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WESTERN CENTRAL ATLANTIC FISHERY COMMISSION (WECAFC)

FIFTEENTH SESSION

Port of Spain, Trinidad and Tobago, 26-28 March 2014

Recommendations on Fisheries Management

This document provides the final draft “Review of current Fisheries management performance and conservation measures in the WECAFC Region”. It has been kindly prepared by experts from the Caribbean Regional Fisheries Mechanism (CRFM) under a contract with FAO.

The WECAFC Secretariat expresses its particular appreciation to Ms. Susan Singh-Renton of CRFM for preparing this high quality draft and to the experts from the countries who have dedicated their precious time to complete the extensive survey that formed the base of this review.

The first findings of this review were presented and discussed at a Workshop to validate the outcomes of the review of current fisheries management performance and conservation measures in the WECAFC region, held in Kingston, Jamaica, 8 December 2012.

The sixth session of the Scientific Advisory Group (SAG), which was held in Texas in November 2013, reviewed the document and particularly its conclusions and recommendations.

The SAG recommended that the Commission at this session reviews the outcomes and recommendations of this review study and takes appropriate action to address the recommendations.

Document WECAFC/XV/2014/16 provides a summary of the recommendations of this Review for discussion and endorsement (if appropriate) by the Commission.

The final version of this Review will be published as FAO Fisheries and Aquaculture Technical Paper No. 587 in 2014.

Due to funding constraints it has not been possible to prepare the Spanish and French versions of this draft document.

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Review of the state of world marine capture fisheries management: WECAFC region

Introduction

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Fish is a renewable but finite resource. Global understanding of this concept improved only after the excessive capitalization of the fishing industry following on the heels of the Second World War of the 20th century, and after the popular target species of some fisheries suffered sufficient depletion to impact the economic returns likewise, 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 adoption of the United Nations Convention on the Law of the Sea in 1982 marked an important development in the history of fisheries management, conferring rights and responsibilities to countries for the maritime spaces under their jurisdictions.

As understanding of the impacts of fishing activities on the environment and ecosystems improved, this led to the formulation of additional related and supporting international agreements, with the following agreements being among the more important fundamental ones: the United Nations Convention on the Law of the Sea (hereinafter referred to as UNCLOS) (UN 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, (hereinafter referred to as the 'UN Fish Stocks Agreement') adopted in 1995 (UN 1995); the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas adopted in 1993 (hereinafter referred to as the 'FAO Compliance Agreement') (FAO 1993); The Code of Conduct for Responsible Fisheries adopted in 1995 (FAO 1995); and the UN Conference on Environment and Sustainable Development Agenda 21, adopted in 1992 (UN 1992). Despite these developments, there continues to be widespread concern about the state of the world's fisheries, based on the scientific evidence (e.g. FAO 2012a, Ye *et al.*, 2012), and recent efforts to strengthen the global legislation, e.g. the recent formulation and adoption of the Agreement on Port State Measures to prevent, deter and eliminate IUU fishing adopted in 2009 (hereinafter referred to as the 'Port State Measures Agreement') (FAO 2009).

In an effort to improve understanding of the present level of fisheries management performance actually being achieved in practice, a detailed questionnaire, the State of World Marine Capture Fisheries Management (SOWMCFM), has been developed to

facilitate fisheries management performance studies that have since been completed for the Indian and Pacific Oceans (De Young 2006, 2007). For the present study, the original SOWMCFM questionnaire was updated and expanded for application in the Western Central Atlantic Region to take into account the characteristics of fisheries in that region, 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 correspondents 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, compliance and enforcement. Additionally, the questionnaire facilitated the organization of this information firstly at the level of the country or territory, and then for major fishery sub-sectors.

The questionnaire facilitating country reviews contained 4 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 sub-sectors: (1) commercial/ industrial (large-scale); (2) small-scale, artisanal, lifestyle, subsistence, indigenous, customary fisheries; (3) recreational, including non-consumptive use such as catch and release fishing, ecotourism and diving. For the purposes of administering the questionnaire, the definitions of each fishery type were provided as a guide (Table 1), but country correspondents were requested to indicate where these definitions differed from what was applied within their respective countries.

Specifically, the questions were organized according to the following format:

POLICY FRAMEWORK

- Is there specific legislation for marine capture fisheries management? When was it first adopted, and if and when has it been revised?
- Does the legislation provide a framework for management, and where are these set forth (national, regional, local)?
- Does the legislation list the objectives of fisheries management, are these prioritized and also included in fisheries management plans?
- If the legislation has been recently revised, were changes made to specifically incorporate recent international fisheries management norms/ mandates, e.g. the FAO Compliance Agreement and the FAO Code of Conduct for Responsible Fisheries?
- Is there non-fishery specific legislation that supports the objectives of fisheries management?

LEGAL FRAMEWORK

- Who is responsible for fisheries management at national, regional and local levels?
- Are the administrative, scientific monitoring, and enforcement responsibilities for management formally divided and how so?
- Does the legislation 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?
- Does the legislation require specific information to guide decision-making?

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- Is the legislation informed by the work of RFBs or RFMOs in the case of shared resources?
 - Does the legislation support the fulfillment of national obligations to international legislation? List major conventions, and regional/ international organizations to which the country is a party.
 - Does the legislation allow for management to occur in other ways, e.g. alternative sources of information and associated decisions, external decisions?
 - What provisions are made for handling prosecutions and also illegal fishing by foreign vessels?
 - Is the legislation influenced/ supported by other, non-fishery specific legislation and how?

DESCRIPTION AND STATUS OF FISHERIES IN THE COUNTRY

- What are the characteristics of the different types of fisheries carried out within the three major sub-sectors?
- Which are the major fisheries in terms of landings, value, and how have these changed over the past 10 years?
- Where are these fisheries located?
- What is the level of fishing effort and how has this changed in the past 10 years?
- How does the fishery contribute to food security and employment?
- What is the extent of overfishing occurring in formally managed fisheries and believed to be occurring in all of the sector considered altogether
- For each sub-sector, what has been the trend in catch and effort and is overfishing currently taking place?
- Is fishing capacity monitored and if there is overcapacity, has management sought to reduce fishing effort?

MANAGEMENT ACTIVITY

- In practice, what percentage of marine capture fisheries is managed in some way?
- Has the management process been informed by the legislation, management plans and regulations, and for what percentage of fisheries?
- How has the management process been affected by international legislation?
- How has the number of managed fisheries changed over the last 10 years?
- Which major fisheries, if any, are not currently managed?
- What is the extent of overfishing occurring in formally managed fisheries and believed to be occurring in all of the sector considered altogether
- For each subsector, indicate if there are management plans in effect for the major fisheries and what are the management objectives?
- For each sub-sector, are any major fisheries multi-species in nature, and how is this taken into account, if at all, by the management process?
- Does the management process include specific ways of applying the Ecosystem Approach to Fisheries (EAF) management and the precautionary approach, and how is this achieved?
- Which management tools are applied in the main sub-sectors, are these unique to the fisheries concerned, and how have the application of these tools changed in the past 10 years?

- Are the applied management tools linked to established international performance standards, and/or regional or internationally agreed management measures?
- Do any existing marine protected areas/ marine reserves include fisheries management as one of the aims? If not, is fisheries management affected by these protected areas/ reserves and how?
- What is the nature (formal and organized versus ad hoc), quality and extent of stakeholder involvement in management, and how has this contributed to improved management?
- What efforts are made to ensure transparency of the management process?
- If there is conflict within the sector, why does it exist and how has this changed over the past 10 years?
- Does the management process include formal steps for resolving conflicts, and if so, what does this involve?
- For each sub-sector, what has been the trend in catch and effort and is overfishing currently taking place?
- Is fishing capacity monitored and if there is overcapacity, has management sought to reduce fishing effort? What constraints exist to delay monitoring and measurement of fishing capacity?
- What capacity-reduction programs have been implemented, for what aims, and to what extent have these been successful in reducing and maintaining a reduced fishing capacity? Who has paid for the program, and what has been its cost, relative to the value of the fishery?
- Which agencies support enforcement activities and what are their specific roles and responsibilities?
- What monitoring systems are used to support compliance? Have the number of offences changed over the past 10 years?
- Has the enforcement budget changed in the past 10 years, and how has this affected the success of enforcement?
- Are penalties applied for non-compliance with fisheries regulations, and if so, what penalties are applied? Have these been effective at deterring actions of non-compliance and cheating?

COSTS AND FUNDING OF FISHERIES MANAGEMENT

- What level of financial support is provided by the government, if required? Is such funding provided for activities at the national, regional and local level?
- Are there provisions in the legislation for recovering the costs of fisheries management, e.g. fees, resource rentals?
- How have the budgets and costs changed over the past 10 years and why?
- Where the costs have increased, how are these costs being met?

IMPLEMENTATION OF GLOBAL FISHERIES MANDATES AND INITIATIVES

- List major conventions, and regional/ international organizations to which the country is a party
- If the country has signed, ratified, or acceded to the United Nations Fish Stocks Agreement, the FAO Compliance Agreement, and other key Agreements, please describe the provisions in domestic fisheries.

- If the country has taken steps to implement agreed International Plans of Action relating to reducing incidental catch of seabirds, shark conservation and management, fishing capacity management and others, please describe the actions taken to date.
- If the country has taken steps to implement agreed FAO Technical/International Guidelines on EAF, deep sea fisheries management and bycatch and discard reduction, please describe the actions taken to date.

PARTICIPATION IN REGIONAL FISHERY BODIES (RFBs)

- To what extent does the country participate in the activities of Regional Fishery Bodies, and list any constraints affecting active participation
- List the main ways in which the national legislation supports implementation of agreed regional/ international measures that may be adopted by RFBs in which the country is a member or participant.
- What statistical data and management contributions are made in accordance with agreed RFB requirements? What constraints, if any, affect these contributions?

Country reviews were prepared, guided by the above format. It should be noted that these reviews were not official government reviews, but national correspondents were selected based on their expert knowledge and experience. Hopefully, this has helped to guarantee an overview that is fairly representative at the time of writing this report.

Overview –WECAFC Region

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INTRODUCTION

The management of fish as a renewable resource has received increasing attention since the adoption of UNCLOS in 1982, improved understanding of the ecosystem concept, notable declines in several major fish resources, and the corresponding related challenges posed by overcapitalization of the fishing industry, illegal fishing and the need to guarantee food and nutrition security for the world's increasing population. Though 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. These reviews are intended to shed light on the level of application and success of internationally agreed fisheries management paradigms, and to foster appreciation for the advantages and disadvantages associated with the strategies applied.

The present regional review covers countries that are located in the Western Central Atlantic region (FAO Statistical Area 31), as well as Brazil in the southwest Atlantic Ocean (northern portion of FAO Statistical Area 41). Consequently, 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, 2009). 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 that 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 26 independent countries and several overseas territories belonging to the UK, France, the USA, and the Netherlands are located in this region, and so 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 affords examination of the existing fisheries management situation in the region, with emphasis on the governance and management frameworks in place in the various countries studied, and determination of how these national frameworks have so far contributed to achieving sustainable fisheries management as prescribed by international agreed standards.

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 Region 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 correspondents 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. Additionally, the questionnaire facilitated the organization of this information firstly at the level of the country or territory, and then for three major fishery sub-sectors.

The questionnaire therefore contained 4 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 sub-sectors: (1) commercial/ industrial (large-scale); (2) small-scale, artisanal, lifestyle, subsistence, indigenous, customary fisheries; (3) recreational, including non-consumptive use such as catch and release fishing, ecotourism and diving. Country correspondents were selected based on their expert knowledge and experience, and this hopefully has helped to guarantee an overview that is fairly representative of the current situation in the WECAFC region.

Definitions, Sampling Coverage, and Interpretation of Chart Data

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

It should be noted that all country correspondents 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 have given instead in terms of confirmed frequency of occurrence (% of yes responses) among the total number of non-blank responses for that question. This latter option still allows the reader to remain aware of the varying level of survey participation

with 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 sub-region and each sub-sector (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 size gear and vessel. The term has sometimes 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 (even though 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 same connotation of relatively low levels of technology and 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.

