fairly recent and notes a general management objective. Roles and responsibilities are defined in the legislation. The provisions, although these cover several aspects of the management process, face a number of constraints in their enactment, as summarized and explained in the following paragraphs.
- An estimated 33–67 percent of marine capture fisheries in Dominican Republic are managed in some way at all levels, but not all major fisheries are managed. Fewer

than 33 percent of managed fisheries have published regulations which have been informed by methodical scientific monitoring and evaluation. Management plans have been formulated only for the major small-scale fisheries, but no fishery-specific management objectives are noted. Notwithstanding, various regulations have been put in place, including lobster and shark regulations adopted because of Dominican Republic's associate membership of OSPESCA. In conclusion, there is much effort to adopt and implement management measures to regulate the major fisheries, but these appear to be influenced by external parties and factors rather than through the implementation of formal management plans and objectives. Fishery-specific management plans should be developed and should include specific and measurable operational management objectives that could be evaluated quantitatively for better accounting purposes.

- All the major fisheries identified are multispecies in nature. Management of the lobster fishery takes this into account through regulations covering other lobster and similar species caught by the same fishery. For the small-scale scalefish fishery, regulations are species-specific, depending on each species' conservation and management needs. The trawl fishery is developing a co-management approach, so as to involve a range of stakeholders. These are the main ways in which multispecies aspects have been taken into account in management. EAF is not yet applied in the management of the commercial and recreational fisheries. In the small-scale fisheries, EAF is considered to have progressed, with regulations covering a variety of species in the scalefish fishery and a variety of lobster species in the lobster fishery. Also, a pilot study in one area is being used to develop EAF for the reef fisheries, and EAF is also being considered in the development of a management plan for the lobster fishery. Some precautionary measures are applied only in the recreational fishery for marlin/wahoo. This fishery is "catch and release" and also, a known area of white marlin recruitment is closed to all fishers. Many of the present regulations contribute to an ecosystem and precautionary approach, but these are not guided by any formal management plans and objectives. In view of this, the reef fishery pilot study and lobster management plan should be used, as a first step, to consider and inform the adoption and implementation of more formal EAF management and also a formal precautionary approach.
- The legislation makes provisions for stakeholder participation arrangements, although stakeholders groups are not formally defined. In practice, the management process can still be authoritarian, but consultative and co-management arrangements are occurring and developing in some fisheries. While stakeholder involvement has quickened the management process and helped to reduce conflict, these successes are not apparent in the recreational fisheries. The management process appears to be generally transparent, although meetings are not open to all stakeholders. Information dissemination is conducted by mostly conventional means. The present forms of participatory management are not yielding the full range of anticipated potential benefits. As the legislative provisions can facilitate co-management arrangements, efforts should be made to achieve this. This will likely require strong investment in stakeholder education and in capacity-building activities to enable them to be effective partners in the management process. It may also be necessary to invest in education of the government partners concerned, to ensure that all parties are fully appreciative of the need for a greater participatory process. Newer forms of communication should also be considered, and this may require the development of a formal communication strategy to support the participatory processes envisaged and agreed.
- Conflict exists in all major fisheries examined in this report, and conflict levels have mostly increased in the past ten years. In general, the conflict is due to

competition for access to fishing areas and resources. The legislation makes a general provision for the settlement of disputes, but formal conflict resolution processes are only part of the management process for the small-scale shrimp fishery. The tools used to support conflict resolution among user groups have included area allocations for different uses, education and limited access arrangements. Overcapacity is considered to be an issue for the small-scale shrimp fishery only. Capacity reduction programmes have been implemented for the small-scale fishery, which appears to have funded partly by other industries. In conclusion, the management process for conflict management is not a formal one and has not been able to decrease or eliminate the level of conflict in any of the major fisheries in the recent past. This implies that although there may be legislative provisions and some tools have been applied to manage the conflict, these have had limited success. The efforts to date should therefore be reviewed and evaluated with the intention of introducing an improved and formal agreed process. Additionally, a more effective and active participatory management process, as previously identified, as well as transparency in terms of monitoring, evaluation and reporting, should be nurtured to ensure that conflict issues are routinely and objectively addressed.

- There is not sufficient information available to determine the nature and extent of overfishing in the Dominican Republic. Catch rates have declined in some fisheries, such as the reef fishery and some over-exploitation of coastal resources has been noted. However, overcapacity is only considered to be an issue for the small-scale shrimp fishery. That said, fishing effort levels have increased in the lobster and recreational fisheries. Currently, only the commercial fisheries are subjected to regulations aimed at reducing fishing effort and/or reducing the harvest. The completion of the measurement and assessment of fishing capacity is constrained by a lack of funding, human resources, and stakeholder support and education. In view of the fact that little data appear to be available on levels of fishing effort, in terms of participants and vessels, the measurement and assessment of fishing capacity should be completed as a matter of priority. Where CPUE declines have been observed, quantitative stock assessment should be completed to inform regulations that may be required to reduce fishing effort.
- The legislation makes several provisions concerning monitoring and enforcement, as well as the application of punitive measures for various acts of non-compliance. Several agencies share the responsibility of monitoring, compliance and enforcement activities. A range of penalties is applied, but these are not considered to be effective in the case of the small-scale and recreational fisheries. The compliance and enforcement system appears dependent on inspection schemes and is not supported by either VMS or observer programmes. No monitoring of the recreational fishery takes place at present. The available budget to allow enforcement of all regulations is also not adequate. Given the inadequacy of funding for enforcement activities, this suggests that any observed trend in offences is questionable. An impressive legislative and administrative framework for monitoring, compliance and enforcement exists, but the implementation of the various supporting systems and enforcement patrols is likely affected by budgetary constraints. Further investment in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, say via limited entry, may be the most cost effective means and should help to reduce the incidence of non-compliance, as well as enforcement costs.
- Management costs are only partly funded by the government and only for the commercial and small-scale fisheries. Some recovery of costs is facilitated through the payment of licence fees for all but the recreational fisheries. That noted,

the licensing system is incomplete, and so this will reduce the full potential of the licensing contributions. Over the past ten years, the budget for fisheries management has remained unchanged, while management costs have increased for a range of reasons, all of which are directed to improving management. At present, additional costs are only being met in the commercial and small-scale fisheries through projects sponsored by the private sector and international donors. An economic valuation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Also, as stated previously, additional investments in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, say via limited entry measures, should help to limit the rising management costs.

- The Dominican Republic has introduced a number of rules and regulations, and these provide some level of compliance with certain international instruments, including the CCRF, the Compliance Agreement, the UN Fish Stocks Agreement, and the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001). A NPOA is also being developed for sharks, which should be consistent with the corresponding FAO International plan of Action. The Dominican Republic is an actively participating member of WECAFC, OSPESCA, COPESCAALC and INFOPESCA. In conclusion, there have been efforts to address some provisions of regional and international agreements, but these contributions are mostly in the form of regulations. The development of a formal MCS network, and the NPOA on sharks are first attempts to organize the approach towards more complete implementation of international agreements. These efforts need to be continued, both through the formulation of additional NPOAs for implementing other FAO IPOAs, and the development and operationalization of management plans that identify, within an organized framework, suitable objectives and approaches to guide the overall management process, consistent with the global directives.

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COUNTRY REVIEW

Mexico

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INTRODUCTION

Mexico is located at 23°N and 102°W, bordering the Caribbean Sea and Gulf of Mexico, between Belize and the United States of America (USA) and bordering the North Pacific Ocean, between Guatemala and the USA. The country's GDP (PPP) is estimated at USD 1.788 trillion, with a real growth rate of 3.9 percent (2012). Agriculture, which includes fisheries, contributes 4.1 percent to GDP (2012 estimate). The population is estimated at 116.2 million (July 2013) (Central Intelligence Agency, 2013).

The fisheries and aquaculture sector is considered a strategic priority for the country's development. This industry not only provides the food that the Mexican families consume, but also supplies the raw materials for manufacturing and processing industries. Additionally, by maintaining high export dynamism, it acts as an important generator of foreign exchange. Because fishing is an activity based on the sustainable use of renewable resources, it also drives other related industrial activities such as: construction, repair and maintenance of ships, container manufacturing, gear manufacturing, testing laboratories and construction of processing plants. Mexican fisheries and aquaculture plays a vital role from the economic growth perspective. In fact, in recent years it has shown to be one of the sector's most dynamic branches.

In Mexico, the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food, through the National Commission of Aquaculture and Fisheries (CONAPESCA), a decentralized administrative body, is responsible for the management of the fisheries and aquaculture resources of the country. This responsibility is shared with state governments and municipalities.

Due to its location, Mexico is privileged to have a wide diversity of fisheries resources. With a land area of nearly 2 million km^2, Mexico has 11 592 km of coastline, 8 475 on the Pacific coast and 3 117 along the Gulf of Mexico and Caribbean Sea, including islands; it also has 3 million km^2 of exclusive economic zone (EEZ). These geographic features provide a vast potential of biotic resources. Within the jurisdictional waters reside a great variety of species that perform most of their biological cycle within those waters.

Products used for commercial use located in territorial waters and inland waters of the country are grouped in four categories:

- Pelagic or massive species: tuna, sardine and anchovy.
- Demersal species: red snapper, mullet, snapper, shark, dogfish, mackerel and bream.
- Crustaceans and shellfish: shrimp, lobster, abalone, oysters, clams, snails, octopus, sea cucumber and sea urchin
- Susceptible crop species: About 58 species are found in continental waters, of which can stand out: mojarra, tilapia, carp, trout, catfish and prawns.

POLICY FRAMEWORK

The primary legislation for marine capture fisheries management is the General Sustainable Fisheries and Aquaculture Act (Ley General de Pesca y Acuacultura Sustentables – LGPAS), gazetted in the Federation's Daily Journal on 24 July 2007, with the latest amendment made on 07 June 2012. In terms of local-level division, the country identifies 32 state entities and a federal district. To date, 13 State Laws for sustainable fisheries and aquaculture (Leyes Estatales de Pesca y Acuacultura Sustentables) exist for the following states: Baja California (16 June 2008), Baja California Sur (30 June 2010), Campeche (20 November 2008), Chiapas (13 May 2009), Colima (29 October 2008), Jalisco (17 November 2012), Nayarit (25 May 2011), Oaxaca (18 August 2011), Sinaloa (13 July 2012), Sonora (28 August 2008), Tabasco (12 December 2011), Tamaulipas (1 September 2011), Veracruz (25 July 2011) and Yucatán (6 July 2010). At the regional level, regional fisheries management organizations (RFMOs) enforce management measures, and these are adopted and incorporated into national regulations as far as possible. In this regard, it should be noted that Mexico is a signatory of several international agreements pertaining to the Caribbean, Atlantic and Pacific regions.

The relatively recent 2007 legislation has taken into account the provisions of FAO's CCRF. In addition, Mexico established and implemented national standards for fisheries and aquaculture focused on sustainability, and resource management and protection. There has also been public investment in basic infrastructure and training to support understanding and implementation of the CCRF. The 2007 legislation also takes into account FAO's Compliance Agreeement. It applies to all Mexican vessels regardless of their location, and by this means, the fishing vessels are also bound to the standards prescribed by international agreements. Additionally, a VMS has been in operation for larger fishing vessels since 2003, and participation of these vessels in the VMS was made compulsory since 2006. In addition, foreign fishing vessels are not flagged by Mexico to operate in its EEZ, and moreover, no surplus has been declared to facilitate the flagging and operation of such vessels. It is important to highlight the compulsory presence of 100 percent of observers in the Mexican tuna fishery.

According to Article 4, Section XXV of LGPAS, fisheries management is described as composed of a collection of tools aimed at regulating and managing fishing activities for the sustainable use of fisheries resources and aquaculture, taking into account the availability of fish resources, historical information on harvests, resource usage, potential development activities, fishing capacity or aquaculture capacity, reference points for fisheries management and understanding of the ecological boundaries. The legislation provides a legal framework for activities at all levels of management: national, regional/international and local. However, the administrative framework is defined only for national and local-level activities. Hence at the national and local levels, the legislation identifies a single authority for marine capture fisheries management.

Several fisheries management objectives are listed in the legislation, and these are also prioritized as follows:

I. Establish and define the principles to organize, promote and regulate the integrated management and sustainable use of fisheries and aquaculture, taking into consideration social, technological, productive, biological and environmental aspects;
II. To promote the improvement of the quality of life of fishermen and farmers of the country through programmes that are implemented for the fisheries and aquaculture sector;
III. Establish the basis for the management, conservation, protection, recovery and sustainable use of fisheries and aquaculture resources and the protection and rehabilitation of the ecosystems in which these resources are found;
IV. Establish basic rules for planning and regulating the use of fisheries and aquaculture resources, in controlled, natural, conditioned or artificial media or

selected environments, whether concerned with the partial or complete life cycle, in marine, inland or brackish and on the grounds of public or private property;

V. Ensure the right to access, preferential use and benefits of fisheries and aquaculture resources by communities and indigenous peoples, in terms of this Act, by the places they occupy and inhabit;

VI. To establish the basis and the coordination mechanisms among the federation's authorities, the states and municipalities to better fulfill the objectives of this Act;

VII. To determine and establish the basis for the creation, operation and functioning of participatory mechanisms for the dedicated producers involved in fisheries and aquaculture activities;

VIII. Support and facilitate scientific and technological research in the field of aquaculture and fisheries;

IX. Set the system of concessions and permits for fishing activities and aquaculture;

X. Establish the basis for the development and implementation of sanitary measures of fisheries and aquaculture resources;

XI. Establish the basis for health, safety and quality certification of fisheries and aquaculture products, from procurement or capture up until primary processing, of the supporting activities, and of the establishments and facilities involved in production or holding;

XII. To establish a national fisheries and aquaculture information and registration system;

XIII. Establish an inspection and monitoring scheme for fisheries and aquaculture, as well as the mechanisms for coordination among the competent authorities;

XIV. To establish offences and corresponding penalties for any breach or violation of the provisions of this Act, its regulations and associated official Mexican standards, and

XV. To propose mechanisms to guarantee that fisheries and aquaculture activities are focused on food production.

It should be noted that these objectives are incorporated into fisheries management plans, and in the case of shared resources, have been informed by the work of RFBs and RFMOs.

Additionally, many other non-fishery legislation instruments impact fisheries management in Mexico, including: endangered species legislation, export/import/trade legislation, biodiversity legislation oceans policy legislation, marine park/sanctuary/reserves legislation, port management legislation and forestry (mangroves) legislation. These include the following:

a) Legislation of endangered species:
   - NOM -059 -SEMARNAT-
   - General Law of Ecological Equilibrium and Environmental Protection
   - General Wildlife Law

b) Legislation on export and import of fishery products:
   - NOM -010 -PESC- 1993
   - NOM -011 -PESC- 1993
   - NOM -030 -PESC -2000

c) Legislation ocean policies, legislation on marine parks and sanctuaries:
   - General Law of Ecological Equilibrium and Environmental Protection.

d) Port Management Legislation:
   - Ports Act
   - Regulation of the Ports Act
   - Law of Navigation and Maritime Commerce

e) Legislation forest (mangrove) (Mangroves are present in the 17 states of the Republic which are landlocked, with coverage of 770 057 ha).

- NOM -059 -SEMARNAT- 2010
- NOM -022 -SEMARNAT -2003
- RAMSAR Convention

LEGAL FRAMEWORK

At the national level and also for regions within the country, the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación – SAGARPA), under the National Commission of Aquaculture and Fisheries (Comisión Nacional de Acuacultura y Pesca -–CONAPESCA), has primary responsibility for marine capture fisheries management matters. At the local level, management responsibility is led by the five regional offices of Fisheries and Aquaculture (Oficinas Regionales de Pesca y Acuacultura – ORPA) and the corresponding local counterpart fisheries authorities or their equivalent in the 32 states of the Mexican Republic. The governments of the states and municipalities also share some of this management responsibility.

According to law, the National Institute of Fisheries (Instituto Nacional de Pesca – INAPESCA) is the fisheries science authority, but it also recognizes the national network of fisheries and aquaculture research which involves most of the academic institutions of higher education and scientific research in marine and coastal sciences, as well as some civil society organizations. There are a number of research centers that work on specific fisheries problems, and while they can do so in coordination with INAPESCA, they can also work independently, e.g. Centro Interdisciplinario de Ciencias Marina del Instituto Politécnico Nacional -–CICIMAR, Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional – CINVESTAV, Centro de Investigaciones Biológicas del Noroeste – CIBNOR, El Colegio de la Frontera del Sur (Centro de Investigaciones Ecológicas del Sureste) – ECOSUR, Instituto de Ecología, Pesquerías y Oceanografía del Golfo de México, la Universidad Autónoma de Campeche – EPOMEX, El Centro de Investigación Científica y de Educación Superior de Ensenada – CICESE, El Colegio de México – COLMEX, Centros Interdisciplinarios de Investigación para el Desarrollo Integral Regional – CIIDIR. At the local level, other agencies also have responsibility for scientific contributions. As part of INAPESCA there are 15 Regional Centers of Fisheries Research (Centros Regionales de Investigación Pesquera – CRIPs) located in the main ports and aquaculture localities in the country. Additionally, several state universities include in their research programmes fisheries and/or marine aspects.

Regarding fisheries enforcement at the national level, the National Commission of Aquaculture and Fisheries (CONAPESCA), through the General Directorate of Inspection and Surveillance, is responsible. Some responsibility is also given to the navy and the Federal Environmental Protection Agency (PROFEPA). For enforcement at the local level, apart from the agencies operating at the national level, federal and municipal police are given some limited responsibilities. Also, the Secretariat of the Environment, Natural Resources and Fisheries has jurisdiction over some protected areas.

The fisheries legislation is designed as a framework that shapes fisheries management and management plans, i.e. it provides specific guidance on management approaches and tools. The legislation also sets up a series of steps or a process for developing, organizing and implementing fishery management plans but not fishery management regulations. Specific management measures and regulations for individual fisheries are not included in the primary legislation but are documented in the Mexican Official Standards (NOMs) and regulatory agreements. The summary of these regulations can be accessed through the website of the CONAPESCA: www.conapesca.sagarpa.gob.mx/wb/cona/cona_cuadro_de_noms.

In the case of Mexico, the legislation prescribes a specific procedure for setting up the management process itself. This is outlined below and is followed for every

fishery. According to Article 37 of the LGPAS, fisheries management programmes must include, at the minimum:

a) exact specification about the area covered in the programmes;
b) a complete and up-to-date list of all stakeholders in the region of concern;
c) the fishing resources subjected to exploitation; and
d) management plans sanctioned and publicized.

In addition, the management process must be completed in a given timeframe.

The legislation requires management decisions to be based on a broad range of information. Such information can come from: biological analyses, economic analyses, social impact analyses, environmental analyses, ecosystem analyses/assessments, monitoring and enforcement options, and also analyses by regional fisheries bodies (RFBs) or regional fisheries management organizations (RFMOs), in the case of shared resources. Apart from any formal management process, other ways in which marine capture fisheries management can occur are by: decisions made by the management agency; decisions made by the participants in the fishery; decisions made by other parts of government; decisions made by RFBs, RFMOs or organizations concerned with human rights, labour, trade (e.g. CITES) or other marine species outside the CONAPESCA.

As already mentioned, in the case of shared resources, the work of RFBs and RFMOs inform the objectives of the legislation. The legislation also makes provisions to implement internationally agreed measures that have been adopted by regional fisheries management organizations in which the country is either a member or participant. The Constitution of the United Mexican States includes three articles that are related to the implementation of international agreements. The first is Article 76, in which Clause I gives the Senate the exclusive power to analyze foreign policy developed by the Federal Government based on the annual reports that the President and the Secretary's Office submit to Congress. In addition, the Senate must approve international treaties and diplomatic conventions endorsed by the Federal Executive as well as its decision to terminate, denounce, suspend, modify, amend, withdraw reservations and to formulate interpretative declarations on such treaties and conventions.

In addition, Clause I of Article 104 states that the courts of the Federation must deal with all the controversies of a civil or criminal nature on the implementation and enforcement of federal laws or international treaties signed by Mexico. When such disputes affect private interests only, the courts of the Federation may also deal with these disputes at the discretion of the plaintiff, judges and ordinary courts of the States and the Federal District. Finally, Article 133 states that the Constitution, the laws of Congress and all treaties derived in accordance with the Constitution and upheld by the President, with approval of the Senate, shall be the supreme law of the Union. Judges in every State shall conform to the Constitution, laws and treaties, despite the contradictory provisions that may appear in the constitutions or laws of the individual States. In the case of fisheries management recommendations issued by RFMOs, CONAPESCA has the responsibility to issue regularly agreed regulatory arrangements for the establishment of seasons, limits on fishing effort or catch quotas.

It is clear, therefore, that the national fisheries management legislation gives the fisheries management authorities the legal power, as may be agreed, to meet the priorities and obligations of: international agreements/conventions (global), regional agreements and other multilateral arrangements. At present, Mexico is party to the following three major international marine fisheries management conventions: UNCLOS; Antigua Convention, negotiated to strengthen and replace the 1949 Convention establishing the Inter American Tropical Tuna Commission (IATTC) and the Agreement on the International Dolphin Conservation Program (AIDCP, signed in 1992 after the La Jolla Agreement); and the Convention Establishing the

Latin American Fisheries Development Organization, OLDEPESCA (October 29, 1982). Mexico is also currently a member of COPESCAALC, ICCAT, WECAFC, OLDEPESCA and IATTC. It also has a status of a Cooperating Non Member in the WCPFC and at the Scientific level is member of the International Scientific Committee (ISC) of the Tuna and Tuna-like Species of the North Pacific.

Regarding provisions for handling prosecutions, Article 420 of the Federal Penal Code is applied for cases in which a fishing ban has been declared. There are also provisions for handling illegal fishing by foreign vessels: Article 132, sections X and XII, article 138, sections III and IV, and Articles 140 and 145 of the General Law of Sustainable Fisheries and Aquaculture (LGPAS). As already mentioned in the previous section, various non-fishery instruments of legislation also impact marine capture fisheries management in Mexico.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

In Mexico, two fleets are defined: the coastal fishery (which includes the "small scale" and "artisanal") and the offshore fleet (equivalent to industrial). The General Law on Sustainable Fisheries and Aquaculture (LGPAS) includes two types of vessels, described in Article 4, paragraphs XVII and XVIII:

1. Minor vessel, with or without outboard and maximum length of 10.5m, with or without the use of ice for preserving the catch, and able to stay at sea for a maximum of 3 days;
2. Fishing boat, being any construction of any shape or size, used for fishing activities, and able to stay afloat or ride the surface waters.

The LGPAS (Article 4, paragraphs XXVII and XXXII) categorizes fishing not by the users, but by the purposes intended. The following definitions are provided in LGPAS:

1. Fishing - The act of extracting, capture or collection, by any method or process, biological species or biogenic elements, whose medium for life, either total, partial or temporary, is water.
2. Commercial fishing - The capture and extraction is performed for purposes of profit.
3. Sport and recreational fishing - An activity practiced for amusement or recreation with fishing gear authorized by this Act, regulations and current official standards.
4. Fishing for domestic consumption - The capture and extraction is carried out without purpose of profit and with the sole purpose of obtaining food for the operators, and their dependents.

Commercial fisheries

As noted earlier, Mexico's LGPAS defines commercial fisheries as fisheries in which the capture and extraction is performed for the purpose of financial gain. The definition does not consider the size of "broad market" in the concept, but only the certainty of generating a profit. In these fisheries, the vessel type can vary with type of commercial operation, but industrial fishing is generally considered to involve the operation of vessels over 10 m in length, with a covered deck, stationary inboard engine and having a storage capacity exceeding 10 tonnes. Gears and equipment, as well as marketing arrangements, can vary with the type of commercial fishery.

Small-scale fisheries

Mexico argues that the FAO definitions for small-scale and artisanal fisheries were designed within the context of fisheries management in developed countries. In Mexico, the "small-scale fisheries" includes the "artisanal", and so the distinctions are

not very clear, especially in view of the multiple and variable connotations of definitions provided by FAO. As already mentioned, the LGPAS identified two main fleets, one of which is the coastal fishery, which includes the "small scale" and "artisanal" components. Small-scale fisheries include fisheries that generate very low income but also fisheries that can catch species of high commercial value and which have also been certified internationally, e.g. Pacific lobster, *Paniluris interruptus*. The introduction of GPS has allowed small-scale fishermen to expand their areas of operation, and so even simple technological modifications can expand the capabilities of small-scale operations. Typically, small-scale vessels are less than 10 m in length, use outboard motors, and have no covered decks, are normally operated up to two fisherman and use a variety of fishing gear to harvest resources opportunistically. Up to 2010, there were 94 111 registered vessels, of which 3 206 were conducting deep-sea fishing and 90 905 were involved in coastal fishing. In the case of the small-scale deep-sea fishery, the vessels operate from the coast to open waters and sometimes beyond the limits of the territorial sea and the EEZ. The fishing effort focused on catching shrimp consists of 1 932 units with an average net tonnage of between 40 and 80 tonnes, and with vessels having an average length of 20 to 25 m. The vessels concerned have an average age of over 30 years, and hence this is an old fleet. Seventy percent of the activity takes place on the Pacific coast and the other 30 percent on the coast of the Gulf of Mexico and the Caribbean Sea.

Subsistence fishing also occurs in which the capture and extraction is carried out without purpose of profit and with the sole purpose of obtaining food for the operators' own consumption and that of his/her dependents. It can be performed by any citizen of Mexican nationality. Article 72 of the LGPAS and Rule 99 of the act requires no license, permit or authorization, and so landed catches are not reported and hence not captured in the statistics by the Bureau of Fisheries. This type of fishing can be made by residents along the river banks and on the coasts. It can only be done from land with a rod or hook, as it is forbidden to be conducted from a boat. Also it only allows the capture of species outside of the closed seasons, and of those species not under some special protection category. The volume of catch is expected to be limited to domestic needs. That said, there are no statistics on the volume, frequency and catch amounts.

There is no official definition of "indigenous fishing" noted in the LGPAS. The Constitution of the United Mexican States treats all citizens as equals, so that members of indigenous peoples whose subsistence activity is fishing must, like any other citizen, acquire from the corresponding authority their fishing licenses, according to the type of fishing they want or require to conduct. However, according to Article 20 of the LGPAS, paragraph VII, "indigenous fishing" is performed by the inhabitants of indigenous communities using their arts and traditional fishing methods. Moreover, Article 43 of the LGPAS, for the granting of concessions and permits, gives preference to applications from indigenous communities, giving priority to members of those communities who inhabit the coastal strip, including when the license or permit may affect the habitat of an indigenous community, and requires the authority to seek the advice of representatives of that community.

Recreational fisheries

As noted previously, sport and recreational fishing is considered to be an activity practiced for amusement or recreation, and the gears used are regulated by the relevant laws. The sport/recreational fishery has developed involving a wide range of vessels, among which there are yachts typically of about 6 m in length and fishing boats ranging from 3.6 to 4.6 m in length. Some recreational fishers also operate from the land, i.e. without a boat. NOM-017-PESC-1994 (05/09/95 DOF) for shad affords some control of recreational fishing. Only one rod and reel with one hook is allowed per angler, with a maximum resistance of the main line of 60 kg (130 lbs),

and a maximum catch/bag limit of two specimens per fisher per day, after which all other fish caught must be released in good condition for survival. In addition, sport fishing is not allowed during specified closed seasons and in certain areas that include refuge areas, reserves and protected areas. Those fishers targeting mainly billfishes (marlin, sailfish and swordfish) use a sportfishing boat, with individual rods, and conduct day trips. Small vessels of less than 10 tonnes capacity can carry up to four fishermen, while boats over 10 tonnes capacity can facilitate up to 25 sport fishers. Underwater fishing by harpoon is also authorized by the sportfishing league. Sale of sport/recreational catches is strictly prohibited. Catches can be for private use and for taxidermy purposes. Sport fisheries licenses are also granted to some American boats which operate in areas in the Pacific northwest of Mexico and a few operating in the northern Gulf of Mexico.

Fish production and value

Commercial fisheries

Mexico's three most important commercial/industrial fisheries, in terms of tonnage of landings are: the sardine fishery, which currently harvests around 700 000 tonnes/year; the shrimp fishery, which currently harvests about 184 000tonnes/year; and the tuna fishery, which currently harvests about 128 000tonnes/year. These are also among the top most valuable fisheries, with the shrimp fishery being the most valuable. Both shrimp landings and gross value increased over the ten-year period between 2002 and 2010. Although sardine landings increased steadily from 2002 to 2010, the overall gross value of this fishery has continually decreased. In the case of the tuna fishery, in the same time period, the landings have fluctuated, but the overall gross value has continued to increase (Table 1).

TABLE 1

Gross landings (tonnes) and gross value (USD) of each of the three major commercial fisheries in the most recent year (2010), five years ago (2007) and ten years ago (2002)

A. Annual Gross Landings of Catch (whole weight in tonnes)			
Fishery	**Most recent year (2010)**	**~ 5 Years Ago (2007)**	**10 Years Ago (2002)**
Sardine	715 826	694 516	514 944
Shrimp	184 326	72 907	86 772
Tuna	128 437	83 669	161 953
B. Annual Gross Value of Catch (USD)			
Fishery	**Most recent year (2010)**	**~ 5 Years Ago (2007)**	**10 Years Ago (2002)**
Sardine	$20 498	$20 834	$92 856
Shrimp	$519 515	$573 457	$360 318
Tuna	$89 911	$84 522	$57 568

Small-scale fisheries

The catches of the category of "riverine/coastal fisheries" are combined with the catches of the high seas fleet, and so it is not possible to provide separate information regarding the harvests generated by the subcategories listed in this particular fleet. That noted, the three most-important fisheries of a small-scale nature, in terms of landed tonnage are: shrimp, shark and octopus. These are also the three most-valuable fisheries. During the period 2002 to 2010, landings of these three fisheries increased steadily, with the octopus and shark fisheries showing the larger overall increases by 2010 (Table 2). While the gross value of the shrimp and shark fisheries appears to have dropped over the same time period, the gross value of the octopus fishery has increased, presumably in parallel with the observed increase in octopus landings.

TABLE 2
Estimated gross landings (tonnes) and value (USD) of each of the three major small-scale fisheries in the most recent year (2010), five years ago (2007) and ten years ago (2002)

A. Estimated Annual Gross Landings of Catch (whole weight in tonnes)			
Fishery	**Most recent year (2010)**	**~ 5 Years Ago (2007)**	**10 Years Ago (2002)**
Shrimp	24 245	22 256	21 477
Shark	29 775	27 049	24 383
Octopus	23 167	19 733	16 693
B. Annual Gross Value of Catch (USD)			
Fishery	**Most recent year (2010)**	**~ 5 Years Ago (2007)**	**10 Years Ago (2002)**
Shrimp	258 883	91 575	260 318
Shark	43 375	1 087 355	–
Octopus	70 369	59 441	41 096

Recreational fisheries

It should be noted that in all of Mexico recreational fishing is allowed with the condition of a fixed consumption allowance per angler, as established in NOM-017-PESC-1994 (DOF 09/05/95). In this regard, in terms of consumption, the following resources were important: marlin, with a reported harvest of 60 000 tonnes in 2008; sailfish and shad. The gross value of each of these fisheries has not been estimated. Table 3 provides an indication of catches (number of fish) for the marlin and shad fisheries for three years for the most recent ten-year period. These data suggest a fluctuation in marlin catches, with the lowest catch level observed in the most recent year (Table 3). In comparison, shad catches for the two fishing areas noted showed an increase over the last ten years.

TABLE 3
Estimated catches (number of fish) caught by the recreational fisheries for marlin and for shad for three years for the most recent ten-year period

Estimated Annual Gross Landings of Catch (whole weight in tonnes)			
Fishery	**Most recent year**	**~ 5 Years Ago**	**10 Years Ago**
Marlin	~40 000 fish	~63 000 fish	52 000 fish
Shad	~100 fish (data for Veracruz and Tamaulipas)	~80 fish (data for Veracruz and Tamaulipas)	~75 fish (data for Veracruz and Tamaulipas)

Food security and employment

The commercial fishery provides the sole source of income but not the sole source of food for the majority of participants. The small-scale fishery does not provide the sole source of income or sole source of food for the majority of participants, implying low income levels that necessitate the need for operators to engage in other jobs as well. As may be expected, the recreational fishery does not provide the sole source of income for the majority of vessel owners and does not provide the sole source of food for the participants.

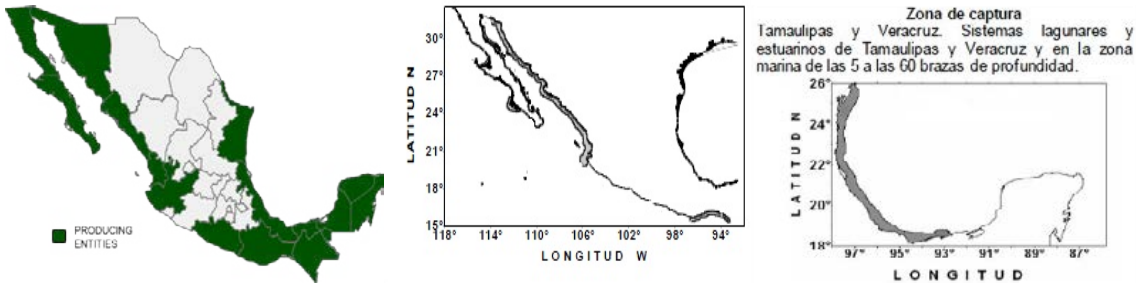
Fishing effort and impacts

Fishing areas

The commercial fishing operations for the sardine fishery are conducted in the Gulf of California and along the western coast of the Baja California Peninsula in the north. In the case of the shrimp fishery, this operates in the trawlable continental areas within the EEZ (see national fishing chart). On the other hand, the Mexican commercial tuna fleet operates in the tropical eastern Pacific Ocean. Small-scale shrimp fisheries exist in the states of Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit, Jalisco, Chiapas, Tamaulipas, Veracruz, Campeche, and Yucatán y Quintana Roo (see Figure 1).

FIGURE 1

Chart on left shows the Mexican States where there are small-scale shrimp fishing operations, with the charts in the middle and right showing the fishing areas used

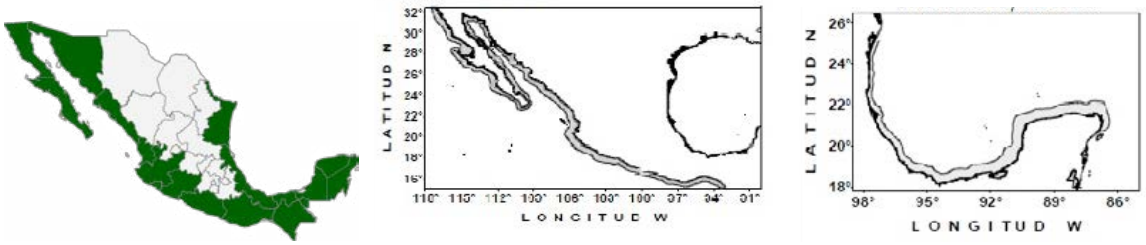


Source: based on the statistical area of CONAPESCA.

Figure 2 shows the states and fishing zones for the small-scale shark fishery. Shark is fished in the states of Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit, Jalisco, Colima, Michoacán, Guerrero, Chiapas, Tamaulipas, Veracruz, Campeche and Yucatán y Quintana Roo (Figure 2).

FIGURE 2

Chart on left shows the Mexican States engaged in small-scale shark fishing operations, while the charts in the middle and on the right shows the fishing areas used

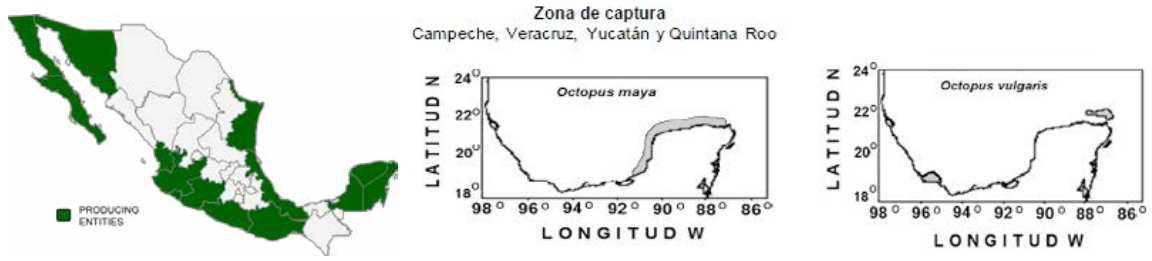


Source: based on the statistical area of CONAPESCA.

Similarly, Figure 3 shows the states concerned and fishing areas in respect of the octopus fishery. Octopus is fished in the states of Baja California, Baja California Sur, Sonora, Nayarit, Jalisco, Colima, Michoacán, Guerrero, Tamaulipas, Veracruz, Campeche and Yucatán y Quintana Roo (Figure 3).

FIGURE 3

Chart on left shows the Mexican States engaged in small-scale octopus fishing operations, while the charts in the middle and on the right show the fishing areas used

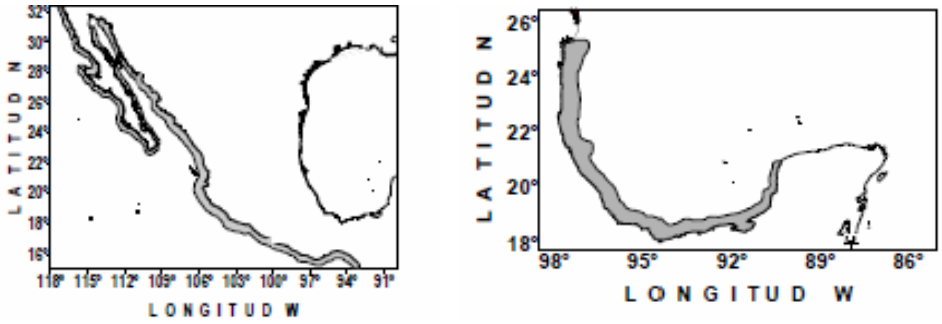


Source: based on the statistical area of CONAPESCA.

In the case of the recreational fisheries, a 50-mile coastal strip area is reserved for marlin and sailfish sport fishing, outside of which commercial fishing is allowed. Both inside and outside of the strip, the fishery resources are subject to bycatch by fisheries targeting other species. The potential impact of these catches has therefore created conflicts, particularly in locations where sport fishing contributes significantly to the local economy (see Figure 4 – left). On the other hand, sport/recreational fishing activities for shad take place on the east coast of the country, specifically in the Gulf of Mexico, including the states of Campeche, Tabasco, Veracruz and Tamaulipas (Figure 4 – right).

FIGURE 4

Left shows coastal strip on Pacific side that is reserved for sport/recreational fishing of marlin and sailfish, while the right shows sport/recreational fishing areas for shad in the Gulf of Mexico



Source: The illustration is based on the statistical area of CONAPESCA.

Fishing effort

In terms of management of fishing effort, the numbers of fishing vessels and participants are known for all three major commercial fisheries, with the highest number of operators and vessels recorded for the shrimp fishery (Table 4). All participants and most fishing vessels require either a permit or a concession to fish. However, the permit is essential for the larger shrimp-fishing vessels. While the number of participants in the sardine fishery has remained unchanged over the past ten years, the number of participants in the other fisheries has decreased. The number of vessels has decreased in all three discussed fisheries during the same time period.

TABLE 4

The approximate current level of fishing effort for the three major commercial fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed? [a]	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed? [b]	Increased (i)/ decreased (d)/ unchanged (u)
Sardine	44	yes	u	78	yes	d
Shrimp	503	yes	d	1261	yes	d
Tuna	66	yes	d	66	yes	d

[a] These participants operate under a permit or concession.

[b] These vessels operate under a permit or concession and the navy awards a certificate of registration, a national maritime safety certificate and formal approval for the vessels to go to sea. Only the larger boats of the shrimp fishery require these permits.

Table 5 provides the data and information on fishing effort levels and trends in the past ten years for the small-scale fisheries. All participants and most fishing vessels require either a permit or a concession to fish. However, the permit is essential for the larger shrimp fishing vessels. Over the past ten years, there has been no change in the either the number of participants or the number of fishing vessels involved.

TABLE 5
The approximate current level of fishing effort for the three major small-scale fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed? [a]	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed? [b]	Increased (i)/ decreased (d)/ unchanged (u)
Shrimp	1283	Yes	u	17 125	yes	u
Shark	426	Yes	u	2 903	yes	u
Octopus	80	Yes	u	394	yes	u

[a] These participants operate under a permit or concession.

[b] These vessels operate under a permit or concession and the navy awards a certificate of registration, a national maritime safety certificate and formal approval for the vessels to go to sea. Only the larger boats of the shrimp fishery require these permits.

General note: One fishing license with a single holder (described in the table in the document as "Participant") may protect more than 50 vessels.

Regarding sport/recreational fishing effort, both participants and vessels are issued licences. Notwithstanding, the exact number of participants is unknown. The number of vessels used to fish for marlin and sailfish are also not known, but 700 vessels are involved in shad recreational fishing operations. Regarding this type of fisheries, nowadays 78.5 percent of the captures of marlin and sailfish are released. There is a perception that the levels of fishing effort in the three major recreational fisheries have increased over the past ten years (Table 6).

TABLE 6
The approximate current level of fishing effort for the three major sport/recreational fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
1	Not estimated	yes	i	Not estimated	yes	i
2	No reliable estimate	yes	i	Not estimated	yes	
3	Not estimated	yes	i	700	yes	

Overfishing and fishing capacity

The LGPAS does not have a specific definition of "overfishing", but Article 4, paragraphs XXXIV and XXXV, respectively define the categories of: "fishery in recovery" as that fishery that is found in deterioration and subject to a set of measures for the purpose of recovery, and "overexploited fishery" as that fishery that is operated above its limit of recovery. Based on evidence from fishery assessments completed by the National Fisheries Institute, overfishing occurs in fisheries with formal management, but the estimated percentage is variable. The percentage of overfishing occurring in all fisheries, managed and unmanaged, is not known.