Table 2. Countries that participated fully in the questionnaire survey, listed according to the sub-regions represented.

Central and northeast (NE) Insular WECAFC sub-region	Southern WECAFC sub-region	Western WECAFC sub-region
Anguilla	Venezuela	Colombia
Antigua and Barbuda	Trinidad and Tobago	Mexico
Aruba	Suriname	Nicaragua
Dominica	Brazil	Panama
Dominican Republic		
Netherland Antilles		
St. Kitts and Nevis		
St. Lucia		

NATIONAL MARINE FISHERIES FRAMEWORKS

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% of 14 responding countries ('responding countries' is used in this section of the regional report to mean countries that provided non-blank responses) and 77% of 13 responding countries respectively. While only 33% of 15 responding countries explicitly defined the term 'fisheries management' in national legislation, 50% of 16 responding countries had legislation that provided specific guidance on the application of management approaches and tools. In 47% of 15 responding countries, the legislation listed the objectives of fisheries management but fewer countries (25% of all 16 countries) had legislation in place that outlined a stepwise process for establishing effective fisheries management (Figure 1).

In the Central and northeast (NE) Insular sub-region, it should be noted that in those instances where overall objectives were indicated, there was no prioritization, and legislated objectives seldom appeared to form a part of management plans or guiding documents. In fact, the legislated objectives of fisheries management were indicated for only two countries: Antigua & Barbuda and Dominican Republic. In these two cases, the objectives incorporated paradigms of ecologically sustainable development and scientific understanding alongside economic development goals. Interestingly, these two countries were also those with the newest legislation in place: Antigua & Barbuda enacted a new fisheries act in 2006 and The Dominican Republic in 2004.

In the Southern sub-region, despite the recent efforts to update legislation in the 4 responding countries, only Suriname and Brazil had legislative frameworks which 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 for enforcement, but did not address the need for scientific understanding of fisheries. Although neither of these 2 countries had prioritized their established objectives, the objectives were included in fisheries management plans.

In the case of the Western sub-region, the legislation of all 4 responding countries listed fisheries management objectives. Apart from Colombia which listed only a single general management objective, the other western 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 3 responding countries, sustainable use was included in the formulation of at least the first or only management objective, as the cases may be. Additionally, except for Panama for which the response was unavailable, management objectives of the other 3 countries had been informed by the work of RFBs/ 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, of course, 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.

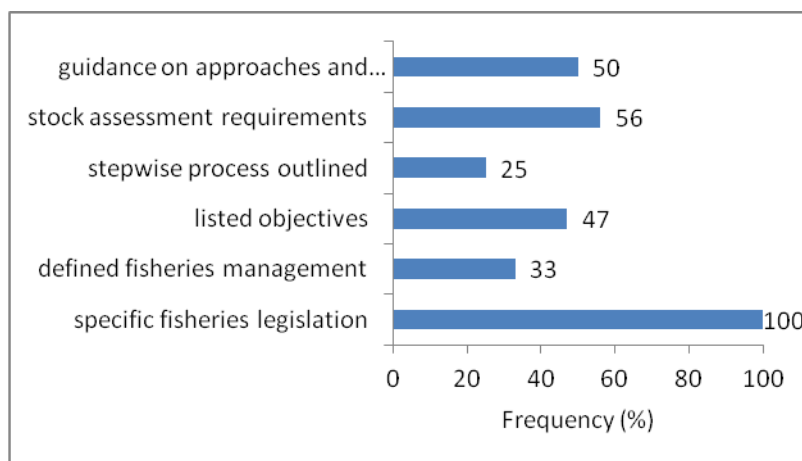


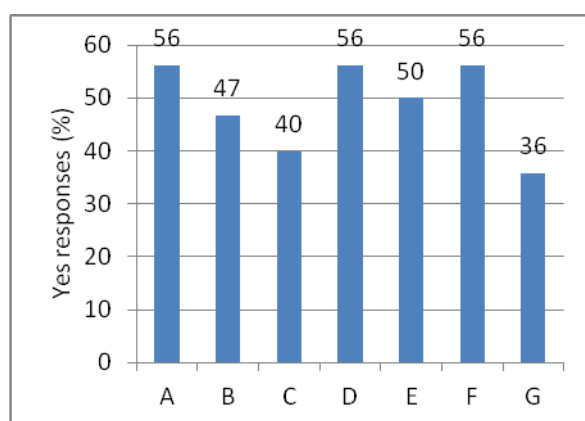
Figure 1. General characteristics of the fisheries legislation in responding countries. For each category, the data label provides the percentage of the responding countries (i.e.

countries providing non-blank responses) that varies between 13 and 16, as explained in the text.

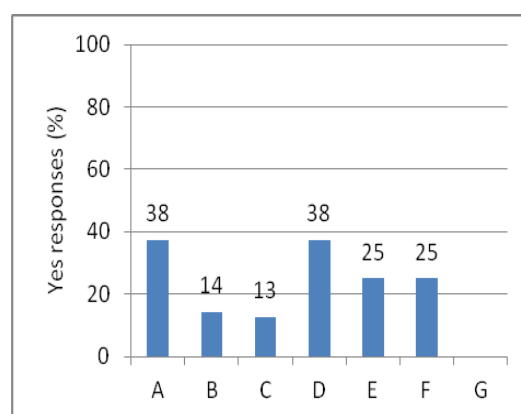
Overall, 56% of all 16 countries indicated that national legislation required that fisheries management decisions be based on information generated by at least one of the following analyses: biological analyses/stock assessments, social impact analyses, economic analyses, monitoring and enforcement analyses,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

In contrast, only 38% of 8 responding countries in the central and insular sub-region indicated that the legislative framework included provisions for biological stock assessments and environmental analyses (Figure 2b). That noted, a quarter of the 8 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 7 responding countries of this sub-region apparently made provisions for use of information obtained from regional fisheries bodies, and social and economic analyses were required in only 13% of 8 and 14% of 7 responding countries respectively.

In comparison, of information requirements stipulated in the fisheries legislation for responding countries in the southern sub-region, monitoring and enforcement information was prevalent (75% of all 4 countries), with the full range of biological, social, economic, ecological and environmental analyses each receiving equal but less attention (50% of all 4 countries in each case) (Figure 2c). However, only 1 country's legislation in the southern sub-region (33% of 3 responding countries) appeared to make provisions for consideration of information from regional fisheries bodies. Finally, in the western sub-region, the legislative framework included provisions for the full range of scientific information to be used in all 4 countries (Figure 2d). The 4 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 CITES.



(a) All sub-regions combined



(b) Central & NE Insular sub- region

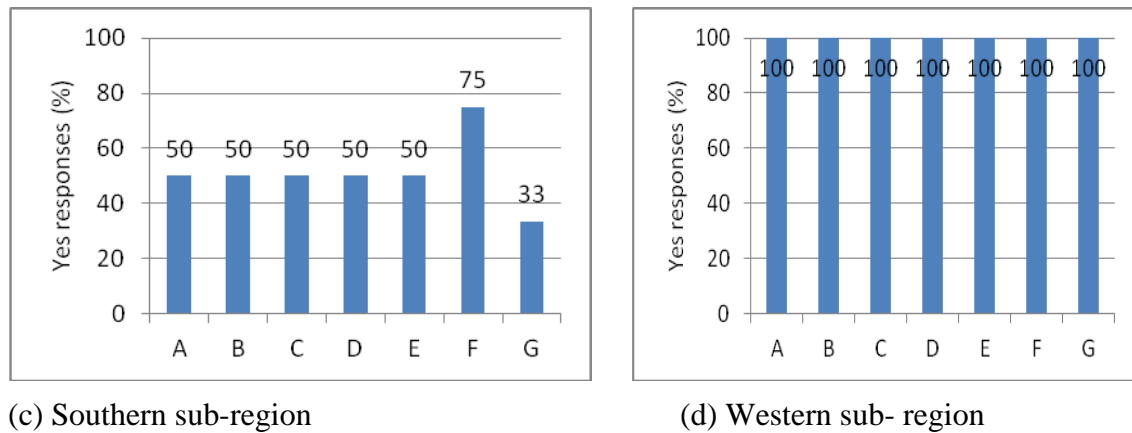


Figure 2. The frequency of countries (given as % of responding countries, i.e. countries providing non-blank responses) which legally require the following information for management decisions: A - biological analyses/ stock assessments; B - economic analysis; C -social impact analyses; D - environmental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

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% 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% of 14 responding countries indicated that their governments provided funding support. Such outlays included funding for research and development, monitoring and enforcement, and daily administrative management.

In the central and northeast insular sub-region, all countries confirmed government funding support for national level activities, with 88% of all 8 countries depending solely on government funding (Figure 3b). Also, 67% of 6 responding countries and 80% of 5 responding countries confirmed total dependence on government funds for regional and local-level activities respectively. In comparison, all 4 surveyed countries in the southern sub-region generally depended mostly on government support for national-level activities, with 3 out of 4 countries relying solely on such support (Figure 3c). In 2 countries, government funds were also being used to support all management activities at the regional and local levels, while in the other 2 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 sub-region, where all 4 countries provided responses for each category (Figure 3d).

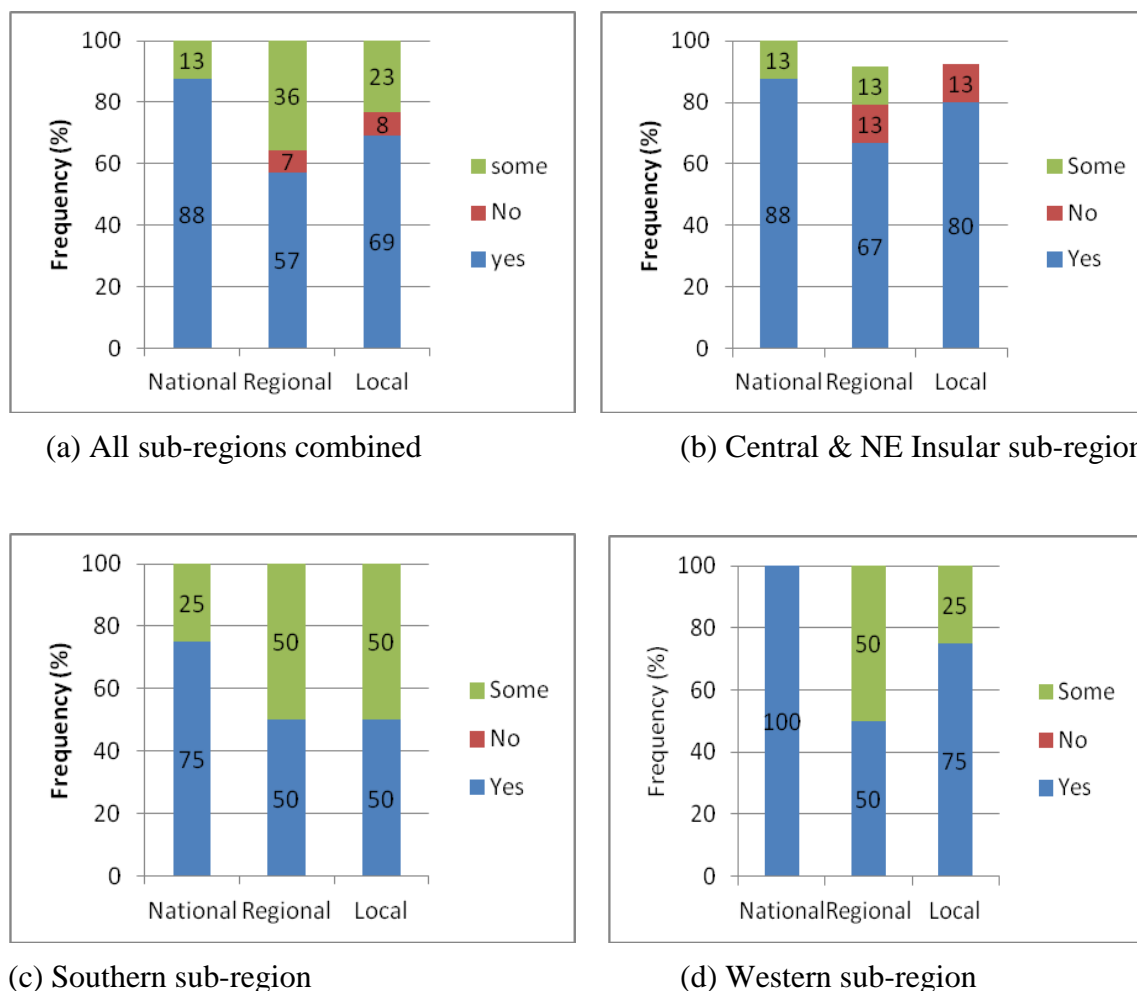


Figure 3. Frequency (given as % of responding countries), of allocation arrangements in respect of fisheries management budgets to activities at the national, regional and local levels. The information is illustrated for: (a) all sub-regions combined; (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries comprising the Western sub-region. Refer also to Table 2 that provides the list of countries by sub-region.

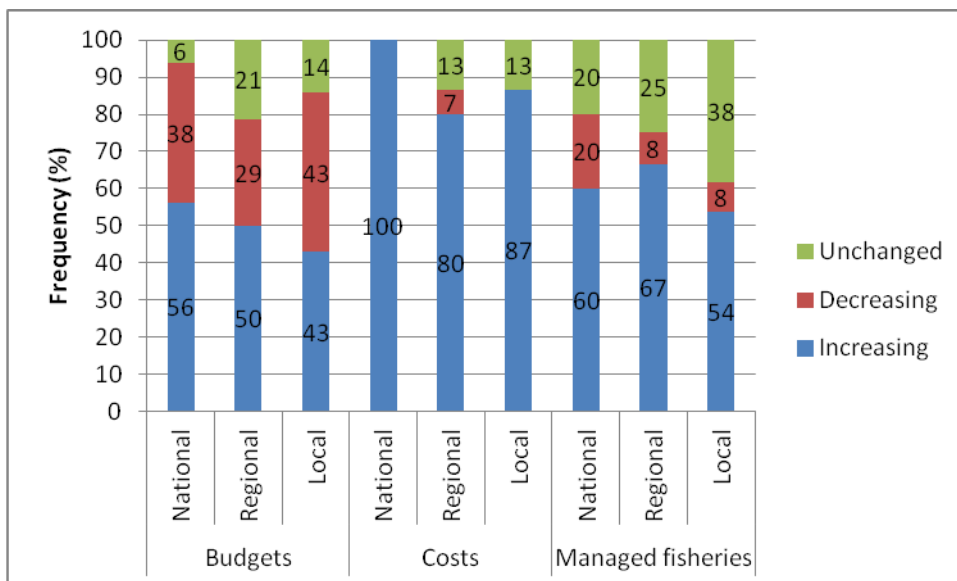
All 16 country respondents agreed that the costs of national fisheries management had increased over the past 10 years. At the regional and local levels, costs were also primarily perceived to be increasing in 80% and 87% respectively of 15 responding countries. Despite increasing costs, budgets for fisheries management had not increased to the same extent; rather, a notable percentage had either decreased or remained unchanged (national-44% of all 16 countries, regional-50% of 14 responding countries, local-57% of 14 responding countries). Furthermore, over the same time span, the number of fisheries requiring attention by managing bodies had increased and by a comparatively greater percentage compared to perceived budget increases (national-60% of 15 responding countries, regional-67% of 12 responding countries, local-54% of 13 responding countries) (Figure 4a). A minority of country correspondents indicated that the number of managed fisheries was decreasing (national – 20% of 15 responding countries, regional-8% of 12 responding countries, local-8% 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.

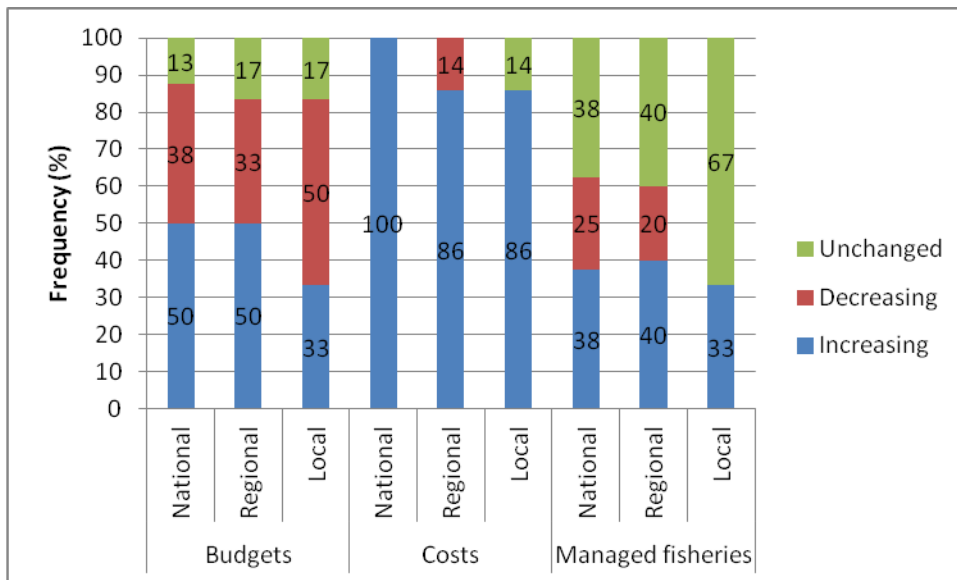
This general pattern in national correspondent perceptions was again observed for the central and northeast insular sub-region, with the exception that regional and local level costs had increased more or less equally, and management responsibilities for new fisheries were the least for the whole region (Figure 4b). The latter result is perhaps not unexpected, in view of the small size of the countries involved and the comparatively greater multi-species 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 sub-region, while the management costs increased at the national and local level in all 4 countries, and also at the regional level in 3 out of 4 of these countries (unchanged in 1 country), budgets were considered to have increased in only 2 out of 4 countries at all levels (national, regional, local). The number of managed fisheries also increased in 75% of the 4 responding countries at both the national and regional levels, and in 50% of the 4 responding countries at the local level (Figure 4c), with 25% of responding countries (1 out of 4 countries) actually indicating a decrease in the number of fisheries managed at the national and local levels.

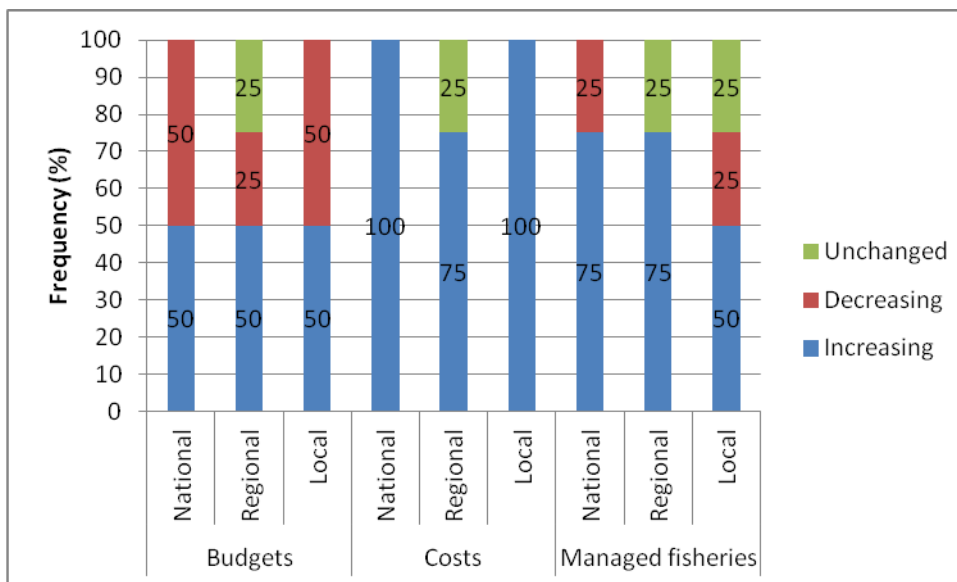
On the other hand, in the western sub-region, management costs had increased at the national level in all 4 responding countries, and in 75% of these (3 countries) at the regional and local levels also (Figure 4d). Management budgets were believed to have increased in 75% of all 4 responding countries at the national level, with 50% of 4 countries noting budgetary increases also at the regional and local levels of management. All 4 responding countries also confirmed that the number of managed fisheries had increased at all levels (national, regional, local).



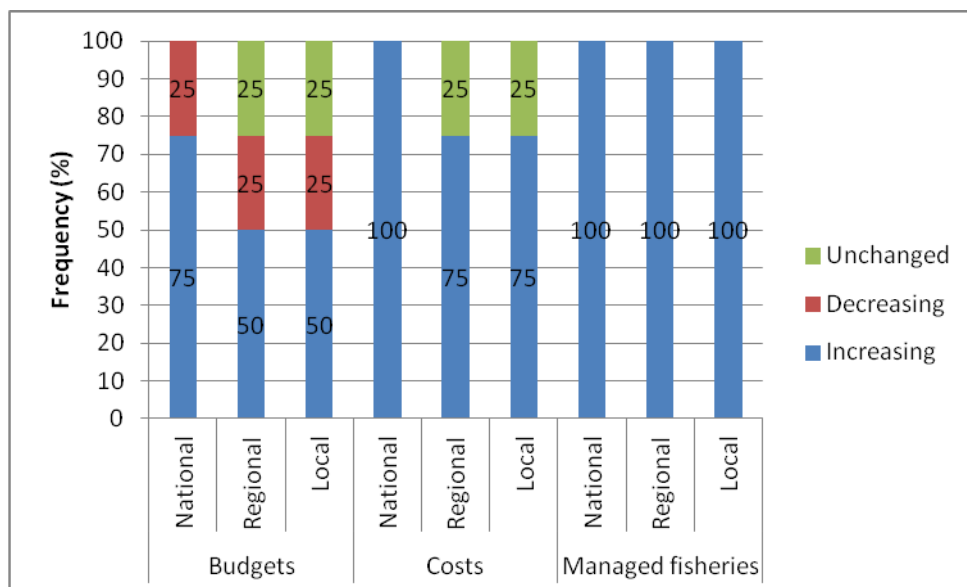
(a) All sub-regions combined – number of responding countries for each category listed on x-axis: budgets (national – 16, regional & local – 14); costs (national – 16, regional & local – 15); managed fisheries (national – 15, regional – 12, local – 13)



(b) Central and NE Insular sub-region – 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 sub- region– number of responding countries was 4 for each category listed on x-axis



(d) Western sub-region– 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)

Figure 4. Frequency (given as % 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 sub-regions combined; (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries comprising the Western sub-region. Refer also to Table 2 that provides the list of countries by sub-region. 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 10 years had increased the expenditures. A majority (81% 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% of 16 countries) (Figure 5a). Increased stakeholder consultations have also increased costs for 56% of the 16 countries surveyed. Increased litigation was identified as the component that least contributed to increasing costs (25% of 16 countries). Regarding ‘other’ reasons for higher costs, four countries specifically sighted increasing fuel costs, increasing salaries, and costs associated with the expansion and updating of data collection and management systems (Figure 5a). In the specific sub-regions 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 be a result from increased conflict management in the central and northeast insular sub-region (Figure 5b), increased activity in amending regulations in the southern sub-region (Figure 5c), and increased stakeholder consultation and obligations to regional initiatives in the case of the western sub-region (Figure 5d).