That noted, overfishing is not considered to be a problem in the three major commercial fisheries identified. However, a constant or decreasing CPUE has been observed in the sardine fishery. Overfishing is also not documented to be an issue for the three major small-scale fisheries, and also, no constant or decreasing CPUE has been observed in any of these three fisheries. That noted, there must be some concern about fishing pressure in the small-scale shrimp fishery, as one of the management objectives of the small-scale fisheries is intended to reduce fishing effort. The occurrence of overfishing in the recreational fisheries is not known.

Mexico has begun work towards the measurement of capacity in all of its marine capture fisheries, but this work has not been completed. The delay in doing so is due to: a lack of budget or funding for such work, a lack of the supporting data for making such measurements, a lack of human resources to do the assessments, a lack of stakeholder support and education, and; other more urgent fishery management priorities. That

noted, fishing capacity has been measured for the major commercial and small-scale fisheries identified. In the case of the commercial fisheries, the regulations in the last two to three years have focused on reducing fishing effort and/or reducing the harvest in the shrimp fishery only. There is also a sense of overcapacity in the shrimp fishery, but this is not the case in the sardine and tuna fisheries. In the case of the small-scale fisheries, recent regulations have focused on reducing fishing effort and/or reducing the harvest in the shrimp fishery only. However, overcapacity is not believed to be a problem in any of the three major small-scale fisheries noted. There is no available information on fishing capacity measurement and assessment for the recreational fisheries.

MANAGEMENT ACTIVITY

General nature and extent

In Mexico, the LGPAS does not have a specific definition of "fisheries management", but Article 4, paragraph XXXVI defines the term "fishery management plan" as a set of actions aimed at development of fisheries in a balanced, comprehensive and sustainable manner, based on current knowledge of the biological, ecological, fishery-related, environmental, economic, cultural and social aspects.

Over 67 percent of marine capture fisheries in the country are managed in some way at the national level, but <33 percent are managed at the regional and local levels. This percentage represents an increase at all levels for the most recent ten-year period. It should be noted that there are no major fisheries (in terms of weight of landings) that are not currently managed. Of the fisheries that are managed at any level, fewer than 33 percent have a formal, documented fishery management plan. Of those managed by plans, less than 33 percent have published regulations or rules and <33 percent of these rules have been informed by methodical scientific monitoring and evaluation.

At the national and local levels, the management process has been informed by: legislation about individual fisheries, management plans for specific fisheries, interventions/actions to support specific management objectives, published regulations or rules for specific fisheries, traditional rules or customs that affect the harvest of marine fisheries and also, rules established by fishing organizations. In contrast, the regional process is not influenced by any of the instruments, plans or actions noted above.

As already explained, Mexico updated its legislation in 2007 and this new legislation takes into account the provisions of the CCRF and the Compliance Agreement in a number of ways. In particular, consistent with the CCRF, Mexico has introduced national standards focused on sustainability, resource management and protection. It has also invested in basic infrastructure and training to support understanding and implementation of the CCRF. In respect of the Compliance Agreement, the 2007 legislation applies to all Mexican vessels and also makes them bound to the relevant provisions of international agreements. A VMS system is in place for all larger fishing vessels, and foreign fishing vessels are not flagged by Mexico at present. Mexico has also made efforts to implement several FAO Technical and International Guidelines, and FAO International Plans of Action, and these have mostly included the introduction of new regulations, promotion of research to develop the ecosystem approach and to manage bycatch, development of national plans of actions, promoting stakeholder participation in monitoring and surveillance activities, and increasing penalties for non-compliance. Further details of these efforts are described later in this report.

For the commercial fisheries, management plans came into effect for the shrimp fishery in 2004 and for the sardine and tuna fisheries in 2005. The management objectives for the sardine are to: maintain production levels close to MSY, allocate at least 40 percent of the harvest for human consumption or products destined for human consumption, and maintain employment levels. The management objectives for the shrimp fishery are to: maintain target species biomass at appropriate levels

for the annual renewal of the population; maintain employment levels and to ensure an adequate balance between the benefits obtained by the industrial and small-scale subsectors. In the case of the tuna fishery, the management objectives are to: obtain the highest levels of production within the limits established by the management reference points, control the levels of dolphin bycatch and ensure their conservation, promote the capture of adult tuna, and minimize the capture of small fish.

Among the small-scale fisheries, there is a management plan for the shrimp fishery only, which came into effect in 2004. The management objectives for this fishery are to reduce fishing effort and to manage the fishery according to existing national regulations, as well as the recommendations made in the National Fisheries Charter. There are no management plans for the major recreational fisheries identified. In terms of management objectives, the sport/recreational fishing subsector is currently a general source of income that contributes significantly to the national economy, owing to *inter alia*, the fishery's capacity to earn foreign exchange and to generate employment and promote regional development, the benefits of which spread to other activities with a multiplier effect on the tourism, fishing and industrial sectors.

Management approaches and tools

Multispecies aspects

The major commercial and small-scale fisheries identified are all multispecies in nature, and management takes this into account to some extent. In the case of the commercial fisheries, the correct completion of the fishing logbook and arrival notices is required. For the small-scale shrimp fishery, the National Fisheries Charter (CNP) issued by the federal government and published and periodically updated in the Official Journal of the Federation (02/12/2010) includes five technical reference sheets for the "shrimp resource", providing information on the various geographic regions and different species (shrimp, Pacific coast seabob, red and rock shrimp, brown shrimp and queen shrimp). There is a cartographic and written account of the resource and the various species that comprise it which also contains a summary of the necessary diagnostic and assessment information on the fishery, as well as indicators of resource availability and resource health. This information is used by the productive sectors and is taken into account in the fisheries authorities' decisions regarding the adoption and implementation of instruments and measures to control fishing effort and in handling requests for concessions and permits for fishing and aquaculture activities.

In the case of the shark fishery, the National Fisheries Charter includes a technical reference sheet for the shark resource, covering coastal sharks in the Pacific, Gulf of Tehuantepec and Gulf Coast of Mexico and including a list of target and associated shark species. Also, the charter mentions the basking shark (*Cetorhinus maximus*), white shark (*Carcharodon carcharias*) and the whale shark (*Rhincodon typus*) as permanently protected species, because these species are considered to be in danger of extinction. In 2013 Mexico agreed to list in appendix II of CITES the hammerhead sharks. The charter also distinguishes two main species of octopus harvested in Mexico: the red octopus (*Octopus maya*) and the common octopus (*O. vulgaris*). Management therefore takes into account the differences between these two species when developing management recommendations. NOM-008-PESC-1993 (21/12/93 DOF) also establishes a minimum landing size of 110 mm mantle length for both species, and also prohibits the use of hooks and harpoons. The sport/recreational fisheries are not multispecies in nature.

EAF and precautionary approach

The management of the three major commercial fisheries includes specific ways for applying the ecosystem approach to fisheries (EAF) management. In the case of the sardine fishery, NOM-003-PESC-1993 (DOF 31/12/93) provides, among other

measures, different minimum landing sizes for the major species caught: Pacific sardine (150 mm standard length, SL), thread herring (160 mm SL) and anchovy (100 mm SL). Optimal performance per season for all small pelagics is around 524 000 tonnes, and so an upper limit in the harvest rate is recommended to avoid impacts on other resources such as squid and tuna. For the shrimp fishery, actions based on the ecosystem approach to management are very limited. In the Mexican Pacific, the shrimp fishery is regulated through the NOM-002-PESC-1993 (DOF 31/12/93) and its amendment (DOF 30/07/97), which establishes time-area closures, fishing effort limits, regulation of vessels, equipment and gear, and mandatory use of turtle excluder devices. It is also regulated through NOM-009-PESC-1993 (DOF 04/03/94) that establishes the procedure for determining closed seasons and areas. In the case of the tuna fishery, Mexico signed the Agreement on the International Dolphin Conservation (Official Journal of the Federation 17/05/99). Also, closures have been implemented through a global quota system for attaining maximum sustainable yield in the entire eastern Pacific. There are limited closures in some restricted areas as well. Temporary closures are currently applied to the entire eastern Pacific to reduce fishing mortality of yellowfin and bigeye tuna. Additionally, incidental catch limit recommendations apply, based on the work of the IATTC in the ecosystem approach, in which analyses by scientific working groups are used to develop proposals on recommendations to be adopted by consensus by the countries. The precautionary approach is not yet applied in the management of the major commercial fisheries.

Regarding the three major small-scale fisheries identified, their management does not include specific ways for applying EAF. In the case of the shrimp fishery in the Pacific Ocean, apart from the laws indicated previously, there is continuous assessment of reproduction and recruitment, and the results of these investigations by the National Fisheries Institute are discussed with key informants from the production sector. In the case of the shark fishery, the National Action Plan for the Conservation and Management of Sharks, Rays and Related Species (PANMCT) was adopted in 2004 in order to ensure the management, sustainable use and long-term conservation of sharks, rays and related species in federal waters, with public and private participation. This plan has facilitated the establishment of closed seasons and areas for fishing different species of aquatic fauna, including for sharks and rays in the Pacific Ocean, and sharks in the Gulf of Mexico and the Caribbean Sea. Such closures provide protection for all species within that portion of the ecosystem.

Additionally, octopus is actively and selectively fished by medium-sized boats (10 tonnes) and also smaller vessels of less than 7–8 m in length using outboard motors of 40–75 hp. The method of capture is the "gareteo" with two bamboo rods and an average of 12 lines per boat. Particularly, *O. vulgaris* in the State of Veracruz is captured by free diving, using fiberglass boats with outboard engines, with two to six anglers per boat. Fishing for octopus is considered to have very little impact on the ecosystem. The management of the major small-scale fisheries does not include specific ways for applying the precautionary approach. Similarly, the management of the three major recreational fisheries does not include specific ways for applying EAF management or for applying the precautionary approach.

Management tools and trends in usage

The primary management tools used in the three major commercial fisheries are shown in Table 7. The fishery management tools being used in these three marine capture fisheries are the same types as used in other fisheries in this category.

TABLE 7
Types of management tools used in the three major commercial fisheries identified

Type of Management Tool	Sardine	Shrimp	Tuna
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)			
Temporal restrictions such as:			
Defined fishing season(s)	√	√	√
Defined number of days fishing	√	√	√
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions	√	√	√
Engine size restrictions	√	√	√
Gear size restrictions	√	√	√
Gear type restrictions	√	√	√
Size restrictions (i.e. minimum or maximum sizes)	√	√	√
Participatory restrictions such as:			
Licenses	√	√	√
Limited entry (limited vessels or limited fishers)	√	√	√
Catch restrictions such as:			
Total allowable catch (TAC) limits	√	√	√
Vessel catch limits			
individual vessel quotas			
Rights- /incentive-adjusting regulations such as:			
Individual effort quotas		√	
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights	√	√	√
Regionally/internationally agreed restrictions	√	√	√
Taxes or royalties	√	√	√
Performance standards			

Over the past ten years, there has been an increasing use of specific fishing seasons, catch-at-size measures and catch quotas in all three fisheries noted. In addition, there has been increasing use of vessel and engine size restrictions for the shrimp fishery, and of limited entry measures for both the shrimp and tuna fisheries. Regionally/internationally agreed restrictions have also been increasingly applied to the tuna fishery. In contrast, there has been a decreasing use of measures to limit the number of fishing days in all three commercial fisheries.

The primary management tools applied for the three major small-scale fisheries identified are shown in Table 8.

TABLE 8
Types of management tools used in the three major small-scale fisheries identified.

Type of Management Tool	Shrimp	Shark	Octopus
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)	√	√	√
Temporal restrictions such as:			
Defined fishing season(s)	√	√	√
Defined number of days fishing	√	√	√
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions	√	√	√
Engine size restrictions	√	√	√
Gear size restrictions	√	√	√
Gear type restrictions	√	√	√
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses	√	√	√
Limited entry (limited vessels or limited fishers)	√	√	√
Catch restrictions such as:			
Total allowable catch (TAC) limits	√	√	√
Vessel catch limits			
Individual vessel quotas	√		
Rights- /incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions			
Taxes or royalties			
Performance standards			

The fishery management tools being used in these three marine capture fisheries are the same types as used in other fisheries in this category. In all three fisheries, there has been an increasing application of all the tools used, except for TAC in the shark and octopus fisheries, over the last ten years. All three small-scale fisheries have also seen the introduction and increasing use of new tools such as marine reserves with no fishing, nursery areas and catch-at-size restrictions. The shrimp fishery has also seen an increasing use of TAC, vessel catch limits and no-take zones. In addition, the application of taxes increased in the same time period for the shark fishery.

The primary management tools used for the recreational fisheries are shown in Table 9.

TABLE 9
Types of management tools used in the three major recreational fisheries identified

Type of Management Tool	Marlin	Sailfish	Shad
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)			
Temporal restrictions such as:			
Defined fishing season(s)	√	√	√
Defined number of days fishing			
Defined number of hours per day fishing	√	√	√
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions	√	√	√
Engine size restrictions	√	√	√
Gear size restrictions	√	√	√
Gear type restrictions	√	√	√
Hook and line restrictions	√	√	√
Hook type/size restrictions	√	√	√
Bait restrictions(e.g. use of artificial lures vs. fresh/live bait)	√	√	√
Method restrictions such as:			
Motor trolling			
Use of artificial light			
Use of scents			
Size restrictions (i.e. minimum or maximum sizes)	√		√
Participatory restrictions such as:			
Licenses			
Limited entry			
Number of rods/lines per vessel	√	√	√
Catch restrictions such as:			
Total allowable catch (TAC) limits	√	√	√
Vessel catch limits	√	√	√
Individual vessel quotas	√	√	√
Bag limits	√	√	√
Fish holding limits	√	√	√
Sales restrictions such as:			
Commercial sale restrictions	√	√	√
Rights- /incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Encouragement of harvest of overabundant species			
Encouragement of harvest of invasive species, e.g. lionfish			
User conveniences such as:			
Provision of landing sites/fish piers	√	√	√
Provision of fish cleaning stations	√	√	√
Regionally/internationally agreed restrictions			
Taxes or royalties			
Performance standards			

The fishery management tools being used in these three marine capture fisheries are not the same types as used in other fisheries in this category. The three fisheries are regulated by the NOM-017-PESC-1994 (DOF 5.9.95) that includes all species targeted by the recreational fishery. However, there are species that are taken incidentally and which are not covered by the regulations. A broad range of management tools has been applied in the three major recreational fisheries, but regulations related to user rights and incentives are not used. Over the past ten years in all three fisheries, there has been an increasing application of the following management tools: marine reserves, marine protected areas, closed area measures, no-take zones, engine size and gear size measures, licensing and limited entry, and provision of special landing sites. Vessel size and bait restrictions have also been increasingly used in the marlin and sailfish fisheries. During the same time period though, there has been a corresponding decreasing application of TACs and vessel catch limits.

International standards

None of the major commercial or small-scale fisheries identified is managed using performance standards. Only the commercial fishery for tuna is managed based solely on regionally/internationally agreed restrictions. In the recreational fisheries, there are not (except the catch/release in the billfishes) voluntary regulations/codes of conduct in place to support management of the fisheries, and these fisheries are also not managed solely on regionally/internationally agreed restrictions.

Role and impact of marine reserves

Fisheries management is not listed as one of the objectives or reasons for establishing marine protected areas or reserves. However, despite this, marine protected areas or reserves affect the management of the commercial sardine and shrimp fisheries, presumably by reducing available fishing areas. Management of the small-scale fisheries is unaffected by the marine protected areas or reserves. It should be noted that there is still no marine protected area (refuge area in Mexico) aimed at the protection of these resources in particular.

Stakeholder involvement and transparency in management

Stakeholders are formally involved in the management process at the national, regional/international and local levels, and there is a formal definition of the groups included as "stakeholders". Stakeholders are defined as users in fisheries and aquaculture, as well as subject specialists with interest in its regulation, promotion and development. This covers the permit and concession holders of commercial fishing, technical specialists of management committees, the authorities, and specialists working in technical workgroups concerned with the fishery regulatory processes. The form of participation varies by region and by fishery, from a purely consultative mode to active participation, and there are some cases of co-management.

It should be noted that the legislation enables the full range of participatory processes: consultative management, in which stakeholders are consulted but have no management responsibility; co-management, where stakeholders are consulted and share some management responsibility; co-management, where stakeholders actively participate in the management process and share significant management responsibility; and devolution of management, where local participants/stakeholders have full management responsibility. Moreover, these participatory processes are a formal and required part of the management process for these capture fisheries, with specific defined steps that are routinely followed as part of fisheries management.

Commercial fisheries

Efforts have been made to identify the stakeholders who have an interest in the use and management of the resources for all three fisheries. However, the management plans for the three major fisheries include definitions of the stakeholders at the local and national levels only. The stakeholders of the three main fisheries are organized into distinct groups, and arrangements have been made to consult these stakeholders and to work with them on management issues. The management process, as it relates to stakeholders, could be described as: consultative, as well as co-management involving some management responsibility by stakeholders for all three major fisheries; and co-management, with active participation and significant management responsibility by stakeholders in the case of the shrimp and tuna fisheries. As already noted, the exact form of participation achieved varies by region and by fishery. Stakeholder participation in decision-making can be rated as: informative, consultative, communicative and participative, but not advisory and not under community control. It is not known whether the management system creates incentives and reasons for participants to practice "responsible" fisheries stewardship voluntarily. However, where stakeholders are part of the fisheries management decision-making process, the management measures have resulted in stable stock levels over the last five years, and stakeholder involvement has made the process faster. Stakeholder participation in the decision-making process has also helped to reduce conflict in the sardine and tuna fisheries, but this has not been the case for the shrimp fishery.

Small-scale fisheries

Similar to the commercial fisheries, efforts have been made to identify the stakeholders for all three major fisheries noted. Only the shrimp fishery has a management plan, and this includes a definition of the stakeholders in that fishery. Notwithstanding, the fishery stakeholders in the three main fisheries are organized into distinct groups, and arrangements have been made to consult with them on management matters. At present, the management process, as it relates to stakeholder involvement, could be described as: consultative and also co-management, where stakeholders are consulted and share some management responsibility. Additionally, the participation of stakeholders in decision-making can be rated as: informative, consultative and participative, but not communicative, advisory or under community control. In conclusion, the participants find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. Where stakeholders are part of the decision-making process, the management measures have resulted in stable stock levels over the last five years, and the management process has been made faster. Stakeholder involvement has also helped to reduce conflict in all three fisheries.

Recreational fisheries

Similar to the other major fisheries, efforts have been made to identify the stakeholders in the three major recreational fisheries noted. While there is no management plan for any of the recreational fisheries, the fishery stakeholders are nonetheless organized into distinct groups. There have also been efforts to consult these stakeholders on management matters. In these fisheries, the management process, as it relates to stakeholders, involves a co-management arrangement, with the fishery stakeholders sharing some management responsibility. Stakeholder participation in decision-making can therefore be rated as both consultative and participatory. Despite these arrangements, the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. It is not known if the co-management arrangement has contributed positively to stock stability or to making the process more efficient and/or to improved conflict management.

All parts of the fisheries management process are considered to be transparent. In particular, information about the fisheries management process is clearly documented and easily available to the public. Additionally, meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery, and such meetings are advertised and publicized in advance of the actual meeting dates. Moreover, there is the opportunity for both fishery participants and other stakeholders to contribute to the decision-making process by providing public comments. If information about management measures and meetings is shared with fishery participants and other stakeholders, the information is disseminated using direct mail and Internet mail.

Management of conflict and fishing effort

Conflict exists both in the commercial and small-sale fisheries, but is not reported to be an issue in the recreational fisheries. To address conflict management, the legislation sets up particular processes, such as the need to consider multiple uses and users within the fisheries sector, as well as those of sectors. Additionally, dispute resolution and conflict management processes are part of the fisheries management process. In fact, conflict resolution is included in the specific procedures of fisheries regulations. At present, the tools applied to support conflict resolution among user groups include: zoning of different areas for different users, resource allocation between the different participants in the fishery, resource allocation between the fisheries and other sectors, and limited access to certain areas for certain types of fishers.

Regarding the management of fishing effort and as noted earlier in this report, the LGPAS does not define the term "overfishing", but acknowledges the terms "fishery in recovery" and "overexploited fishery". National fishery assessments have confirmed that overfishing is occurring, but the estimated percentage of this in managed fisheries varies. Mexico has not been able to complete the measurement and assessment of fishing capacity in all its marine capture fisheries due to a lack of sufficient human and financial resources, stakeholder cooperation and data. Available resources are being used to address other more urgent fishery management priorities.

Commercial fisheries

Conflict is currently a problem mostly in the sardine and shrimp fisheries. Moreover, over the last ten years, the level or amount of conflict in the shrimp fishery has increased, but has remained at the same levels in the sardine and tuna fisheries. Reasons for the observed conflict in the shrimp fishery include: competition among the same, as well as different types of vessels; competition for gear deployment in the same fishing area; and competition with other uses for the same area of water. In these fisheries, like others, dispute resolution and conflict management processes are part of the management process, which includes the need to consider multiple uses and users within the fisheries sector. The specific legislative provisions for conflict management tools for the major commercial fisheries require: zoning of different areas for different users in fisheries, stock enhancement, resource allocation between the different participants and also between the fishery and other sectors in the case of the shrimp fishery, education about sharing marine fisheries resources, and limited access to certain areas for certain types of shrimp fishers.

As explained earlier in the report, there is currently no overfishing in the three major fisheries identified, and a constant or decreasing CPUE has only been observed in the sardine fishery. Fishing capacity has been measured for these three fisheries. Interestingly, recent regulations focused on reducing fishing effort in the shrimp fishery only, presumably because there is also a sense of overcapacity in this fishery. Overcapacity is not considered to be an issue in the sardine and tuna fisheries. In particular, there has been a capacity reduction programme set up and implemented

during 2005–2012 for the shrimp fishery. Essentially, this programme has involved a buyout of fishing vessels licensed to operate. It was effective in immediately reducing the excess fishing capacity and continues to be effective in maintaining a reduced fishing capacity. The application of the capacity reduction programme was specifically intended to: reduce/eliminate overfishing, increase the profitability of the remaining boats, remove all of the participants from one of the sectors, and consider other non-fisheries sector needs as well. This programme was sponsored completely by the government, at a cost of $609 million Mexican pesos or USD 47 392 996 (using a rate of 12.85 pesos = USD 1.00). The programme has removed 801 vessels from the fishery, accounting for a 39 percent reduction in the fishing effort that existed in 2004.

Small-scale fisheries

Conflict exists in the three major fisheries noted and the level of conflict has increased over the last ten years. There are several reasons for this conflict: competition among the same, as well as among different types of vessels; competition between shark fishers and recreational fishers for the same area of water; competition with other industry uses for the same area of water in the case of the shrimp and shark fisheries; and competition with other fisheries for the same area of water. In these three fisheries, like others in Mexico, dispute resolution and conflict management processes are part of the management process. In particular, legislative provisions for controlling conflict in the small-scale fisheries requires: zoning of different areas for different users and also limited access to certain areas for certain types of fishers in all three fisheries noted; and resource allocation among the different participants, and also between the fishery and other sectors in the case of the shrimp fishery.

Overfishing is not believed to be a problem in the three major fisheries noted, and this belief is supported by the observed CPUE trends, as noted earlier in this report. Fishing capacity has been measured for the three major fisheries identified, and overcapacity is not considered to be an issue for any of these fisheries. Perhaps related to regulation of the commercial shrimp fishery, the small-scale fishery has been subjected to regulations in recent years which have focused on reducing fishing pressure. Unlike the commercial shrimp fishery, there has been no comparable capacity reduction programme set up and implemented for the small-scale shrimp fishery. The other two small-scale fisheries have also not been the subject of capacity-reduction programmes.

Management of monitoring, compliance and enforcement

To assist with monitoring, compliance and enforcement issues, Mexico has a navy; a coastguard; a marine police enforcement unit; a fisheries agency or department that does fisheries enforcement; a marine transport agency that does fisheries enforcement; and other marine patrol, monitoring and enforcement groups. These other groups include Community Inspection squads, which, despite not having the authority to make arrests, participate in surveillance schemes and programmes in coordination with the federal fisheries officials. In some states of the Mexican Republic, there are also fisheries police or vigilantes in the community or port, as in the case of Baja California Sur. The navy, coastguard, marine police enforcement unit and the fisheries agency share the responsibility for at-sea fisheries patrols, monitoring and enforcement work in the coastal waters (0–3 nautical miles). On the other hand, only the navy and the fisheries agency have responsibility for at-sea fisheries patrols, monitoring and enforcement work in the territorial waters (0–12 nautical miles). Similarly, both the navy and the fisheries agency are responsible for fisheries monitoring work that involves checking dock-side landings and logbooks, and also for enforcing penalties.

Penalties are applied for non-compliance, and include: small fines for first offences, larger fines for additional offences, fixed fines for specific offences, the revocation or suspension of fishing licences and permits, and the exclusion or removal from the

fishery. Other types of penalties are also applicable. The legal system makes provisions for a series of increasing penalties to be imposed, considering the seriousness of the violation, the economic conditions of the offender, recidivism if any, the intentional or negligent nature of the infringement and the benefit to the offender. In the case of fines, penalties are determined between a minimum and a maximum amount, which is provided for in the law. In addition, penalties can involve forfeiture of vessels, vehicles, fishing gear and fishing products obtained, and closure of establishments. In Mexico, systems for supporting compliance and enforcement include the use of: VMS, which tracks the behavior of the medium and large-scale fleet; on-board observer programmes; random dockside inspection schemes; routine inspection schemes at landing sites; and at-sea boarding and inspection schemes. In addition, inspections or audits are made of facilities, vehicles and persons who are involved in transporting, processing, storing or marketing of fishery and aquaculture products.

Over the last ten years, the number of offences occurring has steadily increased. This increase may be related to the fact that detection efforts (e.g. at-sea patrols, port monitors) have also been increasing in the same time period. While the available budget for monitoring and enforcement has also been increasing over the past ten years, it does not appear that the funding provided allows the agencies concerned to enforce all fisheries regulations. Hence, although it appears that the penalties for non-compliance are sufficiently severe to deter incidents of non-compliance, the risk of detection is not high enough that participants try not to cheat.

Commercial fisheries

In all three major commercial fisheries noted, the applicable penalties for breaking marine capture fisheries management regulations and rules include: fixed fines for specific offences, revocation or suspension of fishing licences, and refusal of the opportunity to fish for the rest of the season or year. Supporting systems for compliance and enforcement include the use of: VMS, random dockside inspection schemes and routine inspection schemes at landing sites in all three fisheries; on-board observer programmes in the shrimp and tuna fisheries; and also an at-sea boarding and inspection scheme for the shrimp fishery. Over the past ten years, the number of offences that are taking place has been increasing in the three fisheries. While the budget for monitoring and enforcement has been increasing in the same time period, this does not seem to be adequate to facilitate enforcement of all fisheries regulations. Hence the risk of detection is not high enough that the participants in these fisheries try not to cheat. That noted, where penalties are enforced, they are effective at deterring actions of non-compliance in all three major fisheries.

Small-scale fisheries

Penalties for breaking marine capture fisheries management regulations and rules are applied, and include fixed fines for specific offences and revocation or suspension of fishing licences. These penalties are applicable to all three fisheries. In these fisheries also, there are systems for supporting compliance and enforcement, and these include the use of: random dockside inspection schemes and routine inspection schemes at landing sites, and also VMS in the case of the shrimp fishery. Similar to the commercial fisheries, over the past ten years the number of offences that are taking place has been increasing in all three fisheries. However, the budget for monitoring and enforcement has also been increasing during the same time period. Although the available funding is considered to be adequate to allow the fisheries managers to enforce all fisheries regulations fully, the risk of detection is not high enough that the participants in these fisheries try not to cheat. Consequently, this aspect of enforcement appears to require additional support, implying that the budget is still not sufficient. In addition, where penalties are enforced, they are not effective at deterring incidents of non-compliance.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

The national government provides a variable level of funding for fisheries management activities at all levels (national, regional (within the country) and local levels). These funds are used to support activities in research and development, monitoring and enforcement, and daily management. Currently, the fisheries legislation allows for some of the costs associated with managing fisheries resources to be recovered through the collection of licence fees charged to the fishery participants. In real terms, the budget for fisheries management has generally increased over the last ten years for all management activities, including the national, regional and local levels, but especially so during 2011–2012 (Table 10). On the other hand, the real costs for fisheries management have also increased for all levels of activity in the same time period.

TABLE 10
Annual fisheries management budget, in both Mexican pesos and US dollars (assuming conversion rate of 1USD = 12.85 Mexican pesos), during the period 2006–2012

Year	Budget (Mexican Pesos)	Budget (USD)
2006	$42 200 600	$3 284 093
2007	$34 930 000	$2 718 288
2008	$46 420 000	$3 612 451
2009	$43 000 000	$3 346 304
2010	$33 277 700	$2 589 704
2011	$52 750 000	$4 105 058
2012	$52 600 000	$4 093 385

These increasing costs have arisen because of: increased/improved stakeholder consultation, increased monitoring requirements, increased enforcement activities, increased rate of modifying fisheries management regulations, and increased member-country obligations to RFBs and RFMOs. Currently, the additional costs are being funded by increased government contributions to fisheries management.

Commercial fisheries

In the case of the three major commercial fisheries, government funding covers all the fisheries management costs associated with research and development, and monitoring and enforcement.

In real terms, both the budget and costs for the management have increased over the past ten years for all three major fisheries noted. The increased costs have arisen because of: increased monitoring requirements, increased enforcement activities, increased rate of modifying fisheries management regulations, and increased obligations under regional/international agreements/conventions to which the country is a party. In addition, for the shrimp fishery, increasing costs have been associated with an increase in litigations and increased conflict management activities. The additional management costs are currently being funded by: increased government contributions in the case of all three fisheries and increased contributions from fisheries participants in the tuna fishery.

Small-scale fisheries

Government funding covers all the fisheries management costs for the three major fisheries noted. These funds therefore pay for: research and development, monitoring and enforcement, and daily management activities. Similar to the commercial fisheries, both the budget and costs for the management of these fisheries have increased in real terms over the past ten years for all three major fisheries noted. Moreover, the increasing costs have arisen because of: increased monitoring requirements, increased enforcement activities, increased litigation activities, increased conflict management, and in the case of the shark fishery, increased obligations under regional/international

agreements/conventions to which the country is a party. The additional management costs are currently being funded by increased government contributions in the case of all three fisheries.

Recreational fisheries

Currently, for the three major fisheries noted, government funding covers all the fisheries management costs pertaining to research and development, and monitoring and enforcement. In addition, the legislation allows for the costs associated with managing these fisheries resources to be recovered via licence fees paid by the participants. No further information is available on the budget and costs of managing the recreational fisheries.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Three major international marine fisheries management conventions to which Mexico is a party are the: United Nations Convention on the Law of the Sea – UNCLOS; the Antigua Convention, negotiated to strengthen and replace the 1949 Convention establishing the Inter American Tropical Tuna Commission (IATTC) and the Agreement on the International Dolphin Conservation Program (AIDCP); and the Convention Establishing the Latin American Fisheries Development Organization, OLDEPESCA (October 29, 1982). Additionally, Mexico is a member of COPESCAALC, ICCAT, WECAFC, OLDEPESCA and IATTC; Nowadays Mexico has a status of Cooperating Non Member with the WCPFC.

As already noted, Mexico's current fisheries legislation was enacted in 2007. The new legislation takes into account the provisions of several international fisheries instruments, especially provisions of the CCRF, the Compliance Agreement and the UN Fish Stocks Agreement. In particular, as prescribed by the CCRF, Mexico has established and implemented national standards/rules for fisheries and aquaculture, with the aim of sustainability, as well as resource management and protection. There has also been public investment in basic infrastructure and training to support understanding and implementation of the CCRF. Regarding the Compliance Agreement, the current legislation applies to all Mexican vessels, and in so doing, also necessitates their compliance with those standards prescribed by international agreements. Additionally, a VMS was established in 2003 for larger fishing vessels, and participation of these vessels in the VMS was made compulsory in 2006. Foreign fishing vessels are not flagged by Mexico to operate in its EEZ, and no surplus has been declared to facilitate the flagging and operation of such vessels. Mexico has also made efforts toward implementation, with the most important achievements being: fishing effort limitations in major pelagic fisheries (1998 to 2011), e.g. for tunas, sharks and billfishes alike, large driftnets were prohibited in 2001, and this was legislated in 2007; and establishment of tuna fishing area closures in the Pacific Ocean.

Implementation of the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003) has begun with actions to promote the development of research with a focus on the ecosystem and consideration of the technical information, although it has not yet translated into specific management measures in many fisheries. There has also been some movement towards measures intended to control catches of small pelagic species, tuna and shrimp, taking into consideration the multispecies nature of these fisheries. In the case of the FAO International Guidelines for the Management of Deep Sea Fisheries in the High Seas, Mexico does not have at present deep-sea fisheries, and so these guidelines are not applicable at this time, although a new research vessel is being constructed to explore this possibility. On the other hand, the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010) are applicable. Implementation efforts have so far included: promotion of research on selective fishing systems: modification of trawls to reduce shrimp bycatch by 40–65 percent; use of

circle hooks in shark fishing and using adaptations to longlines to reduce the catches of sea turtles; information and training workshops for fishermen on the legal framework and responsible fisheries; projects for replacement of traditional gears with selective fishing gear, including the application of subsidies for modernization of operations and rationalization of fishing effort to support compliance with rules and the use of selective nets.

There have also been efforts to commence implementation of three major FAO International Plans of Action. Considerable progress has been made to implement the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999). Mexico established the Mexican Official Standard NOM-029-PESC-2006 for Responsible Fisheries for Sharks and Rays. This rule was being integrated into the fishery since 1996, although the regulation itself was not completed until six years later. This is because Mexico began controlling fishing effort of the medium and large-scale fishing fleet. Moreover, the moratorium on commercial fishing permits in the coastal areas became effective in 1993, six years before the international plan. It should be noted that NOM-029 was made being based on the fact that fishing for sharks and rays is an important activity of the Mexican fishing industry, as a source of food, and also for the economic and social benefits, by virtue of job creation throughout the industry chain.

During 2004, Mexico published its National Plan of Action for the Conservation and Management of Sharks, Rays and Related Species to ensure the management, sustainable use and long-term conservation of sharks, rays and related species in waters under federal jurisdiction, with public and private participation. Additionally, there is a 2007 bycatch agreement that specifies the levels of allowed catches of pelagic species that share habitat with sharks. Finally, there have also been efforts to establish additional fishing controls via spatial and seasonal closures to provide spatial and temporal refuges for shark and related species in the Gulf of Mexico, the Caribbean Sea and the eastern Pacific Ocean. There is a NOM-029-PESC-2006, for the responsible fishing of sharks and rays. Also Mexico has a National Action Plan for the Conservation and Management of Sharks. Mexico is the only country to implement a three-month ban as a means to contribute to the conservation of sharks by prohibiting their catch during the period of greatest reproductive intensity of the main distributed species in our waters.

Regarding implementation of the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999), Mexico established a moratorium on the issuance of commercial fishing licences since 2005 in all traditional fisheries (except new fisheries). Mexico also decreased the size of its shrimp trawl fleet (operating on the continental shelf) by 39 percent through a voluntary retirement programme and cancellation of permits. Additionally, as part of the administrative provisions, fishing capacity for both large and small pelagic species have been maintained at the recommended levels below MSY.

In the case of the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), Mexico has developed the corresponding NPOA that includes the FAO information, dissemination of the legal framework to fishing communities and that also facilitates participation of fishing (fisherfolk) organizations in monitoring, inspection and surveillance. In particular, co-management capacity has been strengthened through agreements with fishing organizations for cooperation on inspection and surveillance in the instances where closure measures apply. Administrative penalties for non-compliance have also been improved. Related to the issue of IUU fishing and to deter the activities of vessels that have reflagged to avoid regional conservation and management measures, the following national measures have been adopted: Flag of convenience (FOC) vessels are not allowed to enter Mexican waters, and only agreed numbers of licences and

fishing permits are issued, mainly to explore fishing techniques. Regarding the FAO International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999), it should be noted that the incidental catch of seabirds by the longline fishery is insignificant and hence to date, no concrete measures are considered to be necessary to adopt.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Mexico is a member of COPESCAALC, ICCAT, WECAFC, OLDEPESCA and IATTC, and cooperates with the WCPFC and actively participates in the activities of these RFBs. However, Mexico does not participate in the work of other RFBs in which the country is not a member.

As already explained, the national legislation makes several provisions for implementing internationally agreed measures that have been adopted by regional fisheries management organizations in which the country is either a member or participant. These provisions include: consideration and approval of Mexico's position in respect of international treaties, together with the formulation of interpretative declarations on such treaties and conventions; arrangements for managing controversies that may arise from implementation and enforcement of the said treaties; and acknowledgment of approved treaty provisions as law. As already noted, in an effort to deter the IUU fishing activities of vessels that have reflagged to avoid regional conservation and management measures, Mexico does not allow FOC vessels to enter its waters. Moreover, only agreed numbers of national licences and fishing permits are issued.

Regarding statistical contributions to RFBs, Mexico has a formal national mechanism to collect and provide fishery-related data to CITES, FAO and ICCAT. These RFBs contain specific timetables for data provision, and Mexico is able to meet the reporting deadlines stipulated.

SUMMARY AND CONCLUSIONS

- The fisheries legislation for Mexico was updated in 2007 and appears to be comprehensive and current in terms of inclusion of provisions of key international fisheries instruments. The legislation includes a definition of fisheries management, general sustainable management objectives, and outlines the steps for setting up the management process and for it to be completed in a given timeframe and be informed by a broad range of scientific information. Objectives and regulations adopted by RFBs/RFMOs are incorporated and fully implemented. It also identifies separate agencies for administration, scientific support and enforcement at the national, regional state and local levels. In fact, there appears to be an extensive fisheries scientific network foundation to inform the management process and to a lesser extent, a network of enforcement agencies with responsibilities at the national, regional state, and local levels. There are also legislative provisions for stakeholder involvement, conflict management, handling prosecutions and illegal fishing by foreign vessels. However, penalty fines are not considered effective in respect of the small-scale fisheries. In conclusion, the current fisheries legislation makes provisions for all components of the management process to be addressed in an organized fashion.
- Over 67 percent of marine capture fisheries in Mexico are managed in some way at the national level, but <33 percent are managed at the regional and local levels. All major fisheries are managed, but <33 percent of managed fisheries have a formal fishery management plan, with even fewer having regulations and with regulations informed by routine scientific monitoring and evaluation. Management plans have been formulated for the three major commercial fisheries and also for the small-scale shrimp fishery. However, the small-scale shark and

octopus fisheries, as well as the recreational fisheries, do not have management plans. In conclusion, it appears that much informal and ad hoc management is taking place. It may be that although legislative provisions stipulate a structured process, these are often not followed logically. This will certainly happen where the management of the fishery is not being informed by a specific management plan, with specific objectives noted that can be reviewed and evaluated for performance.

- The major commercial and small-scale fisheries identified are multispecies in nature, and this is taken into account in management through production of educational materials and consideration of the available information on the resources and areas. Regulations are established to minimize the impact on the bycatch species through overall catch limits, limiting the number of permits etc. The ecosystem approach to fisheries management is already being applied to the three major commercial fisheries through the variety of management tools used, especially area closures that provide spatial refuges, but not in any of the other fisheries. The precautionary approach has not yet been applied in the management of any fishery. Temporal (defined fishing season) and gear/vessel restrictions are the most common management tools used in Mexico. Catch at size, catch quotas and participation restrictions also increasingly used in the commercial fisheries. There has also been an increasing use of spatial restrictions such as marine reserves and marine protected areas, which are believed to contribute to management of at least the commercial fisheries, presumably by reducing the areas impacted by fishing. The broadest range of tools are applied in the recreational fisheries, and this may be related to the fact that these fisheries, which are not conducted primarily for food or profit purposes, are hence the least impacted by management controls. It may also simply reflect that the recreational fishing strategy naturally lends itself to the application of a broader range of management tools. The multispecies nature of some of the key fisheries, which is also partly related to the need for adopting an ecosystem-based approach, is being addressed to the extent possible and making use of the usual types of information that are available for conventional fisheries management. Additionally, the use of both temporal and spatial area closures provides a level of multispecies/ecosystem-level protection and refuge from the particular fishing impacts for both the range of species and habitats occurring in those areas. Apart from these regulatory measures, gear/vessel restrictions are popular and may be expected to help the control of bycatch and negative environmental impacts. Participation restrictions, applied more in the commercial fisheries, should now also be considered more for the small-scale fisheries. Furthermore, if efforts could be made to inform the establishment of participation restrictions based on ecosystem health, impact and response data, this could provide a major step towards sustainability, with both precautionary and ecosystem concerns incorporated. Mexico is already promoting research on ecosystem aspects, and may need to identify relevant key ecosystem health/impact/response indicators and introduce routine monitoring of these.
- The legislation makes provisions for a range of stakeholder participation arrangements, and stakeholders are defined in the management plans. The form of participation varies by region and by fishery, from a purely consultative mode, to active participation, and there are some cases of co-management. Moreover, these participatory processes have specific defined steps that are routinely followed as part of fisheries management. Only the commercial fisheries have so far achieved a co-management arrangement in which the stakeholders share significant management responsibility. Also, stakeholder inputs are described as informative, communicative and consultative, but never advisory or under community control, which suggests that either stakeholder contributions may be limited or

limited use is being made of stakeholder contributions. Interestingly, the small-scale fisheries management process appeared to have benefited the most from stakeholder involvement in management, in that it has helped stewardship and stock health, and has quickened the management process and reduced conflict in all the major fisheries. For the commercial fisheries, stock health, the efficiency of the management process, and conflict management in the case the sardine and tuna fisheries, also benefited from stakeholder participation in the decision-making process. While all parts of the management process are conducted in a transparent manner, information dissemination is conducted via ordinary mail and Internet mail only, and this would limit the potential benefits to be derived. Although participatory management is supported and there have been some successes with regard to stock health and management efficiency, stakeholders are not yet operating in an advisory mode, owing to: not being sufficiently organized to contribute seriously and formally to the management process; not being sufficiently skilled to present their knowledge in an interpretable and usable manner, possibly because of low educational levels; and not being sufficiently informed about the issues. Arguably, any further improvements in the management process may not be achievable unless there is effective stakeholder support and cooperation. Hence, strong investment in stakeholder education and in capacity-building activities to enable them to be effective partners in the management process is recommended.