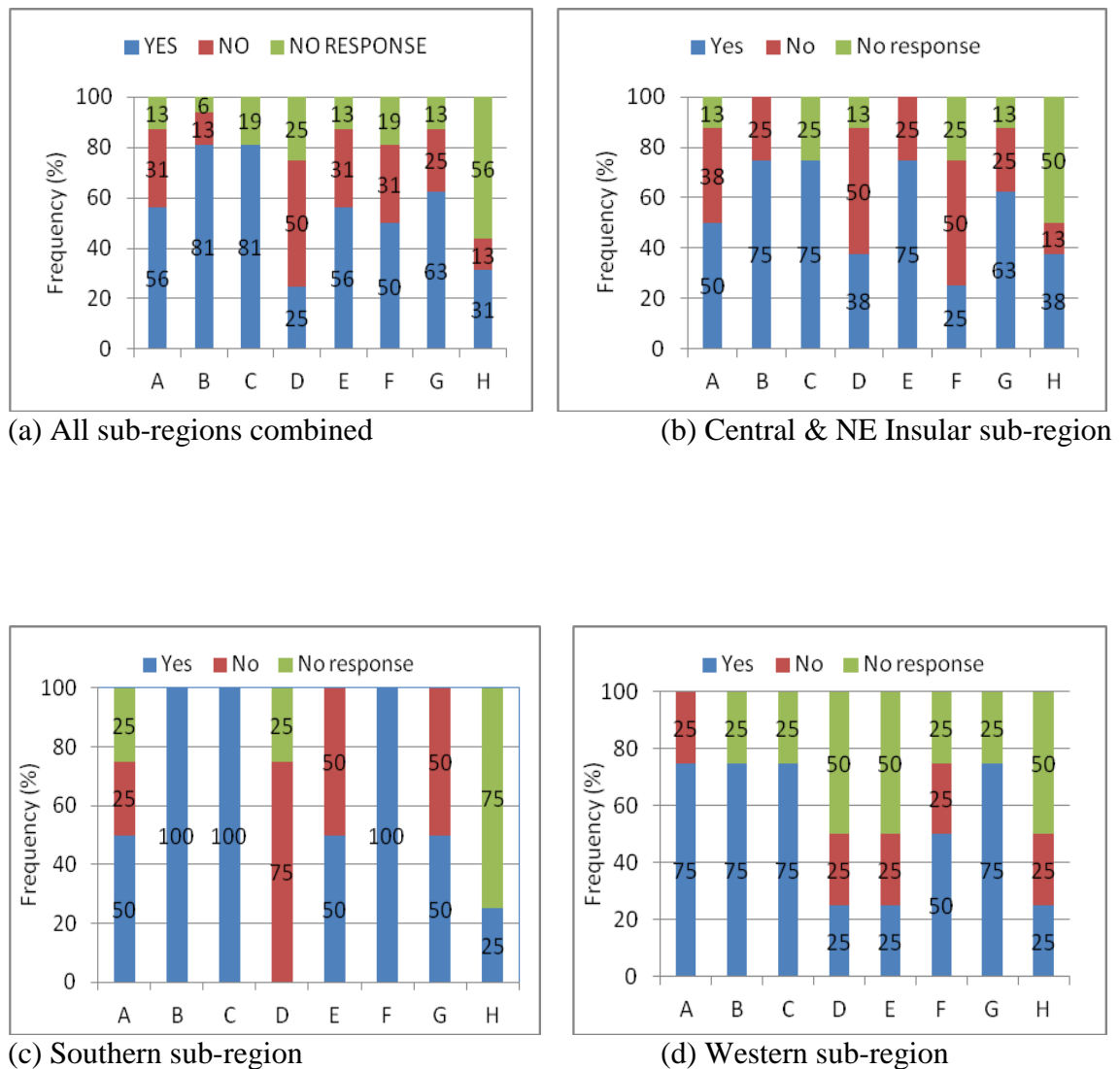


Figure 5. Frequency (%) of responses identifying sources of increased costs in fisheries management: A - stakeholder consultation; B - monitoring requirements; C - enforcement activities; D - litigation; E - conflict management; F - modification of regulations; G - member country obligations to regional fisheries initiatives; H - other. The information is illustrated for: (a) all sub-regions combined (see Table 2 for explanation); (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries comprising the Western sub-region.

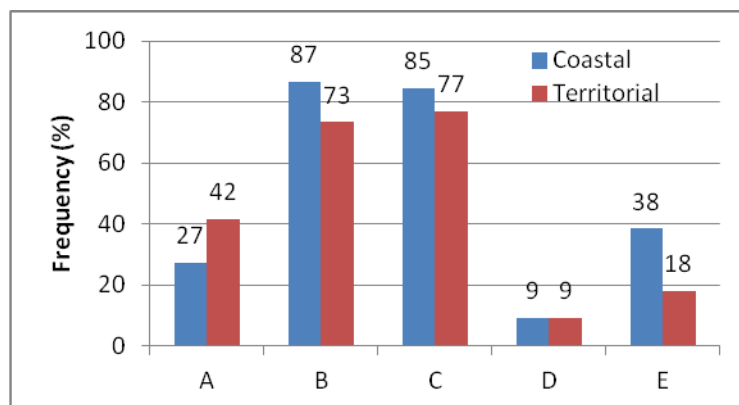
Regarding cost recovery options employed, the charging of licence fees was the most common one applied. In the central and northeast insular sub-region, governments were receiving revenues from licences and to a much smaller extent, resource rentals. However, licence fee revenues were generally small and did not really cover the costs of managing fisheries. When asked where the funding for increasing costs in fisheries management comes from, fisheries participants were indicated by only 2 countries. Although fisheries controlled primarily by stakeholders exist, fisheries in the central and northeast insular sub-region still appeared to rely on government and donor funding. In comparison in the southern sub-region, the use of legislation to recover the costs of

fisheries management was very limited. Two of the 4 responding countries indicated that some cost recovery was conducted through licensing fees, but such fees were normally received as general government revenues. Venezuela 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 2 southern countries, Suriname and Trinidad and Tobago, were relying on both government contributions and donor funds to cover their additional management costs.

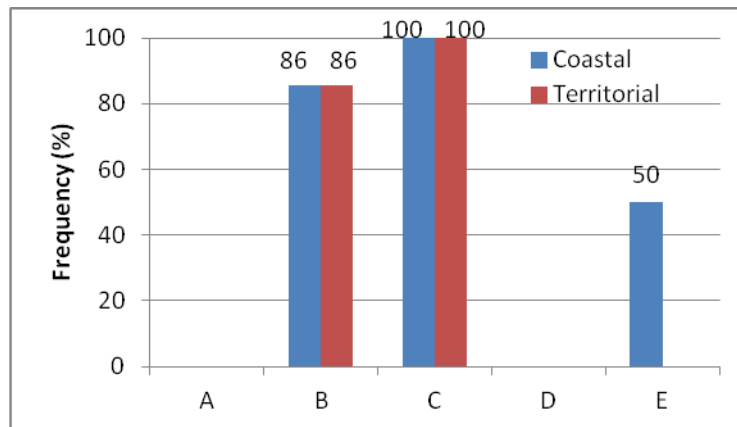
Similarly, the legislation in all 4 responding countries in the western sub-region allowed for recovery of management costs using licence fees. Except for Mexico, the increased costs for marine capture fisheries management in the western countries examined were being funded partly by increased government 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.

Compliance and enforcement for fisheries management

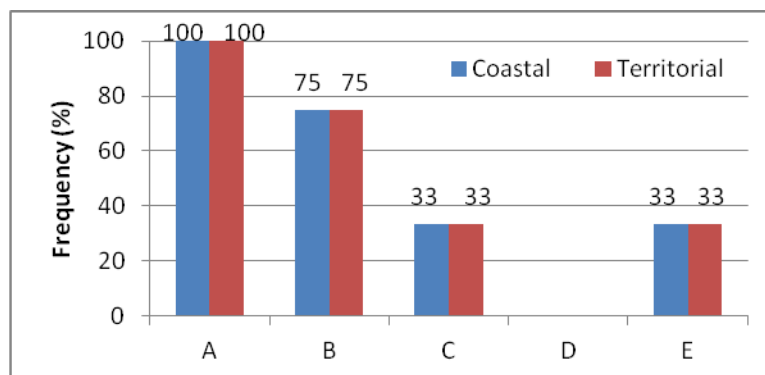
Throughout the region, it was most common for the coast guard (territorial waters: 73% of 15 responding countries; coastal waters: 87% of 15 responding countries) and the national fisheries agency (territorial waters: 77% of 13 responding countries; coastal waters: 85% of 13 responding countries) to 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 sub-region, and included scientific institutes and non-governmental organizations (NGOs) (Figure 6b). However, in the southern sub-region and for both coastal and territorial waters, the navy was the most important agency involved in respect of compliance and enforcement responsibilities (100% 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 sub-region, 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% of responding countries) and was supported equally by the navy and coast guard for countries in the western sub-region (Figure 6d).



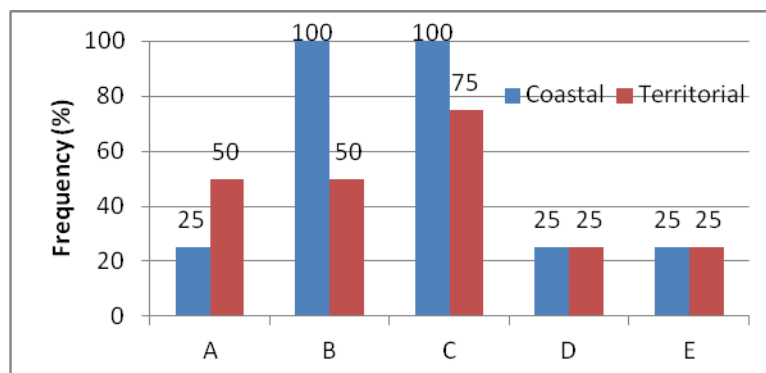
(a) All sub-regions combined – The number of responding countries for each category is: Coastal (A-11, B-15, C-13, D-11, E-13); Territorial (A -12, B-15, C-13, D-11, E-11)



(b) Central & NE Insular sub-region– 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 sub-region – 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 sub-region– The number of responding countries for each category is: 4

Figure 6. The frequency (% of positive responses among responding countries) of responsibility allocations among agencies/authorities for at-sea fisheries patrols,

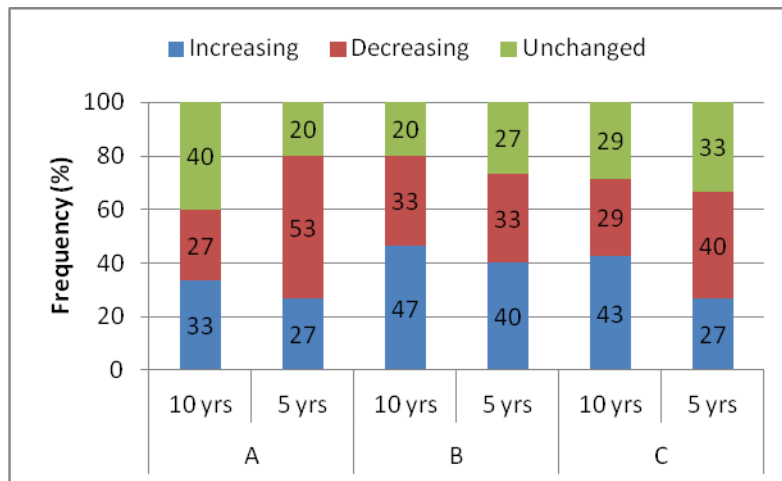
monitoring, and enforcement work in coastal and territorial waters (0-3 and 0-12 nautical miles offshore respectively): A – navy; B - coast guard; C - fisheries agency; D -marine transport agency; E - other patrol, monitoring or enforcement groups. The information is illustrated for: (a) all sub-regions combined; (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries comprising the Western sub-region. Data labels indicate percentages, and data on number of responding countries are given below each individual template.

As already explained, the increased costs of monitoring and enforcement appeared not to match corresponding increases in budgets. In fact, the majority, 73% 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% 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% of 15 responding countries in previous 5 years, may be suggestive of failures in fisheries management, rather than improved compliance outcomes. Compared to the perceptions for the past 10 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 5-year period (Figure 7a).