- Conflict exists both in the commercial and small-sale fisheries, but is not reported to be an issue in the recreational fisheries. In recent years in the commercial fishery, there has been increasing conflict in the shrimp fishery, but conflict levels have remained about the same in the sardine and tuna fisheries. In the case of the small-scale fisheries, conflict levels have increased in all major fisheries in the past ten years. In general, the conflict is due to competition for access to fishing areas and resources. The current legislation sets up particular processes for conflict management. Both conflict management and dispute resolution are part of the fisheries management process and of the specific procedures of fisheries regulations. At present, the tools being applied to support conflict resolution among user groups have included the use of: area allocations for different uses, resource allocations among the different users, and education in the case of the commercial fisheries. In conclusion, the management process has not been able to decrease or eliminate the level of conflict in any of the major fisheries to date, and this implies that although there may be legislative provisions, these have not been actively implemented routinely, and also not been subjected to regular evaluation, with the intention of introducing an improved process. While the tools applied can achieve a certain level of conflict reduction, a more effective and active partnership with stakeholders, as well as transparency in terms of monitoring, evaluation and reporting, should be established to ensure that conflict issues are routinely and actively addressed.
- There are various estimates of the percentage of managed fisheries that are overfished, and the percentage of overfishing in all fisheries, whether currently managed or not, is unknown. A constant or declining CPUE has been observed for the commercial sardine fishery only. Although overfishing is not considered an issue for any of the major commercial and small-scale fisheries, there is a sense of overcapacity in the shrimp fishery. As such, recent regulations have focused on reducing fishing effort and/or reducing the harvest in both the commercial and small-scale shrimp fisheries. Additionally, a capacity-reduction programme was in effect for the commercial shrimp fishery, involving a government buyout of fishing vessels. This initiative has been successful in reducing the commercial shrimp fishing effort by an estimated 39 percent, but has cost the government far

more than the value of the fishery. Fishing capacity has been measured for the three major commercial and small-scale fisheries identified. However, recreational fishing operations do not appear to be monitored sufficiently to determine if overfishing and overcapacity exist. The completion of the measurement and assessment of fishing capacity is constrained by a lack of: data, funding to collect the data, human resources to do the assessments, stakeholder support and education. Available resources are being used to address other more urgent fishery management priorities. Scientific monitoring can always be improved, but it appears that Mexico has acted at least to evaluate and address excessive fishing capacity where the problem has been perceived to be the worst. If not yet done, an economic valuation of the goods and services of the major fisheries would help to inform future capacity reduction programmes and fishing effort controls, should these become necessary in the future.

- Several agencies share the responsibility of monitoring, compliance, and enforcement activities, and in fact there are additional groups involved in enforcement at the local levels. There also appear to be good legislative provisions for the nature and application of penalties, and more than one supporting system is in place, such as VMS, observer programmes and dockside inspection schemes. That noted, the available budget to allow enforcement of all regulations is not adequate, as the number of offences has reportedly increased in all the major commercial and small-scale fisheries, and not all offences are detected. While the penalties for the commercial fisheries are considered to be sufficiently severe and effective when applied, this is not the case for the small-scale fisheries. The legislative and administrative framework for monitoring, compliance and enforcement exists, but implementation is clearly less than perfect. Budgetary constraints could be impacting both the implementation of the various supporting systems, such as VMS and catch inspections, as well as enforcement patrols. In view of this, the use of input controls, such as limited entry measures, should be used more often than output controls such as catch limits, as this should help to lessen the enforcement costs. Further investment in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, say via limited entry, should help to reduce the incidence of non-compliance, as well as enforcement costs. Mexico is already making efforts to address these areas of weakness, particularly stakeholder cooperation and limited entry.
- Management costs are primarily funded by the government, with some recovery of costs facilitated through the payment of license fees, although this appears not to be applicable for several major fisheries. It may be that the revenue from fishing license fees are not re-directed for supporting the continued growth of the fisheries management process. The budget for fisheries management has increased in recent years, but as management costs have also increased, the additional funds may not be adequate to support all needed improvements. Increasing costs are associated with a range of activities, e.g. increases monitoring and enforcement obligations, increases in efforts promoting stakeholder cooperation, and increases in obligations to RFMOs, and increases in litigations. Additional management recovery options need to be carefully considered. In this regard, an economic evaluation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Also, as stated previously, additional investments in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, e.g. via limited entry measures, should help to limit the rising management costs. Mexico is already making efforts to address these weaknesses.

- Mexico's legislation allows the country to incorporate and implement the provisions of regional/international agreements. In this regard, Mexico introduced a number of rules and regulations to support compliance with such international provisions, including provisions of the CCRF and the Compliance Agreement. Implementation of the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003) has also begun with the development of research and the introduction of catch controls in multispecies fisheries. In the case of the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), several gear modification regulations have been introduced to minimize bycatch and hence also discards, and these have been supported by educational programmes for those involved. Considerable efforts have also been made for the implementation of three major FAO International Plans of Action: the IPOA on management and conservation of sharks, mainly via the introductions of gear and fishing effort limitations; the IPOA on management of fishing capacity, mainly via fishing effort limitations and reductions, some of which have been informed by stock assessment advice on MSY levels; and the IPOA to prevent, deter and eliminate IUU fishing, mainly via improved stakeholder cooperation arrangements, increase in penalties and non-registration of foreign fishing vessels. Mexico is a member of COPESCAALC, ICCAT, WECAFC, OLDEPESCA and IATTC and cooperates with WCPFC, seeking to be a member, and also actively participates in the activities of these RFBs. In conclusion, the current fisheries legislation makes provisions for compliance with regional/international agreements. While the legislation appears reasonably comprehensive, enactment of the provisions through implementation of different components of the management process faces a number of constraints, as already described. Notwithstanding, Mexico's efforts to implement a number of FAO international agreements have allowed the country to identify and to begin addressing key areas of weakness.

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COUNTRY REVIEW

Nicaragua

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INTRODUCTION

Nicaragua is the largest country in the Central American isthmus, bordering Honduras to the north and Costa Rica to the south. The country is situated at 13° N and 85 ° W, with a land area of 119 990 km^2, a sea area of 10 380 km^2 and a coastline of 910 km (Central Intelligence Agency, 2013). Its maritime claims include a 12 nautical mile territorial sea and 24 nautical mile contiguous zone. Considered the poorest country in Central America and the second poorest in the Western Hemisphere, Nicaragua's GDP (real growth rate) is estimated at 1.05 percent (2012). Agriculture, which includes fisheries, contributes 17.3 percent to GDP (2012 estimate). The population is estimated at 5.79 million (July 2013).

Due to the widespread poverty and underemployment, the socio-economic role of fisheries is very important. There are three main commercial fisheries by weight: the spiny lobster (*Panulirus argus*) fishery, the shrimp fishery on both the Pacific and Caribbean coasts (*Litopenaeus* and *Farfantepenaeus*) and the queen conch (*Strombus gigas*) fishery. Landings in 2011 for the respective fisheries were 3 826 tonnes, 2 111 tonnes and 6 501 tonnes with corresponding values of USD 40 million, USD 8.5 million and USD 4.8 million. The small-scale fisheries focus on coastal finfish and lobster. The landings in 2011 for the respective species are estimated at 637.2 tonnes and 4 246 tonnes, respectively with corresponding values of USD 21 million and USD 23 million. The recreational fishery, which practices catch and release, targets dolphinfish and billfish.

POLICY FRAMEWORK

The primary fisheries legislation is the Fisheries and Aquaculture Act No 489 adopted on 26 November 2004 and published in La Gaceta (Official Journal) No. 251 on December 27, 2004. This legislation provides both a legal and administrative framework for governing the management process at the national, regional/international and local levels and identifies a single authority for marine capture fisheries management at the national level.

The term "fisheries management" is defined in the legislation as standards and control measures based on updated scientific data and knowledge, in order to maintain an adequate system of management of fisheries and aquaculture activities. Three fairly general fisheries management objectives are listed in the legislation, and these are prioritized in the following order: sustainable use, social and economic development, and food security. These objectives are incorporated into fisheries management plans, and in the case of shared resources, have been informed by the work of RFBs and RFMOs.

The CCRF is acknowledged in Article 5 of the Fisheries and Aquaculture Act No. 489, which notes that the principles of conservation, sustainability and the precautionary approach, stipulated by the code, are taken into account in the

formulation and implementation of the fisheries policy and legislation in the country. The act also gives recognition to those conventions, multilateral and bilateral treaties, and international conservation programmes that have been ratified by Nicaragua.

Additionally, many non-fishery legislative instruments impact fisheries management in Nicaragua: endangered species legislation, export/import/trade legislation, biodiversity legislation, oceans policy legislation, marine park/sanctuary/reserves legislation, port management legislation, coastal zone management legislation, and forestry (mangroves) legislation. Among these, those legal instruments that have the most impact on marine capture fisheries management are: the Water Transport Act regulating the licensing and patent of motorboat navigation, the Criminal Code of the Republic of Nicaragua, and the General Environment and Natural Resources Act.

LEGAL FRAMEWORK

The fisheries legislation identifies the Nicaraguan Institute of Fisheries and Aquaculture (INPESCA) as the lead authority for marine capture fisheries management at the national level. At the national level, the responsibility is shared with the Ministry of Environment and Natural Resources, while at the local level, the responsibility is shared with the municipal mayors and local governments (for the Caribbean Nicaragua). No separate fisheries science agency is identified in the legislation. In terms of enforcement, INPESCA has a Directorate of Monitoring, Surveillance and Control that works together with the navy and national police force. At the local level, the enforcement responsibility is also shared with the municipal mayors and local governments.

The fisheries legislation is designed as a framework that shapes fisheries management and management plans, and sets up a series of steps or a process for developing, organizing and implementing fishery management regulations and fishery management plans. Specific management measures and regulations for individual fisheries are included, e.g. annual catch quotas, fishing effort limitations, closed seasons, minimum size regulations, gear regulations, and balanced use. Additionally, the legislation prescribes steps for setting up the management process itself, and these steps are followed for all fisheries: this involves the formulation of a technical proposal, which is then presented to the advisory board of INPESCA and to the National Fisheries and Aquaculture Commission for review and approval. That noted, there are no legal provisions for the management process to be completed in a given timeframe.

Regarding management decisions, the legislation requires these to be based on information coming from: biological analyses, economic analyses, environmental analyses, ecosystem analyses/assessments, monitoring and enforcement options, and analyses by regional fisheries bodies (RFBs) or regional fisheries management organizations (RFMOs) in the case of shared resources. Also, in the case of shared resources, the work of RFBs and RFMOs informs the objectives of the legislation. In particular, Decree 40-2005 makes provisions for regulating the fishing of tuna and other highly migratory fish species, while the relevant Central American regulations (OSPESCA) and regulations adopted by the WTO are adopted and implemented at the national level. Apart from any formal management process, other ways in which marine capture fisheries management can occur are by: decisions made by the management agency; decisions made by the participants in the fishery; decisions made by other parts of government; decisions made by other countries with similar species stock and fishery situations; and decisions made by RFBs, RFMOs or organizations concerned with human rights, labour, trade (e.g. CITES).

Nicaragua is a party to the FAO, CITES, ICCAT and UNCLOS conventions and is a member of ICCAT, WECAFC, OSPESCA, OLDEPESCA, IATTC, COPESCAALC and the Aquaculture Network of the Americas. The legislation makes provisions that give the fisheries management authorities the legal power to meet the priorities and obligations of the international agreements/conventions (global),

regional agreements and other multilateral arrangements to which Nicaragua is a party.

In the area of prosecutions, provisions are included under Articles 122, 123, 124, 125 and 126 of the Fisheries and Aquaculture Act No. 489. In particular, Article 123, paragraph 21 makes provisions for addressing illegal fishing activities by foreign fishing vessels. Finally, it has already been noted that several non-fishery instruments of legislation impact fisheries management in Nicaragua. Of particular importance in this regard are the Water Transport Act regulating the licensing and patent of motorboat navigation, the Criminal Code of the Republic of Nicaragua, and the General Environment and Natural Resources Act.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

In Nicaragua, the fishing vessels involved in commercial fishing are usually more than 15 m in length and are of the Florida type. The typical gears used are trawls, traps (pots) for fish and crustaceans, and hook and line. Catch is marketed locally, as well as exported. In comparison, the small-scale fishing vessels are <15 m in length, have inboard engines and are capable of deploying 20 miles of longline gear (main line). These vessels usually have a crew of six, use a winch for gear deployment and retrieval, and store their catches on ice. The catch is usually delivered to specific storage/collection centers and the local market. These vessels are also able to stay at sea for up to eight days.

Some small-scale fishing operations are further classified as artisanal, with the vessels for these operations generally being 8–15 m in length and using outboard engines. Artisanal fishing trips are conducted on a daily basis and carry 100 pounds of ice per trip. The vessels usually support a crew of four, and use gillnets and hook and line gear to target scalefish. Similar to the other small-scale vessels, the production is delivered to the collection centers and the local market. Another form of small-scale fishing is a lifestyle operation, which in Nicaragua, involves fishing communities living on the beaches and landing their production directly on the beach.

A subsistence fishery also exists. In this fishery, the fishers use small wooden dugout canoes, fish to satisfy their own personal consumption needs, and some minimum sale occurs. The typical gears are cast nets, gill nets and hook and line. Fishing expeditions are conducted daily and can last from dawn until the middle of the day. In those cases where indigenous or original ethnic communities engage in fishing for subsistence purposes, these small-scale operations are further classified as indigenous in nature. The gears used are hook and line gear and small gillnets. There is also customary fishing, in which the fishers operate in the estuaries and inland waters using fishing hooks. In the case of recreational fishing operations, the vessels are usually 7 m in length and use fishing rods as their primary gear. Additionally, the catch is normally donated for charity purposes.

Fish production and value

Commercial fisheries

The three most important commercial fisheries by weight are the spiny lobster (*Panulirus argus*) fishery, the shrimp fishery on both the Pacific and Caribbean coasts (*Litopenaeus* and *Farfantepenaeus*) and the queen conch (*Strombus gigas*) fishery. These fisheries are also among the top most valuable fisheries of this subsector. Although landings for spiny lobster increased by about 600 tonnes between 2007 and 2011, the value of the fishery has decreased by USD 2 million in the same time period (Table 1). On the other hand, both the landings and value of the shrimp fishery decreased over the past five years. In contrast, queen conch landings more than doubled, and the value of the fishery more than tripled in the same time period (Table 1).

TABLE 1
Gross landings (tonnes) and value (USD) of each of the three major commercial fisheries in the most recent year (2011) and five years ago (2007)

A. Annual Gross Landings of Catch (whole weight in tonnes)		
Fishery	**Most recent year (2011)**	**5 years ago (2007)**
Spiny lobster	3 826	3 200
Shrimp on both coasts	2 111	2 199
Queen conch	6 501	2 433

B. Annual Gross Value of Catch (USD)		
Fishery	**Most recent year (2011)**	**5 years ago (2007)**
Spiny lobster	40 millon	42 millon
Shrimp on both coasts	8.5 millon	9.5 millon
Queen conch	4.8 millon	1.5 millon

Small-scale fisheries
In terms of landed weight, there are two major small-scale marine capture fisheries: coastal finfish and spiny lobster. The third most important small-scale fishery is one that is focused on freshwater fish, and so does not receive further attention in this report. Lobster is among the top most valuable fisheries of the country. While landings of the coastal finfish and lobster fisheries have shown slight increases between 2007 and 2011, only the value of the lobster fishery has increased and notably so.

TABLE 2
Gross landings (tonnes) and value (USD) of each of the two major small-scale marine capture fisheries in the most recent year (2011) and five years ago (2007)

A. Annual Gross Landings of Catch (whole weight in tonnes)		
Fishery	**Most recent year (2011)**	**5 years ago (2007)**
Coastal finfish	637.2	509.5
Spiny lobster	4 246.0	4 071.0

B. Annual Gross Value of Catch (USD)		
Fishery	**Most recent year (2011)**	**5 years ago (2007)**
Coastal finfish	21 049 800	22 042 858
Spiny lobster	23 127 130	18 821 993

Recreational fisheries
The major recreational marine capture fishery for non-consumptive purposes targets billfishes and dolphinfish. However catch and value data for determining trends over the past ten years are not available.

Food security and employment
The commercial fishery provides the sole source of income but not the sole source of food for the majority of participants. The small-scale fishery does not provide the sole source of income or sole source of food for the majority of participants. The recreational fishery does not provide the sole source of income for the majority of vessel owners and also does not provide the sole source of food for the participants. These patterns are not unexpected. In the case of the small-scale fisheries, as the fishery is not the sole source of income, this implies that the operations are low level in terms of their investment and technology.

Fishing effort and impacts
Fishing areas
Commercial fishing operations for spiny lobster and queen conch take place along the Nicaraguan Caribbean continental shelf. In the case of the commercial shrimp fishery, fishing operations are conducted on the continental shelf of both the Caribbean and

Pacific coasts. In comparison, the small-scale fishery for coastal finfish is conducted on the continental shelf of both coasts and also on the continental slope on the Pacific side. Likewise, the small-scale lobster fishery uses the same area as the commercial lobster fishery. Recreational fishing for billfishes and dolphinfish takes place off both the Caribbean and Pacific coasts.

Fishing effort

Levels and trends in fishing effort and licensing arrangements are shown in Tables 3, 4 and 5 for the major commercial, small-scale and recreational marine capture fisheries identified, respectively. While the commercial fishery for spiny lobster has the highest number of participants and vessels among the commercial fisheries (Table 3), it is the small-scale fishery for coastal finfish that has the highest number of participants and vessels of the small-scale fisheries (Table 4). All participants and vessels for the three major commercial fisheries and the single major recreational marine capture fishery are licensed. It should be noted that while commercial licences have decreased over the past ten years for both participants and vessels involved in the lobster and shrimp fisheries, the number of licences and hence fishing effort has increased for the queen conch fishery. Likewise, in the case of the recreational fishery, the number of licences and by implication, also the level of fishing effort has increased in the past ten years (Table 5). It should also be noted that about 50 percent of recreational fishers are foreign tourists. Of the two major small-scale fisheries identified, licensing is only done for the lobster fishery. However, the levels of fishing effort, in terms of participants and vessels, are believed to have increased in the past ten-year period for both fisheries.

TABLE 3
The approximate current level of fishing effort for the three major commercial fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Spiny lobster	1 565	yes	d	57	yes	d
Shrimp on both coasts	98	yes	d	14	yes	d
Queen conch	480	yes	i	8	yes	i

TABLE 4
The current approximate level of fishing effort for each of the two major small-scale marine capture fisheries, licensing arrangements and the perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Coastal finfish	16 000	no	i	5 600	no	i
Spiny lobster	1 000	yes	i	700		i

TABLE 5
The current approximate level of fishing effort for the major marine recreational fishery, licensing arrangements and the perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Marine recreational	400	yes	i	350	yes	i

Overfishing and fishing capacity

Nicaragua does not have its own definition of overfishing. However, overfishing is believed to be occurring in the spiny lobster fishery but not in the shrimp and queen conch fisheries. This is supported by observed CPUE trends, i.e. a constant or decreasing CPUE has been observed over time for the lobster fishery but not the other

two major commercial fisheries. In comparison, there is currently overfishing in the small-scale coastal finfish fishery but not in the small-scale lobster fishery. Taking the CPUE trend into account, this has decreased over time in the case of the coastal finfish fishery, while a constant trend over time has been observed for the small-scale lobster fishery. Overfishing is not considered to be an issue for the major recreational fishery identified, and this is somewhat supported by the fact that a constant or decreasing CPUE over time has also not been observed in this fishery.

Nicaragua has begun work towards the measurement of fishing capacity. However, the measurement and assessment of fishing capacity has not been completed in all marine capture fisheries. The delay in doing so is due to: a lack of political will to undertake such work, a lack of human resources to do the assessments, and a lack of stakeholder support and education.

Regarding the commercial subsector, fishing capacity has been measured for the three major fisheries identified. There is a sense of overcapacity with regard to the lobster fishery, but this is not so for the shrimp and conch fisheries. Notwithstanding, regulations for all three commercial fisheries in the last two to three years have focused on reducing fishing effort and/or reducing the harvest in all three fisheries. In comparison, fishing capacity has been measured in the small-scale coastal finfish fishery but not in the small-scale lobster fishery, and there is a sense of overcapacity in the case of the coastal finfish fishery. In view of this, the regulations for the coastal finfish fishery in the last two to three years have focused on reducing fishing effort and/or reducing the harvest by limiting the number of boats. Such regulations have not been applied to the small-scale lobster fishery. In the case of the single major recreational fishery, fishing capacity has not been measured. However, overcapacity is not considered to be an issue for this fishery, and hence recent fishery management regulations have not focused on reducing fishing effort and/or reducing the harvest in this fishery.

MANAGEMENT ACTIVITY

General nature and extent

It is estimated that more than 67 percent of marine capture fisheries in the country are managed in some way at the national, regional and local levels. Furthermore, the number of managed fisheries has increased at all levels (national, local and regional) over the past ten years, and there are no major fisheries (in terms of weight of landings) that are not currently managed.

At the national and regional levels, the management process has been informed by: legislation about individual fisheries, interventions/actions to support specific management objectives, published regulations or rules for specific fisheries, and rules established by fishing organizations. At the local level, the process is influenced by: published regulations or rules for specific fisheries and rules established by fishing organizations. Management plans and traditional rules or customs that affect the harvest of marine fisheries do not influence the process at any level. Furthermore, of the fisheries that are managed at any level, fewer than 33 percent have a formal, documented fishery management plan. Of these, fewer than 33 percent have published regulations or rules at the regional level, while more than 67 percent have published regulations at the national and local levels. In all cases, 33–67 percent of the published regulations/rules have been informed by methodical scientific monitoring and evaluation.

That noted, there are management plans that came into effect in 2004 for the commercial spiny lobster fishery, in 1980 for the commercial shrimp fishery, and in 2005 for the queen conch fishery. In the case of the commercial spiny lobster and shrimp fisheries, the management objective is to protect the resource when the population is most vulnerable: during periods of spawning, growth and migration of

recruits to the fishing zones. For the queen conch fishery, the management objective is to comply with international standards to protect the population biomass.

Regarding the small-scale fisheries, there is a management plan for the spiny lobster fishery that came into effect in 2002. For this fishery, the management objective is to protect the resource when the population is most vulnerable, during periods of spawning, growth, and migration of recruits to the fishing zones. In the case of the coastal finfish fishery, although there is no management plan, the management measure is designed with the objective to prevent "growth overfishing". That is, there is a minimum catch size limit that is based on the size at first maturity of the species, and this is done to ensure that younger individuals spawn at least once. There is a management plan for the billfish/dolphinfish fishery whose management objectives are: to promote national ecotourism, to sustain the resource and to facilitate recreation by national and foreign fishers by capturing the fish and then releasing it.

International legislation has influenced the management process in Nicaragua, and this is discussed in detail later in this report. In summary, Nicaragua has made efforts to introduce and implement legal provisions in support of the CCRF, which is acknowledged in the Fisheries and Aquaculture Act No. 489, the FAO Compliance Agreement, and the UN Fish Stock Agreement. These provisions have included the establishment of fishery resource conservation action plans and EAF management plans, and the introduction of new management measures and fishing regulations, which in turn have been supported by increased efforts with stock assessments. There has also been progress in the implementation of the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003), primarily through improved stakeholder education and cooperation, and the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), through the establishment of management measures for controlling bycatch and discards. Additionally, four FAO International Plans of Actions (IPOA) have received attention to date: the IPOA for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999), via establishment of relevant gear modification regulations; the IPOA for the Conservation and Management of Sharks (1999), via the establishment of new plans and regulations; the IPOA for the Management of Fishing Capacity (1999), via the elaboration of an NPOA; and the IPOA to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), via new regulations and commencement of formulation of a NPOA. Implementation of the FAO Port States Measures Agreement (2009) has also begun, essentially through procedures to improve monitoring, control and enforcement.

Management approaches and tools

Multispecies aspects

The commercial shrimp fishery is multispecies in nature, and management takes this into account. In particular, as this fishery has a high bycatch of fish and other crustaceans (as much as 80 percent), the fishery must land these for local marketing. There is also the use of TEDs, which are intended to minimize the turtle bycatch. Similarly, the two major small-scale fisheries identified are both multispecies in nature, and management of these fisheries takes this into account. In both instances, species are identified and reported separately, and there are minimum size regulations for the main species. The main recreational marine capture fishery is multispecies in nature as well, and this is also taken into account in the management of the fishery.

EAF and precautionary approach

Although the management of the three major commercial fisheries does not include specific ways for applying the ecosystem approach to fisheries (EAF) management, it is considered to include specific ways for applying the precautionary approach. That is to

say, the spiny lobster and shrimp fisheries each have a global annual catch quota and an agreed number of licensed vessels. In addition, in the case of the queen conch fishery, an annual catch quota is established in accordance with CITES recommendations.

In comparison, management of the small-scale fishery for coastal finfish is considered to include specific ways for applying EAF management. Minimum size limits have been established for some important target species, and there are regulations on fishing gears. The management of the two major fisheries is also considered to include specific ways for applying the precautionary approach. This is because the small-scale spiny lobster fishery is subjected to the same regulations as the industrial fishery. In the lobster fishery, there is also a minimum size limit regulation, a four-month closed season and gear regulations. These have all been introduced as precautionary measures.

Regarding the recreational billfish/dolphin fishery, management is considered to include specific ways for applying EAF management. In this fishery, sport fishing in marine waters is governed by the rules of the IGFA. The management of this fishery also includes application of the precautionary approach, in that sport fishing is based on the catch and release principle.

Management tools and trends in usage

The primary management tools used for regulating commercial fishery operations in Nicaragua are shown in Table 6. A broad range of tools is used. In addition to participatory controls via licensing and limited entry, spatial (specified no-take and regulated areas), temporal (defined fishing season) and gear restrictions are applied. Among the output controls, a total allowable catch (TAC) is also imposed in all three fisheries. Regional/international measures are also implemented.

TABLE 6
Types of management tools used in the three major commercial fisheries identified

Type of Management Tool	Spiny lobster	Shrimp	Queen conch
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)	√	√	√
Temporal restrictions such as:			
Defined fishing season(s)	√	√	√
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions	√	√	√
Engine size restrictions			
Gear size restrictions	√	√	
Gear type restrictions	√	√	
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses	√	√	√
Limited entry (limited vessels or limited fishers)	√	√	
Catch restrictions such as:			
Total allowable catch (TAC) limits	√	√	√
Vessel catch limits			
Individual vessel quotas			
Rights-/incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			

TABLE 6 (CONTINUED)

Type of Management Tool	Spiny lobster	Shrimp	Queen conch
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions	√	√	√
Taxes or royalties	√	√	√
Performance standards			

These tools are the same types as used in other commercial fisheries. However, there has only been an increased use of TAC for the queen conch fishery over the last ten years. The frequency of using other management tools has remained unchanged. In the case of the small-scale fisheries, the primary management tools are shown in Table 7. Similar to the commercial fisheries, there are closed areas and seasons, as well as limited entry controls for the coastal finfish fishery. TAC and other output (catch) controls are not used in the small-scale fisheries, but regional/international measures are implemented for the coastal finfish fishery.

TABLE 7
Types of management tools used in the two major small-scale fisheries identified

Type of Management Tool	Coastal finfish	Spiny lobster
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)	√	√
Temporal restrictions such as:		
Defined fishing season(s)	√	√
Defined number of days fishing		
Defined number of hours per day fishing		
Defined number of hours fishing		
Gear restrictions such as:		
Vessel size restrictions	√	√
Engine size restrictions		
Gear size restrictions	√	√
Gear type restrictions	√	√
Size restrictions (i.e. minimum or maximum sizes)	√	√
Participatory restrictions such as:		
Licenses	√	
Limited entry (limited vessels or limited fishers)	√	
Catch restrictions such as:		
Total allowable catch (TAC) limits		
Vessel catch limits		
Individual vessel quotas		
Rights-/incentive-adjusting regulations such as:		
Individual effort quotas		
Individual fishing quotas		
Individual transferable quotas		
Individual transferable share quotas		
Group fishing rights (including community development quotas)		
Territorial use rights		
Stock use rights		
Regionally/internationally agreed restrictions	√	
Taxes or royalties		
Performance standards		

The fishery management tools being used in these two marine capture fisheries are the same type as used in other small-scale fisheries in this category. Over the last ten years, the use of most management tools has remained unchanged, except that defined fishing seasons has been increasingly used in the small-scale coastal finfish fishery. Regarding the recreational fishery, the primary management tools are shown in Table 8. In comparison, gear and output restrictions are more commonly applied than in other fishery subsectors.

TABLE 8

Types of management tools used in the single major recreational fisheries identified

Type of Management Tool	Billfishes/Dolphinfish
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)	
Temporal restrictions such as:	
Defined fishing season(s)	
Defined number of days fishing	
Defined number of hours per day fishing	
Defined number of hours fishing	
Gear restrictions such as:	
Vessel size restrictions	√
Engine size restrictions	√
Gear size restrictions	√
Gear type restrictions	
Hook and line restrictions	√
Hook type/size restrictions	√
Bait restrictions (e.g. use of artificial lures vs. fresh/live bait)	√
Method restrictions such as:	
Motor trolling	
Use of artificial light	
Use of scents	
Size restrictions (i.e. minimum or maximum sizes)	
Participatory restrictions such as:	
Licenses	√
Limited entry	
Number of rods/lines per vessel	√
Catch restrictions such as:	
Total allowable catch (TAC) limits	√
Vessel catch limits	√
Individual vessel quotas	
Bag limits	√
Fish holding limits	
Sales restrictions such as:	
Commercial sale restrictions	√
Rights-/incentive-adjusting regulations such as:	
Individual effort quotas	
Individual fishing quotas	
Individual transferable quotas	
Individual transferable share quotas	
Group fishing rights (including community development quotas)	
Territorial use rights	
Stock use rights	
Encouragement of harvest of overabundant species	
Encouragement of harvest of invasive species (e.g. lionfish)	√
User conveniences such as:	

TABLE 8 (CONTINUED)

Type of Management Tool	Billfishes/Dolphinfish
Provision of landing sites/fish piers	√
Provision of fish cleaning stations	
Regionally/internationally agreed restrictions	
Taxes or royalties	
Performance standards	

The fishery management tools being used in the billfish/dolphinfish fishery are the same type as used in other recreational fisheries. In the last ten years, there has been an increasing use of hook (type and size), line and bait restrictions for the billfish/dolphinfish fishery.

International standards

In Nicaragua, none of the major commercial or small-scale fisheries is managed using performance standards, or solely on regionally/internationally agreed restrictions. In the case of the recreational fishery for billfish and dolphinfish, there are voluntary regulations/codes of conduct in place to support management. However, this fishery is also not managed based solely on regionally/internationally agreed restrictions.

Role and impact of marine reserves

Regarding the management of the three major commercial fisheries, fisheries management is not listed as one of the objectives or reasons for establishing marine protected areas or reserves, and the role and impact of marine reserves on the management of these fisheries are not known. It should be noted that in Nicaragua, the marine reserves have been created to protect biodiversity and are mainly cays protruding above the ocean. In the case of the small-scale fisheries, marine protected areas or reserves do not affect the management of these fisheries.

Stakeholder involvement and transparency in management

Generally, stakeholders are formally involved in the management of marine capture fisheries at all levels (national, regional (within the country) and local). In addition, there is a formal definition of groups included as "stakeholders". These groups are the industrial and small-scale/artisanal fisher organizations. Currently, the legislation enables a consultative management process, where fisheries management stakeholders are consulted but do not share management responsibility, and a co-management process, where fisheries management stakeholders are consulted and share some management responsibility. The legislative provisions can also support a co-management process, where fisheries management stakeholders actively participate in the management process and share significant management responsibility, and also devolution of management, where local participants/stakeholders have full management responsibility. It should be noted that these participatory processes are a formal and required part of the management of all marine capture fisheries, and have specific steps that are routinely followed as part of fisheries management.

Commercial fisheries

In the three major fisheries concerned, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources. Also, stakeholders are defined in the management plans of the lobster and conch fisheries. The fishery stakeholders of these three fisheries are organized into distinct groups, and arrangements have been made to consult these stakeholders and to work with them on fisheries management issues. Currently, the management process for these commercial fisheries, as it relates to stakeholders, could be described as consultative. In comparison, the participation of stakeholders in decision-making can also be rated as

consultative in all cases. Based on the progress achieved to date, participants find that the management system creates incentives and reasons for them to voluntarily practice responsible fisheries stewardship. However, it is not known whether the participatory process has helped to stabilize stock health or to make the management process faster or to reduce conflict.

Small-scale fisheries

In the two major marine capture fisheries identified, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources. Moreover, stakeholders are defined in the spiny lobster management plan. That noted, in both fisheries, the fishery stakeholders are organized into distinct groups, and arrangements have been made to consult these stakeholders and to work with them for improved management. Currently, the management process in the case of the two major fisheries, as it relates to stakeholders, could be described as consultative. Also, depending on the situation, stakeholder participation in decision-making can be rated as: informative, consultative and under community control.

Notwithstanding, in neither of the two fisheries do the participants find that the management system creates incentives and reasons for them to voluntarily practice responsible fisheries stewardship. However, including stakeholders in the decision-making process has helped to reduce conflict. It is not known though, whether the participatory process has resulted in more stable stock health or helped to expedite the management process.

Recreational fisheries

For the major marine capture fishery, the fishery stakeholders are organized into distinct groups, and arrangements have been made to consult and to work with them on the management of the fishery. Currently, the management process in this instance, as it relates to stakeholders, could be described as consultative, with the participation of stakeholders in decision-making being rated as both informative and participative. The success of this consultative management process, however, appears not to have been evaluated in terms of its contribution to the nurturing of responsible fisheries stewardship practices, stabilization of stock biomass levels, conflict reduction and efficiency of the management process.

Transparency in management

All parts of the fisheries management process are considered to be transparent. Certainly, information about the fisheries management process is clearly documented and easily available to the public, and also meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery. This is facilitated using CONAPESCA, as expressed in the current legislation. In addition, the relevant meetings are advertised and publicized in advance of the actual meeting dates. Opportunity is also provided for both fishery participants and other stakeholders alike to contribute to the decision-making process by providing public comments. If information about management measures and meetings is shared with fishery participants and other stakeholders, this is usually disseminated using: radio announcements or talk shows; television broadcasts; printed materials, such as brochures or information packages; direct mail; fax; Internet mail; and Internet website. Information is also disseminated through meetings with fishers and leaders in ethnic languages (Miskitu, Creole), as well as in English.

Management of conflict and fishing effort

For conflict management, the fisheries management legislation sets up particular processes, such as the need to consider multiple uses and users within the fisheries

sector, as well as between the fisheries and other sectors. However, dispute resolution and conflict management processes do not appear to be a formal, active part of the management process. Notwithstanding, once a conflict takes place, the complaint is placed on record, the law is then interpreted, and punishment is applied, as required. Currently, the tools being used to manage conflict among user groups include: zoning of different areas for different users, education about sharing marine fisheries resources, and limiting access to certain areas for certain types of fishers. As already noted earlier in this report, Nicaragua has not completed the measurement and assessment of fishing capacity in all its marine capture fisheries. Essential support for this task is lacking, particularly, the political will, human resources, and stakeholder support and education.

Commercial fisheries

Conflict is an issue for all fisheries, and over the last ten years, the level or amount of conflict has increased in the spiny lobster and shrimp fisheries, but has remained unchanged in the conch fishery. Generally, reasons for the observed conflict are due to: competition for gear deployment in same fishing area and competition with other fishery uses for the same area of water. Additionally, there is also competition between different types of vessels in the case of the lobster and shrimp fisheries. In addressing issues pertaining to conflict, the management of these fisheries includes consideration of the need to consider multiple uses and users within the fisheries sector. Also, the legislation makes provisions for limiting access to certain areas for certain types of fishers in the case of the spiny lobster and shrimp fisheries.

Small-scale fisheries

Conflict is an issue for the two major small-scale fisheries identified, but it should be noted that the level or amount of conflict in these fisheries has remained unchanged over the last ten years. The conflict arises as a result of competition between different types of vessels, and also competition arises with other uses for the same area of water, either with other fisheries or with other industries. In an effort to address the conflict, the management of these fisheries includes specific steps to follow to resolve conflicts and takes into account the need to consider multiple uses and users within the fisheries sector. In terms of the legislative provisions for conflict management, these require zoning of different areas for different users and limiting access to certain areas for certain types of fishers.

Recreational fisheries

Conflict occurs in the major billfish/dolphinfish marine capture fishery identified, but the level has remained unchanged over the last ten years. Such conflict is due to competition with other uses for the same area of water, particularly involving commercial fishery users. Currently, through the legislative provisions, conflict is managed by limiting access to certain areas for certain types of fishers.

Overfishing and fishing capacity

As already noted in an earlier part of this report, overfishing is considered to be a problem only for the commercial spiny lobster fishery and the small-scale coastal finfish fisheries, but not for the other major fisheries examined. This appears to be at least partly supported by the scientific information presented here on catch rates. Of the major fisheries examined in this report, fishing capacity has been measured only for the three commercial fisheries and the small-scale coastal finfish fishery. Overcapacity is considered to be an issue for the commercial lobster fishery and also for the small-scale coastal finfish fishery. However, recent regulations have focused on reducing fishing effort and/or reducing the harvest in all three major commercial fisheries and

also the small-scale coastal finfish fishery. Capacity reduction programmes have not been set up and implemented for any of the major fisheries identified.

Management of monitoring, compliance and enforcement

Responsibility for monitoring, compliance and enforcement is shared by the fisheries agency (INPESCA), the national coastguard and the naval army force. These three government arms are responsible for at-sea fisheries patrols, monitoring and enforcement work in both the coastal waters (0–3 nautical miles) and the territorial waters (0–12 nautical miles) of Nicaragua. However, INPESCA and the naval base port authorities manage fisheries monitoring work such as checking dock-side landings and logbooks. INPESCA and the port authority are also responsible for enforcing penalties for non-compliance. The penalties for breaking marine capture fisheries management regulations and rules include: small fines for first offences, larger fines for additional offences, fixed fines for specific offences, the revocation or suspension of fishing licences, and prison terms for criminal cases. These are applicable to the commercial/industrial and small-scale/artisanal fleets, and take into account cases of poaching, piracy and illegal fishing.

At present, systems to support compliance and enforcement of fisheries management include the use of: VMS, on-board observer programmes, random dockside inspections, routine inspection schemes at landing sites, at-sea boarding and inspections, and registration of landings by vessel. These systems apply to both the commercial/industrial and small/scale artisanal fleets. While the number of offences occurring has decreased in some fisheries and remained unchanged in others over the past ten years, detection efforts (e.g. at-sea patrols, port monitors) increased between ten and five years ago, but have remained about the same since then. This appears to be related to the budget for monitoring and enforcement, which also increased between ten and five years ago, but also showed no further increases after that. Generally, the funding provided to the enforcement agency is not sufficient to allow it to enforce fisheries regulations. Penalties for non-compliance for the commercial/industrial fleet and those involved in marketing are severe or expensive enough that participants in the fisheries avoid cheating. However, the risk of detection is not high enough to deter incidents of cheating.

Commercial fisheries

In the three major fisheries identified, penalties for breaking marine capture fisheries management regulations and rules can include: small fines for first offences, larger fines for additional offences, revocation or suspension of fishing licenses, exclusion or removal from the fishery, and confiscation of fishing gear and equipment and imprisonment. Among the systems to support compliance and enforcement activities, the ones applied to the commercial fisheries include the use of: VMS, on-board observers, random dockside inspections, routine inspections at landing sites, and at-sea boarding and inspections. In the case of the commercial fisheries, the number of offences has not changed over the past ten years. Although the budget for monitoring and enforcement has been increasing over the same time period, it is still not adequate for the intended purpose. Additionally, while applied penalties are considered effective at deterring actions of non-compliance, the risk of detection is not high enough to deter cheating.

Small-scale fisheries

In these fisheries, penalties for non-compliance include: small fines for first offences, fixed fines for specific offences, and revocation or suspension of fishing licenses. Also, random dockside inspections and routine inspections at landing sites are used as part of the system for supporting compliance and enforcement of small-scale fisheries

management. A decrease was observed in the number of offences between ten and five years ago, but the number has remained unchanged since then. Similar to the commercial fisheries, while the budget for monitoring and enforcement has been increasing in the same time period, the funding provided still does not allow fisheries managers to enforce all fisheries regulations fully. Furthermore, where penalties are enforced, they are not effective at deterring actions of non-compliance, and the risk of detection is not high enough that the participants in these fisheries try not to cheat.

Recreational fisheries

In the major recreational fishery for billfish and dolphinfish, penalties for breaking marine capture fisheries management regulations and rules include: small fines for first offences, revocation or suspension of fishing licenses, refusal of the opportunity to fish for the rest of the season or year, and exclusion or removal from the fishery. Additionally, compliance and enforcement of fisheries management are supported by the use of VMS, random dockside inspections, routine inspections at landing sites, and also routine monitoring of tournament activities. The number of offences that are taking place has remained unchanged over the past ten years. The budget for monitoring and enforcement of the recreational fishery has also remained unchanged over the same time period, and besides, this is not adequate for the intended purpose. Where penalties are enforced, they are effective at deterring actions of non-compliance, although the risk of detection is not high enough that the participants in these fisheries try not to cheat.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

At present, the national government provides financial support for fisheries management activities at the national and local levels, and some funding for activities at the regional level. At least 60 percent of fisheries management activities are currently supported by national government funding. Government pays for daily management activities but only covers some of the costs for activities pertaining to research and development and monitoring and enforcement. Currently, the legislation allows for the costs associated with managing fisheries resources to be recovered using: license fees charged to participants in a fishery, license fees from participants in other fisheries such as participants in other fisheries of the same category of sector (e.g. commercial, recreational, artisanal); and from bilateral and regional projects, such as those sponsored by FAO and OSPESCA.