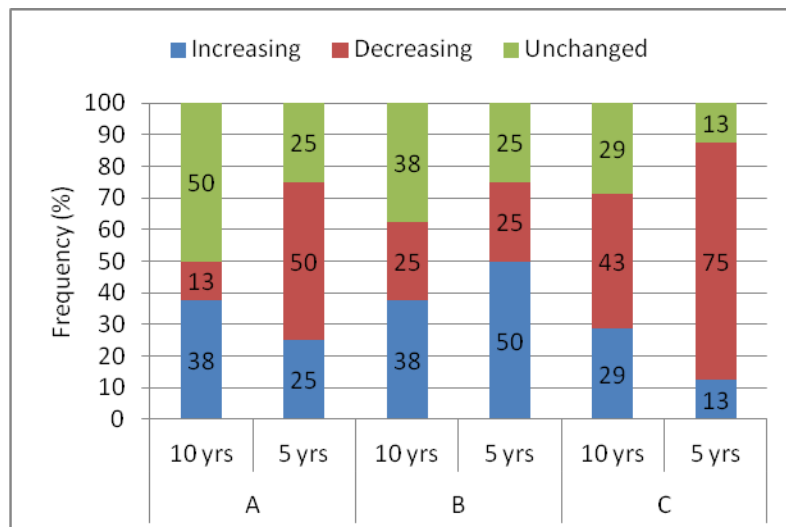
In considering the sub-regional trends, perceived trends for the central and northeast insular sub-region showed that, compared to the past 10 year period, there were fewer cases reporting increases in compliance and enforcement budgets over the past 5 years (13% of 8 responding countries), more frequent reports of increased detection efforts (50% of 8 responding countries) and more frequent reports of decreased offences (50% 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 sub-region, the situation of the past 5 years was reported to be the same also for the past 10 years (Figure 7c). While the compliance and enforcement budget for the increased in 2 countries and remained unchanged in 1 country, all 3 responding countries noted that detection effort had decreased over the entire 5 year and 10 year periods (Figure 7c). Hence, it is perhaps not surprising to note that of 3 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.

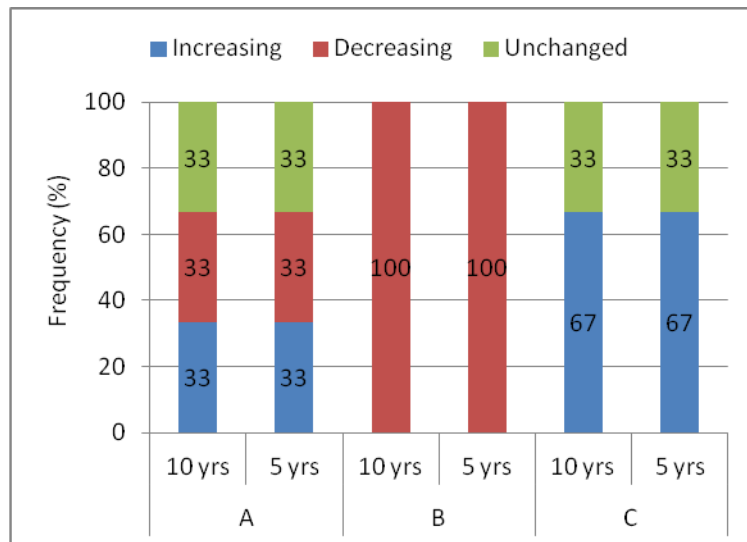
In the case of the western sub-region, increases in both the compliance and enforcement budget and in detection efforts have been occurring over the past 10 and 5 years, with more countries noting increases for the earlier part of the 10 year time period (Figure 7d). This appears to support the observation by 2 (50%) of the 4 responding countries that the number of offences had decreased over the past 10 years, with more countries reporting decreases for the last 5 years (3 of the 4 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 5 year period, i.e. decreased number of offences.



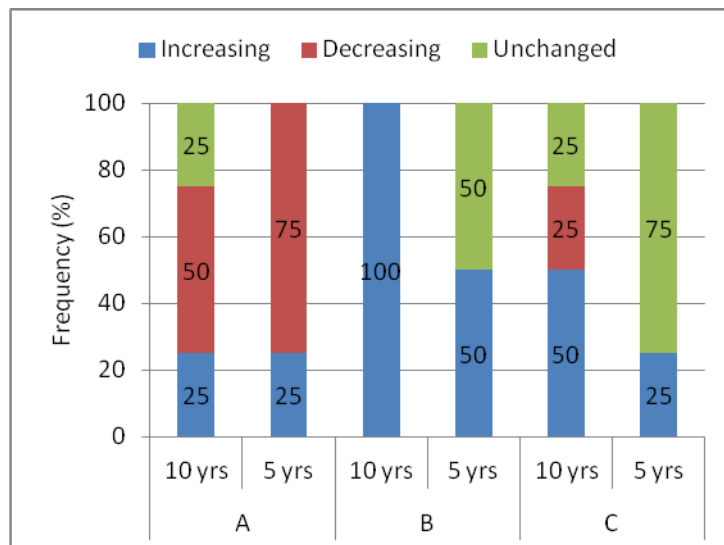
(a) All sub-regions combined – Number of responding countries was 15 for all categories, except C-10 yrs for which there were 14 responding countries



(b) Central & NE Insular sub-region – number of responding countries was 8 for all categories, except for C-10 yrs for which the number was 7.



(c) Southern sub-region – number of responding countries was 3 for all categories.



(d) Western sub-region – all 4 countries provided non-blank responses for all categories

Figure 7. Frequency of responses (% of responding countries), indicating change in the: A - number of marine fisheries offences over the previous 10 and 5 years; B – level of detection effort over the previous 10 and 5 years; C – budget for monitoring and enforcement over the previous 10 and 5 years. This information is shown for: (a) all sub-regions combined; (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries comprising the Western sub-region.

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% of all 16 countries surveyed felt that funding was insufficient to support the enforcement of all regulations. In addition, 63% of these countries felt that penalties were not severe

enough to be an effective deterrence for non-compliance and as a compounding factor, 88% felt that the risk of detection was not high enough to encourage compliance with fisheries regulations. This trend was commonly perceived at the sub-regional levels as well, with the most pessimistic situation reflected in the perceptions noted by countries in the southern sub-region (Figures 8b-d). While responding countries in the western sub-region indicated concerns about budget and detection capacity levels, they were more confident about the severity of their penalties applied for acts of non-compliance.

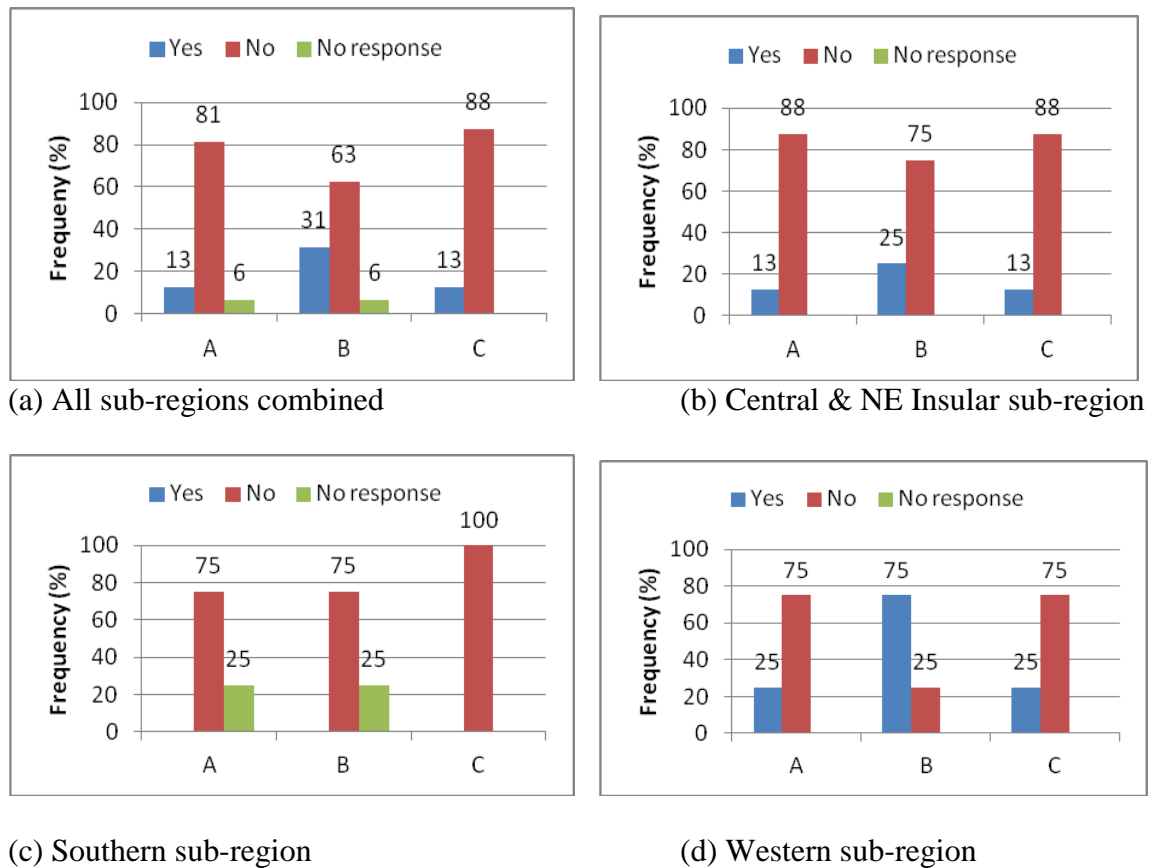


Figure 8. Frequency (% of countries surveyed, by sub-region), of all responses to three questions measuring the effectiveness of enforcement on fisher compliance: A - adequacy of funding for allowing enforcement of all regulations; B - severity of penalties to serve as a deterrence to non-compliance; C - the effectiveness of the risk of detection to stimulate regulation of compliance. The information is illustrated for: (a) all sub-regions combined; (b) surveyed countries comprising the Central and NE Insular WECAFC region; (c) surveyed countries comprising the Southern WECAFC region; (d) surveyed countries comprising the Western WECAFC region.

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% of 16 responding countries, regional- 62% of 13 responding countries, local- 82% of 11 responding countries). However, participatory processes were less often a formally required part of fisheries management and also used routinely (57% of 14 responding

countries in both instances) and even fewer countries (43% of 14 responding countries) explicitly define the stakeholders in their legislative frameworks.

Consultative management, in which stakeholders were consulted but had no management responsibility, was most commonly practiced (81% of 16 countries) (Figure 9a). Management strategies, in which government involvement was limited, were also practiced, though increasingly less common as the following arrangements increased stakeholders' management responsibility, that is: co-management with stakeholders sharing some responsibility (56% of 16 countries), followed by co-management with stakeholders sharing significant responsibility (47% of 16 countries), and then devolution of management in which there was full stakeholder control (31% of 16 countries) (Figure 9a). Among the sub-regions examined, a similar pattern and frequency were indicated for the central and northeast insular sub-region (Figure 9b), with a more pessimistic pattern in respect of stakeholder participation indicated for the southern sub-region (Figure 9c). The best reported progress in stakeholder involvement was indicated by countries in the western sub-region, where there were higher frequencies of occurrence of the full range of stakeholder participation (Figure 9d). These results suggest that, except for the western sub-region, the level of organisation 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.