Generally speaking, over the last ten years the budget for fisheries management has increased at the national level, but has remained unchanged at the regional and local levels. In comparison, the costs for fisheries management, in real terms, has increased at the national level, but has remained unchanged at the regional and local levels over the last ten years. The increased management costs are mostly due to increased/improved stakeholder consultation activities, increased monitoring requirements, increased conflict management (recreational fishery) and increased member-country obligations to RFBs and RFMOs. The additional management costs are being covered partly by increased government funding/contributions, contributions from the fishery participants, and also by contributions from other sources such as projects dealing with capacity building, and monitoring and control for specific fisheries, and also projects that deliver equipment and technology.

Commercial fisheries

For the three major commercial fisheries concerned, government funding pays all the fisheries management costs, including: research and development, monitoring and enforcement, and daily management. Currently, the legislation allows for management costs to be recovered through the application of license fees for fishery participants. In

real terms, the budget for the management of these fisheries has remained unchanged over the last ten years, while their management costs have increased over the same time period. The increasing costs are due to increased monitoring requirements and are being funded both by increased funding/contributions from the fishery participants and in the case of the commercial spiny lobster fishery, regional projects of SICA/OSPESCA, FAO, WWF and USAID.

Small-scale fisheries

For the two major small-scale fisheries concerned, government funding pays all the fisheries management costs, including: research and development, monitoring and enforcement, and daily management. Currently, there are no legislative provisions to facilitate recovery of fisheries management costs in respect of the small-scale fisheries. In real terms, it appears that both the budget and costs for the management of these fisheries have remained unchanged over the last ten years. However, management costs have been supported by additional contributions via international cooperation projects and NGO-funded activities.

Recreational fisheries

Regarding management of the single major recreational marine capture fishery, government funding pays the costs for research and development, as well as for monitoring and enforcement.

Also, there are legislative provisions for licence fees to be paid by fishery participants, and this allows for some recovery of management costs. In real terms, both the budget for management activities and the costs of such activities have increased over the last ten years. The increased cost is because of: increased monitoring requirements, increased enforcement activities, increased conflict management, and increased obligations under regional/international agreements/conventions. At present, the additional management costs are being covered by increased government funding /contributions, and also from other sources such as donor-funded activities.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

As noted earlier, Nicaragua is a party to the FAO, CITES, ICCAT and UNCLOS conventions and is a member of ICCAT, WECAFC, OSPESCA, OLDEPESCA, IATTC, COPESCAALC, and the Aquaculture Network of the Americas. Additionally, the fisheries legislation makes provisions that take into account key principles and objectives of major international fisheries instruments. The principles of conservation, sustainability and the precautionary approach as stipulated by the CCRF are taken into account in the formulation and implementation of the fisheries policy and legislation in the country. The legislation also gives recognition to those conventions and multilateral and bilateral treaties and international conservation programmes that have been ratified by Nicaragua.

In terms of proceeding with implementation of the FAO Compliance agreement, the fisheries legislation has been updated, management measures and fishing regulations have been strengthened and stock assessments are now conducted. There has also been progress to implement the UN Fish Stocks Agreement (1995). The CCRF has been incorporated into the legislation, as already noted. Additionally, action plans have been developed for conservation of fishery resources and fishing capacity regulation, as well as for EAF management. The latter activity is also related to the implementation of the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003). In particular, currently, there is an effort to build capacity on EAF in stakeholders all along the industry chain, and by so doing, nurture holistic fishery and aquaculture practices. In the case of the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), Nicaragua has introduced a law prohibiting

discards. Implementation efforts have also included training of institutional staff and boat captains on the problem of discards, and the use of TEDS on shrimp trawls now ensures compliance with a NOAA requirement to minimize turtle bycatch.

A number of actions taken by Nicaragua can be considered as steps towards implementation of key FAO International Plans of Action (IPOAs). For instance, the national legislation includes a provision to guide the use of circle hooks, and this contributes to the aims of the FAO International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999). In the case of the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999), a Central American regulation has been introduced that bans shark finning, and a Regional Plan of Action in Central America has been elaborated and implemented. Additionally, Nicaragua has elaborated and implemented the corresponding NPOA, and the national Fisheries and Aquaculture Act (Act 489) includes an article that prohibits the landings of sharks without fins attached.

To date, a NPOA has been elaborated to facilitate national-level implementation of the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999). In addressing the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), a NPOA has been elaborated and is being implemented. This is also supported by the following activities: the issuance of catch and inspection certificates in landing ports; an updated register of the fishing fleet, including register of tuna vessels flagged with Nicaragua; the implementation of a national observer programme on flagged tuna vessels; and the mplementation of a regulated satellite monitoring system (VMS). Some of these activities also support the objectives of the FAO Port States Measures Agreement (2009).

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Nicaragua is a member of ICCAT, WECAFC, OSPESCA, OLDEPESCA, IATTC and COPESCAALC. Currently, participation is not considered to be adequate in respect of COPESCAALC and ICCAT, and this is due to: budgetary constraints, a shortage of human resources to cover issues, other more immediately critical fisheries management issues, inter-institutional coordination, and language barrier. Regarding the management of shared resources, the work of RFBs and RFMOs inform the objectives of the national fisheries legislation, and there are legislative provisions for implementation of measures adopted by RFBs/RFMOs. Also, to deter the activities of vessels that have reflagged to avoid regional (RFB/RFMO) conservation and management measures, the published IATTC blacklist of vessels is referred to the Directorate General of Water Transport, so that these vessels are not flagged by Nicaragua.

Concerning data reporting obligations to RFBs, Nicaragua collects and provides fishery-related data to FAO, CITES, ICCAT, OSPESCA and IATTC. To facilitate this activity, there are formal national mechanisms in place so that the relevant data are compiled and provided, as required. Where there are specific timetables for provision of fisheries-related data, such as ICCAT, Nicaragua is not able to meet these timetables. This is due to a lack of human resources to do the reporting and excessive staff workloads.

SUMMARY AND CONCLUSIONS

- The current fisheries legislation for Nicaragua is fairly recent, being adopted in 2004. The legislation includes a definition of fisheries management, general sustainable management objectives, and outlines the steps for setting up the management process. However, there is no provision for the management process to be completed in a given timeframe. Objectives and regulations adopted

by RFBs/RFMOs are incorporated and implemented. The legislation also recognizes the need for management to be informed by a broad range of scientific information, although no separate science agency is identified. INPESCA is the main agency for administration, while enforcement responsibility is shared with other government arms, such as the navy. There are also legislative provisions for stakeholder involvement, conflict management, handling prosecutions and illegal fishing by foreign vessels. However, penalty fines are not considered effective in respect of the small-scale fisheries. In conclusion, the current fisheries legislation makes provisions for most, if not all components in the management process to be addressed in an organized fashion. While legislation is in place, enactment of the provisions faces a number of constraints, as summarized and explained in the following paragraphs.

- Over 67 percent of marine capture fisheries in Nicaragua are managed in some way at all levels, and all major fisheries are managed. Fewer than 33 percent of managed fisheries has published regulations at the regional level, and >67 percent have published regulations at the national and local levels. About 33–67 percent of the regulations/rules have been informed by methodical scientific monitoring and evaluation. Management plans have been formulated for the three major commercial fisheries and also for the small-scale lobster and billfish/dolphinfish recreational fisheries. The small-scale coastal finfish fishery does not have a management plan. Management plans note general objectives. In conclusion, it appears that active management is taking place, although the percentage of regulations being informed by scientific monitoring could be improved. If not yet done, the general management objectives noted in the management plans should be further developed to formulate more specific and measurable operational objectives that could be evaluated quantitatively for better accounting purposes.
- The major commercial and small-scale fisheries identified are multispecies in nature. In the case of the shrimp fishery where there is high bycatch, the bycatch must be landed for marketing purposes. In the case of the small-scale coastal finfish fishery, minimum size limits are imposed for the main target species. These are the main ways in which multispecies aspects have been taken into account in management. In the three major commercial fisheries, catch quotas apply, and these are considered to be precautionary measures. Similarly, as the small-scale lobster fishery is subjected to the same regulation as the commercial fishery, as well as other regulations, this has been provided as an example of application of the precautionary approach. The practice of catch and release in the recreational fishery is considered to be precautionary as well. The main example of application of EAF is in the application of several minimum size limits in the case of the small-scale coastal finfish fishery. Spatial (area closures), temporal (defined fishing season), and gear/vessel restrictions are the most widely applied management tools used in Nicaragua. In addition, licensing and total allowable catch (TAC) are also used for the major commercial fisheries, and TAC has been increasingly used in the queen conch fishery over the past ten years. Seasonal closure has been increasingly used for the small-scale coastal finfish fishery. In the case of the recreational fishery, gear/vessel and catch restrictions are very common, with an increase in the use of gear restrictions over the past ten years. Arguably, the use of both temporal and spatial area closures provides a level of multispecies/ecosystem-level protection and refuge from the particular fishing impacts for both the range of species and habitats occurring in those areas. Participation restrictions, particularly limited entry, perhaps hold the best potential to nurture good stakeholder cooperation in the long term, reduce conflicts, and reduce monitoring, compliance and enforcement costs. Also, if efforts could be made to inform the establishment of participation restrictions based on ecosystem health,

impact and response data, this could provide a major step towards sustainability, with both precautionary and ecosystem concerns incorporated.

- The legislation makes provisions for a range of stakeholder participation arrangements, and stakeholders are defined in some of the management plans. However, in practice, the form of participation achieved to date appears to be a consultative process only. The small-scale fisheries management process appears to have benefited the most from stakeholder involvement in management, in that it has helped stewardship and conflict resolution. All parts of the management process are conducted in a transparent manner, affording opportunity by all concerned to contribute. Information dissemination is conducted via many media forms, and some local meetings are conducted in the local language. The present forms of participatory management appear to fall short of the full provisions of the current legislation, and in so doing, detract from the full range of anticipated potential benefits. At present, only a limited amount of benefit to the management process is noted for the small-scale fisheries, despite the fact that there are procedures in place to ensure transparency in communication and reporting. As the legislative provisions can facilitate stronger stakeholder involvement in the management process, efforts should be made to achieve this, even if it requires strong investment in stakeholder education and in capacity-building activities to enable them to be effective partners in the management process is recommended.
- Conflict exists in all major fisheries examined in this report. In the past ten years, conflict levels have increased the commercial spiny lobster and shrimp fisheries. In general, the conflict is due to competition for access to fishing areas and resources. The legislation set up processes for conflict management that take into account various users needs. The tools used to support conflict resolution among user groups have included area allocations for different uses and education in the case of the commercial fisheries, although there appears to be more emphasis on the use of area allocations in practice. In conclusion, the process for conflict management has not been able to decrease or eliminate the level of conflict in any of the major fisheries. This implies that although there may be legislative provisions and some tools have been applied to manage the conflict, these have had limited success. The efforts to date should therefore be reviewed and evaluated with the intention of introducing an improved process, and to achieve full implementation of the legislative provisions. Additionally, a more effective and active partnership with stakeholders, as previously identified, as well as transparency in terms of monitoring, evaluation and reporting, should be nurtured to ensure that conflict issues are routinely and objectively addressed.
- Overfishing and overcapacity is considered to be a problem for the commercial spiny lobster and the small-scale coastal finfish fisheries only. That said, fishing effort levels have increased in all major fisheries except the commercial spiny lobster and shrimp fisheries. Recent fishery regulations have focused on reducing fishing effort and/or reducing the harvest in the three major commercial and the small-scale coastal finfish fisheries. Fishing capacity has been measured for the three major commercial and the small-scale coastal finfish fisheries only. Hence, the small-scale lobster and recreational fishing operations do not appear to be monitored sufficiently to determine if overfishing and overcapacity exist in these fisheries. Additionally, the completion of the measurement and assessment of fishing capacity is constrained by a lack of political will, human resources, and stakeholder support and education. Scientific monitoring may have informed the regulations to reduce fishing pressure, but it appears that not all major fisheries are routinely monitored in a quantitative manner. Notwithstanding, it appears that Nicaragua has acted to put measures in place to control fishing capacity and overfishing where it is at least perceived to be the worst. If not yet done, an

economic valuation of the goods and services of the major fisheries would help to inform capacity reduction programmes and additional fishing effort controls, should these become necessary in the future.

- Several agencies share the responsibility of monitoring, compliance and enforcement activities. A range of penalties is applied, although these are not considered to be effective in the case of the small-scale fisheries. Also, more than one supporting system is in place, e.g. VMS and inspection schemes. That noted, the available budget to allow enforcement of all regulations is not adequate. Given the inadequacy of funding for enforcement activities, this suggests that the observed trend in offences is questionable, as the detection capacity is not considered to be high enough to deter incidents of cheating. The legislative and administrative framework for monitoring, compliance and enforcement exists, but implementation is clearly less than perfect. Both the implementation of the various supporting systems and enforcement patrols are likely affected by budgetary constraints. In view of the budgetary constraints and that several input controls are already applied to restrict fishing effort, greater consideration should be given to the establishment of limited-entry fisheries. Additionally, further investment in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, e.g. via limited entry, should help to reduce the incidence of non-compliance, as well as enforcement costs.
- Management costs are primarily funded by the government, with some recovery of costs facilitated through the payment of licence fees, although this is not applicable for the small-scale fisheries. It may be that the revenue from all fishing licence fees is not re-directed for supporting the continued growth of the fisheries management process. Over the past ten years, the budget for fisheries management has remained unchanged for both the major commercial and small-scale fisheries, but has increased for the recreational fishery. In comparison, over the same time period, management costs have increased for the commercial and recreational fisheries, but have remained unchanged for the small-scale fisheries. In instances of increasing management costs, these are associated with increased stakeholder interactions, monitoring and enforcement requirements, and increased obligations to RFMOs. At present, additional costs are being met mainly by government, but also by fishery participant contributions (commercial-scale spiny lobster fishery) and through donor projects. An economic valuation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Also, as stated previously, additional investments in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, e.g. via limited-entry measures, should help to limit the rising management costs.
- Nicaragua's legislation allows the country to incorporate and implement the provisions of regional/international agreements. Nicaragua has also introduced a number of rules and regulations to support compliance with such international provisions, including provisions of the CCRF, the Compliance Agreement, and the UN Fish Stocks Agreement. Implementation of the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003) has begun with the development of action plans and activities aimed at educating stakeholders about EAF management. In the case of the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), gear modification regulations have been introduced to minimize bycatch and hence discards, and these have been supported by educational programmes for those involved. Efforts have also been made for the implementation of three major FAO International Plans

of Action: the IPOA on management and conservation of sharks, mainly via the introduction of gear and fishing effort limitations and development and implementation of a NPOA; the IPOA management of fishing capacity, via elaboration of a NPOA; and the IPOA to prevent, deter and eliminate IUU fishing, via elaboration and commencement of implementation of a NPOA, catch certification scheme, improved vessel registration, and use of VMS. Nicaragua is a member of ICCAT, WECAFC, OSPESCA, OLDEPESCA, IATTC and COPESCAALC, but participation is not considered to be adequate in respect of ICCAT and COPESCAALC. In conclusion, the current fisheries legislation makes provisions for compliance with regional/international agreements. While the legislation appears reasonably comprehensive, enactment of the provisions through implementation of different components of the management process faces a number of constraints, as already described. Notwithstanding, Nicaragua's efforts to implement a number of FAO international agreements have allowed the country to identify and to begin addressing key areas of weakness, and to work towards introducing proposed new paradigms such as EAF management.

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COUNTRY REVIEW

Panama

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INTRODUCTION

Panama is the southernmost country of Central America, situated at 9° N and 80° W, on the isthmus connecting North and South America (Central Intelligence Agency, 2013). It is bordered by Costa Rica to the west, Colombia to the southeast, the Caribbean Ocean to the north and the Pacific Ocean to the south. The country has a total land area of 74 300 km^2, a total water area of 1 080 km^2 and a coastline of 2 490 km. Its maritime claims include a 12 nautical mile territorial sea, a 24 nautical mile contiguous zone, and a 200 nautical mile exclusive economic zone (or to the edge of the continental margin). Panama's GDP (PPP) is estimated at USD 58.02 billion, with a real growth rate of 10.7 percent (2012 est.). Agriculture, which includes fisheries, contributes 3.8 percent to GDP (2012 estimate). The population is estimated at 3 559 408 (July 2013).

POLICY FRAMEWORK

Several instruments of legislation are in place for governing marine capture fisheries management at the national, regional (within the country), international and local levels. These are: Act 44 of 2006, Act 59 of 1965, Decree No. 49 of 2009, Decree No. 41 of 1977, Decree No. 10 of 1985, Decree No. 33 of 1997, Decree No. 89 of 2002, and Decree No. 49 of 1992. While the term "fisheries management" is not defined in the national fisheries legislation of Panama, the legislation does provide both legal and administrative frameworks for governing the management process at all levels. Additionally, the legislation identifies a single fisheries authority for handling matters at the national, regional/international and local levels. Fisheries management objectives are listed in the legislation and have been prioritized. These objectives are incorporated into management plans, but it is not clear whether they are informed by the work of RFBs and RFMOs.

Many non-fishery legislation instruments impact fisheries management in Panama: endangered species legislation, export/import/trade legislation, biodiversity legislation, oceans policy legislation, marine park/sanctuary/reserves legislation, port management legislation, coastal zone management legislation, and forestry (mangroves) legislation. Act 41 of 1998 (General Law on Environment of the Republic of Panama), Act 57 of 2008 (The General Merchant Marine law), and Act 66 of 1947 (sanitary code, including regulations related to safety and security of biological materials) are the most important pieces of legislation in this regard.

LEGAL FRAMEWORK

The Authority on the Aquatic Resources of Panama has sole responsibility for fisheries management in the country, including sole leading responsibility for fisheries science activities and also fisheries enforcement. The fisheries legislation is designed as a framework that shapes fisheries management and management plans, including provision of specific guidance on management approaches and tools. The legislation

also sets up a series of steps or a process for developing, organizing and implementing fishery management regulations and fishery management plans. Specific management measures and regulations for individual fisheries are included. However, the legislation does not prescribe steps for setting up the management process itself and hence, this is not applied to any fishery. However, there are provisions for the management process to be completed in a given timeframe.

The legislation requires management decisions to be based on information coming from: biological analyses, economic analyses, social impact analyses, environmental analyses, ecosystem analyses/assessments, monitoring and enforcement options, and analyses by regional fisheries bodies (RFBs) or regional fisheries management organizations (RFMOs) in the case of shared resources. Apart from any formal management process, other ways in which marine capture fisheries management can occur are by: decisions made by the management agency, decisions made by other parts of government, decisions made by other countries with similar species stocks and fishery situations, and decisions made by RFBs, RFMOs, or organizations concerned with human rights, labour or trade (e.g. CITES). Examples of the ways in which national legislation implements internationally agreed measures adopted by RFMOs of which Panama is a member include: Resolution ADM/ARAP no. 59 of 10 May 2011 and Resolution No. 005 of 27 February 2012.

The national fisheries management legislation gives the fisheries management authorities the legal power to meet the priorities and obligations of: international agreements/conventions (global), regional agreements and other multilateral arrangements. Panama listed the following three major international marine fisheries management conventions to which it is a party: the United Nations Convention on the Law of the Sea – UNCLOS; the FAO Code of Conduct for Responsible Fisheries; and the International Convention for the Regulation of Whaling (1946). Additionally, Panama is a member of ICCAT, WECAFC, OSPESCA, IATTC and COPESCAALC.

In the area of prosecutions, the penal code is enforced. Act 44 and international conventions are relied upon for addressing illegal fishing issues by foreign fishing vessels. As already noted, several instruments of non-fishery legislation also impact fisheries management in Panama.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

The commercial fishery uses Florida-type vessels for shrimping that are 18–20 m long and made of wood and iron, and also *bolicheros* that are 21–22 m long, and made of iron. The shrimp vessels use trawl gear, while the *bolicheros* use purse seines. A large percentage of the catch for human consumption is destined for the international markets.

However, the most important fishery in Panama is the artisanal fishery, which is a mixed-species fishery. Artisanal fishing is done on a commercial basis, using boats usually made of wood or fiberglass. The vessel capacity is typically less than 10 tonnes (registered gross tonnage), and vessels are equipped with outboard engines. The most common artisanal fishing gears used are gillnets, longlines, and hook and line. In the case of the subsistence fishery, this involves those persons who fish to feed themselves, relatives and even neighbours, and also those who earn less than the salary of a labourer. Finally, the recreational fishery is characterized by vessels that are typically 7.5–14 m and made of fibreglass. Rod and reel gear is commonly used by the recreational fishers, and there are no specific marketing arrangements in place.

Fish production and value

Commercial fisheries

The three major commercial fisheries in Panama are: (i) a fishery for small pelagic fishes, with a production level estimated about five years ago to be 85 569 tonnes; (ii) a fishery for tuna species, with a production level estimated about five years ago to be 17 187 tonnes; and (iii) a fishery for several other large pelagic fishes, with production estimated to be 10 ,650 tonnes five years ago. These three fisheries are also among the top most valuable fisheries of the country.

Small-scale fisheries

There is only one major small-scale fishery in Panama, which is classified as an artisanal fishery. It is a multispecies fishery that harvests fish, shrimp and spiny lobster, and produces about 20 000 tonnes annually. However, production has declined over the years. It should be noted that in 2003, the artisanal fishery production was 33 827 tonnes, with an estimated value of USD 104 909 at that time.

Recreational fisheries

There are three major recreational fisheries: a fishery targeting billfishes, a fishery targeting pelagic fishes and a fishery for bottom fish. These fish are not targeted for consumptive purposes. However there are no available production and value data to determine levels and trends in these three fisheries over the most recent ten-year period.

Food security and employment

For both the commercial and small-scale fisheries, the fishery activities provide the sole source of income. As may be expected, in the case of the recreational fisheries, the fishery activities do not provide the sole source of income for the majority of vessel owners, and do not provide the sole source of food for the participants.

Fishing effort and impacts

Fishing areas

The commercial fisheries are conducted off the Pacific coast in waters under Panama's jurisdiction. In the case of the small-scale fishery, 95 percent of the operations occur in the Pacific Ocean, with the remaining 5 percent occurring in the Caribbean. Recreational fishing takes place on both the Pacific and Caribbean coasts.

Fishing effort

Levels and trends in fishing effort and licensing arrangements are shown in Tables 1, 2 and 3 for the major commercial, small-scale and recreational marine capture fisheries identified, respectively. Participants and vessels are licensed for both commercial and small-scale fishing operations, but this is not the case for recreational fishing operations. Among the major fisheries noted, the small-scale fishery has the highest number of participating individual fishers and vessels, and both the number of fishers and vessels has increased over the past ten-year period. Based on the data provided on the commercial fisheries for small pelagic fish and tunas, the small pelagic fishery has the higher level of fishing effort, both in terms of individual participants and fishing vessels used. That noted, fishing effort levels in these two commercial fisheries have decreased over the past ten years. Regarding the recreational fisheries, an estimated 30, 50 and 20 percent of the fishing effort conducted in the billfish, pelagic and bottom fish fisheries, respectively are conducted by foreign tourists. Moreover, recreational fishing effort has increased in the past ten years.

TABLE 1
The approximate current level of fishing effort for two of the three major commercial fisheries, licensing arrangements and perceived trend over the last ten years. No data are available for the large-pelagic fishery

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Small pelagic	4 000	yes	d	645	yes	d
Tunas	1 000	yes	d	104	yes	d

TABLE 2
The approximate current level of fishing effort for the single major small-scale marine capture fishery, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Multispecies	203 00	yes	i	8 700	yes	i

TABLE 3
The approximate current level of fishing effort for the three major recreational fisheries, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Billfish	400	no	I	30%	no	i
Pelagic	500	no	I	55%	no	i
Bottom fish	100	no	i	15%	no	i

Overfishing and fishing capacity

Panama's legislation does not provide a definition of overfishing. Overfishing is not considered to be a problem in the major commercial fisheries noted, despite the fact that catch rates have shown a constant or decreasing trend in recent years in these fisheries. In contrast, overfishing is believed to be occurring in the single major small-scale fishery identified, and a constant or decreasing catch rates has also been observed in this fishery. Similar to the commercial fisheries, overfishing is not believed to be an issue for any of the major recreational fisheries, although no supporting information is available on catch rate trends over time.

Regarding management of fishing capacity, this has been measured for the commercial small pelagic fishery, but not the tuna and other large-pelagic fisheries. Perhaps in view of this, the regulations in the last two to three years have focused on reducing fishing effort and/or reducing the harvest in the small pelagic fishery only. That said, overcapacity is not considered to be an issue in these major commercial fisheries. In comparison, fishing capacity has been measured for the single major small-scale/artisanal fishery. There is a sense that overcapacity does not exist in this fishery, and so the regulations of the past two to three years have not focused on reducing either fishing effort or harvest levels. In the case of the recreational fisheries, fishing capacity has not been measured for any of the three major fisheries. No additional information is available to determine if there is a problem of overcapacity for these fisheries and whether recent regulations have been imposed to reduce fishing effort impacts.

MANAGEMENT ACTIVITY

General nature and extent

The percentage of fisheries that are managed is unknown. Additionally, management plans have not been developed for the major fisheries, and management objectives have not been established. Legislation is currently being developed for the sport fishery that would improve its regulation in the future.

Regarding provisions included in global fisheries agreements, some actions have been taken. For example, Panama has developed a parallel National Plan of Action

(NPOA) to implement the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), and an inter-agency commission on IUU fishing has also been established to oversee implementation of the NPOA. Similarly, a prohibition on discards in the Eastern Pacific Ocean is seen as a positive contribution towards the implementation of the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010). In the case of the FAO Port States Measures Agreement (2009), certain ports have been authorized for dealing with the landing of fishery products, and prior notification must be given by vessels seeking port entry.

Management approaches and tools

Multispecies aspects

The major commercial fisheries are multispecies in nature, but the management of the fisheries does not take this into account. On the other hand, the single important small-scale/artisanal fishery is multispecies in nature, and this is taken into account to some extent by the issue of species-specific fishing permits, e.g. for fish, shrimp and lobster. In this way, there is some control of fishing effort directed at the various species caught by the small-scale artisanal fishery. Similar to the commercial fisheries, the major recreational fisheries are multispecies in nature, but present management of the fisheries does not take this into account.

EAF and precautionary approach

In Panama, fisheries management does not currently include specific ways for applying the ecosystem approach to fisheries (EAF) management or the precautionary approach.

Management tools and trends in usage

In the major commercial fisheries, the primary management tools are shown in Table 4. The fishery management tools being used in these three marine capture fisheries are the same type as used in other fisheries in this category, and include mostly the use of marine protected areas and gear/engine restrictions. Participatory restrictions, such as licensing and catch controls, have also been applied to the small-pelagic and tuna fisheries. Over the past ten years, there has been an increasing use of marine protected areas (where fishing is prohibited) to control the small-pelagic and tuna fishery operations. In the same time period, there has been a decreasing use of the limited entry measure for the small-pelagic fishery.

TABLE 4
Types of management tools used in the three major commercial fisheries identified

Type of Management Tool	Small pelagics	Tunas	Other large pelagic
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)			
Temporal restrictions such as:			
Defined fishing season(s)	√		
Defined number of days fishing	√		
Defined number of hours per day fishing	√		
Defined number of hours fishing	√		
Gear restrictions such as:			
Vessel size restrictions			
Engine size restrictions	√		
Gear size restrictions	√	√	√

TABLE 4 (CONTINUED)

Type of Management Tool	Small pelagics	Tunas	Other large pelagic
Gear type restrictions	√	√	√
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses	√		
Limited entry (limited vessels or limited fishers)	√		
Catch restrictions such as:			
Total allowable catch (TAC) limits	√	√	
Vessel catch limits	√	√	
Individual vessel quotas			
Rights- /incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions			
Taxes or royalties			
Performance standards			

In the single major small-scale fishery, the primary management tools are shown in Table 5, and include mostly spatial (temporary and permanent area closures) and gear/equipment control measures. Similar to the commercial fisheries, the past ten-year period has seen an increasing use of marine protected areas (where fishing is prohibited) as a tool to control small-scale fishery operations.

TABLE 5
Types of management tools used in the single major small-scale fishery identified

Type of Management Tool	Mixed species		
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)	√		
Temporal restrictions such as:			
Defined fishing season(s)			
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions	√		
Engine size restrictions	√		
Gear size restrictions	√		
Gear type restrictions	√		
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses			
Limited entry (limited vessels or limited fishers)			
Catch restrictions such as:			
Total allowable catch (TAC) limits			
Vessel catch limits			
Individual vessel quotas			
Rights- /incentive-adjusting regulations such as:			

TABLE 5 (CONTINUED)

Type of Management Tool	Mixed species		
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions			
Taxes or royalties			
Performance standards			

For the recreational fisheries, the primary management tools are show in Table 6. Over the last ten years, there has been an increasing use of marine protected areas where fishing is prohibited. Over the same time period, there has been the introduction and increasing use of commercial sale restrictions on the catches and incentives for harvesting invasive species such as lionfish. Also there has been the introduction and increasing use of hook type and size measures for the billfish fishery.

TABLE 6
Types of management tools used in the three major recreational fisheries identified

Type of Management Tool	Billfish	Pelagic	Bottom fish
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)			
Temporal restrictions such as:			
Defined fishing season(s)			
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			
Gear restrictions such as:			
Vessel size restrictions			
Engine size restrictions			
Gear size restrictions			
Gear type restrictions			
Hook and line restrictions			
Hook type/size restrictions			
Bait restrictions (e.g. use of artificial lures vs. fresh/live bait)			
Method restrictions such as:			
Motor trolling			
Use of artificial light			
Use of scents			
Size restrictions (i.e. minimum or maximum sizes)			
Participatory restrictions such as:			
Licenses			
Limited entry			
Number of rods/lines per vessel			
Catch restrictions such as:			
Total allowable catch (TAC) limits			
Vessel catch limits			
Individual vessel quotas			
Bag limits			
Fish holding limits			

TABLE 6 (CONTINUED)

Type of Management Tool	Billfish	Pelagic	Bottom fish
Sales restrictions such as:			
Commercial sale restrictions			
Rights-/incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)			
Territorial use rights			
Stock use rights			
Encouragement of harvest of overabundant species			
Encouragement of harvest of invasive species (e.g. lionfish)			
User conveniences such as:			
Provision of landing sites/fish piers	√	√	√
Provision of fish cleaning stations	√	√	√
Regionally/internationally agreed restrictions	√	√	√
Taxes or royalties	√	√	√
Performance standards			

International standards

Neither the major commercial fisheries nor the small-scale/artisanal fishery is managed using performance standards, nor managed based solely on regionally/internationally agreed restrictions. In the case of the major recreational fisheries, there are voluntary regulations/codes of conduct in place to support management of the fisheries, but these fisheries are not managed based solely on regionally/internationally agreed restrictions.

Role and impact of marine reserves

Management of the important commercial and small-scale fisheries is listed as one of the objectives or reasons for establishing marine protected areas or reserves. However, the impact of marine protected areas or reserves on the management of these fisheries has not been determined.

Stakeholder involvement and transparency in management

Stakeholders are formally involved in the management of all marine capture fisheries at all levels (national, regional (within the country) and local). However, there is no formal definition of the groups included as stakeholders. Currently, in terms of provisions for a participatory process, the legislation enables consultative management, as well as co-management arrangements. However, it is not clear whether the participatory process is a formal requirement, and if there are specific steps that are followed routinely for all fisheries.

Commercial fisheries

In all three major commercial fisheries, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources, and in the case of the small pelagic fishery, the fishery stakeholders are organized into distinct groups. Arrangements have also been made to consult the stakeholders in all three fisheries examined and to work with them on management issues. Currently, stakeholder involvement in decision-making can be rated as participative. In all three fisheries, the participants find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. Additionally, as a consequence of the participatory process, the management measures have resulted in stable stock levels over the last five years, the management process has been made faster and conflict has reduced.

Small-scale fisheries

In the single major fishery identified, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources, and the fishery stakeholders are organized into distinct groups. In addition, arrangements have been made to consult these stakeholders and to work with them on the management of the fishery. In the case of the main small-scale/artisanal fishery, the management process, as it relates to stakeholders, could be described as one of co-management, where fisheries management stakeholders are consulted and share some management responsibility. In this regard, the level of stakeholder involvement achieved can be rated as both communicative and participative. Although the participants find that the management system creates incentives and reasons for them to practice "responsible" fisheries stewardship voluntarily, the participatory process has not produced management measures that have resulted in stable stock levels over the last five years. Moreover, where stakeholders are part of the fisheries management decision-making process, this has not made the management process faster or helped to reduce conflict.

Recreational fisheries

In all three major fisheries identified, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources. Also, the fishery stakeholders are organized into distinct groups, and arrangements have been made to consult these stakeholders and to work with them on management issues. At present, the management process, as it relates to stakeholders in the three fisheries, could be described as consultative, and stakeholder participation in decision-making can be rated as: informative, consultative, communicative, advisory and participative. No additional information is available to determine if stakeholder involvement has improved the management process and responses.

Transparency in management

All parts of the fisheries management process are considered to be transparent. Certainly, information about the fisheries management process is clearly documented and easily available to the public, and meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery. Such meetings are advertised and publicized in advance of the actual meeting dates, and opportunity is provided to both fishery participants and other stakeholders to contribute to the decision-making process by providing public comments. If information about management measures and meetings is shared with fishery participants and other stakeholders, the information is disseminated using direct mail, fax and Internet mail. The Board of Directors, which has a representative of each stakeholder group/guild, is also formally notified.

Management of conflict and fishing effort

The fisheries management legislation does not set up any particular processes for a structured approach to managing conflict. Hence, dispute resolution and conflict management processes are not a formal part of the marine capture fisheries management process.

Commercial fisheries

Conflict is not considered to be a major problem for the three commercial fisheries examined, and the level or amount of conflict in these fisheries has decreased over the last ten years. Where conflict exists, it is mostly due to competition with other uses, particularly recreational uses, for the same area of water. In an effort to address the conflict, management of these fisheries includes the need to consider multiple uses and users between the fisheries and other sectors in the case of the small pelagic and tuna

fisheries. The legislative provisions facilitate conflict management to the extent that they require: zoning of different areas for different users and limited access to certain areas for certain types of fishers in all three fisheries. In addition, management includes education about sharing marine fisheries resources in the case of the small pelagic fishery.

Small-scale fisheries
The level or amount of conflict in the single major small-scale fishery has remained unchanged over the last ten years, and occurs mostly owing to competition with other uses and other fisheries for the same area of water. For this fishery, management includes the need to consider multiple uses and users, both within the fisheries sector and in other sectors. To address such conflicts, the legislative provisions require: zoning of different areas for different users, education about sharing marine fisheries resources, and limited access to certain areas for certain types of fishers.

Recreational fisheries
No information was provided on the occurrence and management of conflict for these fisheries.

Overfishing and fishing capacity
As already mentioned, overfishing is not considered to be a problem in the major commercial or recreational fisheries. It should be noted though that commercial fishery catch rates have shown a constant or decreasing trend in recent years. On the other hand, overfishing is considered to be an issue for the single major small-scale fishery, and catch rate trend appears to support this statement. Fishing capacity has been measured for the commercial small-pelagic fishery and the small-scale fishery only. Overcapacity is not considered to be an issue for the important commercial and small-scale fisheries. The analysis of fishing capacity and overcapacity has not been completed for the recreational fisheries. Regulations to control fishing effort levels and impacts have been in place in recent years in respect of the commercial small-pelagic fishery only, but capacity reduction programmes have not been set up and implemented for any fishery in Panama.

Management of monitoring, compliance and enforcement

Monitoring, compliance and enforcement support are provided by Panama's national fisheries agency, its coastguard, marine police enforcement unit, and marine transport agency that does fisheries enforcement. In particular, the coastguard, fisheries agency and the marine transport agency are responsible for at-sea fisheries patrols, monitoring and enforcement work in the coastal waters (0–3 nautical miles) of Panama. In the case of at-sea fisheries patrols, monitoring and enforcement work in the territorial waters (0–12 nautical miles), this responsibility is held by the coastguard and the marine transport agency. The fisheries agency, together with the marine transport agency, is primarily responsible for fisheries monitoring work such as checking dock-side landings and logbooks.

Penalties for breaking marine capture fisheries management regulations and rules include: small fines for first offences, larger fines for additional offences, fixed fines for specific offences, the revocation or suspension of fishing licences, the refusal of the opportunity to fish for the rest of the season or year, and the exclusion or removal from the fishery. Additionally, the system to support compliance and enforcement of fisheries management includes the use of: VMS, on-board observers, random dockside inspections, routine inspections at landing sites, and at-sea boarding and inspections. Over the past ten years, the frequency of offences has remained unchanged. On the other hand, between ten and five years ago, detection efforts were steadily increased,

but then have remained unchanged since that time. The budget for monitoring and enforcement has increased for the commercial fisheries over the past ten years, but has remained unchanged for other fisheries over the same time period. It does not appear that the funding provided to the relevant enforcement agency allows it to enforce all fisheries regulations. For the small-scale and recreational fisheries, the penalties for non-compliance are severe or expensive enough that participants in the fisheries avoid cheating.

Commercial fisheries

In the major fisheries examined, the penalties for breaking marine capture fisheries management regulations and rules include: small fines for first offences, larger fines for additional offences, fixed fines for specific offences, revocation or suspension of fishing licenses, refusal of the opportunity to fish for the rest of the season or year, and exclusion or removal from the fishery. The system to support compliance and enforcement of fisheries management in the commercial fisheries includes the use of: VMS, on-board observers, random dockside inspections, routine inspections at landing sites, and at-sea boarding and inspections. Over the last ten years, the number of offences that are taking place has been unchanged in all three major fisheries. However, the budget for monitoring and enforcement has been increasing in the same time period. Nonetheless, in all three fisheries, the funding provided does not allow fisheries managers (and others) to enforce all fisheries regulations fully. Where penalties are enforced, they are not effective at deterring actions of non-compliance, although the risk of detection is considered to be high enough that the participants in these fisheries try not to cheat.

Small-scale fisheries

The penalties for non-compliance in the single major fishery identified include: small fines for first offences, fixed fines for specific offences, revocation or suspension of fishing licenses, and exclusion or removal from the fishery. Similar to the commercial fisheries, the system to support compliance and enforcement of activities in the small-scale fishery includes the use of: VMS, on-board observers, random dockside inspections, routine inspections at landing sites, and at-sea boarding and inspections. Over the last ten years, the number of offences that are taking place has been unchanged. The budget for monitoring and enforcement has also remained unchanged in the same time period. Currently, the funding provided does not allow fisheries managers (and others) to enforce all fisheries regulations fully. Where penalties are enforced, they are believed to be effective at deterring actions of non-compliance, and the risk of detection is also high enough that the participants in this fishery try not to cheat.

Recreational fisheries

Penalties for breaking marine capture fisheries management regulations and rules include: small fines for first offences, larger fines for additional offences, and fixed fines for specific offences. In the recreational fisheries, the system to support compliance and enforcement of fisheries management includes the use of routine monitoring of tournaments. Over the last ten years, the number of offences that are taking place in the three major recreational fisheries has remained unchanged. The budget for monitoring and enforcement has also remained at the same level in the same time period. It is not known whether this budget is sufficient to allow fisheries managers (and others) to fully enforce all fisheries regulations for these fisheries. Where penalties are enforced, they are believed to effective for the intended purpose, although it is not known whether the risk of detection is high enough to serve as an effective deterrent for cheating.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Fisheries management requires national government funding, which is used to support activities at all levels (national, regional/(within the country) and local levels), including activities pertaining to: research and development, monitoring and enforcement, and daily management. Currently, the legislation allows for the costs associated with managing fisheries resources to be recovered using: licence fees charged to participants in the fishery and licence fees charged to participants in other fisheries of the same category. NGO-sponsored activities also assist with management costs.

In real terms, over the last ten years the budget for fisheries management has increased or remained unchanged depending on the fishery. At the same time, in real terms also, the costs for fisheries management have increased, and this is believed to be due to: increased/improved stakeholder consultation, increased monitoring requirements, increased enforcement activities, increased litigations, increased conflict management, and increased rate of modifying fisheries management regulations. Currently, the increased costs for marine capture fisheries management are being funded partly by increased government funding/contributions and/or increased funding/contributions from fishery participants. NGO projects have also contributed funds to address some specific management costs.

Commercial fisheries

In the case of the commercial fisheries, government funding pays all the fisheries management costs. As already noted, the legislation allows for some of these costs to be recovered using licence fees charged to participants operating in the commercial fisheries. In real terms, the budget for the management of the commercial fisheries has increased over the last ten years, but management costs for these fisheries have also increased in real terms in the same time period. The increase in costs are because of: increased/improved stakeholder consultation, increased monitoring requirements, increased enforcement activities, increased litigation, increased conflict management, and increased obligations under regional/international agreements/conventions to which the country is a party in the case of the tuna and other large-pelagic fisheries. Currently, the increased costs for commercial marine capture fisheries management are being funded by: increased government funding/contributions and also increased funding /contributions from fisheries participants.

Small-scale fisheries

Government funding pays all the management costs for the single major fishery examined. At present, there are no legislative provisions facilitating the recovery of management costs, e.g. by licence fees. In real terms, both the budget and costs for the management of this fishery have increased over the last ten years. The management costs have increased because of: increased monitoring requirements, increased enforcement activities, and increased obligations under regional/international agreements/conventions to which the country is a party. These increased costs are being funded by the government.

Recreational fisheries

Similar to other fishery subsectors, government funds covers all the fisheries management costs.

In the case of the recreational fisheries, the legislation does not allow for the costs associated with managing these fisheries resources to be recovered. In real terms, the budget for the management of the recreational fisheries has remained unchanged over the last ten years, but corresponding management costs have increased at the same time. The increasing costs are because of: increased/improved stakeholder consultation, increased monitoring requirements, and increased enforcement activities.

In these fisheries, the increased costs are being addressed through increased funding/contributions from the fisheries participants themselves.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Panama's national fisheries management legislation gives the fisheries management authorities the legal power to meet the priorities and obligations of international agreements/conventions (global), regional agreements and other multilateral arrangements. Additionally, Panama is a party to the following three major international marine fisheries management conventions: UNCLOS, the FAO Code of Conduct for Responsible Fisheries, and the International Convention for the Regulation of Whaling (1946). In terms of RFB membership, Panama is a member of ICCAT, WECAFC, OSPESCA, IATTC and COPESCAALC.

Panama has taken a number of actions to address various provisions of international fisheries agreements. For example, a NPOA has been developed and an inter-agency commission on IUU fishing has been established, both with the intention to support implementation of the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001). Regarding the FAO Port States Measures Agreement (2009), certain ports have been designated as authorized ports for landing products, and fishing vessels must give prior notification of port entry needs. The inter-agency commission on IUU fishing, already mentioned, is expected to oversee port management issues as well. Finally, in the case of the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), Panama has imposed a prohibition of discards for its fishing fleet operating in the Eastern Pacific Ocean.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

At present, Panama is a member of ICCAT, WECAFC, OSPESCA, IATTC and COPESCAALC. Additionally, Panama participates in/cooperates with the WCPFC even though it is not a member of that RFB. It should be noted that there are no organizations that Panama belongs to, for which the country is not actively carrying out or otherwise undertaking activities. However, no national measures have been identified with the purpose of deterring the activities of vessels that have reflagged to avoid regional conservation and management measures.

Panama collects and provides CITES, FAO, ICCAT and IATTC with fishery-related data that could be used by these RFBs to establish fisheries management regulations. To facilitate this reporting activity, there are formal national mechanisms in place so that fishery-related data are compiled and provided, as required. These RFBs have specific timetables for reporting of data by countries, and Panama is generally able to meet these timetables. However, sometimes the country is unable to meet the reporting timetable, and this is due mainly to a lack of budget and also human resources to do the reporting.

SUMMARY AND CONCLUSIONS

- The current fisheries legislation does not appear to include specific provisions for addressing EAF and the precautionary approach. While the legislation establishes both legal and administrative frameworks for fisheries management, it does not outline steps for setting up the management process and does not prioritize management objectives. The legislation recognizes the need for management to be informed by a broad range of scientific information, although decisions can also be taken based on inputs from other sources, such as other parts of government and the work of external organizations (RFBs/RFMOs, and CITES). ARAP is the agency with lead responsibility for overseeing all fisheries management activities: administration, science and enforcement. There are also some legislative

provisions for stakeholder involvement (consultative and co-management), use of conflict management tools, and handling prosecutions. Penalty fines are not considered effective in respect of the commercial fisheries. In conclusion, the current fisheries legislation makes general provisions for fisheries management, but a structured process for management is not evident. The legislation also precedes key major international fisheries agreements, and thus may need to be updated so that specific provisions could be incorporated to address the obligations of these international agreements.

- No information has been made available on the percentage of fisheries being managed in Panama. It also appears that apart from the legislative provisions, management plans and objectives have not been specifically formulated for the major fisheries. A structured and routine management process is also not evident. In conclusion, it appears management is not guided by defined plans and objectives, and this makes it difficult to determine if real progress in management is being achieved. If this is indeed the case, fishery-specific management plans and objectives need to be developed in accordance with the legislative provisions. The elaboration of specific and measurable operational management objectives that could be evaluated quantitatively for better accounting purposes is strongly recommended. The implementation of management plans also needs to be supported by a structured management process and completed in an agreed and practical timeframe. This would facilitate timely review and evaluation of the progress achieved and areas in need of additional attention.
- All major fisheries are multispecies in nature. At present, the only action addressing multispecies aspects involves the issuing of species-specific licences for the single and most important small-scale/artisanal fishery. EAF and the precautionary approach are not yet being implemented. In terms of management tools, spatial (marine reserves and temporary area closures) and gear/engine/fishing equipment controls are most common in Panama. Over the past ten years, there has been an increasing use of marine reserves (where fishing is prohibited) as a control measure for all major fisheries, although the actual impact of this tool on management of these fisheries remains undetermined. Catch controls and incentives for harvesting invasive species such as the Pacific lionfish have also been introduced in recent years in the recreational fishery. Apart from the recreational fisheries where voluntary codes of practice are applied, none of the major fisheries is managed against international performance standards or solely on regional/international restrictions. In conclusion, arguably, the use of spatial area closures provides a level of multispecies/ecosystem-level protection and refuge from the particular fishing impacts for both the range of species and habitats occurring in those areas, although the impact of this would be limited for the more migratory species such as the pelagic fishes. While gear/engine/equipment controls can reduce fishing input impacts, participation restrictions, particularly limited entry, perhaps hold the best potential to nurture good stakeholder cooperation in the long term, reduce conflicts, and reduce monitoring, compliance and enforcement costs. Also, if efforts could be made to inform the establishment of participation restrictions based on ecosystem health, impact and response data, this could provide a major step towards sustainability, with both precautionary and ecosystem concerns being addressed.
- The legislation makes provisions for certain stakeholder participation arrangements, but stakeholders are not defined in the legislation. However, in practice for all the major fisheries examined, stakeholders are organized into distinct groups, and efforts are made to involve them in the management process. The highest form of participatory management achieved to date is a co-management arrangement for the main small-scale/artisanal fishery. However,

the recreational fishery benefits the most based on the nature and quality of stakeholder inputs, while in terms of improving the management process and outcomes (stock health, quickness of process and conflict), the commercial fisheries appear to have been the most successful. All parts of the management process are conducted in a transparent manner, affording opportunity for all concerned to contribute. Information dissemination is conducted mainly via both physical and electronic distribution of printed documentation, Internet email and during fisheries management meetings. In conclusion, the present forms of participatory management have had measurable success mostly in the case of the commercial fisheries, despite the fact that there are procedures in place to ensure transparency in communication and reporting. Where participatory and catch controls are applied, as is the case for the commercial and recreational fisheries, these measures may provide a level of comfort and security for the operators concerned, which in turn may be expected to nurture a more trustful partnership between managers and resource users that is capable of yielding tangible results. It is also possible that the quality of stakeholder inputs may need to be improved in the commercial and small-scale fisheries. In this case, there needs to be investment in stakeholder education and in capacity-building activities to enable them to be truly effective partners in the management process.

- In the past ten years, conflict levels have decreased in the commercial fisheries but have remained unchanged in the small-scale/artisanal fishery. In general, the conflict is due to competition for access to fishing areas and resources. While the legislation does not outline a specific process for dispute resolution and conflict management, current management practices take into account various users needs in these fisheries. To date, the tools used to support conflict resolution among user groups have included area allocations for different uses, limited access for certain users, and education in the case of the commercial small-pelagic and small-scale/artisanal fisheries. In conclusion, even though there is no formal process for managing conflict, the management tools applied have considered multiple-user needs. It is also possible that licence and limited entry controls have helped to effect a reduction in conflict observed for the commercial fisheries over the past ten years, when compared to the small-scale fishery, where limited entry controls are not used and the level of conflict has remained about the same in recent years. A more effective and active partnership with stakeholders, as previously identified, as well as transparency in terms of monitoring, evaluation and reporting should be nurtured to ensure that conflict issues are routinely and objectively addressed.
- Fishing effort levels have increased in the small-scale/artisanal and recreational fisheries, and among the main fisheries, fishing capacity has been measured only in the commercial small pelagic and the single important small-scale/artisanal fisheries. Overfishing is considered to be a problem for the small-scale/artisanal fishery. Additionally, catch rates trends have become constant or shown decreases in both the commercial and small-scale fisheries. Although fishing capacity is not believed to be excessive in either the main commercial or small-scale fisheries, recent regulations have focused on reducing fishing effort and its impacts only in the commercial small-pelagic fishery. The occurrence of overfishing and overcapacity has not been evaluated for the recreational fisheries. In conclusion, Panama has acted to put measures in place to reduce fishing effort and its impacts in the commercial small-pelagic fishery, but parallel regulations are not in place where overfishing is currently occurring in the small-scale/artisanal fishery. As the small-scale/artisanal fishery has the highest number of participants, there may be real concerns about the livelihood impact of certain fishing effort controls. In view of this and if not yet done, an economic valuation of the goods and services

of the major fisheries, should be used to inform required capacity-reduction programmes and additional fishing effort controls so as to have minimal impact on livelihood benefits.

- Several agencies share the responsibility of monitoring, compliance, and enforcement activities. Also, more than one supporting system is in place, e.g. VMS, observer programmes and inspection schemes. That noted, the available budget to allow enforcement of all regulations is not adequate. Given the inadequacy of funding for enforcement activities, this suggests that the observed trend in offences is questionable. Also, penalties are considered to be effective only in the case of the small-scale and recreational fisheries. In conclusion, both the implementation of the various supporting systems and enforcement patrols are likely being affected by budgetary constraints, as explained. Penalties for the commercial fishery need to be reviewed, as they are considered ineffective. Greater consideration should also be given to the establishment of limited-entry fisheries, and further investment in stakeholder education and nurturing stakeholder support and involvement. This will demonstrate a process designed to safeguard participants' interests, which should help to reduce the incidence of non-compliance, as well as enforcement costs.
- Management costs are primarily funded by the government, with some recovery of commercial fishery management costs facilitated through the payment of licence fees. In the small-scale fishery, it may be that the revenue from fishing licence fees is not re-directed for supporting the continued growth of the fisheries management process. Over the past ten years, the budget for fisheries management has increased for both the major commercial and small-scale fisheries, but has remained unchanged for the recreational fishery. Over the same time period, all management costs have increased as a result of increased activities in various aspects of management, depending on the fishery. The additional costs are being met by government only in the case of the small-scale fishery, by fishery participants themselves in the case of the recreational fishery, and by both sources in the case of the commercial fishery. In conclusion, options for cost recovery are limited. An economic valuation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Also, as stated previously, additional investments in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, e.g. via limited entry measures, should help to limit the rising management costs.
- Panama's legislation allows the country to incorporate and implement the provisions of regional/international agreements. Panama has also taken actions to support compliance with certain international legal provisions. In this regard, particular mention should be made of Panama's NPOA on IUU, the establishment of an inter-agency commission on IUU, and improved port management controls. Additionally, Panama is a member of several RFBs and strives to fulfill those data reporting obligations required for development of fisheries management regulations. A lack of budget and human resources sometimes poses constraints for fulfillment of statistical reporting obligations to the RFBs noted. In conclusion, the current fisheries legislation makes provisions for compliance with regional/international agreements, and Panama has begun to make efforts to address some of the key provisions. Priorities for participation in RFBs should be reviewed and evaluated, including from an economic standpoint, so as to generate the required active support for meaningful cooperation with the relevant RFBs. This is quite important for Panama, where several major fisheries harvest resources that are known to be migratory.

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COUNTRY REVIEW

Saint Lucia

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INTRODUCTION

Saint Lucia is one of the small island developing states (SIDS) located within the West Indies archipelago at latitude 13° 53' N and longitude 60° 58' W and is the second largest of the four Windward Islands. The island has an area of 616 km^2 and a small economy heavily dependent on agriculture and tourism (GOSL, 2009). St. Lucia's coastline is 158 km (Central Intelligence Agency, 2013). Saint Lucia's GDP (PPP) is USD 2.233 billion, with a real growth rate of -0.4 percent (2012) (Central Intelligence Agency, 2013). Agriculture, which includes fisheries, contributes 3.1 percent to GDP (2012). The island has a resident population of 165 595 and a population density of 308 persons/km^2 (796 persons per square mile), living on a total land area of approximately 537 km^2 (GOSL, 2011). Due to the rugged topography of the interior of the island, most of the population and economic activity is concentrated along the coast or in close proximity to the coastline. It is estimated that 75 percent of populations of Caribbean islands are nestled along the coastal zone (Wade and Webber, 2002). The high ratio of coastline to land area and the concentration of people and economic activity along the coast makes the island, its coastal resources and its people highly vulnerable to the impacts of natural disasters like floods, tropical storms and hurricanes.

Saint Lucia's small economy has historically depended and continues to depend heavily on its limited natural resources for tourism, agriculture and fisheries. Recognizing the critical importance of the fisheries sector to the livelihoods of numerous persons, the Fisheries Management Plan (FMP) of Saint Lucia (2006) enunciates that the government is committed to the conservation and sustainable use of fisheries and associated resources for the long-term benefit of its people. In addition, the plan vouches to ensure that the management decisions undertaken by resource users and managers will be guided by the best scientific evidence available, taking into account traditional knowledge of the resources and their habitats, as well as relevant environmental, economic and social factors to ensure their effective conservation and management (Government of Saint Lucia, 2006).

The Saint Lucia fishing industry comprises demersal, coastal pelagic and offshore pelagic fisheries. The fishing year for Saint Lucia is divided into a high season that typically extends from December to May when significant landings of offshore migratory pelagic species are landed and a low season during June to November when relatively large quantities of demersal fish species are landed.

In 2012, the total annual production for commercial capture fisheries was 1 709 tonnes, of which the offshore pelagic fishery accounted for 64 percent of the annual landings (Department of Fisheries, 2012) which were made up of a number of migratory species including dolphinfish (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), blackfin tuna (*Thunnus atlanticus*), yellowfin tuna (*Thunnus albacares*), skipjack tuna (*Katsuwonus pelamis*) and sharks (various families).

The fishing fleet for the sector consists of 700 registered commercial fishing vessels operated by 2 556 registered fishers (Department of Fisheries, 2012). The fishing fleet is composed of seven vessel classes, but it is dominated by open fibreglass pirogues (76 percent) and the traditional dug-out canoes (12 percent). The vessels in the fishing sector are 3–25 m in length and are powered mainly by 75 hp outboard engines. Due to the multispecies nature of the fishery, most vessels are generally equipped with multiple fishing gears, usually including: trolling lines, flyingfish nets, longlines (palangres), gillnets, handlines and fishpots (traps). Fishing trips are usually one-day trips of three to eight hours duration (Department of Fisheries, 2012).

POLICY FRAMEWORK

The primary fisheries legislation in place is the Fisheries Act, Chapter 7 of the revised laws of Saint Lucia 2008 (originally referred to as the Fisheries Act No. 10 of 1984 and the Fisheries Regulations No. 9 of 1994). This legislation makes provisions for the management of the fisheries at the national and local levels. Although the term fisheries management is not defined in the legislation, and fisheries management objectives are not listed, within the legislation there are provisions for both legal and administrative frameworks for governing the management process at the national and local levels.

Despite Saint Lucia's legislation predating the 1995 Code of Conduct for Responsible Fisheries (CCRF), the country has identified the following actions to implement the 1995 CCRF: educating fishers and consumers in responsible fishing practices and consumption practices; revising the existing Fisheries Act and Regulations to take into consideration current international and regional commitments and emergent factors affecting fisheries, as well as to increase the scope of penalties to serve as a deterrent to non-compliance; monitoring of critical habitats such as coral reefs and also of vulnerable resources such a sea urchins and continued collection of fish landing and effort data; and licensing and registering fishing vessels and operators.

There are other statutes that influence fisheries management in Saint Lucia. These include: the Wildlife Protection Act Chapter 6.03; the Physical Planning and Development Act Chapter 5.12; the Forest, Soil and Water Conservation Act Chapter 7.09, the Maritime Areas Act Chapter 1.16, and the Trade Licence Act, Chapter 13.04 of the Revised Laws of Saint Lucia 2005. Additionally, there is the International Trade in Wild Fauna and Flora Act No. 7 of 2007.

LEGAL FRAMEWORK

The present legislation does not identify a specific lead agency but refers to the Minister responsible for Fisheries appointing a Chief Fisheries Officer and other Fisheries Officers who are necessary to give effect to the act at the national level. That noted, the post of Chief Fisheries Officer is formally established within the institutional structure of the national fisheries department within the ministry responsible for fisheries matters, which is the Ministry of Agriculture, Food Production, Fisheries and Rural Development.

Provisions for the identification of entities with responsibility for various components of fisheries management are included within the national fisheries legislation. The legislation makes provisions for establishment of local fisheries management authorities if the minister deems fit, and these entities would therefore be delegated specific areas of authority, referred to as local fisheries management areas; for example, the Soufriere Marine Management Association (SMMA). The SMMA is a designated local fisheries management authority and therefore, the national Fisheries Department delegates certain responsibilities of fisheries and marine management under the fisheries legislation to the SMMA. Also, the Fisheries Department works in collaboration with the SMMA and is a member of its Board of Directors.

In terms of enforcement, officers within the Royal Saint Lucia Police Force inclusive of the Marine Unit as well as customs officers are designated enforcement officers

under the Fisheries Act and Regulations, and they operate at the national and local levels. The police officers stationed at various police stations island wide, Customs officers, and SMMA officers enforce at a local level.

The current legislation provides some general guidance to shape fisheries management and management plans. Specific management measures and regulations for some individual fisheries are included, e.g. measures for fisheries for lobster, conch, sea turtles, sea urchins and freshwater shrimp/crayfish. The measures may include closed seasons, requirements for special permits, size limit regulations, gear restrictions, protection of egg-laden (berried) or nesting animals, etc. The legislation also requires the preparation of and continuous review of a plan for the management and development of the fisheries in Saint Lucia; that noted, the legislative provisions do not set up a series of steps or a process for developing, organizing and implementing fishery management regulations and fishery management plans. Additionally, steps for setting up the management process itself are not prescribed. Apart from any formal management process, the management agency consults with users and stakeholders on management decisions/approaches. A separate fisheries science agency is not identified in the legislation, and there is no legal requirement for management decisions to be based on information coming from technical or scientific analyses. In addition, a timeframe for the management process to be completed is not prescribed in the legislation.

Saint Lucia is a signatory to the following international marine fisheries management conventions: the International Whaling Convention (IWC), the United Nations Convention on the Law of the Sea (UNCLOS), the Food and Agriculture Organization Compliance Agreement, 1995, the United Nations Fish Stocks Agreement, and The Protocol Concerning Specially Protected Areas and Wildlife (SPAW protocol). Saint Lucia is also a member of two regional fisheries bodies: the Caribbean Regional Fisheries Mechanism (CRFM) and the Western Central Atlantic Fishery Commission (WECAFC). The Fisheries Act and Regulations reflect several of the provisions of these international conventions and polices, such as the UNCLOS and its provisions for licensing and registering fishing vessels and conservation of resources. The Fisheries Act and Regulations also include conservation measures for species listed under the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES), such as queen conch. Generally speaking though, the legislation does not include specific provisions to meet the priorities and obligations of international agreements/conventions (global), regional agreements and other multilateral arrangements.

Regarding the handling of prosecutions, several specific provisions are made in the legislation. These include: provisions for empowerment and immunity of authorized officers, sale of seized goods, release of vessel, court's powers of forfeiture, presumptions, onus of proof, powers to compound, etc. Foreign fishing vessels must apply for licences, and these are issued with conditions. Additionally, the legislation facilitates the application of penalties for illegal foreign fishing.

As already noted, fisheries management in Saint Lucia is also affected by other instruments of non-fishery legislation, particularly, the National CITES Act, the Physical Planning Act and the Wildlife Protection Act.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

In Saint Lucia, the small-scale fishery is the only commercial fishery. The small-scale fishing vessels are typically open-decked reinforced fiberglass pirogues, 4–10 m in length, and mostly equipped with outboard engines of 40 to 150 hp, although some fishing vessels carry 250 hp. A few larger vessels, up to 18 m, also operate. The fishers use a variety of gears, including trolling lines, hand lines, long lines, fish pots, fillet,

seine and gill nets and fish pots/traps, and these are usually hand operated. The use of fish aggregating devices (FADs) is becoming popular.

Most of the catch is locally consumed, being sold to consumers at the community level or sold to the Saint Lucia Fish Marketing Cooperation, retail vendors or hotels/restaurants/supermarkets. Very little fish is exported at present. Some small-scale fishing operations can be further classified as life-style fishing operations. These are family-based operations, normally involving coastal communities, where access to education is limited. In these cases, there are usually also relatively high levels of poverty for many of the fisher families concerned, particularly those who are part-time and have suffered loss of markets for bananas.

In the recreational fishery, the sportfishing craft is the 30–40 ft power launch type that is capable of operating 6–10 reels at a time. Recreational fishers normally use rod and reel gear, while spear-fishing is prohibited. Tag and release activities are common for certain species. Fish are also kept for personal consumption and for charity donations; a minimal amount is also sold.

Fish production and value

Small-scale fishery

Currently, there is a small-scale single multispecies fishery in Saint Lucia that harvests three major species/species groups: tunas, dolphinfish and wahoo. In 2012, the fishery had an annual harvest of about 442 tonnes of tuna species, 504 tonnes of dolphinfish and 151 tonnes of wahoo (Department of Fisheries, 2013). In terms of the gross ex-vessel value of the catch, these are also among the most valuable species/species groups caught. While landings of the tuna have gradually increased over the past ten years, dolphinfish landings have fluctuated and wahoo landings have slightly decreased in the same time period (Table 1). However, the ex-vessel values of these three species/species groups have all increased over the past ten years.

TABLE 1

Gross landings (tonnes) and value (USD) of each of the major species/species groups caught by the single small-scale commercial fishery in the most recent year, five years ago and ten years ago

A. Estimated Annual Gross Landings of Catch (whole weight in tonnes)			
Target species	**Most recent year (2012)**	**~ 5 Years Ago**	**10 Years Ago**
Tuna species	442	328	320
Dolphinfish	504	512	402
Wahoo	151	211	243

B. Annual Gross Value of Catch (USD)			
Target species	**Most recent year (2012)**	**~ 5 Years Ago**	**10 Years Ago**
Tuna species	2.2 million	1.58 million	1.34 million
Dolphinfish	2.8 million	2.48 million	1.75 million
Wahoo	0.72 million	0.91 million	0.84 million

Recreational fisheries

There is a single main recreational fishery that usually targets the same species as the small-scale commercial fishery: tunas, dolphinfish and wahoo. The harvest of demersal species is not permitted for the recreational fishery. Moreover, the levels of catch and value of this fishery are unknown.

Food security and employment

In Saint Lucia, the commercial/small-scale fishery provides the sole source of income but not the sole source of food for the majority of participants. On the other hand, the recreational fishery provides the sole source of income for about 60 percent of the vessel owners and also provides an important source of food for the participants.

Fishing effort and impacts

Fishing areas

The major small-scale commercial and recreational fishing operations identified earlier take place throughout the EEZ, although primarily on the eastern side of the island (coast facing the Atlantic Ocean), where the target large pelagic fishes are available from December to June annually. Moreover, fishing occurs within less than 45 miles from the shore in most cases.

Fishing effort

Estimated levels of fishing effort for the small-scale and recreational fisheries are provided in Tables 2 and 3. Individual participants are registered to operate, whether commercial or recreational operator, but are not licensed. A vessel licensing system is in operation. Additionally, the majority of recreational fishers are foreign tourists, who charter sportfishing vessels during their stay in Saint Lucia. Both the numbers of participants and vessels have increased over the past ten years, representing an increase at least in nominal fishing effort (Tables 2 and 3).

TABLE 2
The current level of fishing effort in the single major small-scale commercial fishery and perceived change over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
2 400	no	i	500–600	yes	i	i

TABLE 3
The current level of fishing effort in the single major recreational fishery and perceived change over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Approx. 3 000–5 000, of which 85 % are foreign tourists	no (a number of illegal operators transition into the fishery seasonally)	i	10 licensed vessels and about 10 unlicensed (illegal)	yes	i	i

Overfishing and fishing capacity

The occurrence and extent of overfishing in the country is not known. Fisheries-dependent assessments have been carried out on some fisheries which indicate constant or decreasing CPUE. Environmental factors such as heavily silted seabed, warming marine waters and marine pollution are also believed to impact negatively the overall state of the resources. In the case of the recreational fishery, it is unknown whether overfishing exists, and the trend in CPUE is also unknown.

Work has not yet commenced on the measurement of capacity in Saint Lucia's marine capture fisheries. This activity is constrained by a lack of financial and human resources, a lack of political will to undertake such work, and a lack of the supporting data for making such measurements. That noted, there is not a sense of overcapacity in the major small-scale fishery identified. In view of this, it is not surprising that the regulations in the last two to three years have not focused on reducing fishing effort and/or reducing the harvest in the fishery concerned. Regarding the recreational fishery, recent regulations are also not intended to reduce fishing effort or the harvest. However, it is unknown whether overcapacity exists in the recreational fishery.

MANAGEMENT ACTIVITY

General nature and extent

It is estimated that more than 67 percent of marine capture fisheries in Saint Lucia are managed in some way, with the number of fisheries being managed not having changed over the past ten years. Moreover, there are major fisheries (in terms of weight of landings) that are not currently managed. In particular, the large-pelagic fisheries are not comprehensively managed except for the provision for fishers to have a vessel licence to engage in capture of these species.

The national management process has been informed by: legislation about individual fisheries, published regulations or rules for specific fisheries, and traditional rules or customs that affect the harvest of marine fisheries. At the regional level, the process is influenced by management plans for specific fisheries. In contrast, the local process is influenced by traditional rules or customs that affect the harvest of marine fisheries. Of the fisheries that are managed at the national level, 33–67 percent have formal, documented fishery management plans and published regulations/rules. In contrast, at the regional and local levels, fewer than 33 percent have formal management plans and published regulations/rules. Of those fisheries impacted by published regulations/rules at the regional level, 33–67 percent of these have been informed by methodical scientific monitoring and evaluation, whereas less than 33 percent of the rules at the national and local levels have been informed by methodical scientific monitoring and evaluation. As pointed out previously, the nature and extent of overfishing in Saint Lucia's fisheries is not known, although catch rates in the large-pelagic fishery have either become constant or declined over time.

There is a management plan for the major fisheries, which came into effect in 2006. As the target species for the small-scale commercial and recreational fisheries are the same, the large-pelagic section of the management plan covers both fisheries and notes the same objectives for these fisheries. These objectives are:

- to promote the sustainable development of the artisanal and sport fisheries for large pelagic species;
- to maintain and improve on the net incomes of the operators in the fishery at a level above the current income levels; and
- to establish management linkages with international regulatory bodies, such as ICCAT, in order to access vital information to properly manage these fishes.

Impacts of international legislation

As noted earlier in this report, Saint Lucia's legislation predates the CCRF. However, fisher and consumer education programmes are planned, as well as revision of the fisheries legislation to incorporate the new and emerging commitments prescribed by the relevant international legal instruments. Also of relevance are plans to increase the effectiveness of penalties for non-compliance, improve monitoring of critical habitats and resources, and fishing activities, and improve licensing and registration of fishing vessels and operators. Some progress has also been noted in the implementation of the UN Fish Stocks Agreement (1995). In this regard, the most significant activities include: Saint Lucia's membership and participation in the activities of appropriate regional fisheries bodies such as CRFM; Saint Lucia's participation in joint assessment exercises, including provision of data on catches and effort, data analysis and reporting for shared stocks; and efforts to prohibit illegal foreign fishing through improved MCS.

In the case of the FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003), the guidelines have been discussed during workshops for key stakeholders, including fisheries management personnel and fisher cooperative representatives. In addition, an ecosystem-based approach is proposed for consideration when the fisheries management plan is updated in the future. At present, the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010) is not considered

to be relevant given the multispecies opportunistic nature of the national fisheries. Similarly, the FAO International Plan of Action (IPOA) for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999) is not currently relevant because of the nature of Saint Lucia's fisheries. Concerning implementation of the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999), it should be noted that the national fisheries management plan includes conservation actions for sharks that are considered to be part of the large-pelagic fishery.

While it has already noted that work on fishing capacity assessment has not yet started, there are efforts to manage fishing capacity in accordance with the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999). These include efforts to license and register fishing vessels, and the establishment of limited-entry system for the queen conch fishery, spear gun fishing operations, and the sea turtle fishery. Related to the management of fishing capacity, Saint Lucia has also undertaken some actions to implement the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001). In particular, Saint Lucia has participated in the preparation of the Castries (Saint Lucia) Declaration on Illegal, Unreported and Unregulated Fishing, which was adopted by the CRFM in 2010. Also, the national fisheries department collaborates with the Marine Unit of the Royal Saint Lucia Police Force and other enforcement bodies in Saint Lucia in capacity-building activities for enforcing the fisheries laws. Finally, there are efforts to sensitize fishers and the public on the threat of IUU fishing activities.

Management approaches and tools

Multispecies aspects

The major small-scale commercial fishery is identified as multispecies in nature, and management takes this into account. Fishers are licensed for the multispecies operations, and vessels are licensed to fish under specific conditions, i.e. using required safety gear in compliance with all fisheries and other national laws such as the Shipping Act. This includes a condition to report data on catches and effort. Also, education/training activities are undertaken to provide information related to the management of all these species and more. The main recreational fishery is also multispecies in nature, and in order to manage these operations, fishing licences limit the amount of catch allowed per trip for particular species/species categories of catch.

EAF and precautionary approach

The management of Saint Lucia's principal commercial and recreational fisheries does not currently include specific ways for applying the ecosystem approach to fisheries (EAF) management. However, arguably, the licensing system has the potential, as a precautionary measure, to serve as a limited entry tool for controlling fishing capacity. Additionally, in the recreational fishery, the catch limit is fixed at no more than 18 dolphinfish, kingfish or wahoo per person on the fishing vessel per trip and arguably, this serves to control fishing effort in some way, even in the absence of quantitative scientific information.

Management tools and trends in usage

The primary management tools used in the major small-scale commercial fishery are engine size restrictions and licensing. These tools, as well as other tools, are used for other small-scale commercial fisheries. Additional tools used to manage other small-scale commercial fisheries such as those for conch and lobster include: spatial closures (marine protected areas, reserves, no take zones), seasonal closures, gear type and size measures, and a limited entry system. Over the past ten years, the use of area closures has increased for other small-scale commercial fisheries, but there have been no changes in the use of the tools used for the main large-pelagic fishery identified in this report.

In the recreational fishery identified, a range of primary management tools is used, including no-take zones, gear restrictions, participatory restrictions and catch limits (Table 4). There have been no changes in the use of these management tools over the last ten years. In addition, it should be noted that the tools used for the large-pelagic recreational fishery are not the same type as used in other recreational fisheries.

TABLE 4
Types of management tools used in the single major recreational fishery identified

Type of Management Tool	Tunas, dolphinfish & wahoo
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)	
Temporal restrictions such as:	
Defined fishing season(s)	
Defined number of days fishing	
Defined number of hours per day fishing	
Defined number of hours fishing	
Gear restrictions such as:	
Vessel size restrictions	
Engine size restrictions	
Gear size restrictions	
Gear type restrictions	√
Hook and line restrictions	√
Hook type/size restrictions	
Bait restrictions(e.g. use of artificial lures vs. fresh/live bait)	
Method restrictions such as:	
Motor trolling	
Use of artificial light	
Use of scents	
Size restrictions (i.e. minimum or maximum sizes)	
Participatory restrictions such as:	
Licenses	√
Limited entry	√
Number of rods/lines per vessel	√
Catch restrictions such as:	
Total allowable catch (TAC) limits	
Vessel catch limits	√
Individual vessel quotas	
Bag limits	
Fish holding limits	
Sales restrictions such as:	
Commercial sale restrictions	√
Rights-/incentive-adjusting regulations such as:	
Individual effort quotas	
Individual fishing quotas	
Individual transferable quotas	
Individual transferable share quotas	
Group fishing rights (including community development quotas)	
Territorial use rights	
Stock use rights	
Encouragement of harvest of overabundant species	
Encouragement of harvest of invasive species (e.g. lionfish)	
User conveniences such as:	
Provision of landing sites/fish piers	
Provision of fish cleaning stations	
Regionally/internationally agreed restrictions	
Taxes or royalties	
Performance standards	

International standards

The small-scale commercial fishery is not managed using performance standards, or based solely on regionally/internationally agreed restrictions. In comparison, in the case of the recreational fishery, there are voluntary regulations/codes of conduct in place to support management of the large-pelagic fishery identified. Additionally, the large-pelagic recreational fishery is managed based solely on regionally/internationally agreed restrictions.

Stakeholder involvement and transparency in management

Stakeholders are informally involved in the management of all marine capture fisheries at the national, regional/international and local levels. Such informal involvement by stakeholders occurs only when funds allow for consultation and co-management systems. There is also no_formal definition in the legislation of the groups that are included as stakeholders. While the legislation enables a range of participatory processes allowing varying shared management responsibility by stakeholders, these participatory processes are not a formal and required part of the management of all marine capture fisheries. As such, there are no steps in these processes that are routinely followed as part of fisheries management.

Small-scale commercial fisheries

In the small-scale commercial fisheries, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources and to consult with them on management issues. In this case, fishery stakeholders are organized into distinct groups, and the management plan includes a definition of these groups. In terms of the participatory process so far achieved for the major fisheries noted, the management process is consultative in nature. However, it should be noted that a co-management is practiced in certain other fisheries, where fisheries management stakeholders are consulted and share management responsibility. Moreover, the quality of stakeholder inputs in decision-making for the major large-pelagic fisheries can be rated as consultative and communicative.

While the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship, stakeholder involvement in the fisheries management decision-making process has made the management process faster and has also helped to reduce conflict.

Recreational fisheries

In contrast to the situation of the small-scale commercial fisheries, recreational fishery stakeholders have not been identified formally, and the management plan of the fishery also does not define these stakeholders. Nonetheless, the recreational fishery stakeholders are organized into distinct groups, and arrangements have been made to consult these stakeholders and to work with them on the management matters. In terms of the participatory process, consultative management occurs, and stakeholder inputs in decision-making are regarded as informative, consultative, communicative and also participative. Additionally, stakeholder involvement in the fisheries management decision-making process has made the management process faster and helped to reduce conflict. However, the participants still do not find that the management system creates incentives and reasons for them to practice "responsible" fisheries stewardship voluntarily.

Transparency in management

All parts of the fisheries management process are not transparent. This is owing to the fact that only some of the information about the fisheries management process is clearly documented and easily available to the public. Furthermore, meetings to

discuss the management of specific fisheries are open to some stakeholders, including the participants in the fishery, but are not advertised and publicized in advance of the actual meeting dates. Moreover, these meetings are dependent on funding, and so do not routinely occur. At times, opportunity is provided for fishery participants, as well as other stakeholders, to contribute to the decision-making process by providing public comments. However, if information about management measures and meetings is shared with fishery participants and other stakeholders, the information is disseminated by various means, including: radio announcements or talk shows; television broadcasts; printed materials, such as brochures or information packages; direct mail; fax; Internet mail; Internet website; community/target group meetings; and workshop/training sessions.

Management of conflict and fishing effort

The current legislation does not set up particular processes for the management of conflict. Generally though, some fisheries management tools are used to manage conflicts among user groups, and these include: zoning of different areas for different users, educating about sharing marine fisheries resources, and limiting access to certain areas for certain types of fishers.

Small-scale fishery

Conflict occurs in the major small-scale commercial fishery identified, and the level or amount of conflict has increased over the last ten years. The reason for the conflict is due to competition among different types of vessels, competition with recreational users, especially for the use of FADs, and also competition with other industry users for the same area of water. Conflict management processes are part of the marine capture fisheries management process and give recognition to the need to consider multiple uses and users, both within the fisheries sector and across economic sectors. However, the legislation provides for the use of certain tools in this fishery that contribute to conflict management, including: zoning marine space for different uses and users, education and promotion of the management and development of fisheries, and limited access to certain areas for certain types of fishers.

Recreational fishery

The recreational fishery experiences conflict, which has also increased over the last ten years. The observed conflict has been caused by competition within the subsector, with the small-scale commercial fisheries and with other industries. Similar to the case of the small-scale fishery, dispute resolution and conflict management processes are part of the marine capture fisheries management process, and consider the needs of all users.

Overfishing and fishing capacity

The nature and extent of overfishing remain unknown. Additionally, the measurement of fishing capacity has not been completed for reasons already mentioned earlier in the report. Overcapacity is not a present concern, at least for the principal small-scale commercial fishery identified. Perhaps in view of this, capacity reduction programmes have not been set up and implemented for any fishery.

Management of monitoring, compliance and enforcement

Agencies that lead fisheries enforcement work in Saint Lucia include the Marine Unit of the Royal Saint Lucia Police Force, the SMMA and the Agriculture Ministry's praedial larceny officers. Both the marine unit and SMMA, within the coastal marine areas under the authority of SMMA, are responsible for at-sea fisheries patrols, monitoring and enforcement work in coastal waters (0–3 nautical miles). However, only the marine police enforcement unit conducts fisheries patrols, monitoring and

enforcement work in the territorial waters (0–12 nautical miles). On the other hand, the responsibility of fisheries monitoring work such as checking dock-side landings and logbooks falls within the mandate of the national fisheries department. The Minister responsible for fisheries or his delegate has the authority to issue penalties, particularly when the department can compound offences if offender wants to settle out of court. Otherwise, the offence is handled by the police.

Generally, penalties for non-compliance include: small fines for first offences, larger fines for additional offences (up to a maximum fine), and imprisonment for some offences. While the legislation facilitates the use of VMS and on-board observer programmes, these are not currently being used to support compliance and enforcement activities. Tools that are being used at present for such purposes include: random dockside inspections, routine inspections at landing sites, at-sea boarding and inspections, education and sensitization as to the laws in an effort to build compliance and the importance of these for sustainable resource use and livelihoods.

Over the last ten years, there has been an increase in the number of offences, while detection efforts and the budget for monitoring and enforcement have simultaneously decreased in the past five years. It does not appear that the funding and staffing structure provided to the agencies concerned allows all fisheries regulations to be properly enforced. It has been pointed out that the judiciary system is also a limiting factor in respect of fisheries enforcement issues. Additionally, the penalties for non-compliance are not considered to be severe or expensive enough that participants in the fisheries avoid cheating, and the risk of detection is also not high enough to deter incidents of non-compliance.

Small-scale fishery

The situation, in terms of conditions and trends in monitoring, compliance and enforcement and the effectiveness of these processes, are the same as described previously for the general case.

Recreational fishery

The case of the recreational fishery is also similar to the general case described previously, with the following exception: imprisonment has not been applied as a penalty measure. Also, at present no tools are used to support compliance and enforcement of fisheries management, such as inspection and monitoring schemes.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

At present, fisheries management requires government funding, which covers at least 60 percent of the activities undertaken at all levels, including annual contributions to CRFM, IWC, CITES etc.. Government funding therefore covers primarily the costs for daily management, monitoring and enforcement. The legislation allows for the costs associated with managing fisheries resources to be recovered via licence fees charged to participants in the same or other fishery, and resource rentals, e.g. SMMA entry/user fees. Additionally, there are certain administration services provided by the national fisheries department that afford some cost recovery, e.g. administration fees for job letters, aquaculture seed stock etc.

In real terms, the budget for fisheries management has increased at the regional/international level but remained unchanged at the national and local levels over the last ten years, while the corresponding costs have simultaneously increased at all levels. The increasing costs are associated with trends in several factors: increased/improved stakeholder consultation, increased monitoring requirements, increased enforcement activities, increased conflict management, increased rate of modifying/changing/amending fisheries management regulations, increased member-country obligations to RFBs, and RFMOs, increased cost of materials, increased salaries for staff, and

increased fuel costs affecting travel costs. So far, the additional costs are being covered by: contributions of externally funded projects and support from friendly governments and organizations.

Small-scale fishery

The costs, cost recovery and funding arrangements for the small-scale commercial fishery, as well as trends in these, are the same as explained for the general case.

Recreational fishery

The cost and funding situation of the recreational fishery is similar to that of the small-scale fishery, with the difference that there are fewer factors that are increasing management costs. In this fishery, the factors contributing to increasing management costs are: increased/improved stakeholder consultation, increased monitoring requirements, increased enforcement activities, increased conflict management, and increased obligations under regional/international agreements/conventions to which the country is a party.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Saint Lucia is a member of the following RFBs: WECAFC and CRFM. As noted earlier in this report, Saint Lucia's legislation predates the CCRF. However, efforts are being made to advance certain key activities for improving the management process, and hence management performance. There are plans to revise the fisheries legislation to incorporate more formally the provisions of more modern international fisheries agreements. Regarding the UN Fish Stocks Agreement (1995), Saint Lucia is a full member of the CRFM and WECAFC and participates actively in the activities of these regional fisheries bodies that are aimed at improving collaboration in the management of shared resources. Saint Lucia also contributes data to ICCAT, even though it is not a member.

The FAO Technical Guidelines on the Ecosystem Approach to Fisheries (2003) have been discussed with a range of key stakeholders. This will facilitate incorporation of the ecosystem-based approach into the fisheries management plan when this is updated in the future. Concerning implementation of the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999), it has already been noted that the national fisheries management plan includes conservation actions for sharks as part of the actions proposed for the large-pelagic fishery.

Current efforts to license and register fishing vessels and to create limited-entry systems for the queen conch fishery, spear gun fishing operations and the turtle fishery are essential for making progress in the management of fishing capacity, in accordance with the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999). Finally, Saint Lucia has undertaken some actions consistent with the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001). Saint Lucia has endorsed the Castries (Saint Lucia) Declaration on IUU Fishing, adopted by the CRFM in 2010. In addition, the national fisheries department collaborates with the Marine Police and other enforcement bodies for delivery of training in law enforcement, and also conducts programmes to sensitize stakeholders on the issues concerning IUU fishing activities.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

As noted previously, Saint Lucia is a member of the following RFBs: WECAFC and CRFM. In addition, Saint Lucia cooperates with ICCAT, specifically in the area of data provision. At present, participation in WECAFC and also CITES activities as these relate to queen conch management, is not adequate. This is primarily owing to

budgetary constraints, a shortage of human resources to cover issues, a lack of political priority, and other more immediately critical fisheries management issues.