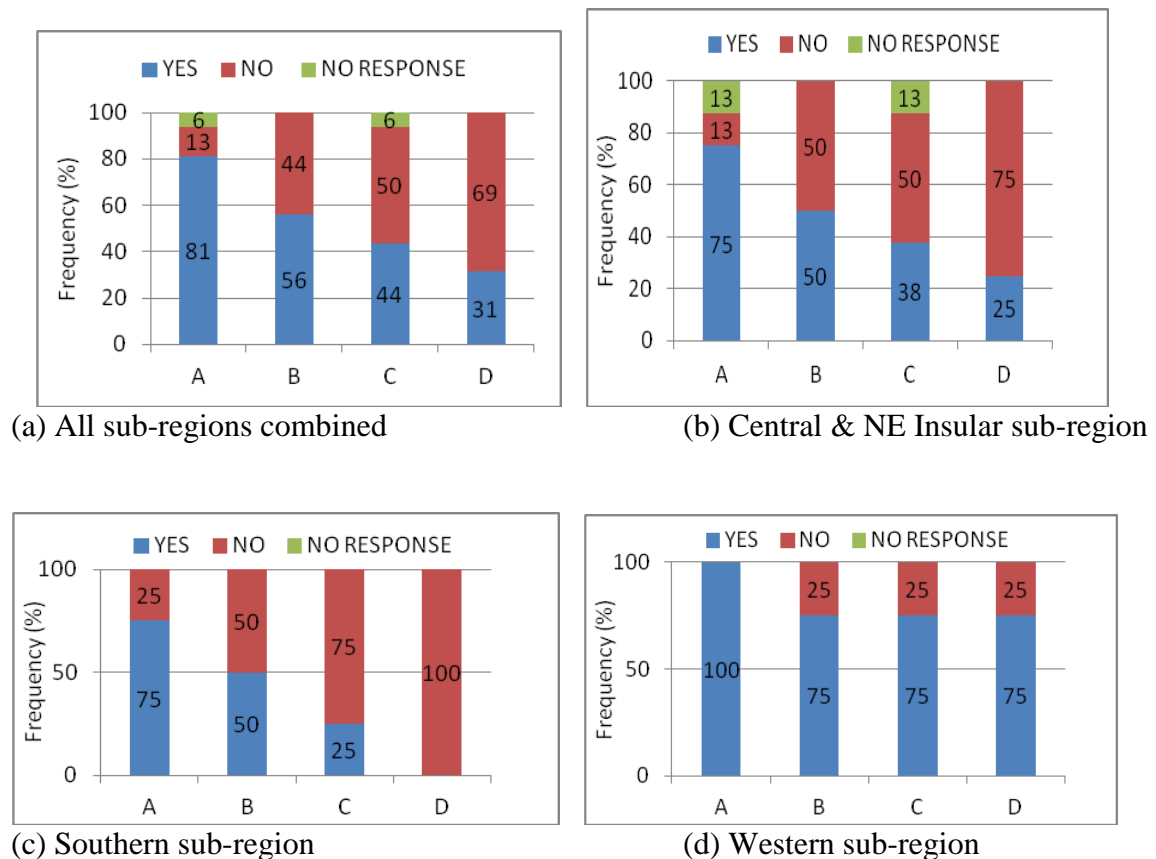
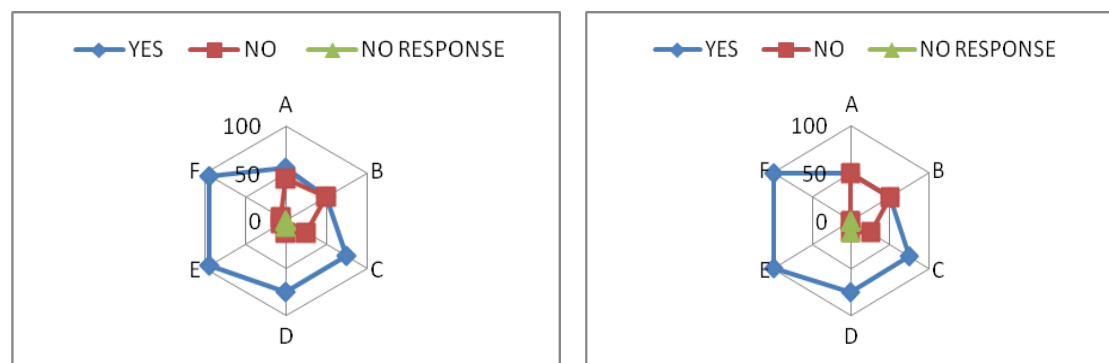


Figure 9. Frequency (% of countries surveyed by sub-region) of occurrence of management arrangements for stakeholder involvement: A - consultative, with stakeholders having no management responsibility; B - consultative with stakeholders having some management responsibility; C - co-management, with 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 sub-regions combined; (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries comprising the Western sub-region.

More than half of the 16 countries surveyed (56%) considered their management process to be fully transparent, with 75% (12 countries) confirming that meetings were advertised and publicized in advance, and, with equal frequency, were also open to all stakeholders. While nearly all 16 countries (94%) confirmed that opportunities were provided for fishery participants and other stakeholders to contribute to the decision-making process, only about 50% (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 sub-region, with similar percentages of performance noted as well (Figure 10b). In the southern sub-region, a far less optimistic picture was apparent, with all 4 surveyed countries indicating the absence of full documentation and the availability of this to the public (Figure 10c). In addition, only 1 country of the southern group reported all parts of its management process to be transparent. In contrast, all transparency criteria for the management process were perceived to be satisfactory in all 4 surveyed countries of the western sub-region, that is: all parts of process were transparent; documentation was clear and easily available, meetings were advertised, publicized and open to all stakeholders, all stakeholders had good opportunity to contribute inputs (Figure 10d).

Internet mail and fax were the more common methods used to disseminate information (93% of 14 responding countries 85% of 13 responding countries respectively), followed by other methods such as meetings (82% of 11 responding countries), direct mail (80% of 15 responding countries) and printed materials (73% of 15 responding countries). There was notably less use of radio (53% of 15 responding countries), television (40% of 15 responding countries), and internet websites (58% 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.



(a) All sub-regions combined

(b) Central & NE Insular sub-region

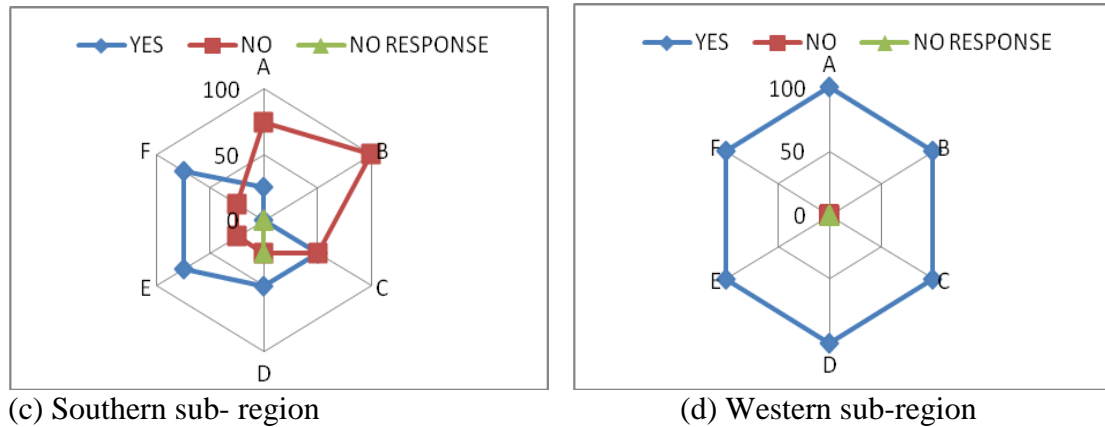


Figure 10. Frequency (% of all countries surveyed, by sub-region) of conditions of transparency in management: A - all parts of process transparent; B - information clearly documented and easily available to the public; C - meetings open to all stakeholders; D - meetings advertised and publicized in 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 sub-regions combined; (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries comprising the Western sub-region.

Conflict management

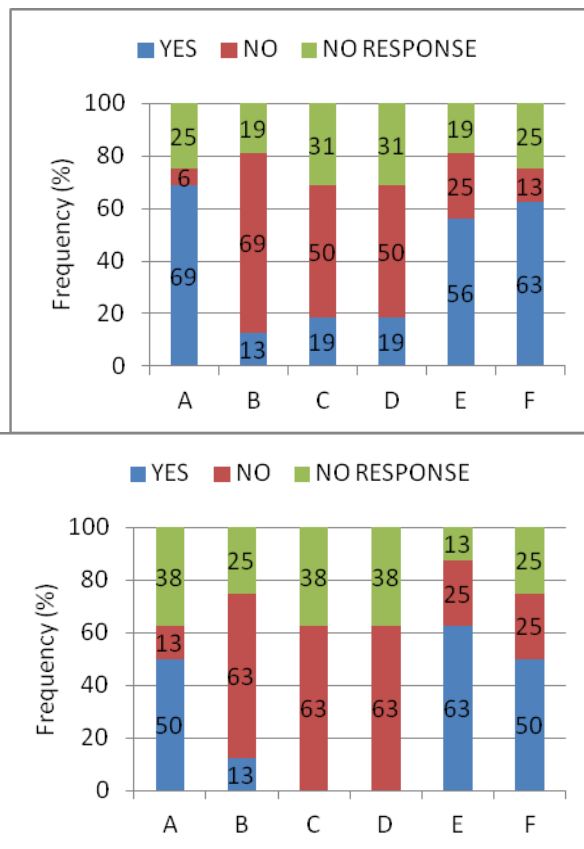
In only 19% of the 16 surveyed countries were steps for conflict resolution included in the legislation, and just 25% of all countries noted legal provisions for use of alternative dispute resolution mechanisms. Additionally, 44% (of 16 responding countries) and 40% (of 15 responding countries) of legislative 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% of all 16 countries), limiting the access of fishers depending on the target species or gear utilized (63%), and stakeholder education programmes (56%). Less often, conflict management tools included: resource allocation for fishery participants (19%), resource allocation between fishers and other sectors (19%), and stock enhancement (13%), (Figure 11a). Besides this general pattern, education was found to be the most common tool applied in the central and northeast sub-region (63% of all 4 countries surveyed), with zoning and limiting fisher access being second and equal to each other in importance (50% in each case) (Figure 11b). In this sub-region, no country reported use of resource allocation for conflict management (Figure 11b).

On other hand, zoning of areas was universally applied by all 4 surveyed countries in the southern sub-region, followed by limited access (75%) and then education (50%) (Figure 11c). There was only a 25% level of usage of resource allocation and stock enhancement tools for conflict management purposes in the southern sub-region. Zoning and limiting access by fishers were used frequently and equally in the western sub-region (each tool being used by 75% of all 4 countries). Resource allocation and education had the second highest reported frequency of usage (50% for each tool). In contrast, stock

enhancement was not used at all for conflict management purposes in the western sub-region (Figure 11d).

The overall regional, as well as the sub-regional patterns in the use of conflict resolution tools appear correlated with level of stakeholder involvement discussed earlier in this report. That is to say, the western sub-region reported greater success for more advanced forms of the participatory approach, and also reported the most use of resource allocation tools which would be expected to require stakeholder negotiation, trust and cooperation. Likewise, the comparatively higher usage of education in the central and northeast insular region may be a key factor in explaining the improved stakeholder cooperation in compliance despite management budgetary constraints, which was already indicated earlier for this sub-region.