Currently, Saint Lucia collects and provides CITES, FAO, ICCAT and CRFM with fishery-related data to help inform the establishment of fisheries management regulations, and there are formal national mechanisms in place to support data compilation and reporting.

SUMMARY AND CONCLUSIONS

- The current fisheries legislation for Saint Lucia was prepared in 1984 and thus predates international fisheries agreements that were adopted from the 1990s onwards. The legislation provides a legal and administrative framework for fisheries management. Roles and responsibilities for the Chief Fisheries Officer and the relevant minister are identified in the legislation and are carried out by the national fisheries department. Enforcement responsibility is shared with other government arms, such as the Marine Police Unit, district police and Customs. While the legislation does not list management objectives, the management plan does. Additionally, while the legislation provides some general guidance on management, it does not outline the steps for setting up the management process, and makes no provision for the management process to be completed in a given timeframe. Objectives and regulations adopted by RFBs/RFMOs are not necessarily incorporated and implemented, and there is no legal requirement for management to be informed by technical/scientific information. There are also legislative provisions for stakeholder involvement, for handling prosecutions and illegal fishing by foreign vessels, but no specific process for conflict management. In conclusion, the fisheries legislation is dated. Hence provisions for fisheries management, consistent with more recent international fisheries agreements are incomplete. This may explain at least some of the constraints faced in implementation, as summarized and explained in the following paragraphs.
- At the national level, more that 67 percent of marine capture fisheries are managed in some way, although the large-pelagic fishery, a major fishery, is not considered to be comprehensively managed. At the national level also, fewer than 33 percent of managed fisheries have published regulations, and of these less than 33 percent have been informed by methodical scientific monitoring and evaluation. A management plan is in place that covers the major fisheries and which notes specific management objectives for the large-pelagic fishery, which apply to both the commercial and recreational subsectors. In conclusion, management measures to regulate the major fisheries appear to be heavily influenced by legislation, traditional customs and published rules. The implementation of fishery-specific management plans should include the development of a good supporting scientific monitoring system that facilitates transparent evaluation and accounting of the performance of agreed management objectives.
- All the major fisheries identified are multispecies in nature, and this is taken into account through licensing conditions that specify the range of species expected to be caught. EAF is not yet applied in the management of the commercial and recreational fisheries. In terms of the precautionary approach, the bag limits applied to the recreational fishery serve to limit catches in the absence of better stock status information. In conclusion, EAF and the precautionary approach need to be incorporated more formally into the management plan, as this does not appear to be the case at present.
- The legislation makes provisions for stakeholder participation arrangements, although stakeholders groups are not formally defined. In practice, consultative and co-management arrangements are occurring in some fisheries. While stakeholder involvement has quickened the management process and helped

to reduce conflict, it has not created incentives for responsible stewardship. The management process is also not transparent, as it does not afford equal opportunity to all stakeholders to contribute in a timely fashion. However, information dissemination is conducted via various traditional and more modern means. The present forms of participatory management are not yielding the full range of anticipated potential benefits. The legislative provisions can facilitate a range of participatory arrangements, and so practical implementation of these provisions should ensure that stakeholder involvement should be made formal, routine and transparent. This may require strong investment in stakeholder education and in capacity-building activities to enable them to be effective partners in the management process. It may also be necessary to invest in education of the government partners concerned, to ensure that all parties concerned are fully appreciative of the need for a greater participatory process. It is also advisable to develop a formal communication strategy to support the participatory processes envisaged and agreed, and to ensure a fully transparent management process.

- Conflict exists in the two major fisheries examined in this report, and conflict levels have increased in the past ten years. The conflict is due to competition within the sector and also with other industries. The legislation does not appear to make provisions for a conflict management process, although the management process appears to take into account multiple-use needs. The tools used to support conflict resolution among user groups have included area allocations for different uses, education and limited-access arrangements. In conclusion, the management process for conflict management is not a formal one. Although some tools have been applied to manage conflict, these alone have not been able to decrease or eliminate the level of conflict in any of the major fisheries in the recent past The efforts to date should therefore be reviewed and evaluated with the intention of introducing an improved and formal agreed process. Additionally, a more effective and active participatory management process, as previously identified, as well as transparency in terms of monitoring, evaluation and reporting, should be nurtured to ensure that conflict issues are routinely and objectively addressed.
- The nature and extent of overfishing in Saint Lucia are unknown. A constant/declining catch rate has been reported for the small-scale commercial fishery identified, but overcapacity is not a present concern, at least for this fishery. That said, fishing capacity measurements have not been completed due to certain constraining factors, and it is believed that fishing effort levels have increased in the major small-scale commercial and recreational fisheries. In conclusion, the measurement and assessment of fishing capacity should be completed as a matter of priority, as well as stock assessments for evaluation of the level of exploitation.
- The legislation makes certain provisions concerning monitoring and enforcement, as well as the application of punitive measures for various acts of non-compliance. Several agencies share the responsibility of monitoring, compliance and enforcement activities. A range of penalties is applied, but these are not considered to be effective. The compliance and enforcement system, which is in place only for the small-scale commercial fishery, appears dependent on inspection schemes and is not supported by either VMS or observer programmes. No monitoring of the recreational fishery takes place at present. The available budget to allow enforcement of all regulations is also not adequate, although offences have reportedly increased in the past ten years. In conclusion, the implementation of the various supporting systems and enforcement patrols are affected by budgetary constraints. There also appears to be a need to elevate penalty fines so as to be more effective in deterring non-compliance. Further investment in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, e.g. via

limited entry, may be the most cost-effective means to reduce the incidence of non-compliance, as well as enforcement costs.

- Management costs are mostly funded by the government. Some recovery of costs is facilitated through the payment of licence fees and administration service charges. Over the past ten years, the budget for fisheries management has remained unchanged, while management costs have increased for a range of reasons, all of which are directed to improving management. Moreover, additional costs are only being met when provided by external projects and other foreign assistance. An economic valuation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Also, as stated previously, additional investments in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, e.g. via limited entry measures, should help to limit the rising management costs.
- Saint Lucia's legislation predates several international fisheries agreements adopted since the 1990s. Notwithstanding, there have been efforts to introduce standards consistent with new and emerging commitments prescribed for achieving sustainable fisheries management. Sensitization, education and capacity-building programmes are undertaken for the stakeholders and operators concerned, and a licensing system is operational, although incomplete. Additionally, Saint Lucia participates in the activities of key RFBs for improving the management of shared fishery resources, e.g. endorsement of CRFM's Castries Declaration on IUU fishing. In conclusion, Saint Lucia has made plans and some efforts to keep pace with developments in approaches to sustainable fisheries management, e.g. education of stakeholders in EAF and IUU fishing issues, plans to revise legislation to strengthen enforcement provisions, and plans to incorporate EAF into next management plan. These plans and efforts need to be organized to ensure that all aspects are addressed in a progressive and comprehensive manner. If possible, the fisheries legislation and the fisheries management plan should be updated as planned, and should include well-defined suitable objectives and approaches to guide the overall management process, consistent with the global directives.

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COUNTRY REVIEW

Suriname

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INTRODUCTION

Suriname is located in the north-eastern part of South America at 4 degree north and 56 degrees west; Guyana is on its western border and French Guiana is on the east; the Atlantic Ocean is to the north and Brazil is to the south. Suriname is the smallest sovereign state in terms of area and population in South America and is the only Dutch-speaking region in the Western Hemisphere that is not a part of the Kingdom of the Netherlands (JICA, 2012). It has a land area of 156 000 km^2, a water area of 7 820 km^2, a coastline of 386 km (Central Intelligence Agency, 2013) and a shelf area of 54 550 km^2 (FAO, 2008). Its maritime claims include a 12 nautical mile territorial sea and a 200 nautical mile exclusive economic zone. Suriname's GDP (PPP) is estimated at USD 6.874 billion with a real growth rate of 4.5 percent (2012). Agriculture, which includes fisheries, contributes 10.6 percent to GDP (2012 estimate). Most of its population of 566,846 lives along the coast (Central Intelligence Agency, 2013).

Suriname fisheries can be divided into two main groups - the industrial trawl and the artisanal fleets. The industrial fleet can be divided into the subcategories: fin fish fishery and shrimp fishery. The artisanal fishery is more diverse with the biggest group of fishers consisting of at least 1200 fish catching units in different categories. The industrial trawl fishery is composed of bottom trawlers and shrimp trawlers. The management system specifies the maximum number of boats which could operate in a designated fishery category (CRFM, 2012). the country's three (3) largest commercial /industrial marine capture fisheries are finfish, seabob, and shrimp. The finfish and seabob fisheries are reported to also be among the top three most valuable national fisheries in terms of the gross value of catch. The annual tonnage figures for the three major industrial fisheries in 2011: 29,000 tonnes for the finfish fishery, 7000 tonnes for the seabob fishery, and 3500 tonnes for the shrimp fishery. The equivalent annual values for these fisheries were: USD 58 million for the finfish fishery; USD 12.8 million for the seabob fishery, and; USD 6 million for the shrimp fishery.

POLICY FRAMEWORK

There is specific legislation for marine capture fisheries management at the national and regional level, but not yet at the local level. The Fisheries Act 2001 is the legislation currently in force, and it provides a legal, as well as an administrative framework for fisheries management at the national level. In addition, the legislation specifies a single agency with responsibility for management at the national level, which is the Department of Fisheries.

A formal definition of fisheries management is not provided, but the legislation lists the following management objective: the fishery must be sustainable. Moreover, the measures to keep a fishery sustainable are contained in a special ministerial bill and license conditions for the fishery. This objective is incorporated into the fisheries management plan.

National legislation that indirectly, but significantly, affects the management of marine capture fisheries includes: endangered species legislation and export/import/trade legislation. The endangered species legislation for turtles has had the most impact on fisheries management. Legislation pertaining to multiple use management areas has also impacted on fisheries management, particularly in the coastal zone areas.

LEGAL FRAMEWORK

The Department of Fisheries is the lead agency with legal responsibility for fisheries management at the national level. It undertakes this responsibility under the authority of the Ministry of Agriculture, Animal Husbandry and Fishery, and in partnership with: the Ministry of Environment; industrial and artisanal fisheries associations at the national level; CRFM and ICCAT at the regional/international level, and; the district commissioners at the local level. The University of Suriname provides scientific support separately for fisheries matters at the national level and CRFM provides this same support at the regional level. Similarly, enforcement support is provided separately by the navy of Suriname, maritime police, and game warden, all working at the national level.

The legislation does not provide specific guidance to shape fisheries management plans, e.g. specific management tools and approaches, although it supports licensing. It also makes no provisions for a formal process consisting of specific steps. Though the management process is not a formal one, there is a fixed timeframe for developing management measures, at least for some fisheries. In terms of information requirements, the national legislation requires management decisions to be based on information coming from only monitoring and enforcement activities. Other types of information, such as derived from analyses of biological, social, economic and other types of data are not mandatory under the legislation. That said, the legislation is informed by the work of RFBs or RFMOs in the case of shared resources. That is to say, the Fisheries Act can be amended or the requirements are added in the ministerial bill to accommodate management measures that are agreed at the regional/international level. Management decisions can also be influenced in other ways, including: inputs made by the management agency; inputs made by stakeholders other than participants in the fishery; inputs made by the participants in the fishery; inputs made by other parts of government; decisions made by RFBs, RFMOs, or organizations concerned with human rights, labour, and trade, e.g. CITES. In terms of regional and /or subregional fishery organizations, agreements, and /or arrangements about the management of marine capture fisheries, Suriname is a member of the following RFBs: CRFM and WECAFC. It is also a Cooperating Non-Contracting Party to ICCAT, gaining this status in 2011.

In the area of compliance and enforcement, all prosecutions, whether local or by foreign vessels found fishing illegally in national waters, are handled by the general state system. As stated earlier, the management of marine capture fisheries can also be influenced by other pieces of national legislation. Of these, the endangered species legislation for turtles has had the most impact on fisheries management.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

In Suriname, the industrial fishery is defined as a fishery with highly mechanized operations. The commercial component is not stated, but would be expected in view of the scale of the operation. The industrial fishing fleet consists mostly of metal boats that are over 20 m in length. The fishing gear typically used are trawl nets, although hook and line gear are also used. The production is destined for both the local and export markets, but more than 75 percent of the catch is usually exported. On the other hand, in the small-scale/artisanal fishery, wooden canoe boats, ranging from 4 m to 16

m in length, are common. These use a variety of gears, such as lines, gillnets, chinese seines, driftnets, bank nets and circle seines. In Suriname, industrial fishing operations take place all along the Suriname coastline (between 54^0 and 57^0 W) and beyond 62^0 10' N. The seabob fishery operations are conducted between the 10 and 18 fathom depth contour. On the other hand, the small-scale fishery operations take place closer to the coast and in waters up to 18 m depth.

Fish production and value

In terms of the annual amount of fish harvested, the country's three (3) largest commercial /industrial marine capture fisheries are finfish, seabob, and shrimp. The finfish and seabob fisheries are reported to also be among the top three most valuable national fisheries in terms of the gross value of catch. The annual tonnage figures for major fisheries were given only for the most recent year (2011): 29,000 tonnes for the finfish fishery (industrial, as well as small-scale landings), 7000 tonnes for the Seabob fishery ((industrial, as well as small-scale landings, with small-scale landings representing a mix of seabob and shrimp), and 570 tonnes for the shrimp fishery. The equivalent annual values for these fisheries in 2011 were: USD 58 million for the finfish fishery; USD 12.8 million for the seabob fishery, and; USD 6 million for the shrimp fishery. In contrast, the small-scale/artisanal fishery landed 23 tonnes in 2011. However, it is a very valuable fishery by comparison, in terms of gross value of the catch, with the value in 2011 estimated at USD 36 million.

Fishing effort and impacts

At present, there are 1100, 22 and 32 licences in the finfish, seabob and shrimp fisheries, respectively. It should be noted that the numbers of participants and vessels have increased in the finfish fishery over the past ten years, while the seabob and shrimp fisheries showed a decline in the numbers of participants as well as numbers of vessels. In all the major fisheries described in this review, the fisheries provide the sole source of income for those concerned, but not the sole source of food.

The country does not have a formal definition of overfishing, and the overall extent of overfishing is currently unknown. However, of the industrial fisheries, overfishing is believed to be occurring only in the finfish fishery. Fishing capacity has been measured only for the seabob fleet. That noted, there is a sense that there is overcapacity in the industrial fisheries and the regulations in the last two to three years have focused on reducing fishing effort in the 3 industrial fisheries described. While overcapacity is also believed to exist in the small-scale fishery, the current regulations are not focused on reducing the effort levels in this case. There is also concern of IUU fishing by foreign vessels.

MANAGEMENT ACTIVITY

General nature and extent of management

In excess of 67 percent of the marine capture fisheries are managed in some way at the national and local levels. There are no major fisheries (in terms of weight of landings) that are not currently managed. However at the regional level < 33 percent of all fisheries is considered managed. At the national level, the concept of fisheries management includes: legislation; management plans for specific fisheries; interventions /actions to support specific management objectives; published regulations or rules for specific fisheries; traditional rules or customs that affect the harvest of marine fisheries. In comparison, at the regional level, the concept of fisheries management includes: rules established by fishing organizations. Among the managed fisheries, fewer than 33 percent have management plans at the national, local and regional levels. Additionally, of the fisheries that are managed, more than 67 percent of national fisheries have published regulations or rules, but less than 33 percent at the local and regional level

have such regulations. Finally, among those fisheries that have published regulations or rules, fewer than 33 percent of these rules have been informed by methodical scientific monitoring and evaluation. At the national level, the number of fisheries managed has increased over the past ten years, but the number has remained the same at the regional and local levels. The management process has been affected indirectly by international legislation.

Management approaches and tools

Of the industrial fisheries, only the seabob fishery has a management plan that was adopted in 2010. Both general and specific management objectives are listed for Seabob in the plan. The general objectives acknowledge the need to pursue fisheries sustainability through achievement of identified ecologically and economically responsible criteria, such as minimizing impacts on species and ecosystems, cost-efficiency, ensuring quality income levels, etc. The specific objectives give further attention to social and economic needs, such as local food security and foreign exchange earnings. No management plans exist for any other fisheries, including the major small-scale/artisanal fishery, and hence there are no documented management objectives.

While the finfish fishery is a multispecies, as well as a multigear fishery, the Seabob and shrimp fisheries are not. The management of the finfish takes into account the multispecies nature of the fishery to the extent that all the different species are monitored separately including the performance of the different gears. The small-scale /artisanal fishery is multispecies in nature, and management takes this into account, via the use of restrictions on minimum mesh size for nets and also restrictions for hook size. The EAF and the precautionary approach are not yet taken into account generally in the management of marine capture fisheries in Suriname. However, the precautionary approach is considered to be applied through the limitation of the number of fishing licences issued, which is applied rigidly for the seabob fishery.

In the industrial finfish fishery, the following management tools are applied: no take zones, defined number of fishing days, vessel and engine size restrictions; licences and limited entry. In the case of the seabob and shrimp fisheries, similar tools are used, such as: no take zones, vessel and engine size restrictions, gear size/type restrictions, size restrictions, licences and limited entry. The use of these tools has not changed over the past ten years. Additionally, VMS has been introduced for the Seabob fishery. In comparison, the primary management tools used in the small-scale fishery are: temporary area closures for specific purposes, vessel size restrictions, gear size and type restrictions, licences, limited entry. These tools are universally applied within the small-scale fishery. Among the tools listed, the use of a vessel size restriction has increased in the past ten years. The seabob fishery is managed to fulfill the Marine Stewardship Council standard. Both the seabob and shrimp trawl fisheries use turtle excluder devices, while the seabob trawl is also fitted with bycatch reduction devices. In contrast, the small-scale fishery is not managed to meet any agreed international performance standards. In terms of additional tools, it should be noted that Marine Protected Areas exist and their enforcement is believed to affect the management of the small-scale fishery indirectly in a positive way, in terms of offering spatial refuges for the resources concerned.

Stakeholder involvement and transparency in management

Stakeholders are actively involved in the management of all marine capture fisheries at the national level. At the national level, the national fisheries advisory board exists and is composed of representatives of fishery groups where these exist, as well as representatives from the national fisheries authority. The legislation enables particular participatory processes, particularly consultative management, in which the stakeholders are consulted, but do not share management responsibility. However,

these participatory processes are not a formal and required part of the management of all marine capture fisheries. Though not formal, there are steps in these processes that are routinely followed as part of the fisheries management process in Suriname.

In all major fisheries, efforts have been made to identify the stakeholders who have an interest in the use and management of the fisheries resources. Stakeholders in both the industrial and small-scale fisheries are organized into distinct groups. That noted, stakeholders at the national and local levels are defined only in the seabob management plan. Arrangements have also been made to consult the industrial fishery stakeholders and to work with them on the management of these fisheries, but this has not been the case for the small-scale subsector. The stakeholders' participation in decision-making can be described as consultative and advisory, with the process being less formal and organized for the small-scale fishery stakeholders. In the authors' opinion, the participants in the fishery generally do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. As such, this may be expected to limit the positive impact of stakeholder involvement on the management process, e.g. for conflict reduction.

All parts of the process of fisheries management are not considered to be transparent, as information about the process is not clearly documented and easily available to the public. That noted, meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery. Such meetings regarding management are advertised and publicized in advance of the actual meeting dates. There is the opportunity for fishery participants, as well as other stakeholders, to contribute to the decision-making process by providing public comments. Information about management measures and meetings is shared with fishery participants and other stakeholders, with the information disseminated via direct mail, email and fax.

Management of conflict and fishing effort

There is conflict in all three industrial fisheries, but this conflict has decreased in the past ten years. In the industrial finfish fishery, conflicts arise from: competition between different types of vessels; competition amongst the same type of vessels; the activities of other fisheries. In the seabob and shrimp fisheries, conflicts arise only from competition between different types of vessels and the activities of other fisheries. Conflict also occurs in the small-scale fishery, and such conflict has increased over the past ten years. In this instance, the conflict is due to competition between different types of vessels, and also competition amongst the same type of vessels.

Generally, the fisheries management legislation does not set up particular processes for conflict management. At present, fisheries management tools being used to manage conflict among user groups are: zoning of different areas for different users, and limited access to certain areas for certain types of fishers. Tools such as stock enhancement, resource allocation schemes (between different participants in the fishery or between the fisheries and other sectors) and education about sharing of marine resources are not currently applied. However, in all three industrial fisheries, dispute resolution and conflict management processes are part of the fisheries management process for these fisheries. For all these fisheries also, the management process does include the need to consider multiple uses and users within the fisheries sector. The fisheries management legislation for these fisheries requires zoning of different areas for different users. In the case of the small-scale fishery the legislation requires zoning of different areas for different users, as well as limited access to certain areas for certain types of fishers.

In the industrial fisheries, overfishing is believed to be occurring in the finfish fishery only, and the catch rate in this case is not increasing. Fishing capacity is being measured but the process has not been completed for all marine capture fisheries. To date, fishing capacity has been measured only for the seabob fleet. Completion of this activity is inhibited by: a lack of human resources to do the assessments; a lack of

stakeholder support and education; other more urgent fishery management priorities. There is a sense that there is overcapacity in the industrial fisheries and the regulations in the last 2-3 years have focused on reducing fishing effort in the three major fisheries described. There is also a sense of overcapacity in the small scale fishery but there are no regulations aimed at reducing fishing effort in this fishery. It should be noted that capacity reduction programmes have only been set up and implemented for the 3 major industrial fisheries identified.

Management of monitoring, compliance and enforcement

The country has a navy and a marine police enforcement unit. These authorities are responsible for at-sea fisheries patrols, monitoring, and enforcement work in the coastal waters (0 – 3 nautical miles) of the country, but only the navy is responsible for at-sea fisheries patrols, monitoring, and enforcement work in the territorial waters (0 – 12 nautical miles). On the other hand, the Fisheries Department is the sole authority responsible for fisheries monitoring work such as checking dock-side landings and logbooks, but is not responsible for enforcing penalties.

In general, compliance and enforcement of fisheries management include the use of: VMS; on-board observers; routine inspections at landing sites; and at-sea boarding and inspections. The number of offences that is taking place has decreased over the past ten years. However, detection efforts (e.g. at-sea patrols, port monitors) are believed to have also decreased at the same time. For the 3 industrial fisheries described, compliance and enforcement are specifically supported by the use of: VMS; on-board observers; and at-sea boarding and inspections. Between ten and five years ago, the number of offences has increased in the finfish fishery. Besides this, the number of offences has generally decreased over the past ten years in all 3 fisheries. In the small-scale fishery, compliance and enforcement tools include: routine inspections at landing sites; at-sea boarding and inspections. The number of offences has increased over the past ten years in the small-scale fishery. In terms of the budget for monitoring and enforcement, this has increased over the past ten years, including specifically for the industrial and small-scale fisheries. However, it appears that the funding provided does not allow the management authority to enforce all fisheries regulations pertaining to the same fisheries.

Penalties exist for non-compliance with the regulations. In general, the penalties for breaking marine capture fisheries management regulations and rules can include: fixed fines for specific offences; the revocation or suspension of fishing licences; the refusal of the opportunity to fish for the rest of the season or year. For the 3 industrial fisheries described, penalties include fixed fines for specific offences and the revocation or suspension of fishing licences. In comparison, in the small-scale fishery, only fixed fines for fixed offences are applied. While penalties for all major fisheries, industrial, as well as small-scale/artisanal, are considered effective at deterring non-compliance, the detection efforts are not considered sufficient to discourage cheating by fishery participants.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

Approximately 30 percent of the relevant Ministry's budget is available for fisheries management, and this is intended to cover activities at the national, regional and local levels. The available funds are primarily utilized for daily (routine) management activities, with some allocated to compliance and enforcement, and research and development work. These government funds are intended to cover management costs for all fisheries.

The national legislation allows the costs associated with managing fisheries resources to be recovered to some extent using: license fees from participants in the fishery; license fees from participants in other fisheries, whether of the same category of subsector, or of different subsectors (e.g. recreational fishery fees being used to pay

for commercial fisheries or vice versa). Unfortunately, the recovery of management costs and the re-investment in the specific management processes for the industrial and the small-scale fisheries are not apparently directly linked.

Both the budget and the costs of fisheries management have increased over the past ten years. This holds true for the three major industrial fisheries and the single small-scale fishery described. In general, the real costs for marine capture fisheries management over the last ten years increased because of: increased monitoring requirements; increased enforcement activities; increased rate of modifying/changing/amending fisheries management regulations, and; increased member country obligations to RFBs, and RFMOs. More specifically, in the case of the industrial and small-scale fisheries, costs increased also because of the cost of staff salaries and goods.

Generally, the increased costs are being funded mostly by government, with some funding provided by external sources, RFBs (FAO, CRFM) and donor agencies (JICA). In the case of the industrial and small-scale fisheries specifically, government is directly covering the increased costs.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

The national fisheries management legislation, to some extent, gives the fisheries management authority the legal power to meet the priorities and obligations of: international agreements/conventions (global), regional agreements, and other multilateral arrangements. That said, arguably some management developments do support implementation of the FAO Code of Conduct for Responsible Fisheries (CCRF) (1995). For instance, Suriname has a national fisheries advisory board, which should facilitate a transparent and participatory process, with specific steps to be completed in a fixed timeframe. Suriname has also limited the maximum effort of certain fleets, which is a fishing capacity limitation measure, which if informed by regularly updated scientific advice, can ensure responsible fishing. The fishing license conditions also mention regulations concerning anti-pollution and other non fishery regulations to protect biodiversity and the environment. With regard to the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), Suriname has established a special IUU unit at the Department of Fisheries.

However, to date, measures have not yet been taken to facilitate implementation of agreed FAO International Plans of Action relating to reducing incidental catch of seabirds, shark conservation and management, fishing capacity management and others. Similarly, no measures have yet been taken to implement agreed FAO Technical/International Guidelines on EAF, and deep sea fisheries management. In the case of the FAO Technical Guidelines on bycatch and discard reduction, tuna longline fisheries are prohibited to catch species on the CITES list. Also the Fisheries Department, in collaboration with WWF and the Maritime Authority of Suriname, places buoys at the no fishing zone at Galibi, along the border with French Guiana, so that fishermen are aware that the area is a restricted zone, although it is a regulation in their fishing licence.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Regarding regional and/or subregional fishery organizations, agreements, and / or arrangements about the management of marine capture fisheries, Suriname is a member of the following RFBs: CRFM and WECAFC. It is also a Cooperating Non-Contracting Party to ICCAT, gaining this status in 2011. Suriname actively participates in those organizations in which it is a member. At present, to facilitate implementation of agreed regional/international measures that may be adopted by RFBs in which Suriname is a member or participant, the fishery law or act is amended or the requirements are added to the Ministerial Bill.

Of the RFBs in which Suriname participates in the activities, ICCAT is the only RFMO that establishes regulations affecting fisheries management. Suriname therefore provides ICCAT with fishery-related data. On the other hand, Suriname provides fishery data to FAO on a yearly basis. There is a formal mechanism in place so that fishery related data are compiled and provided to ICCAT, which has a specific reporting timetable. Suriname appears to be able to meet the ICCAT reporting timetable.

SUMMARY AND CONCLUSIONS

- The Fisheries Act 2001 is the current legislation, which provides the legal and administrative framework for fisheries management in Suriname. Apart from this primary fisheries legislation, the endangered species legislation for turtles has the capacity to influence management practices in the industrial fisheries. The 2001 Fisheries Act lists an overall objective regarding the necessity for a sustainable fishery. By law, the Department of Fisheries is the lead agency with responsibility for fisheries management. However, the Department of Fisheries receives support from the Ministry under which it operates, as well as from the Ministry of Environment, the navy and maritime police, district commissioners and various stakeholder groups.
- The legislation does not provide specific guidance for establishing management plans or a management process, and there are no compulsory provisions for adherence to key conventions and agreements. This suggests that there is limited national level appreciation of the benefits of responsible fisheries management. This is an obvious deficiency that needs to be addressed as early as possible to ensure not only compliance with international law, but also to provide the required legal foundation for responsible fisheries management. Formal steps for realizing a management process have been developed for some fisheries, particularly the seabob trawl fishery that was MSC certified in 2011. That noted, where formal steps do not currently exist, management regulations determined at the regional/international level can still be incorporated into law.
- Major industrial fisheries exist for finfish, seabob and shrimp. These fisheries also generate significant revenue. On the other hand, the small-scale fishery involves the most vessels and participants by comparison, and the revenue generated is second only to the industrial finfish fishery. In terms of employment, therefore, the small-scale fishery is the most important contributor in terms of the numbers of persons benefiting. Fisheries management is conducted by establishment of rules, and in less than 33 percent of the cases, the rules are directly informed by scientific monitoring. For example, a range of reasonable management tools are applied to all the major fisheries, e.g. area closures, and a range of measures aimed at restricting fishing effort. The multispecies nature of the industrial finfish fishery is simply managed through monitoring of the various species caught, while in the case of the small-scale fishery, there are mesh size and hook size restrictions, presumably to reduce the impact on the juvenile populations concerned. Arguably, therefore, the impacts of these measures would be ad hoc with regard to sustainability of the fisheries.
- The seabob fishery is the only fishery for which there is a formal management plan, documented management objectives, a specific management process, and for which the management measures are directly linked to a routine scientific process. The development of the management process for seabob has been supported heavily by the fishery participants who applied for the MSC label since 2009, and gained it in 2011. For the seabob fishery, therefore, stakeholder involvement has been very active and focused. In other fisheries where there is no management plan and objectives, stakeholders are consulted and provide advice, with meetings and information preparation and distribution led by the

Department of Fisheries. Moreover, the stakeholders in the small-scale fishery are less organized to function in this capacity than those of the industrial fisheries. It is clear that the transparency and outreach capacity of the management process could be improved, as it appears that the present management process does not create incentives to promote responsible fishing stewardship among stakeholders.

- While the management process does not provide specific steps for conflict management, the existing rules demonstrate that multiple uses and users are taken into account, e.g. zoning of fishing areas to facilitate different fishing operations. In addition, overcapacity is believed to exist in both the industrial finfish and small-scale fishery, but efforts to reduce fishing capacity have only been exercised in the industrial fisheries so far. In contrast, the MSC-certified Seabob fleet has a fixed, known fishing capacity.
- While the Fisheries Department uses tools such as VMS, at-sea observer programmes and at-sea boarding and inspection schemes to support compliance and enforcement, the navy and marine police enforcement unit are responsible for enforcement. Generally speaking, the capacity to detect non-compliance has decreased over the past ten years, and this will diminish the effectiveness of the penalty measures applied and make the fishery more vulnerable to acts of cheating. This poses a potentially more serious problem for the small-scale fishery in which case, the number of offences has risen over the past ten years.
- Management costs are currently primarily covered by government funds. Although the fishing industry collects licence fees, this source of revenue is not directly re-invested in fisheries management, and so it is not known whether these fees are sufficient to support all the related management expenses. Moreover, budgets and costs have risen in the past ten years; these increases have been noted to be largely associated with staff salary increases and the increase in the cost of goods generally, a result of inflation of the economy. This suggests that in real terms, the fisheries management budget is not really keeping pace with the increased responsibilities under international agreements and RFB memberships, and the increasing demands of new developments in the industry. While the CRFM and JICA were identified as contributors in helping to meet the management costs, it is clear that attention is needed to pursue and develop self-sustaining options for management cost recovery and re-investment. An economic evaluation of the industry could help to elucidate such options.
- At present, Suriname's progress in implementing agreed global conventions and agreements has been limited. The establishment of a national Fisheries Advisory Board and a special IUU unit represent good efforts to organize the Department and its work in all areas. However, these need to be incorporated into a formal and comprehensive management process with specific steps and timeframes for completion. Moreover, stakeholder groups within the small-scale fishery need to become better organized, so that all stakeholders can serve as equal partners in the management process. Also, dissemination of information is currently undertaken through traditional methods of communication, and as such, could be limiting readership only to those immediately concerned. Hence, more modern communication options need to be introduced and implemented to ensure broader public education and support with regard to fisheries management needs. The improvement of the fisheries management process at the national level will also enable Suriname to make more substantial scientific and management contributions to corresponding activities undertaken at the regional and international scales in respect of shared fishery resources.

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COUNTRY REVIEW

Trinidad and Tobago

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INTRODUCTION

The location of Trinidad and Tobago 11 degrees north latitude and 61degrees west longitude on the north east South American shelf, places it at the confluence of two major marine ecosystems, the Caribbean Large Marine Ecosystem and the North Brazil Shelf Ecosystem downstream of approximately 17 South American rivers including the Amazon and Orinoco rivers. Here oceanographic features are influenced by these rivers and the North and South America Equatorial Currents (Chan A Shing, 2002). As a consequence of this mixing and transfer of large volumes of freshwater and the existence of conditions more typical island shelf ecosystems to the north off Tobago, the aquatic biodiversity including the marine fish is rich and dynamic (Phillip, 1998). Trinidad is about 11.2 km from Venezuela. The continental shelf extends up to 100 nautical miles south, 35 nautical miles east and 27 nautical miles north of Trinidad. Topographically there are no recognized canyons or submerged features. Tobago lies entirely on the shelf, 19 nautical miles from Trinidad. In 1986 Trinidad and Tobago was declared an Archipelagic State (Act 24 of 1986, Archipelagic Waters and Exclusive Economic Zone Act) with approximate marine space comprising 7 158 km² of Archipelagic waters; 9 337 km² of territorial sea and an EEZ approximate area of 56 722 km², representing 15 times its land area (Chan A Shing, 2002).

The fisheries sector accounts for about 15 percent of the Agriculture GDP which in turn contributes to some 3 percent of the national GDP. The estimated GDP (PPP) is USD 27.14 billion (2012) with a corresponding real growth rate of 0.4 percent (Central Intelligence Agency, 2013). Financially, the fisheries sector is small but in terms of employment generation and related social benefits, it is estimated to support some 40, 000 persons of an estimated population of about 1.2 million (Central Intelligence Agency, 2013).

Average annual landings from the marine capture fisheries of Trinidad and Tobago over the past ten years were estimated to be between 13 000 to 15 000 tonnes. Ex-vessel value (i.e. the value at the first point of sale) of marine fishery landings is at least USD 17 741 935 ($110 million Trinidad and Tobago dollars) annually. Approximately 3.5 to 4.5 tonnes of fish are exported annually at a value of about USD 12 million to USD 15 million. Per capita consumption of fish is estimated to be about 14 kg based on data from the national Central Statistical Office.

It is estimated that the commercial fleet accounts for over 90 percent of the total landings, while the recreational fleet lands just about 6 to 12 percent of the total each year. The small scale or artisanal component of the fishery contributes an estimated 80 percent of the landings in terms of quantity and 75 percent in terms of value. Some of the more dominant species/species groups landed include Spanish mackerel and kingfish (*Scomberomorus brasiliensis*; *S. cavalla respectively);* five species of shrimp, sharks, snappers, croakers and groupers, flying fish (*Hirundichthys affinis*), dolphin fish (*Coryphaena hippurus*) and mullet.

Based on the level of activities and vessel types, there are three categories of vessels which operate commercially as well as a recreational component which fishes for the purposes of recreation, personal consumption, competition or business through charterboat fishing operations (Mohammed, 2012).

The small scale or artisanal fleet comprises some 1400 open-decked fiberglass or fibreglass coated wooden vessels (pirogues) ranging in length between 6.7 and 11.6 m. The artisanal trawlers in this category of vessels are described as Types I and II. Artisanal fishing vessels are powered by one or two outboard engines with each generally ranging between 45 and 75 Hp. Type II trawlers are powered by inboard, diesel engines of 90 to 150 Hp. All fishing gear (fish pots, lines [switchering, palangue, banking, a la vive, trolling], gill nets [surface and bottom set], seines [Italian, beach, bait] and bottom trawls) are manually operated and the vessels leave from and return to port within 24 hours.

The non-artisanal fleet is comprised of what are locally known as semi-industrial and industrial vessels. The semi-industrial fleet consists of fibreglass stern trawlers, and multigear vessels. Stern trawlers range between 9.3 and 12.2 m, with inboard diesel engines of 165 to 174 Hp. These vessels each utilize a hydraulic winch to operate the net, while multigear vessels range between 10 and 14 m, carry inboard, diesel engines of 75 to 335 Hp, have communication equipment and may carry electronic fishing aids. The multigear vessels utilize fish pots, demersal lines (bank lines and longlines) and pelagic lines (troll and live-bait lines). Trips can last from a few days to just over a week.

The industrial fleet consists of longliners and Gulf-of-Mexico double-rigged trawlers. Longliners range between 14 and 23 m, are 60 GRT on average and are fitted with inboard diesel engines of 160 to 400 Hp. Trawlers range between 10.9 and 23.6 m, are 30 to 96 GRT, carry inboard diesel engines of 325 to 425 Hp, have communication equipment and may carry electronic fishing aids and refrigeration. These vessels each utilize a hydraulic double-drum winch and usually stay out for up to three weeks.

The fleet of pleasure craft or recreational fishing vessels consists of vessels of varying lengths and design and engage in recreational fishing. The vessel types include cabin cruisers which range between 7.9 and 16.8m, fiberglass pirogues which range between 6.4 and 12.2 m and powerboats which range between 6.4 and 21.3 m (the majority being between 9.4 and 10.7 m), Shoy (2011). Gear used include pelagic lines (live-bait, troll and switchering lines), demersal lines (bank lines and longlines), fish pots and spears. Recreational fisheries may vary from line casting from the shore to the use of sophisticated rod and reel systems.

Gillnet Fishing is the most common artisanal fishing method practised in Trinidad with Spanish mackerel or Carite, kingfish and several types of sharks being the highest value species caught. Other methods include trawling, bottom-set (palangue) and pelagic long lines, trolling, fish pots and a variety of handline methods (*a la vive* or live bait fishing, switchering, vertical long lining).

The Fisheries Division of the Ministry of Food Production is the government authority with responsibility for management of fisheries resources in Trinidad and Tobago. Under Act 40 of 1996 (the Tobago House of Assembly Act) which came into operation on 10th December 1996, the Tobago House of Assembly, a corporate body, has responsibility for fisheries and marine parks within six (6) nautical miles from the baselines of Tobago.

Current legislation to effect fisheries management is the Fisheries Act Chapter 67:51 of 1916. An updated fisheries management Bill is currently under legislative review prior to being considered by Parliament. The updated legislation is consistent with the international best-practice, ecosystem approach to fisheries management, and is expected to have a tremendous impact on the long term sustainability of the fisheries resources for future generations. It will enable the efficient regulation of the sector

which will provide for the rebuilding of stocks that are currently evaluated to be either fully or over-exploited. It will also contribute to the protection of sensitive or degraded habitats and further it will give formal effect to significant and sustained involvement of the stakeholders in the process of management and governance of the sector. This legislation will also result in strengthened collaboration among key agencies in the enforcement of regulations to enable management of the sector. It will allow greater coherence of the conduct and results of research to build on the knowledge base and contribute to informed decision making for future assessments of the resource. Most importantly the legislation provides for compatibility with other related legislation and consistency with regional and international Agreements and Conventions to which Trinidad and Tobago is signatory.

The present prevailing fisheries management system comprises essentially:

1. **Effort management** in the trawl fisheries and pelagic longline fishery (restriction in number of vessels of a particular fleet) – Through a Cabinet decision in 1988 the number of trawlers entering the Trinidad and Tobago fishery is restricted to the number existing in the fleet at that time.
2. **Fishing area restrictions** for certain fleets – The Fisheries (Control of Demersal Trawling) Regulation 2004 sets out specific areas within which the trawl fleets can operate and further specifies the season of trawling off Trinidad's north coast. Other regulations prohibit the capture of fish, shellfish, crabs and shrimp from specified areas in the Gulf of Paria and oysters from the Ortoire area on the east coast. Under the Marine Areas (Preservation and Enhancement) Act of 1970 (last amended in 1997) fishing on the Buccoo reef, Tobago, is regulated.
3. **Regulation of fishing gear** – stipulations in respect of net length and mesh size;
4. **Catch size limits** – the size of capture of several species of fish of commercial importance is limited;
5. **Protection of environmentally sensitive species** – The Protection of Turtle and Turtle Eggs Regulations prohibit the killing of turtles at sea and the taking of eggs after laid and buried; the Fisheries (Conservation of Marine Turtles) Regulations require the use of Turtle Excluder Devices by semi-industrial and industrial trawlers.

A Fisheries Monitoring, Surveillance and Enforcement (FMSE) Unit was established in the Fisheries Division for the purpose of enforcing the Fisheries Regulations. The Unit collaborates with the Ministry of National Security in the execution of its duties. A pilot vessel monitoring system has been tested with a view to implementation for large-scale vessels of the semi-industrial fleet targeting highly-migratory species on the high seas in order to enhance compliance with management recommendations of the International Commission for the Conservation of Atlantic Tunas.

Among the international Agreements and Conventions to which Trinidad and Tobago is signatory those of significance here are the United Nations Convention on the Law of the Sea, 10 December, 1982 (Montego Bay). Signed: 10 December, 1982; Ratified: 25 April, 1986 and the United Nations Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, ratified: 13 September 2006. Since 1999 Trinidad and Tobago has been a Contracting Party to the International Convention for the Conservation of Atlantic Tunas (ICCAT).

The routine collection of catch and effort data at fish landing sites for the artisanal fishery and most components of the trawl fleets was implemented since the 1950s. With the emergence of the longline fleet and other non-artisanal fleets a trip reporting system has been implemented. Landings data are also recorded at major recreational fishing tournaments. The data collected are used for several purposes including national, regional and international assessments of the status of fish stocks. The Fisheries Division also collects fisher, vessel and engine registration data (regular basis);

biological data (ad-hoc; or for a specific purpose such as morphometric studies, fish ageing studies; reproductive studies; acquisition of length frequency data for stock assessment); fish import and export data (regular basis); economic data (ad-hoc; based on specific costs and earnings studies; regular collection of ex-vessel price data); social data (based on specific surveys, questionnaires and interviews) and fisheries incentive data (regular).