(a) All sub-regions combined

(b) Central & NE Insular sub-region

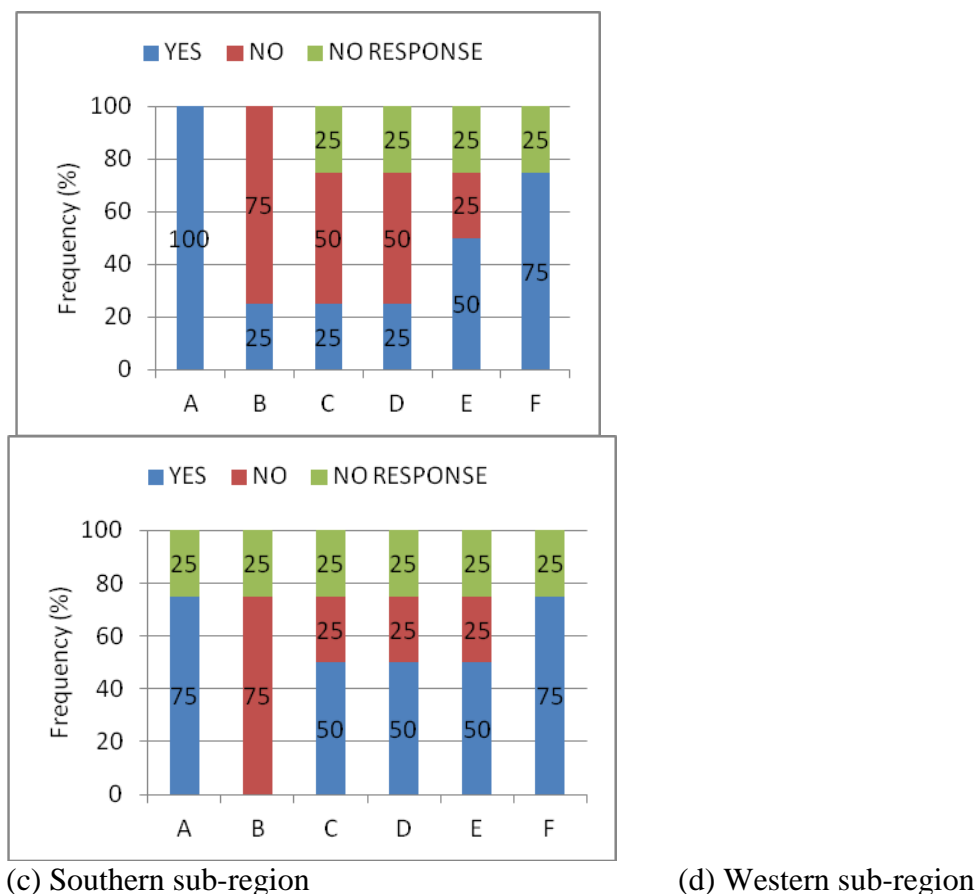


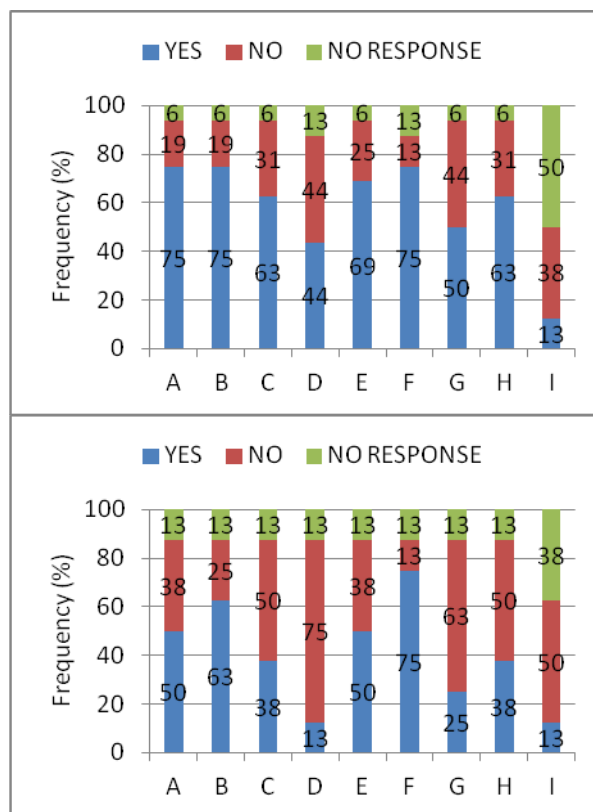
Figure 11. Frequency (% of all countries surveyed, by sub-region) of responses concerning use of various tools to manage conflict: A - zoning of different areas for different users; B - stock enhancement; C - resource allocation among participants of the fishery; D - resource allocation between fisheries & 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 sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries comprising the Western sub-region.

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 legislation were most often cited as indirectly impacting fisheries management (Figure 12a). Specific legislation which 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 sub-regional variations in this pattern, countries in the central and northeast insular sub-region reported that impacts by port management (75% of 8 countries) and trade legislation (63% of 8 countries) were

most common (Figure 12b). Endangered species legislation was universally identified (100% of 4 countries surveyed) in the southern sub-region (Figure 12c). However, except for port management legislation, the impacts of the range of non-fishery legislation examined was more frequently reported by countries in both the southern and western sub-regions, compared to that noted for the central and northeast insular sub-region (Figure 12b, c, d).

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 impact fisheries management.



(a) All sub-regions combined

(b) Central & NE Insular sub-region

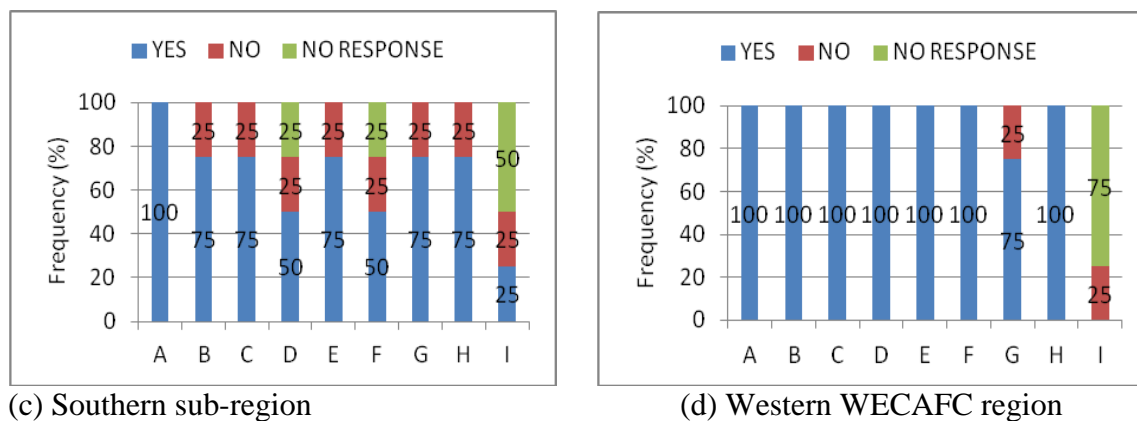


Figure 12. Frequency (% of all countries surveyed, by sub-region) of responses indicating national legislation instruments that indirectly affect the management of marine capture fisheries: A - endangered species legislation; B - trade legislation; C - biodiversity legislation; D - oceans policy legislation; 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 sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

International legislation affecting marine capture fisheries management & RFB participation

Throughout the 16 surveyed countries, WECAFC was the international organisation of which all countries were members, followed by COPESCAALC, CRFM and ICCAT (Figure 13). The comparatively lower level of membership in SICA-OSPESCA reflected the relatively limited geographical coverage of this organization (only Central American countries and the Dominican Republic). In most countries (88%), a formal mechanism for compiling and passing fisheries data to the regional/ international organisations was in place. Most frequently, information was shared with the FAO. However, a majority of countries also shared information with CITES (12 countries), ICCAT (10 countries), and CRFM (9 countries) (Figure 14). Other organisations and major data and information gathering initiatives which were indicated included: OSPESCA, the CLME project and NOAA (Figure 14).

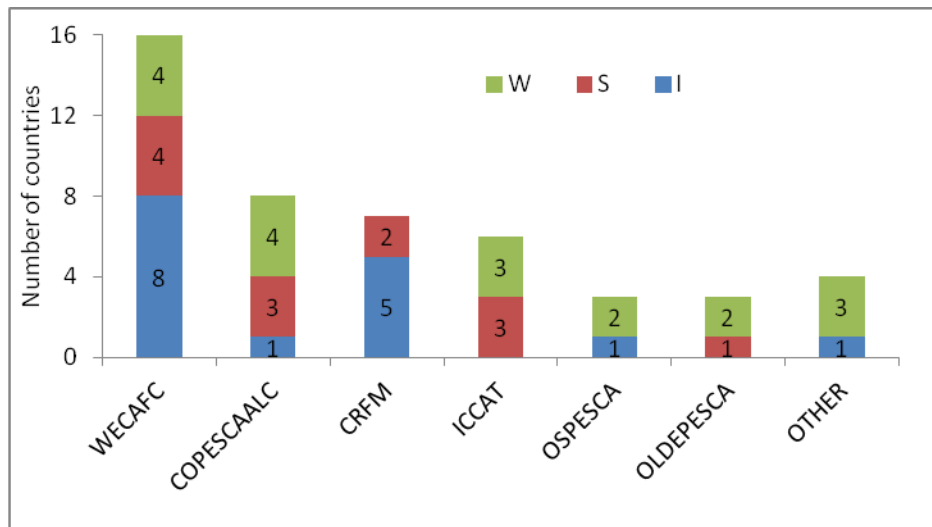


Figure 13. The number of countries that confirmed membership in various regional fisheries organisations of: a total of 8 countries sampled in the Central & NE Insular sub-region (I), a total of 4 countries sampled in the southern sub-region (S), and a total of 4 countries sampled in the Western sub-region (W).

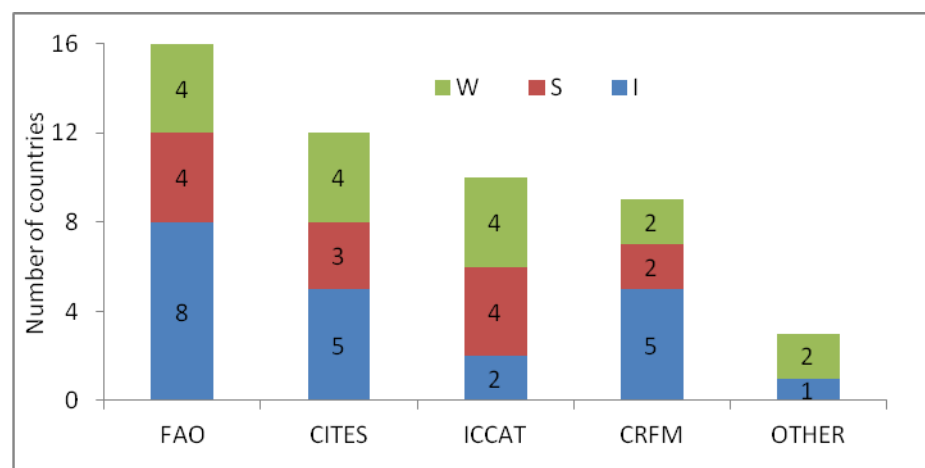


Figure 14. Number of countries providing fisheries related data to the regional/international organizations identified. Responses to 'Other' specifically identified: OSPESCA, the CLME project, and NOAA.

Management of fishing capacity

In the majority of the countries (67% 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% of 15 responding countries reported that they 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% of all 16 countries surveyed), and lack of human resources (also 63% of 16 countries), with budget and data constraints also reported with notable frequency (50% 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 sub-regions

(50% of 8 countries and 50% of 4 countries respectively), while countries in the southern sub-region reported that other more urgent fisheries management priorities was just as important a constraint (50% of 4 countries) as lack of stakeholder support and human resource limitations (Figures 15b-d). These results suggest that there is 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. The importance of this task may therefore not have been promoted at the political and stakeholder levels sufficiently to obtain the necessary support.