In Trinidad and Tobago systems exist for periodic reporting of fisheries data to the FAO and ICCAT, as well as the Caribbean Regional Fisheries Mechanism. Such data include fish landings, fishing effort, ex-vessel value of fisheries; list of vessels authorized to fish in the ICCAT Convention Area, list of vessels engaged in illegal, unreported and unregulated fishing, national report on fisheries management, policy and other developments.

Stock assessments for the species of major commercial importance, mackerels (*Scomberomorus brasiliensis*; *S. cavalla*; *Acanthocybium solandri*), dolphinfish (*Coryphaena hippurus*), five species of shrimp and demersal fish species (selected snappers and croakers) are conducted by and large on an annual or biannual basis. Stock assessments have also been conducted for the four-winged flyingfish (*Hirundichthys affinis*), the Crevalle Jack (*Caranx hippos*) and selected species of snappers and groupers, (*Lutjanus purpureus, Rhomboplites aurorubens, Lutjanus synagris, Epinephelus flavolimbatus and Mycteroperca interstitialis*). These assessments are conducted mainly through the Working Groups of the Caribbean Regional Fisheries Mechanism (CRFM) of which 18 Caribbean States are members- and the Working Groups of FAO/WECAFC. In addition, a multispecies assessment to determine the ecosystem impacts of trawling in the Gulf of Paria using Ecopath with Ecosim (EWE) was conducted for the shrimp and groundfish fishery in 2004 (Manickchand-Heileman *et al*., 2004) and Trinidad and Tobago participated in a regional multispecies assessment of the large-pelagic fishery using EWE to examine possible ecosystem impacts of expansion of the longline fishery on bait species and ecologically dependent species (Mohammed *et al*., 2008).

Draft Fisheries Management Plans (FMPs) for the artisanal fishery for coastal pelagics as well as the shrimp trawl fishery of Trinidad and Tobago were developed in collaboration with the Food and Agriculture Organization of the United Nations (FAO) in 1992. In 1996, a Draft Plan for Managing the Marine Fisheries of Trinidad and Tobago was developed under the CARICOM Fisheries Resource Assessment and Management Programme (CFRAMP). These Plans remain to be updated and finalised in this regard. The FMPs to be developed will focus on the following fisheries which all exhibit a high degree of complexity being multispecies, multigear, and multifleet: 1. Soft-substrate demersals (shrimp, groundfish); 2. Hard-substrate demersals (snappers, groupers, lobsters); 3. Coastal pelagics (Spanish mackerel, King mackerel, Flyingfish and associated species); 4. Highly migratory pelagics (Tunas, billfish); 5. Sharks; 6. Recreational. Currently a FMP for the Hard-Substrate Demersal Fishery is being drafted under the regional project, *Strengthening Fisheries Management in ACP Countries (ACP Fish II)* and the Food and Agriculture Organization of the United Nations is providing assistance update the FMP for the Trawl Fishery. Trinidad and Tobago is also participating in the elaboration of a regional FMP for the flyingfish fishery facilitated through the CRFM/WECAFC Working Group on Flyingfish in the Eastern Caribbean.

Fishing is one of the many activities conducted in the coastal zone. Through a project, *Integrated Coastal Fisheries Management*, funded by the FAO in the early-mid 1990s, the relevant government authorities were made aware of the critical role of the Fisheries Division in highlighting the impacts of coastal development on fisheries and the marine environment. Since establishment of the Environmental Management Authority (EMA) in 1995, the Fisheries Division has been among the state agencies

consulted and involved in the process for granting of Certificates of Environmental Clearance for coastal development.

Other activities, mainly industrial and agricultural, exert negative impacts on fisheries resources through pollution and habitat destruction. To effectively address the issues of fisheries management therefore, an integrated approach to management of the coastal zone is required. To this end Trinidad and Tobago has established a multisectoral Committee appointed by Cabinet to establish an Integrated Coastal Management Framework, Strategies and Action Plan. The Fisheries Division of the Ministry of Food Production is a key partner and member of this Committee. In addition Trinidad and Tobago has signalled its endorsement of the Caribbean Large Marine Ecosystems Strategic Action Programme (CLME/SAP). Currently the Fisheries Division is among the government agencies represented on a Cabinet-appointed Committee responsible for development of an integrated coastal zone management framework, strategies and action plan.

The involvement of stakeholders, in particular members of the fishing community, in the management process is regarded as critical for the acquisition of quality data, conduct of assessments and the elaboration of FMPs. A consultative framework has been established and is applied at every stage in the management process. The Division remains concerned about the level of formal organisation of the sector, and is currently seeking to facilitate such organization and to assist with the necessary training to strengthen fishers' participation in the management process.

POLICY FRAMEWORK

Specific legislation for marine capture fisheries management exists, but is in the process of being updated. In particular, the Legislation Review Committee of Ministers of Cabinet is considering the Fisheries Management Bill 2011, which is on the legislative agenda. At present, the Fisheries Act of 1916 is the active legislation in place, which includes subsidiary legislation that makes provisions for specific regulations that have been introduced over time since 1916. For example, there are now regulations pertaining to, inter alia: mesh size of nets/seines, minimum size measures for certain types of fishes, the sale of certain fish for use as bait, seasonal closures, zoning of fishing operations, closed areas, conservation of turtles, specification of turtle excluder devices to be installed in trawl nets, control of demersal trawling operations. The Archipelagic Waters and Exclusive Economic Zone, Act 24 of 1986, is also relevant in that this legislation identifies the archipelagic status of Trinidad and Tobago, defines the nature and extent of the jurisdiction in the various marine areas, and makes provisions for matters connected in accordance with UNCLOS.

The existing Fisheries Act does not include a formal definition of fisheries management. However, it provides a legal and administrative framework for fisheries management with regard to rivers and the Territorial Sea. In the case of Trinidad, this framework is provided by the Fisheries Division operating under the supervision of the Minister with responsibility for Fisheries, currently the Minister of Food Production; in the case of Tobago, the Tobago House of Assembly provides the necessary local administrative framework. In the existing legislation, the Minister, to whom responsibility for fisheries is assigned, has the statutory responsibility for proclaiming management regulations and the Fisheries Officer (FO) or any person authorized in writing by the FO has the authority to enforce the management regulations. These positions exist only in the Ministry with responsibility for Fisheries and the Director of Fisheries is the head of the Fisheries Division. Currently there is no local level management framework however, proposed new legislation will provide for local-level administration. This legislation will enable the Minister to delegate authority to a local fisheries management authority, a body representing the majority of fishers in a designated local Fisheries Management Area. While the legal responsibility of

fisheries management is not routinely shared with any other national agency, the Minister responsible for Fisheries could share some authority with the Minister with responsibility for Foreign Affairs in matters at the regional/international level.

The existing legislation does not list fisheries management objectives. However, recently proposed new legislation will require fisheries management plans to be established, and these may be expected to include management objectives. The proposed legislation will also take into account recent international fisheries management norms/mandates, with particular attention given to FAO International Plans of Action and the development of the corresponding national plans of action. In addition, several pieces of non-fishery national legislation are in effect and indirectly, but significantly, impact the management of marine capture fisheries in Trinidad and Tobago. Among these, the major ones include the Wildlife Act/CITES, the Fish and Fish Product Regulations 1994, and the Environmental Management Act 2000 - Sensitive Species and Areas Rules.

LEGAL FRAMEWORK

As explained earlier, there is a single agency in Trinidad (the Fisheries Division) operating under the relevant Ministry) and also in Tobago (The Tobago House of Assembly) that has responsibility for the daily task of fisheries management. Moreover, the existing legislation does not identify a separate authority with formal responsibility for scientific support in fisheries management. However the Fisheries Division has a separate unit, the Marine Fishery Analysis Unit (MFAU), with the primary responsibility for fisheries data collection and analysis and conducting management oriented research to inform the Division's fisheries management mandate. In addition, the Institute of Marine Affairs and the University of the West Indies have played a notable, but informal, role in conducting fisheries-related scientific research, development, and monitoring activities. The relevant information generated by these two agencies is generally considered in any active fisheries management process.

The Fisheries Division, under the Minister with responsibility for Fisheries, recently reconstituted a Fisheries Monitoring Surveillance and Enforcement Unit (FMSEU) to facilitate monitoring and evaluation of compliance with fisheries management legislation. This Unit works with the Coast Guard and Police in taking matters through the existing Magistrate Court System. .

The existing legislation does not provide specific guidance to shape fisheries management plans, e.g. specific guidance on management tools and approaches, a formal process and a fixed timeframe for implementation. However, the proposed new legislation will establish a fixed framework with specific steps to be followed. The proposed legislation will also mandate the minimum contents of the Fisheries Management Plans (FMPs) and the level of consultation required in the preparation of these plans, as well as the review period and the implementation strategy in the absence of a review. Once prepared, the Director of Fisheries will be required to ensure that all FMPs are submitted to a Fisheries Advisory Board of stakeholders (comprising members of both the public and private sector) for review and recommendations for amendments. Under the proposed new legislation, final FMPs will then have to be submitted by the Director of Fisheries to the responsible Minister for approval and implementation by the Director, or any local Fisheries Management Authority. Moreover, FMPs will be publicized. The proposed legislation will further mandate that a FMP be valid for a three year period, after which time the FMP should be reviewed. However, the review could take place at any time that there is a request by named stakeholders to do so. In the absence of a review, the plan would remain valid, but not for more than a further three years.

In terms of specific fisheries management measures, several are specified for key fisheries: length, depth and mesh size of gill/seine nets; minimum sizes for mackerels,

jacks and a variety of species; zoned fishing grounds for shrimp trawlers, by vessel size and degree of mechanization; a requirement for trawl nets to have TEDS installed. It should be noted that these management tools, though specific, are not based on specific scientific advice. The proposed new legislation makes specific provisions for the designation of prohibited areas and prohibited methods. In addition, while certain internationally agreed measures are not specifically included in the legislation, e.g. ICCAT recommendations, these will be accommodated in the updated legislation through the FMPs and enforced as appropriate. The new proposed legislation will also facilitate conditional licenses and associated penalties.

While the existing legislation does not require specific information to guide decision-making, the proposed new legislation is designed to facilitate the incorporation of data from all available sources, e.g. biological, environmental, economical, ecological, as well as external information that may be generated by RFBs. The proposed new legislation also makes provisions for continual review and updating of the available data and information, which in turn could be used to inform review of management plans.

As noted earlier, the existing legislation is limited in scope, and predates UNCLOS and other subsequent major international fisheries agreements. In consequence, it does not make specific reference to such obligations. This old legislation does not include management objectives, and hence the objectives listed by international agreements, as well as RFBs and RFMOs, are also not incorporated. However, the proposed new legislation has taken into account the national obligations under international conventions, to which Trinidad and Tobago is a party. These include: The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement) and also the Convention on the International Commission for the Conservation of Atlantic Tunas (ICCAT).

The proposed new legislation will provide legislative support for the elaboration of National Plans of Action under the FAO Code of Conduct for Responsible Fishing (CCRF). Input and support for the IPOAs will be facilitated through the Fisheries Management Plans, which will become the mandatory basis for fisheries management measures to be implemented. By this means, provisions will include the assessment of resources, and determination of surplus and associated access arrangements as may be required.

Also, in so far as the objectives of RFBs and RFMOs are increasingly being brought into alignment with internationally agreed objectives for sustainable fisheries management, the proposed new legislation is in accordance with these, e.g. the establishment of appropriate target and limit reference points, and application of the precautionary approach. At present, Trinidad and Tobago is a member of the Caribbean Regional Fisheries Mechanism (CRFM) and the Western Central Atlantic Fishery Commission (WECAFC) which are RFBs, and of the International Commission for the Conservation of Atlantic Tunas (ICCAT) which is a tuna RFMO. In the case of ICCAT, the ICCAT Convention lists the attainment of Maximum Sustainable Yield as its objective, but ICCAT is proposing to update its Convention text to embrace new management approaches. In the absence of the relevant provisions within the existing legislation, required administrative and procedural measures are being adopted to meet ICCAT obligations.

The management agency, fishery stakeholders, as well as non-fishery stakeholders, and the activities/measures adopted by other countries and/or RFBs and RFMOs all have the capacity to influence management decisions. This, together with the absence of a defined management process and fixed steps, suggests that the management process may not be fully transparent and accountable.

As noted earlier, several pieces of non-fishery legislation are in effect, and known to impact fisheries management in Trinidad and Tobago, with the major ones being: the Wildlife Act/CITES, the Fish and Fish Product Regulations 1994, and Environmental Management Act 1994- Sensitive Species and Areas Rules.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

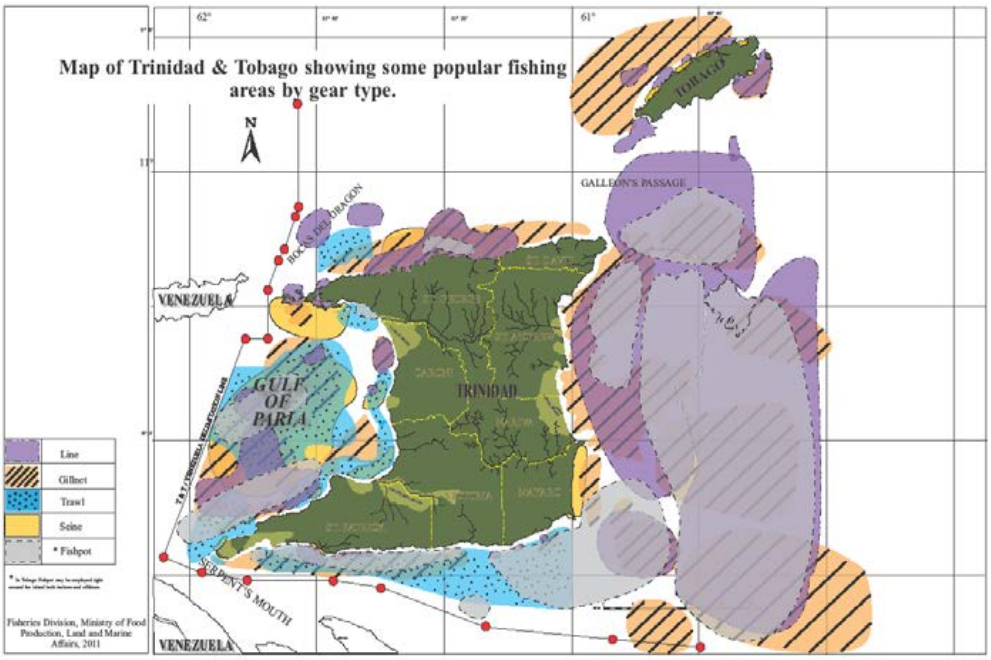
In Trinidad and Tobago, commercial/industrial fisheries are defined as fisheries conducted for wide marketing. Commercial/industrial fishing vessels are most commonly14-23 m in length, and typically use 160-400 hp inboard diesel engines. In terms of gear and equipment, vessels are stern and double rigged in the case of trawlers (vessel length being 9-12m and 11-24m, respectively). The commercial fishery also uses pelagic longlines and fish pots. Hydraulic winches are used for hauling gear, and vessels are equipped with electronic fishing aids, communication equipment, and in some cases, refrigeration. Commercial fishery production targets both the local and export markets, although the exact contribution to food security and employment. The number of commercial/non-artisanal fishers in Trinidad and Tobago is estimated to be close to 400.

There are also small-scale fisheries, in which the vessels used are pirogues. These are open, undecked vessels of 7-12 m in length; these vessels have 1 or 2 outboard engines, usually 45-75 hp each, though the majority of pirogue trawlers carry a 90-150 Hp inboard diesel engine. For these fisheries, gillnets, beach seines, and lines are the primary gear. All fisheries, with the exception of the pelagic longline fishing fleet, operate within the EEZ of Trinidad and Tobago.

With respect to the recreational fishery information provided subsequent to this study on the characteristics of this fishery indicate the recreational fishery comprised mainly three types of fishing vessels: undecked pirogues of 6.4 to 12.2 m in length, powerboats of 9.4 to 10.7 m, and cabin cruisers of 7.9 to 16.8 m in length. These vessels targeted similar species to the commercial vessels and so used similar fishing methods (Mohammed, 2012).

The most important fishing areas in Trinidad and Tobago are shown in Figure 1.

FIGURE 1
Most important fishing areas in Trinidad and Tobago



Fish production and value

The trawl, fish pot/line and pelagic longline fisheries are the top three commercial/non-artisanal fisheries in terms of landings, yielding an estimated annual production of 1269t (2010 estimate), 942t (2010 estimate), and 430t (2010 estimate) respectively. These fisheries are considered to be about equally valuable, though less important in value than the artisanal gillnet fisheries. In 2010, the annual gross value of the trawl fishery (semi-industrial and industrial) was estimated to be just under USD 4 million, showing a gradual increase since 2001. The fish pot/line fishery had an annual gross value of about USD 2.5 million in 1997, but no additional estimates are available for determining a time trend for this fishery over the past ten years. In the case of the pelagic longline fishery, this fishery had a gross value of just over US1.5 million in 2002, which more than doubled to just over USD 3.3 million in 2006.

The monofilament(transparent) gillnet, fillet(green net) gillnet, and *a la vive* (live bait) line fisheries are the top three small-scale fisheries in terms of landings, with the annual 2010 production levels being 2,168t, 2,111t and 469t respectively. However, only the monofilament and fillet gillnet fisheries are among those with the highest gross value of the catch. During the period 2001-2010, annual landings for the monofilament fishery showed a notable increase from 2857 tonnes in 2001 to 3995 tonnes in 2005, but then declined to 2168t by 2010. In the case of the fillet gillnet fishery, annual landings show a marked consistent decrease since 2001: from 3383t in 2001 to 3191 tonnes in 2005, and 2111t in 2010. Like the fillet gillnet fishery, the annual landings of the *a la vive* fishery decreased continually during 2001-2010: from 697t in 2001 to 655t in 2005 and 469t in 2010.

No information is readily available on the recreational fisheries, because the regular activities of these fisheries are not routinely monitored by the national fisheries agency responsible for fisheries management. That noted, Mohammed (2012) examined landings of 6 major sport fishing tournaments in Trinidad and Tobago during 1981-2011: collectively, the total landings generally and steadily increased from 1981, with 2 historical peaks observed in 1995 and 2002. During 2006-2010, the collective landings recorded have been 3-4 tonnes, and this declined to a little over 2 tonnes in 2011. Shoy (2010) noted that the majority, 64 percent of the recreational fishers in the northwest peninsula, did not sell their catch. No data are available on the value of the recreational catch that is sold.

Fishing effort and impacts

In terms of fishing effort, there are: 134 participants and 36 vessels operating in the trawl fishery (semi-industrial and industrial); 48 participants and 12 vessels operating in the fish pot/line fishery; and 180 participants and 30 vessels in the pelagic longline fishery, for Trinidad. Over the past ten years, while the numbers of participants and vessels have remained more or less the same in the trawl fishery, there has been a reported increase in the participants for the fish pot/line and pelagic longline fisheries and also in the number of longline vessels. It is not known whether there has been any change in vessels using fish pots and lines over the past ten years. There is also a semi-industrial multigear fleet operating out of Tobago with an estimated ten or so vessels and 30 participants. Similarly, the numbers of participants and vessels in the artisanal multigear fleet of Trinidad have remained more or less the same over the past ten years and are currently estimated to be 2,214 and 1,107 respectively, with the estimates for Tobago being 618 and 309 respectively. The levels of participation in the small-scale and recreational fisheries, in terms of participants and vessels, as well as how this has changed over the past ten years, are not precisely known. .

Overfishing is believed to be occurring in approximately 70 percent of managed marine capture fisheries. In this regard, there is evidence of declining catches of some species, as well as reductions in the sizes of major species. About 80 percent of

all fisheries are also believed to be overfished, likely to be the cause of an observed stagnation in overall fish production and also reductions in the sizes caught of major species, as noted previously. In particular, overfishing is believed to be occurring in the commercial trawl and fish pot/line fisheries, and there is some overfishing taking place in the pelagic longline fisheries. This understanding of the status of the pelagic longline fishery may be primarily linked to ICCAT assessment and management advice, as no separate, specific information is available on the trends in catch and effort for any of the longline fisheries.

Fishing capacity is being measured in the three major commercial fisheries. However, there is no confirmation that a situation of overcapacity exists in the longline and fishpot/line fisheries, though this has been found to be the case for the trawl fishery. Efforts have been made to limit fishing capacity in some of these fisheries. With respect to the semi-industrial and industrial trawl fisheries, efforts have been made to limit and not increase the numbers of vessels since 1988. Efforts are also being made to control the numbers of vessels in the longline fleet via a licensing system. With respect to the small-scale fisheries, there is also overcapacity in the trawl and gillnet fisheries though measures are not yet in place to limit or reduce these fleets. Fishing capacity in the recreational fisheries is more challenging to measure, and so there is limited understanding of whether there is currently over-capacity in this fishery subsector.

MANAGEMENT ACTIVITY

General nature and extent of management

All the major fisheries are managed in some way in Trinidad and Tobago. Moreover, the number of fisheries being managed at the national, regional and local levels has increased in the past ten years. That noted, the percentage of fisheries managed, the nature of the management process, the percentage of fisheries managed by plans and regulations are not precisely known.

In view of the fact that the fisheries management process is not supported by legislation that takes into account the objectives of the major fundamental international fisheries agreements, the existing process would seem to be ad hoc and informal in practice. While some management regulations, such as area closures have been put in place to avoid conflict, others have been adopted to comply with internationally-defined needs, e.g. catch restrictions imposed by ICCAT, and CITES regulations regarding trade in endangered species such as queen conch.

Although the current legislation does not specify the need for plans, draft management plans exist for the trawl fishery, and the small-scale fishery for coastal pelagics but not for the recreational fisheries.

Management approaches and tools

Both the commercial/industrial fisheries and small-scale fisheries are multispecies in nature. Present-day management practice takes this aspect into account, through the adoption of regulations that appear to be more fleet-specific rather than species-specific. Current fisheries management does not incorporate EAF and the precautionary approach. As noted previously, the pelagic longline fisheries are subjected to catch restriction measures that have been imposed by ICCAT. Prohibited areas and zoning are implemented for the trawl fleets; minimum mesh sizes for the gillnets and trawl nets; maximum net dimensions for gillnets and seines; and minimum fish lengths for several species such as carite, kingfish, snapper and salmon. The existing marine protected areas/marine reserves do not specify fisheries management as one of the aims, and it is not known how fisheries management might be affected by these protected areas/reserves.

Stakeholder involvement and transparency in management

In Trinidad and Tobago, stakeholder consultation in fisheries management is routine and a matter of policy, but the process is not a formal one or one required by the current legislation. There is no statutory requirement for stakeholders to be consulted, but the recently proposed new legislation makes provisions for various levels of stakeholder consultation. It proposes a Fisheries Advisory Board, mandatory consultation in the elaboration and finalization of fisheries management plans, and mandatory collaboration among agencies which regulate use of the coastal zone and activities likely to have negative impact on the marine habitat.

Under existing arrangements, meetings to discuss the management of specific fisheries are open to all stakeholders, including the participants in the fishery, and these meetings are publicized in advance of the meeting dates. In addition, the process seeks to facilitate opportunity for fishery participants and other stakeholders to contribute to the decision-making process by providing public comments. That said, all aspects of the management process are not transparent, and information about the fisheries management process is not clearly documented and made available to the public. Information dissemination is currently effected through the use of printed materials such as brochures or information packages, direct mail, email, fax, community mobile loudspeaker, and also through the use of routine fisheries extension services.

Management of conflict and fishing effort

The legislation does not set up any particular conflict management processes such as: specific steps to resolve conflicts, the use of alternative dispute resolution mechanisms, or the need to consider multiple uses and users within the fisheries sector, or between the fisheries sector and other sectors. That noted, the designation of specific fishing zones for specific users and also stock enhancement (in wetland areas) are the management tools that are currently in effect to help reduce conflict. It should be noted that the proposed new legislation is designed to address conflict through a formal process. Conflict is reported to exist in the trawl fishery, primarily arising from competition for usage of the same areas of water by other fisheries and by other industries. However, the level of this conflict had not changed in the past ten years. Incidents of conflict are not reported to be occurring in the small-scale fishery. Mohammed (2012) identified the operations of foreign longliners, impacts of seismic surveys on fish populations and unsustainable fishing practices of commercial fishers as sources of conflict for recreational fishers. Other issues related to multiple use of the ecosystem including pollution, banditry and piracy are also sources of conflict for recreational fishers in the northwest peninsular (Shoy, 2010).

As already noted, overfishing is occurring in the commercial trawl and fish pot/line fisheries, and also to some extent in the pelagic longline fishery. There is, therefore, concern about the level of fishing capacity in these fisheries. To date, a government-mandated fishing capacity restriction has been adopted for the industrial trawl fleet and has been endorsed also by the industry. However, no actual formal capacity reduction programmes are in effect for any of the fisheries.

Management of monitoring, compliance and enforcement

Under the existing legal framework, The Trinidad and Tobago Police Service (TTPS) has the primary responsibility to enforce all national laws, which includes the fisheries laws. Statutory power is contained in the Police Service Act (2006) Chap 15:01-Sec. 45 (http://rgd.legalaffairs.gov.tt/laws2/alphabetical_list/lawspdfs/15.01.pdf) and The Police Service (Amendment) Act (www.ttparliament.org/legislations/a2007-13.pdf). A Marine Police Unit existed and operated previously to assist with enforcement activities, but was disbanded about 15 years ago. The current administration has indicated a strong interest in reconstituting the Marine Police Unit.

However, the Fisheries Monitoring, Surveillance and Enforcement Unit (FMSEU) of the Fisheries Division was established in 2004 by Cabinet to provide support to facilitate and focus on compliance of the fisheries laws and policies of the Fisheries Division. Authorized persons of the Unit include Fisheries Officers, Fish Inspection Officers and Fish Inspectors. Statutory power is derived from the current Fisheries Act 1916 that defines a "Fisheries Officer" as any officer of the Fisheries Division" and it charges the "Fisheries Officer" with the duty to carry out the provisions of the Act. In addition to the establishment of FMSEU, Cabinet approval was given for the creation of the positions "Fish Inspection Officers" and "Fish Inspector" as well as for the powers of arrest to be conferred onto Authorised Officers of the Unit. On induction, Officers of FMSEU are precepted under the Supplemental Police Act and thereby empowered to enforce national laws.

Currently, both the Fisheries Division and the Trinidad and Tobago Coast Guard are responsible for conducting at-sea fisheries patrols, monitoring, and enforcement work in coastal waters (0-3 nautical miles), as well as the territorial waters (0 – 12 nautical miles) of the country. On the other hand, the Fisheries Division has sole responsibility for conducting fisheries monitoring work such as checking dock-side landings and logbooks, and is also responsible for enforcing penalties.

To promote compliance and enforcement, the management process includes the use of: vessel monitoring systems (pilot tests conducted to date); sea patrols, random dockside inspections and routine inspections at landing sites. A pilot VMS was implemented to evaluate the service provided by different suppliers. Once a suitable supplier is selected, the VMS is expected to be extended to all vessels operating in the commercial/industrial fisheries. The number of offences are believed to have increased in the past ten years, but there have also been efforts to increase the capacity to detect these offences in recent years with the establishment of the FMSEU. This situation has occurred despite the fact that the budget for monitoring and compliance has increased over the same time period, presumably for all fisheries.

Currently there is weak application of penalties related to management regulations, while penalties are not being applied for the recreational fisheries. However, the proposed new legislation makes formal provisions for the application of penalties. Under the existing arrangement, penalties for breach of marine capture fisheries management regulations and rules include small fines for first offences and larger fines for additional offences. The levels of effectiveness in penalty enforcement for deterring non-compliance and in detection capacity for preventing/reducing incidences of cheating are unknown. Generally speaking though, penalties and detection efforts are not considered sufficient to deter incidents of non-compliance. When prosecutions do occur, the Police Service and the existing Magistrate Court System become actively involved in the management process.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

The government provides the majority of funding for fisheries management at the national, regional and local levels. Such funding covers research and development, monitoring and enforcement and daily management activities for all fisheries. However, the current legislation does not facilitate recovery of management costs through collection of licence or other usage fees. The proposed new legislation will allow the fisheries authority to set the fees payable for services and licences, with the exception of some tournaments and licences for underaged participants and some pleasure fishers.

The budget has increased minimally in recent years, relative to the costs of management. In Trinidad and Tobago, the increase in management costs is associated with: increased stakeholder participation, increased monitoring requirements, increased enforcement activities, increased rate of modifying/changing/amending fisheries management regulations, expansion of data collection systems, and updating and

consolidation of databases for easier access and manipulation of data. Such increased costs of management are not currently being met by fishery participants, but by the government and also primarily through participation in various regional/ subregional projects.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

Trinidad and Tobago is a party to The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement) and also the International Convention for the Conservation of Atlantic Tunas (ICCAT). At present, Trinidad and Tobago is a member of the Caribbean Regional Fisheries Mechanism (CRFM), and the Western Central Atlantic Fishery Commission (WECAFC) which are RFBs, and of ICCAT which is a tuna RFMO. The proposed new legislation takes into account several FAO IPOAs and the provisions of the CCRF.

In promoting the CCRF, the Fisheries Division co-ordinated a one-day training workshop in 2012 on the Code of Conduct with the support of the FAO and the Caribbean Network of Fisherfolk Organisations (CNFO). Also, in the late 1990s the CCRF booklet was reproduced and distributed to stakeholders to provide background for the Fisheries Management Policy that was being elaborated at that time. The Fisheries Division had acquired the full set of CCRF Guidelines and at least Fisheries Division staff, in their respective areas of responsibility, are being made aware of the guidelines. With regard to implementing the provisions of the UN Fish Stocks Agreement, Trinidad and Tobago became a member of the relevant Atlantic tuna RFMO, ICCAT, in 1999, and has regularly participated in ICCAT activities since then. Trinidad and Tobago has also proposed updated legislation taking into consideration the provisions of the UN Fish Stocks Agreement. A pilot VMS is being implemented, with the intention of more widespread application in the near future.

Regarding the FAO International Plan of Action (IPOA) for the Management of Fishing Capacity (1999), and the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001), Trinidad and Tobago has established appropriate vessel lists and developed a list of vessels in good standing for the commercial/semi-industrial fleet.

To move closer to implement the FAO International Guidelines on Bycatch Management and Reduction of Discards (2010), Trinidad and Tobago has participated in a Global Environment Facility Project aimed at reducing by-catch in catches of the trawl fleet, EP/GLO/201/GEF "Reduction of Environmental Impact from Tropical Shrimp Trawling, through the Implementation of Bycatch Reduction Technologies and Change of Management".

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

Trinidad and Tobago is a member of the CRFM, WECAFC, and ICCAT, and participates in the activities of these RFBs routinely. In the case of the CRFM and WECAFC, Trinidad and Tobago participates in both the scientific and management activities and meetings. For ICCAT, participation has so far been limited to the annual management-level Commission meetings. ICCAT meetings are often held outside of the Caribbean region, and so this makes participation costs higher in this instance. The perception of costs versus benefits would also appear not be helped by the absence of a formal management plan and process that would be expected to prioritise objectives and accurately evaluate costs in relation to the value and benefits at stake. Trinidad and Tobago also participates in fisheries-related activities of the Organization of the Eastern Caribbean States (OECS) and Organization of the American States (OAS) activities, and is able to participate in other organizational activities, if requested to do so.

To facilitate implementation of agreed regional and international management measures, administrative and procedural measures are adopted in the absence of suitable national legislation. This has been the approach to ensure compliance with ICCAT regulations that are mandatory. The proposed new legislation for Trinidad and Tobago would, however, provide legislative support for the elaboration of National Plans of Action under the CCRF, and also input and support for implementation of the FAO IPOAs. Through the Fisheries Management Plans, which will become the mandatory basis for fisheries management under the proposed new legislation, establishment of regulatory measures, the assessment of resources and determination of surplus and associated access arrangements will be facilitated.

In terms of present statistical data and management contributions in accordance with agreed RFB requirements, Trinidad and Tobago provides fishery related data to the FAO, ICCAT, CRFM and CITES, and has a formal national mechanism in place to facilitate these submissions. While deadlines are stipulated by each of the organizations mentioned above, these reporting deadlines are not always met due to a lack of human resources.

SUMMARY AND CONCLUSIONS

- The existing fisheries legislation in Trinidad and Tobago does not support a formal management process and does not identify specific management objectives and approaches. The legislation also does not provide for formal and fixed steps for stakeholder involvement, ensuring good governance practices such as transparency, accountability and conflict management, and for handling compliance and enforcement. However, new legislation has been proposed, which makes provisions for fisheries management plans to be established. Such legislation will also accommodate a formal management process with specified steps ranging from data acquisition to stakeholder consultation, decision-making and compliance and enforcement. As the proposed new legislation has taken into account obligations and also technical and management guidelines under recent international agreements, particularly the UN Fish Stocks Agreement, the Code of Conduct for Responsible Fisheries and the FAO IPOAs, the management plans generated are expected to reflect the relevant provisions as well.
- Consequently, enactment of the new legislation appears to be a crucial step if Trinidad and Tobago is to make progress towards proactive and successful management. This is because at present, the only management regulations in effect are regional and international regulatory measures that are mandatory. Additionally, while stakeholders are routinely consulted, there is no established and reliably transparent formal process for consultation and decision-making. It has been reported that even non-participants are able to influence management decisions. If this occurs in the absence of fishery participant and other primary stakeholder input, then this is not ideal for nurturing stakeholder/participants support particularly for addressing matters of conflict and non-compliance. Also, dissemination of information is currently undertaken through traditional methods of communication, and as such, could be limiting readership only to those immediately concerned. More modern communication options need to be introduced and implemented to ensure broader public education and support with regard to fisheries management needs.
- The existing legislation formally identifies only a single agency in Trinidad and one in Tobago to carry out all the tasks of fisheries management. At present, the Fisheries Division has been able to make progress in the area of statistical monitoring, fish stock assessment and interpretation via participation in RFB activities and in informal consultation with stakeholders, and implementation of agreed regional/international management measures that are mandatory.

Necessary additional research and other scientific support are dependent on ad hoc contributions from the IMA and UWI. Similarly, dockside and landing site inspections, as well as the developing use of vessel monitoring systems, are the tools being applied to improve compliance with management regulations. However, there is concern about an increasing number of offences, and current penalties are apparently not sufficient to combat incidents of non-compliance.

- It is not desirable to have the same agency involved both in monitoring and enforcement. Ideally, the proposed new legislation should identify formal roles for separate agencies to provide the necessary management advisory and compliance and enforcement support, or alternatively, an expanded role of the fisheries authority that allows it to have separate arms, each with a distinct role and responsibility for different components of the fisheries management process. In the latter option, the re-establishment of the Marine Police Unit warrants careful consideration. Both options will very likely require additional investments in management, the costs of which are currently funded largely by government sources. Recovery of the costs of management should also be given further attention, e.g. via the collection of reasonable annual licence fees and the consistent application of appropriate non-compliance penalties, at levels that are commensurate with the benefits enjoyed by the users, or lost to other users, as the case may be.

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COUNTRY REVIEW

Venezuela

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INTRODUCTION

Venezuela, situated on the South American northern coast, has a continental coast that extends 3 964 km of which 68 percent is located in the Caribbean Sea, 21 percent in the Atlantic Ocean, and the remaining 11 percent correspond to an insular region consisting of 14 archipelagos formed by over 300 islands and islets (MARNR, 1979). The total maritime area of Venezuela is 860 000 km^2, and within this area an array of ecosystems rich in marine biodiversity has been identified and classified into 13 eco-regions, most of which 11 are located along the Venezuelan Caribbean coast; while the remaining two correspond to the Oceanic and the Orinoco Delta eco-regions (Klein, 2008). In the eco-regions of the Venezuelan Caribbean coasts, the Eastern Upwelling Zone is one of the largest coastal eco-regions and the most relevant because it sustains most of the important fisheries of Venezuela. The Venezuelan Eastern Upwelling Zone is one of the more productive areas of the Caribbean Sea due to the seasonal nutrient inputs caused by localized wind-induced upwelling during the dry-season and river discharge from the Orinoco during the rainy season (Freon and Mendoza 2003). The eco-regions along the central coast are characterized by a narrow shelf with sparse resources; in contrast to the eco-regions in the west of Venezuela like the Maracaibo Lake estuary and Gulf of Venezuela that support important shrimp and crab fisheries (Gines, 1982; Casler *et al.*, 2011).

Venezuela's maritime and fishing tradition dates back to pre-Columbian time, written accounts in the early 1500s mentioned local fishers around Margarita Island using fishing nets and building vessels to catch fish and trade between the islands and the mainland (Marval and Cervigón, 2008). Until the first half of the 20th century Venezuelan fisheries were exclusively artisanal coastal fisheries, the dominant gear being the 'chinchorro' (a kind of large seine net operated by more than 50 fishers) (Suarez and Bethencourt, 1994). In the early 1950s, the Venezuelan fishing operations began its industrialization with the introduction of trawling vessels for the capture of penaeid shrimps in the Gulf of Venezuela, and pelagic longline vessels for the capture of tuna species in the Caribbean Sea. During the period of 1950-1960, public investment in port and landing facilities, the construction of canneries, and the introduction of outboard engines led to a rapid development of the fishing activities in Venezuela (Novoa, 2000). Nowadays the Venezuelan artisanal fishing fleets consists of approximately 20,000 small vessels (< 10 m, open deck, out board engines, coastal), and about 1,000 mid-size vessels (14-18 m, closed deck, central engine, mid-long range); while the industrial fleets consists of about 30 tuna purse seiners, 65 pelagic longliners, and five tuna baitboats (Anon., 1996). Recently (2008–2010), due to the ban of the bottom-trawl fishery, about 200 shrimp trawlers were transformed into multigear fishing vessels deploying traps and bottom-longline gear operating in the shelf areas. Regardless of all the advances in the Venezuelan fishing fleets, the artisanal fleets continue to provide most of the Venezuelan fishery products to the population, which can account for more than 60 percent (Marval and Cervigón, 2008).

POLICY FRAMEWORK

The primary fisheries legislation for fisheries management is the Fisheries and Aquaculture Act, adopted on 14 March 2008, which provides both legal and administrative frameworks for governing the management process at the national, regional/international and local levels. The legislation also identifies a single fisheries authority for handling matters at the national, regional/international and local levels.

The term "fisheries management" is defined in the legislation, but fisheries management objectives are not listed. Consequently, management objectives do not currently form part of fisheries management plans, and related to this also, the work of RFBs is not used to inform development of fisheries management objectives in the case of shared resources.

It should be noted that the Code of Conduct for Responsible Fisheries (CCRF) is mentioned in the 2008 legislation. However, the legislation does not make provisions that link specifically to provisions under the CCRF and the FAO Compliance Agreement. Nonetheless, two particular instruments of the Venezuelan legislation that influence fisheries management, the 2003 resolution on billfish and the 2012 resolution on sharks, provide in its preamble references to the spirit of the CCRF.

Several pieces of non-fishery legislation instruments impact fisheries management in Venezuela: endangered species legislation; export/import/trade legislation; biodiversity legislation; marine park/sanctuary/reserves legislation; coastal zone management legislation; forestry (mangroves) legislation. In particular, the instruments of non-fishery legislation that have the most impact on marine capture fisheries management are: the resolution on marine turtles, and the resolution on marine parks.

LEGAL FRAMEWORK

The Socialist Institute of Fisheries and Aquaculture (INSOPESCA) is the agency with primary responsibility for marine capture fisheries management. At the regional level within the country, management responsibility is shared with regional agencies established for the purpose (regional submanagement agencies). At the local level, management responsibility is shared by fisheries inspectorates. The National Institute for Agricultural Research (INIA) in the Ministry of Agriculture and Lands has responsibility for the fisheries science component of management. At the local level, there are two additional institutions that share the responsibility of making fisheries science contributions: the Oceanographic Institute of Venezuela – Universidad de Oriente (IOV-UDO), located in Cumana in eastern Venezuela, and; the Institute of Technology and Marine Sciences (INTECTMAR) - Simon Bolivar University in Caracas. On the other hand, the National Guard has lead responsibility for all matters pertaining to fisheries enforcement.

The fisheries legislation is designed as a framework that shapes fisheries management and management plans. However, the legislation does not set up a series of steps or a process for developing, organizing, and implementing fishery management regulations and fishery management plans. While specific management measures and regulations for individual fisheries are not included in the legislation, decisions can and have been taken to enforce national law and regulations for specific management issues. Examples of such regulations include: the 2003 Resolution on fishing restrictions for billfishes and swordfish, creation of protected areas; the 2012 Resolution on fish catch and landing restrictions for sharks; Resolution on individual species such as the turkey wing ark clam (*Arca zebra*), blue crab (*Callinectes* sp.), sardine (*Sardinella aurita*). Additionally, the legislation does not prescribe steps for setting up the management process itself, and hence this is not applied to any fishery. Moreover, there are no provisions for the management process to be completed in a given timeframe.

Currently, the fisheries legislation requires management decisions to be based

on information coming from: biological analyses; economic analyses; social impact analyses; environmental analyses; ecosystem analyses/assessments; monitoring and enforcement options; analyses by regional fisheries bodies (RFBs) or regional fisheries management organizations (RFMOs) in the case of shared resources. Apart from any formal management process, other ways in which marine capture fisheries management can occur are by: decisions made by the management agency; decisions made by other parts of government; decisions made by RFBs, RFMOs, or organizations concerned with human rights, labour, trade, e.g. CITES.

Venezuela is a party to the Conventions establishing IATTC, ICCAT, OLDEPESCA and WECAFC, and is a member of ICCAT, IATTC, WECAFC and OLDEPESCA. In this regard, the fisheries legislation gives the fisheries management authorities the legal power to meet the priorities and obligations of: international agreements/ conventions (global), regional agreements, and other multilateral arrangements. In fact, the 2008 Fisheries and Aquaculture Act was passed as a result of international agreed instruments. Resolutions are usually passed by INSOPESCA, sanctioned by the Republic and then gazetted in the official gazette. It should be noted that the Fisheries and Aquaculture Act makes provisions for handling prosecutions and also illegal fishing by foreign fishing vessels.

It has already been noted that several non-fishery legislation instruments impact fisheries management in Venezuela, particularly those dealing with the management of marine parks and the protection of threatened species such as turtles.

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

Description of the fisheries

In Venezuela, industrial fishing is defined as that operation which is mechanized at the time of extracting sea fishery resources, and commercial fishing has both industrial and artisanal components. In the industrial fishery, fishing vessels are usually 17 to over 30 m, made of iron and/or steel, and equipped with inboard engines, and hydraulic pulleys. Several gears are common in this fishery: surface and bottom longlines, traps, purse seine, and pole and line, with gear retrieval mechanized. The harvest of the industrial fishery is destined for both the national and export markets.

The small-scale fishery involves wooden boats that are 4-12 m in length, and equipped with outboard engines. The usual fishing gears include: driftnets, seine nets, drop lines (with hooks), traps, and trawls. The small-scale fishery harvest is marketed locally. There is also an artisanal fishery which consists of wooden boats that are 4-17 m in length, and equipped with either outboard engine or inboard engines. These vessels fish using surface and bottom longlines, driftnets, lines with hooks, and traps. In all cases, the gear is operated manually. In terms of marketing, the products are usually sold on the national market, although the slightly bigger vessels, >14m, sell some of their catch to neighbouring Caribbean islands. In Venezuela, an indigenous fishery is also recognized, and operates in the rivers and coastal lagoons. In this case, the vessels are wooden pirogues, powered by oars or outboard engines, and typically fish with hook and line or cast nets.

In the recreational fishery, fiberglass boats are used that are typically 9-16 m in length, and are also equipped with outboard engines and a range of electronic aids. The fishing rod is the main gear used, and lines are baited with dead fish. For this purpose, the bait species commonly used are (*Hemirhamphus sp.*, *Mugil sp*). Commercial sale of the recreational fishery products is prohibited, and hence, the catch is normally consumed by participants or shared among the crew. In some cases, especially during tournaments, billfish are tagged and released.

Fish production and value

Commercial fisheries

The single most important industrial fishery harvests tuna species. Currently, the fishery lands about 7,000 tonnes annually. It should be noted that the commercial tuna fishery landings have declined steadily in recent years: the fishery landed 15,768t in 2000, which decreased to 9,341t in 2006, and decreased further to 6,876t in 2011. The tuna fishery is also among the top most valuable fisheries in Venezuela, with an estimated annual gross value of USD 17.5 million.

Small-scale fisheries

The three most important small-scale fisheries are: (i) the fishery for turkey wing ark clam, *Arca zebra*, which in 2010, landed 26,500t with an estimated gross value of USD 1.3 million; (ii) the fishery for sardine, *Sardinella aurita*, which in 2010, landed 36,000t with an estimated gross value of USD 125 million; (iii) the fishery for blue crab, *Callinectes sp.*, which in 2009, landed 11,500t with an estimated gross value of USD 15 million. Over the past ten years approximately, all three fisheries increased landings up to 2004 (turkey wing ark clam and sardine) and 2007 (blue crab), after which comparably much lower landings have been reported during 2009-2010) (Table 1). Of these, the blue crab fishery is among the top most valuable fisheries of Venezuela in terms of price per unit weight.

TABLE 1
Gross landings (tonnes) of each of the three major small-scale marine capture fisheries in selected interval years spanning 1999–2010

Estimated Annual Gross Landings of Catch (whole weight in tonnes)			
Target species	**Most recent year**	**5 Years Ago**	**10 Years Ago**
Turkey wing ark clam	26 500 (2010)	53 500 (2004)	44 700 (2000)
Sardine	36 000 (2010)	200 000 (2004)	123 500 (1999)
Blue crab	11 500 (2009)	16 448 (2007)	12 393 (2003)

Recreational fisheries

There are two major recreational fisheries. The first fishery targets the istiophorids (billfishes), while the second major fishery harvests a mix of large pelagic species, primarily consisting of dolphinfish, wahoo, king mackerel (locally called carite-lucio), and tuna. These species are important for both consumptive and non-consumptive uses.

Food security and employment

In both subsectors, the commercial tuna fishery and the three major small-scale fisheries, provide the only source of income and food for the majority of participants. On the other hand and as may be expected, the recreational fishery provides neither the only source of income for the majority of vessel owners, nor is it an important source of food for the participants.

Fishing effort and impacts

Fishing areas

The commercial tuna fleet operates in the Eastern Caribbean and adjacent waters of the Atlantic Ocean. In contrast, the small-scale fishery for the turkey wing ark clam is a very local fishery, with operations carried out south of Coche Island in Nueva Esparta State in the northeast region of Venezuela. Small-scale sardine fishing operations occur along the continental shelf of northeast Venezuela, while fishing for blue crab takes place along the Strait of Lake Maracaibo.

In the case of recreational fishing operations, billfishes are fished primarily in central Venezuela, in an area known as '*El Placer de la Guaira*'. Other recreational fishing

areas include the Paraguaná Peninsula in the west, the central coast of Venezuela between La Guaira and Puerto Cabello, and southeast of Tortuga Island in the east.

Fishing effort

Levels and trends in fishing effort and licensing arrangements are shown in Tables 2, 3, and 4 for the major commercial, small-scale and recreational marine capture fisheries identified respectively. The blue crab have, by a notable amount, the highest number of participants and licensed vessels, with the sardine fishery fishing effort being second highest. The commercial/industrial tuna fishery has the third highest number of participants.

Participants, as well as vessels, are licensed for the industrial tuna fishery, the small-scale blue crab fishery, and the two major recreational fisheries. On the other hand, only vessels are licensed in the case of the turkey wing ark clam and the sardine fisheries. That noted, in the commercial/industrial tuna and three major small-scale fisheries examined, both the number of participants and vessels are estimated to have increased in each case over the past ten years. In contrast, the number of participants in the two major recreational fisheries has decreased in the same time period. It should be noted that 5-25 percent and < 5 percent of participants in the billfish and mixed large-pelagic fisheries, respectively, consist of foreign tourists.

TABLE 2
The approximate current level of fishing effort for the single major commercial fishery, licensing arrangements and perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Tuna	~1 000	yes	i	120	yes	i

TABLE 3
The current approximate level of fishing effort for each of the three major small-scale marine capture fisheries, licensing arrangements and the perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Turkey wing ark clam	360		i	60	yes	i
Sardine	3 000		i	350	yes	i
Blue crab	4 000	yes	i	2 000	yes	i

TABLE 4
The current approximate level of fishing effort for the two major marine recreational fisheries, licensing arrangements and the perceived trend over the last ten years

Fishery	Participants	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)	Vessels	Licensed?	Increased (i)/ decreased (d)/ unchanged (u)
Billfishes		yes	d	141	yes	
Other large pelagic fish		yes	d		yes	

Overfishing and fishing capacity

Venezuela does not have its own definition of overfishing, and the occurrence and extent of overfishing in the country is not fully understood. That noted, overfishing is occurring in the case of the commercial/industrial tuna fishery and also the three important small-scale fisheries examined. Additionally, a constant or decreasing CPUE has been observed in all these fisheries.

Venezuela has not begun work towards the measurement of fishing capacity in all of its marine capture fisheries. The measurement and assessment of fishing capacity has

therefore not been completed, but fishing capacity has been measured for the major industrial tuna fishery and three small-scale fisheries identified. While overcapacity is believed to be a problem for these 4 fisheries mentioned, recent regulations in the last two to three years have not focused on reducing fishing effort and/or reducing the harvest levels. While fishing capacity has not been measured and assessed for the two most important recreational fisheries, overcapacity is not believed to be a problem for these fisheries.

MANAGEMENT ACTIVITY

General nature and extent

It is estimated that less than 33 percent of marine capture fisheries in the country are managed in some way at the national, regional and local levels. Additionally, over the past ten years, the number of managed fisheries has increased at all levels (national, local, and regional). It should be noted though that the offshore artisanal fishery is a major fishery (in terms of weight of landings) that is not currently managed. This fishery targets *Scomberomorus* sp. (carite), dolphinfish, and billfish.

The national and local management processes have been informed by: legislation about individual fisheries; published regulations or rules for specific fisheries; traditional rules or customs that affect the harvest of marine fisheries. In comparison, at the regional level, the process is influenced by: legislation about individual fisheries; interventions /actions to support specific management objectives; published regulations or rules for specific fisheries; rules established by fishing organizations. Of the fisheries that are managed at any level, fewer than 33 percent have a formal, documented fishery management plan. Moreover, fewer than 33 percent of managed fisheries have published regulations or rules, and fewer than 33 percent of these rules have been informed by methodical scientific monitoring and evaluation.

There is a management plan for the commercial/industrial tuna fishery. Moreover, the management measures in place, minimum size limit and catch quotas, indicate objectives associated with resource conservation. Similarly, there are management plans for the three major small-scale fisheries identified. The management plans for the turkey wing ark clam and sardine fisheries came into effect in 2006, while the blue crab management plan came into effect in 2010. In support of the implementation of the agreed plans, several management regulations are implemented: a minimum size limit and closed season in the case of the turkey wing ark clam fishery, a minimum size limit, closed season, and gear restrictions in the case of the sardine fishery; a minimum size limit, closed season, gear restrictions, and fishing area restrictions in the case of the blue crab fishery. Management plans have also been formulated for the two major recreational fisheries, which came into effect in 2008. The following management measures are in effect for the recreational fisheries. A resolution, in effect since 2003, limits fishing for billfish and swordfish, and creates exclusive spaces. Also concerning recreational fisheries, the 2008 legislation specifies that the catches should not be sold commercially.

Regarding the impact of international legislation on the management process in Venezuela, the CCRF and the UN Fish Stocks Agreement (1995) are only mentioned in the 2008 fisheries legislation. That said, the legislation does not appear to make provisions that link specifically to provisions under the CCRF and the Compliance Agreement. Of course, the UN Fish Stocks Agreement is also taken into account in some of the resolutions of the RFMOs to which Venezuela belongs. Additionally, the FAO International Plan of Action (IPOA) to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (2001) has been articulated in the 2008 legislation, although no specific measures have been taken to date. In 2012, Venezuela adopted a resolution for conservation and management of sharks, and this measure serves as a contribution towards the implementation of the FAO International Plan of

Action (IPOA) for the Conservation and Management of Sharks (1999).

Management approaches and tools

Multispecies aspects

The commercial/industrial tuna fishery is multispecies in nature, and management takes this into account, essentially through the implementation of a combination of management measures directed at different species. That is to say, catch quotas are established for *Thunnus alalunga* (albacore tuna), but a minimum size limit is in place for *Thunnus albacares* (yellowfin tuna). There is also enforcement of the ICCAT regulation prohibiting the increase in fishing effort on the tropical tunas above the 1992 level. Additionally, there are management measures on sharks, prohibiting landing of various species, as recommended by ICCAT. There are also measures regulating billfish (istiophorids) and swordfish landings and minimum allowed sizes at capture, as agreed by ICCAT.

In comparison, while the small-scale and recreational fisheries are also multispecies in nature, management of these fisheries currently does not take this into account. That noted, all species of billfishes are released during tournaments.

EAF and precautionary approach

Currently, the fisheries management process in Venezuela does not include specific ways for applying the ecosystem approach to fisheries (EAF) management or the precautionary approach. That said, in the case of the recreational fishery for billfishes, although the law does not specify it, it is mandatory to release fish during tournaments. This effort reflects a precautionary approach as it helps to reduce the overall mortality of billfishes. Furthermore, it should be noted that the 2008 Fisheries and Aquaculture Act mentions the precautionary approach in a general way with regard to the management of the recreational fishery targeting a mix of large pelagic species.

Management tools and trends in usage

The primary management tools for regulating commercial/industrial tuna fishery operations in Venezuela are shown in Table 5. The industrial fishery is subjected to area closures, licensing controls and a total overall catch quota allocation. Over the past ten years, though there has been no change in the application of area restrictions, there has been an increase in the use of licensing controls and TAC measures, both of which have been informed by an increasing level of international regulations.

TABLE 5
Types of management tools used in the single major commercial/industrial tuna fishery identified

Type of Management Tool	Tunas
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)	√
Temporal restrictions such as:	
Defined fishing season(s)	
Defined number of days fishing	
Defined number of hours per day fishing	
Defined number of hours fishing	
Gear restrictions such as:	
Vessel size restrictions	
Engine size restrictions	
Gear size restrictions	

TABLE 5 (CONTINUED)

Type of Management Tool	Tunas
Gear type restrictions	
Size restrictions (i.e. minimum or maximum sizes)	
Participatory restrictions such as:	
Licenses	√
Limited entry (limited vessels or limited fishers)	
Catch restrictions such as:	
Total allowable catch (TAC) limits	√
Vessel catch limits	
Individual vessel quotas	
Rights-/incentive-adjusting regulations such as:	
Individual effort quotas	
Individual fishing quotas	
Individual transferable quotas	
Individual transferable share quotas	
Group fishing rights (including community development quotas)	
Territorial use rights	
Stock use rights	
Regionally/internationally agreed restrictions	√
Taxes or royalties	√
Performance standards	

In the case of the three major small-scale fisheries, the primary management tools are shown in Table 6, and include: nursery area closure for the blue crab fishery, temporal measures in the case of the turkey wing ark clam and blue crab fishery, gear type and size controls for all three fisheries, catch limits for the turkey wing ark clam and sardine fisheries, and user group rights (quotas) for the sardine fishery. These management tools are not the same tools used in other fisheries in this category, because the type and size of fishing gear, closed season, and minimum size are specific for each fishery. Over the past ten years, there has been no change in the use of closed seasons, but the use of other tools have increased at the same time: nursery areas, hours fishing, gear type and size measures for the blue crab fishery; gear size measure for the turkey wing ark clam fishery; gear type and user group rights (quotas) for the sardine fishery. In addition, licensing controls have been introduced and used increasingly over the past ten years in all three small-scale fisheries examined.

TABLE 6
Types of management tools used in the three major small-scale fisheries identified

Type of Management Tool	Turkey wing ark clam	Sardine	Blue crab
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)			
Temporal restrictions such as:			
Defined fishing season(s)	√		√
Defined number of days fishing			
Defined number of hours per day fishing			
Defined number of hours fishing			√
Gear restrictions such as:			
Vessel size restrictions			
Engine size restrictions			
Gear size restrictions	√	√	√

TABLE 6 (CONTINUED)

Type of Management Tool	Turkey wing ark clam	Sardine	Blue crab
Gear type restrictions	√	√	√
Size restrictions (i.e. minimum or maximum sizes)	√	√	√
Participatory restrictions such as:			
Licenses			
Limited entry (limited vessels or limited fishers)			
Catch restrictions such as:			
Total allowable catch (TAC) limits		√	
Vessel catch limits	√		
Individual vessel quotas			
Rights-/incentive-adjusting regulations such as:			
Individual effort quotas			
Individual fishing quotas			
Individual transferable quotas			
Individual transferable share quotas			
Group fishing rights (including community development quotas)		√	
Territorial use rights			
Stock use rights			
Regionally/internationally agreed restrictions			
Taxes or royalties			
Performance standards			

The primary management tools for the recreational fishery include: commercial sale restrictions for the two major fisheries noted, and; territorial use rights and international regulations also in the case of the billfish fishery (Table 7). These tools are the same type as used in other fisheries in this category.

TABLE 7
Types of management tools used in the two major recreational fisheries identified

Type of Management Tool	Billfishes	Dolphinfish, wahoo, Serra Spanish mackerel, tunas
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)		
Temporal restrictions such as:		
Defined fishing season(s)		
Defined number of days fishing		
Defined number of hours per day fishing		
Defined number of hours fishing		
Gear restrictions such as:		
Vessel size restrictions		
Engine size restrictions		
Gear size restrictions		
Gear type restrictions		
Hook and line restrictions		
Hook type/size restrictions		
Bait restrictions (e.g. use of artificial lures vs. fresh/live bait)		
Method restrictions such as:		
Motor trolling		
Use of artificial light		
Use of scents		
Size restrictions (i.e. minimum or maximum sizes)		
Participatory restrictions such as:		
Licenses		
Limited entry		

TABLE 7 (CONTINUED)

Type of Management Tool	Billfishes	Dolphinfish, wahoo, Serra Spanish mackerel, tunas
Number of rods/lines per vessel		
Catch restrictions such as:		
Total allowable catch (TAC) limits		
Vessel catch limits		
Individual vessel quotas		
Bag limits		
Fish holding limits		
Sales restrictions such as:		
Commercial sale restrictions	√	√
Rights-/incentive-adjusting regulations such as:		
Individual effort quotas		
Individual fishing quotas		
Individual transferable quotas		
Individual transferable share quotas		
Group fishing rights (including community development quotas)		
Territorial use rights	√	
Stock use rights		
Encouragement of harvest of overabundant species		
Encouragement of harvest of invasive species (e.g. lionfish)		
User conveniences such as:		
Provision of landing sites/fish piers		
Provision of fish cleaning stations		
Regionally/internationally agreed restrictions	√	
Taxes or royalties		
Performance standards		

International standards

The commercial/industrial tuna fishery and the small-scale fisheries are not managed using performance standards, or solely on regionally/internationally agreed restrictions. On the other hand, there are voluntary regulations/codes of conduct in place to support management of the recreational fishery for billfishes, as IGFA rules are applied. That noted, the two recreational fisheries examined are not managed based solely on regionally/internationally agreed restrictions.

Role and impact of marine reserves

Fisheries management is listed as one of the objectives or reasons for establishing marine protected areas or reserves for the commercial/industrial tuna fishery, and such reserves do affect the management of the commercial/industrial, as well as recreational fishery, as there is a protected area for tunas and billfishes. Similarly, fisheries management is listed as one of the objectives for establishing marine protected areas or reserves in the case of the small-scale fishery for blue crab, and this tool has had some impact on the management of this fishery. It should be noted that there are specific spawning areas or hatcheries in the southern part of Strait of Lake Maracaibo which is a protected area.

Stakeholder involvement and transparency in management

Generally, stakeholders are formally involved in the management of all marine capture fisheries at the national, regional/international and local levels, although there is no formal documented definition of the groups that are included as stakeholders. Currently, the legislation enables two types of participatory process: consultative management, and; co-management, where fisheries management stakeholders are consulted and share some management responsibility. However, these participatory processes are not a formal and required part of the management of all marine capture fisheries. Furthermore, none of the steps in these processes are routinely followed as part of fisheries management.

Commercial fisheries

In the single major commercial/industrial tuna fishery identified, efforts have been made to identify the stakeholders who have an interest in the use and management of the resources, although the management plan of the fishery does not include a definition of the stakeholders for this fishery. That noted, the fishery stakeholders are organized into distinct groups, and arrangements have been made to consult these stakeholders and to work with them on management concerns. The management process, as it relates to stakeholders, is not considered to have attained any measurable level of effective participation, including at the level of decision-making. In view of this, it is not surprising, therefore, that the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. Likewise, although stakeholders are part of the decision-making process, the management measures have not resulted in stable stock levels over the last five years. Stakeholder participation has also not made the management process faster or helped to reduce conflict for this fishery.

Small-scale fisheries

Similar to the commercial/industrial tuna fishery situation, efforts have been made to identify the relevant stakeholders in all three major small-scale fisheries identified, although again, the management plan for these fisheries does not include a definition of the stakeholders. Notwithstanding, the fishery stakeholders are organized into distinct groups, and arrangements have been made to consult and work with these stakeholders for the management of these three fisheries. Currently, the management process, as it relates to stakeholders, could be described as consultative management in the case of all three fisheries examined. In terms of the participation of stakeholders in decision-making, this can be rated as informative, consultative, communicative, and also advisory. That noted, only in the blue crab fishery do the participants find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. Moreover, where stakeholders are part of the fisheries management decision-making process, the management measures have not resulted in stable stock levels over the last five years. Stakeholder engagement has also not helped to make the management process faster, or to reduce conflict in the fisheries examined.

Recreational fisheries

In the two major fisheries identified, there has been no effort to identify the stakeholders who have an interest in the use and management of the resources, and the management plan includes no definition of stakeholders to help with such identification. Neither have arrangements been made to consult these stakeholders and to work with them on management issues. Hence, the present management process, as it relates to stakeholders, could be described as authoritarian (top-down) in style. In both fisheries, the fishery stakeholders are organized into distinct groups, and stakeholder inputs for decision-making purposes can be rated as informative. Currently, the participants do not find that the management system creates incentives and reasons for them to voluntarily practice "responsible" fisheries stewardship. This situation, similar to that of the commercial and small-scale fisheries, is unlikely to help other aspects of management, such as stock status and conflict resolution.

Transparency in management

The fisheries management process is not considered to be fully transparent. Certainly, information about the fisheries management process is not clearly documented and easily available to the public. In addition, meetings to discuss the management of specific fisheries are not open to all stakeholders, including the participants in

the fishery, and such meetings are not advertised and publicized in advance of the actual meeting dates. There is also no opportunity for either fishery participants or other stakeholders to contribute to the decision-making process by providing public comments. It should be noted that if information about management measures and meetings is shared with fishery participants and other stakeholders, the information is usually disseminated using: printed materials, such as brochures or information packages; an internet website, and; the Venezuela Official Gazette, which is the printed organ of the Supreme Court of Justice.

Management of conflict and fishing effort

For conflict management, the fisheries management legislation sets up particular processes, such as: the use of alternative dispute resolution mechanisms; the need to consider multiple uses and users within the fisheries sector; the need to consider multiple uses and users between the fisheries and other sectors. In general, the fisheries management tools being used for conflict resolution among user groups are: zoning of different areas for different users; resource allocation between the different participants in the fishery; resource allocation between the fisheries and other sectors; education about sharing marine fisheries resources; limited access to certain areas for certain types of fishers.

Commercial fisheries

Conflict occurs in the commercial/industrial tuna fishery, and has increased over the last ten years. It is due to: competition among the same, as well as different types of vessels in the same fishery, and also; competition with other uses for the same area of water. Dispute resolution and conflict management processes are part of the marine capture fisheries management process for this fishery, and currently include: specific steps to follow; the use of alternative dispute resolution mechanisms, and; the need to consider multiple uses and users within the fisheries sector, as well as uses by other sectors. At present, the fisheries management legislation for this fishery requires limited access to certain areas for certain types of fishers.

Small-scale fisheries

Conflict is an issue in all three fisheries identified, and the amount of conflict in these fisheries has increased over the last ten years. The reasons for the observed conflict vary with the fishery. In all three fisheries, there is competition among different types of vessels. In the case of the sardine fishery, there is also competition amongst the same type of vessels, and in the blue crab fishery there is competition with other uses by other fisheries for the same area of water. In all three fisheries, dispute resolution and conflict management processes are part of the marine capture fisheries management process, and these usually include the use of alternative dispute resolution mechanisms. To support conflict management, the relevant legislation has provisions for zoning of different areas for different users and limited access to certain areas for certain types of fishers. However, these legislative provisions are applicable only to the sardine fishery.

Recreational fisheries

Conflict occurs in both major fisheries identified, but it should be noted that the amount of conflict in these two fisheries has remained unchanged over the last ten years. Where conflict does occur, it is due mainly to competition with other uses by other fisheries. In the recreational fisheries, dispute resolution and conflict management processes are not part of the marine capture fisheries management process. That noted, the relevant management legislation for these fisheries has provisions for limited access to certain areas for certain types of fishers.

Overfishing and fishing capacity

As already mentioned, the occurrence and extent of overfishing in Venezuela is not fully understood. However, there is evidence of overfishing in all the major industrial and small-scale fisheries identified in this report. Fishing capacity has been measured for the major industrial and small-scale fisheries, and overcapacity is considered to be an issue for all of them. Despite this, recent regulations in the last two to three years have not focused on reducing fishing effort and /or reducing the harvest levels, and capacity reduction programmes have also not been implemented. While fishing capacity has not been measured and assessed for the two most important recreational fisheries, overcapacity is not believed to be a problem for these fisheries. Fishing capacity measurement and evaluation also remain to be completed for other fisheries in Venezuela.

Management of monitoring, compliance and enforcement

In general, responsibility for monitoring, compliance and enforcement is shared by the navy, coastguard, a National Guard marine enforcement unit, and the fisheries agency. The navy, coastguard, and the National Guard marine enforcement unit are responsible for at-sea fisheries patrols, monitoring, and enforcement work in the coastal waters (0–3 nautical miles) of Venezuela, while only the navy and coastguard have responsibility for this work in the territorial waters (0–12 nautical miles). On the other hand, the fisheries agency is the authority responsible for fisheries monitoring work such as checking dock-side landings, logbooks and for enforcing penalties.

Generally, penalties for non-compliance currently include: small fines for first offences; larger fines for additional offences; fixed fines for specific offences; revocation of fishing licences; the refusal of the opportunity to fish for the rest of the season or year; the exclusion or removal from the fishery. Additionally, systems to support compliance and enforcement of fisheries management include the use of: random dockside inspections; routine inspections at landing sites; at-sea boarding and inspections. Generally over the last ten years, the number of offences that are taking place has increased in certain major fisheries. That noted, detection efforts (e.g. at-sea patrols, port monitors) have been decreasing over the same time period, and currently, the risk of detection is not believed to be sufficient that participants in marine capture fisheries try not to cheat. However, the penalties for non-compliance at least for the major fisheries are severe or expensive enough that fishers avoid cheating. In the last ten years also, the budget for monitoring and enforcement has generally been decreasing, and the available level of funding provided to the fisheries agency is not considered adequate to enforce all fisheries regulations.

Commercial fisheries

In the single major commercial/industrial fishery for tuna species, penalties for breaking marine capture fisheries management regulations and rules specifically include: small fines for first offences; larger fines for additional offences; fixed fines for specific offences; revocation or suspension of fishing licences; refusal of the opportunity to fish for the rest of the season or year; exclusion or removal from the fishery. Systems for supporting compliance and enforcement in this fishery are the same ones described above for general fisheries management purposes, including, therefore, the use of: on-board observers; random dockside inspections; routine inspections at landing sites.

Unlike the general case, the number of offences in the commercial/industrial tuna fishery has been increasing over the past ten years. Despite this, the risk of detection is not high enough that the participants in these fisheries try not to cheat. However, where penalties are enforced, they are effective at deterring actions of non-compliance. The budget for monitoring and enforcement in this fishery has been decreasing over

the past ten years, and the current available funding does not allow fisheries managers to fully enforce all relevant fisheries regulations.

Small-scale fisheries

Penalties for breaking marine capture fisheries management regulations and rules are applied in the three major small-scale fisheries identified and include: small fines for first offences; larger fines for additional offences; fixed fines for specific offences. Systems supporting compliance and enforcement within these fisheries only include the use of random dockside inspections and routine inspections at landing sites. Over the last ten years and similar to the commercial/industrial tuna fishery, the number of offences is believed to have increased in all the major small-scale fisheries. Added to this, the risk of detection is not considered to be high enough that the participants in these fisheries try not to cheat. However, where penalties are enforced, they are effective at deterring actions of non-compliance. Over the last ten years, the trend in the budget for monitoring and enforcement and its adequacy for the purpose intended are the same as noted for the commercial/industrial tuna fishery.

Recreational fisheries

Similar to the other major fisheries, penalties for breaking marine capture fisheries management regulations and rules are also applied to the two important existing recreational fisheries and specifically include: small fines for first offences; larger fines for additional offences; fixed fines for specific offences; revocation or suspension of fishing licences. In the case of these fisheries, the systems supporting compliance and enforcement activities include the use of: random dockside inspections; routine monitoring of tournament activities, and; at-sea boarding and inspections. Specific trends over the past ten years in the number of offences, the level of detection effort, and the level of budget for compliance and enforcement are not known.

COSTS AND FUNDING OF FISHERIES MANAGEMENT

In general, the national government provides some funding for fisheries management activities at the national, regional, and local levels, and this funding covers some of the expenses associated with activities pertaining to: research and development; monitoring and enforcement; daily management. The current legislation allows for some of the costs associated with managing fisheries resources to be recovered via licence fees, with the arrangement that licence fee contribution from any particular fishery may not be specifically allocated to management of the same fishery.

In real terms, the budget for fisheries management at the national, regional and local levels in Venezuela has generally decreased over the last ten years, while in real terms, the corresponding costs have generally increased in the same time period. The increase in management costs are primarily due to: increased monitoring requirements; increased enforcement activities; increased litigation; increased conflict management; increased rate of modifying/changing/amending fisheries management regulations; increased member country obligations to RFBs, and RFMOs. Currently, the additional costs are being met by increased government contributions, increased contributions from fisheries participants, and increased contributions from other sources from RFMOS, particularly ICCAT and IATTC.

Commercial fisheries

For the major commercial/industrial tuna fishery, government funding pays all the fisheries management costs, including the costs associated with carrying out research and development activities. As noted in the general case, there are legislative provisions for some fisheries management costs to be recovered via licence fees charged specifically to participants in the commercial fishery. Over the past ten years, the available budget

and management costs showed similar trends as noted for the general case, i.e. the budget decreased while costs increased. In addition to the reasons noted for increased fisheries management costs generally, increased/improved stakeholder consultation have also contributed to the additional costs in the case of the commercial/industrial fisheries. For these fisheries, increased government funding and increased funding /contributions from fisheries participants have been used to cover the increased management costs.

Small-scale fisheries

For the major small-scale fisheries examined, government funding pays all the fisheries management costs, including: research and development costs; monitoring and enforcement costs; daily management costs. At present, the legislation allows for some management costs to be recovered via a licence fee system applied to the blue crab fishery only. Similar to the commercial/industrial fisheries, the budget for the management of the small-scale fisheries has decreased over the past ten years, while corresponding management costs have increased. The reasons for the increase in real costs are also the same as noted for the commercial/industrial fisheries. However, in the case of the small-scale fisheries, the increased costs for marine capture fisheries management are currently being supported by increased government funding / contributions only.

Recreational fisheries

In the recreational fisheries, government funding does not pay all the fisheries management costs, but available funding can be used to support activities pertaining to: research and development; monitoring and enforcement; daily management. At present, there are no specific legislative provisions to allow for the costs associated with managing these fisheries resources to be recovered. No information is available on the most recent ten-year trends in the budget and costs for management of these fisheries.

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

The national fisheries management legislation gives the fisheries management authorities the legal power to meet the priorities and obligations of international agreements/ conventions (global), regional agreements, and other multilateral arrangements. Venezuela is a party to the following major international marine fisheries management conventions: IATTC, ICCAT, OLDEPESCA and WECAFC. Venezuela is also a member of the following RFBs: ICCAT, WECAFC and OLDEPESCA.

The CCRF is only mentioned in the 2008 legislation which is in force. Moreover, the current legislation does not contain provisions that link specifically to provisions under the CCRF and the Compliance Agreement. Similarly, the UN Fish Stocks Agreement (1995) is only mentioned in the current legislation. However, the UN Fish Stock Agreement is quoted in the relevant resolutions adopted by the RFMOs to which Venezuela belongs, and these resolutions are implemented for the particular fisheries concerned. It should also be noted that the need to deter the activities of vessels that have reflagged to avoid regional conservation and management measures has been articulated in the fisheries and aquaculture legislation. There has also been effort to implement the FAO International Plan of Action (IPOA) for the Conservation and Management of Sharks (1999). In this regard, Venezuela adopted a 2012 Resolution on sharks, which was published in the Official Gazette.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBS)

It has already been noted that Venezuela is a member of the following RFBs: ICCAT, WECAFC and OLDEPESCA. Venezuelan scientists also participate in the activities of another RFB, CRFM, even though Venezuela is not a member of the CRFM.

Regarding participation in the RFBs to which Venezuela belongs and in the opinion of the authors, the country is not active carrying out its obligations to ICCAT. This apparent lack of participation is due to: a shortage of human resources to cover issues; poor stakeholder support and education; a lack of political priority.

Currently, Venezuela collects and provides fishery-related data to CITES, FAO, and ICCAT to inform the establishment of fisheries management regulations, and the country has formal national mechanisms in place for this task. These organizations have specific statistical reporting timetables and Venezuela is able to meet these timetables.

SUMMARY AND CONCLUSIONS

- The current fisheries legislation for Venezuela is fairly recent, being adopted in 2008, and as a result of emerging new international fisheries agreements and related instruments. The legislation includes a definition of fisheries management, but does not list management objectives, or outlines the steps for developing fisheries management plans or setting up the management process. There is also no provision for the management process to be completed in a given timeframe. That noted, there are specific and separate agencies assigned authority for the administration, scientific and enforcement components of management. Additionally, the legislation recognizes the need for management to be informed by a broad range of scientific information. There are also legislative provisions for a limited amount of stakeholder involvement, conflict management, handling prosecutions and illegal fishing by foreign vessels. Penalty fines are considered effective at least for those major fisheries where they are applied. In conclusion, the current fisheries legislation makes provisions for several components of the management process to be organized. The administrative and legal frameworks are in place, with specific agencies allocated responsibilities for administration, science and enforcement at the national, regional and local levels. While legislation is in place, some of the provisions are limited and also enactment of the provisions face a number of constraints, as further explained in the following paragraphs.
- Less than 33 percent of marine capture fisheries in Venezuela are managed in some way. A major artisanal fishery targeting large pelagic is not being managed. Less than 33 percent of managed fisheries have published regulations, and <33 percent of the regulations/rules have been informed by methodical scientific monitoring and evaluation. Although less than one-third of the fisheries have a formal management plan, management plans have been formulated for the major fisheries identified in this report, except the artisanal large-pelagic fishery. Several regulations are also in place for the major fisheries, although it is not clear that these are linked to and evaluated against specific management objectives. In conclusion, it appears that active management is taking place at least for the major fisheries with management plans established. If not yet done, the general management objectives noted in the management plans should be further developed to formulate more specific and measurable operational objectives that could be evaluated quantitatively for better accounting purposes. The issue of good governance practices, which would include the need for transparent accountability, is further addressed later in this section.
- All the major fisheries identified are multispecies in nature. In the case of the commercial/industrial fishery for tuna species, this is taken into account by the adoption of a mix of regulations that address the main conservation concerns for the various species concerned. The multispecies nature of the small-scale fisheries is not taken into account in managing these fisheries. EAF management and the precautionary approach are also not currently being applied to any fishery. That noted, recreational fishing tournaments impose a mandatory condition of catch of release for billfishes; although there is no formal legal provision to support

this action, it reflects a precautionary measure. Spatial (nursery and spawning areas), temporal restrictions, gear type/size restrictions, catch, participatory, and user rights are the common management tools used in Venezuela. While the use of closed areas and seasons has remained unchanged over the past ten years, the use of other tools has increased, e.g. licensing, TAC, gear type and size measures. The temporal and spatial area closures appear to be justified and implemented with effect. The increased use of licensing controls is an essential step towards achieving limited entry, which should hold the best potential to nurture good stakeholder cooperation in the long term, reduce conflicts, and reduce monitoring, compliance and enforcement costs. If efforts could be made to inform the establishment and fair application of participatory restrictions, as well as catch and user rights quotas, based on ecosystem health, impact and response data, this could also help to provide a major step towards sustainability, with both precautionary and ecosystem concerns incorporated.

- The legislation makes provisions for a limited range of stakeholder participation arrangements, but stakeholder groups are not formally defined in the management plans. Although stakeholders are organized into distinct groups, only in the small-scale fisheries has some level of participatory management achieved (consultative management), and only in the blue crab fishery do the participants feel that the process creates positive incentives. However, in no case has the participatory process achieved stable stock levels, quickened the management process or helped to reduce conflict. Furthermore, all parts of the management process are not conducted in a transparent manner, so as to afford equal and good opportunity by all concerned to contribute. Information dissemination is conducted via official methods, but also the internet. Both the legislation and current governance and management practices appear to limit the nature and extent of stakeholder involvement, and in so doing, detract from the full range of anticipated potential benefits. Meetings and opportunities for stakeholder engagement and two-way communication are also not transparent. As the current legislation is able to facilitate co-management with some stakeholder responsibility, attention needs to focus on exercising good governance in executing management activities. An independent evaluation of the performance of governance practices by the agencies concerned appears warranted, and would help to inform implementation of required improvements in the governance processes with regard to stakeholder relations. This should be coupled with a genuine investment in stakeholder education and in capacity building activities for both managers and the primary stakeholders to enable them to be effective partners in the management process.
- Conflict exists in all major fisheries examined in this report. In the past ten years, conflict levels have increased in both the commercial/industrial tuna fisheries and the three major small-scale fisheries. In general, the conflict is due to competition for access to fishing areas and resources within the same marine areas. The legislation set up processes for conflict management that take into account various users needs and use alternative dispute resolution mechanisms. The legislative provisions to support conflict resolution among user groups have included limited access to certain areas for certain fishers and also resource allocations in the case of the small-scale fisheries. While conflict has remained unchanged in the recreational fisheries, there is no formal process for resolving conflict for this fishery and no legislative provisions for use of specific tools. In conclusion, the management process for conflict management has not been able to decrease or eliminate the level of conflict in any of the major fisheries. This implies that although there may be legislative provisions and some tools have been applied to manage the conflict, these have had limited success. The efforts to date should therefore be reviewed and evaluated with the intention

of introducing an improved process, and achieve full implementation of the legislative provisions. Additionally, a more effective and active partnership with stakeholders, and improved transparency in the governance and management processes, as previously identified, would need to be faithfully nurtured so as to ensure that conflict issues are routinely and objectively addressed.

- Overfishing and overcapacity are considered to be a problem for both the major commercial/industrial tuna and small-scale fisheries, but not for the two important recreational fisheries. Fishing effort levels have also increased in the main commercial/industrial and small-scale fisheries over the past ten years. Despite this, recent regulations have not specifically addressed the issue of reducing fishing effort or fishing capacity. Fishing capacity has been measured for the major commercial and the small-scale coastal finfish fisheries only, and remains to be completed for all other fisheries. To address the overcapacity and overfishing issues in the major fisheries, an economic valuation of the goods and services of the major fisheries would help to inform capacity reduction programmes and additional fishing effort controls so as to minimize the expected economic impacts. The importance of completing measurement and assessment of fishing capacity for remaining fisheries should also be recognized, at least from a precautionary standpoint.
- Several agencies share the responsibility of monitoring, compliance, and enforcement activities. A range of penalties is applied, and more than one supporting system is in place, e.g. observer programmes, and inspection schemes. The available budget to allow enforcement of all regulations has been decreasing over the past ten years and is not considered adequate for the purposes. The number of offences is believed to have increased in recent years, with the risk of detection not considered to be high enough to deter incidents of cheating. The legislative and administrative framework for monitoring, compliance and enforcement exist, but implementation of the various supporting systems and enforcement patrols are affected by budgetary constraints. In view of the budgetary constraints and the possibility that these may not be easily addressed, greater consideration should be given to the establishment of limited entry fisheries. Additionally, further investment in stakeholder education and nurturing stakeholder support and involvement, together with a move to safeguard participants' interests, say via limited entry and user rights controls, should help to reduce the incidence of non-compliance, as well as enforcement costs.
- Management costs are primarily funded by the government, with some recovery of costs facilitated through the payment of licence fees for selected fisheries only. Generally over the past ten years, the budget for fisheries management has decreased, but management costs have increased. Increasing management costs are attributed to an increase in a wide range of supporting activities, e.g. stakeholder consultation, increased obligations to RFMOs. At present, additional costs are being met by government only in the case of the small-scale fisheries, but also by fishery participant contributions in the case of the commercial/industrial fisheries. An economic valuation of the fishery and marine ecosystem goods and services can provide useful information for informing feasible options for recovery of management costs from sources separate from the government. Also, as stated previously, additional investments in promoting stakeholder trust and support and good governance practices, together with a move to safeguard participants' interests, say via limited entry and user rights controls, should help to limit at least of the rising management costs. Venezuela's legislation allows the country to incorporate and implement the provisions of regional/international agreements. Efforts have also been made for the implementation of the FAO International Plan of Action on management and conservation of sharks. Venezuela is a member

of ICCAT, WECAFC, and OLDEPESCA, but participation is not considered to be active in respect of ICCAT, primarily due to lack of the required human resources, lack of political priority and poor stakeholder education and support. Venezuela is able to comply with statistical reporting obligations to international organizations requiring such data for management purposes. Hence, although the current fisheries legislation makes provisions for compliance with regional/international agreements, very limited efforts and adopted measures are noted in respect of the various international legal agreements and related instruments. Venezuela has the administrative and legal frameworks in place and the legislation was updated in 2008. Additionally, management plans and regulations are in place for the major fisheries. However, the management process itself does not appear to be structured and implemented in a sufficiently transparent and participatory manner that creates positive incentives for stakeholder cooperation, and in so doing, also negatively impacts the motivation for both managers and stakeholders to make further advancements in the management of the industry, not only at the national level but also with regard to international obligations.

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This technical paper provides an inventory and describes trends in legal, administrative and management frameworks in place for managing marine capture fisheries in the Western Central Atlantic Fishery Commission (WECAFC) area. The review includes 16 countries and overseas territories and is part of an ongoing process initiated by FAO to report on the state of world marine capture fisheries management. The review identifies a number of challenges in fisheries management, including inadequate legislation; ad hoc management processes and plans; uncoordinated monitoring and enforcement; insufficient stakeholder identification and participation, conflict resolution and fishing capacity measurements; limited incorporation of issues pertaining to the operation of multispecies fisheries and use of the ecosystem approach; unequal application of management tools and measures across fisheries subsectors; and rising fisheries management costs coupled with stagnant budgets for governments.

Actions are listed to address the challenges and specific recommendations are made to address legislative issues, apply participatory approaches and fisheries management processes. The 15th session of WECAFC endorsed the review outcomes and adopted recommendation WECAFC/15/2014/4 "on strengthening fisheries management planning in the WECAFC area". This technical paper aims to inform fishery policy decision-makers, fishery managers and other stakeholders with interest in fisheries in the Wider Caribbean Region.

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