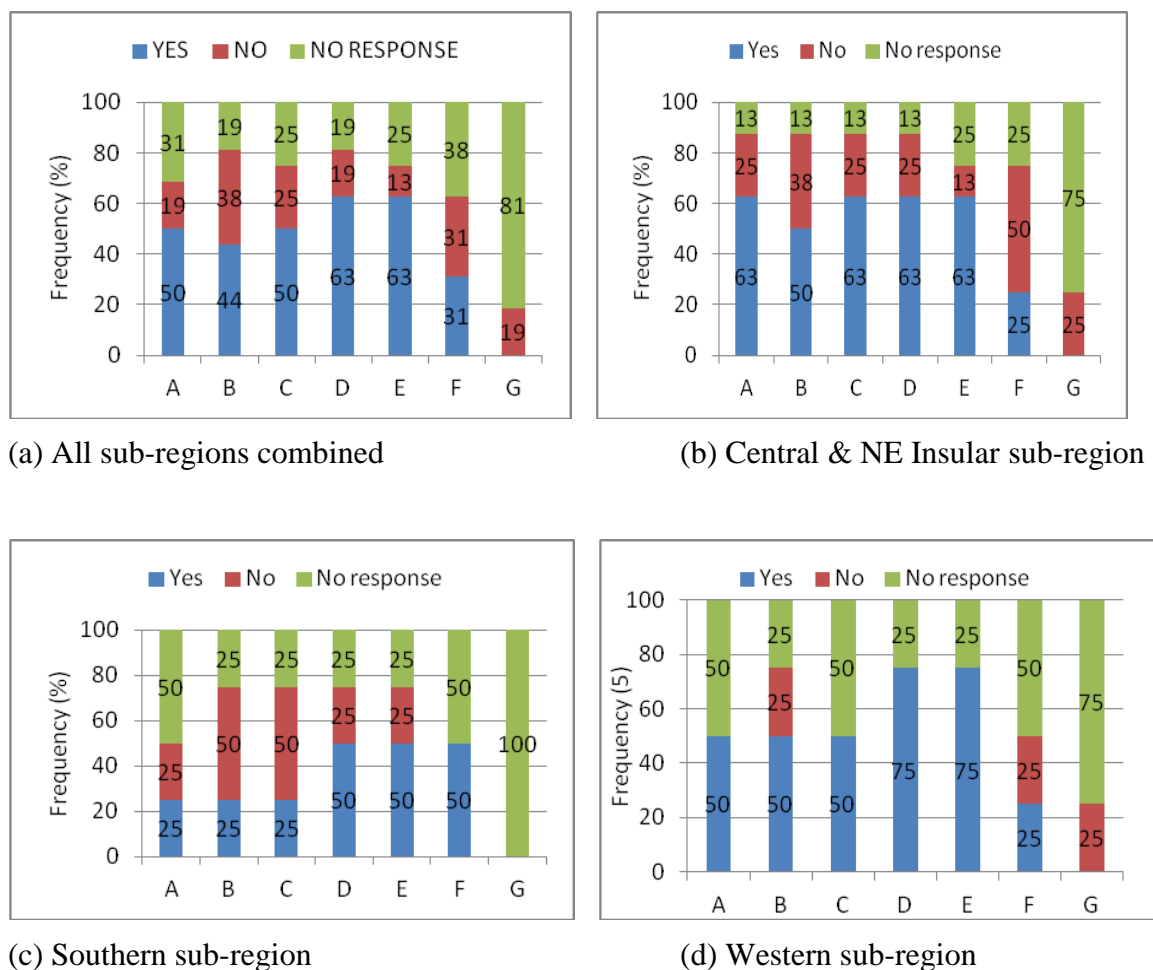


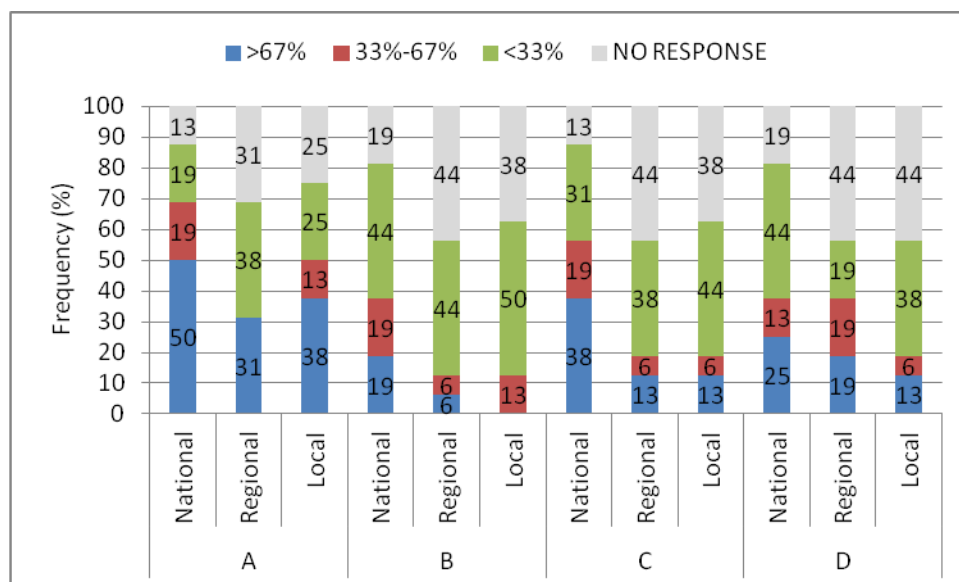
Figure 15. Frequency (% of all countries surveyed, by sub-region) of responses identifying the primary obstacles preventing completion of measurement of fishing capacity in marine capture fisheries: A - budget constraints; B - lack of political will; C - lack of supporting data to make measurements; 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 sub-regions combined; (b) countries of the Central and NE Insular sub-region; (c) countries of the Southern sub-region; (d) countries of the Western sub-region.

Marine capture fisheries under management – general characteristics

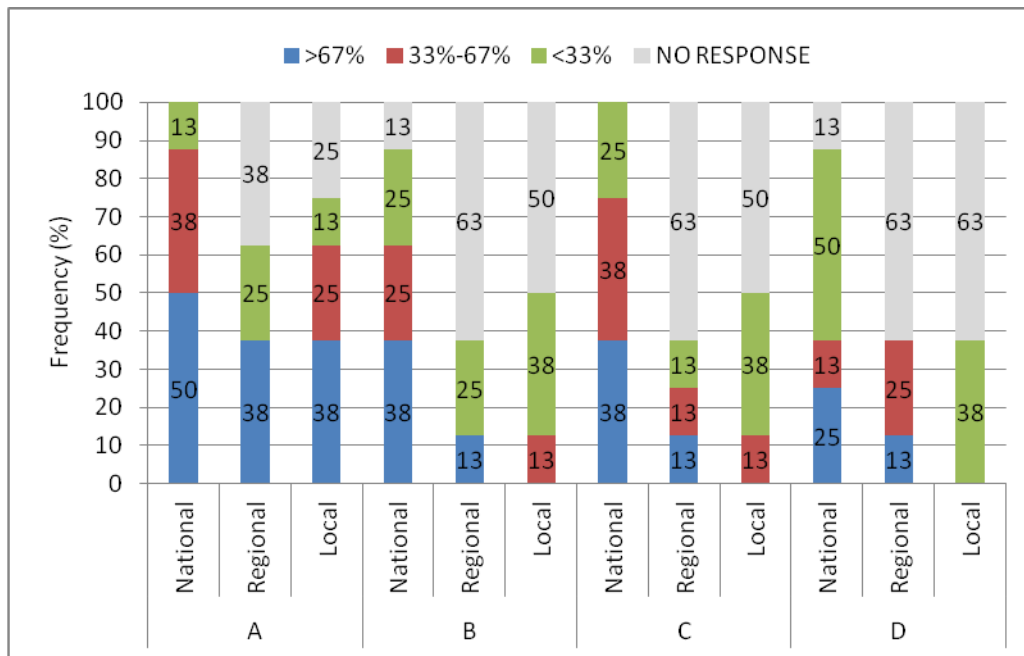
In 50% of all 16 countries, more than two-thirds of the marine capture fisheries were considered ‘managed in some way’ at the national level, with a lesser frequency of this level of management, >67% of fisheries managed in some way, occurring at the regional (31% of 16 countries) and local (38% of 16 countries) levels. For those fisheries considered managed, 19% of all 16 surveyed countries had formally documented management plans for national level management of over 67% of their fisheries (Figure 16a). While 38% of the 16 countries reported having regulations governing the majority (>67 %) of managed fisheries at the national level, for more than 67% of fisheries regulated at the national level, the regulations were informed by methodical scientific monitoring and evaluation in only 25% 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 sub-region 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 to be the worst in the southern sub-region, where management in some form, plans, regulations and monitoring were identified most frequently for less than 33% of the fisheries (Figure 16c). While the western sub-region 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).

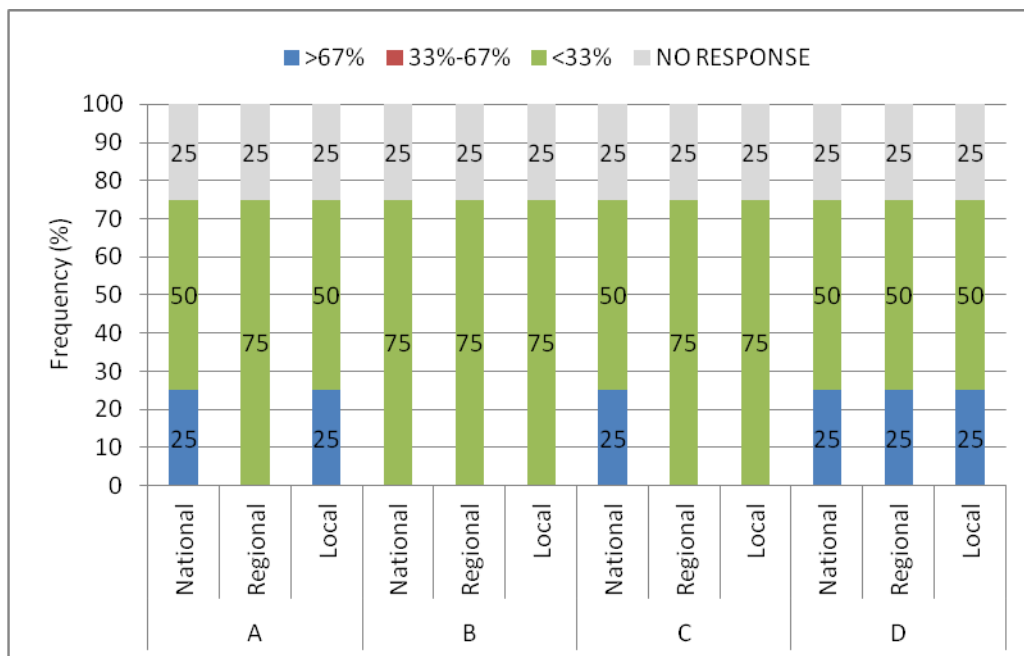
There was a strong perception by the surveyed countries that the number of fisheries managed had increased over the past ten years (national level - 60% of 15 responding countries, regional – 67% of 12 responding countries, local – 54% of 13 responding countries), but 31% of 13 responding countries felt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



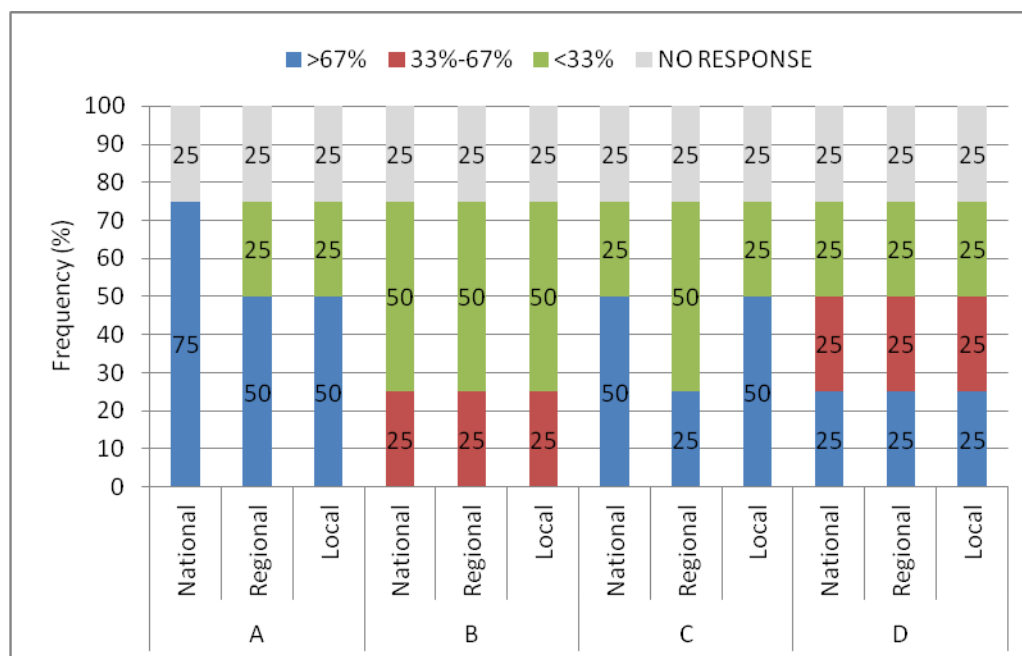
(a) All sub-regions combined



(b) Central & NE Insular sub-region



(c) Southern sub-region



(d) Western sub-region

Figure 16. Frequency of responses, by percentage category of all countries surveyed, by sub-region, identifying various management achievements at the national, regional and local levels, specifically: A - % fisheries managed in some way; B - % fisheries with formal management plans; C - % fisheries with published regulations; D - % fisheries for which regulations are based on methodical scientific monitoring and evaluation. The information is illustrated for: (a) All sub-regions combined; (b) countries of the Central and NE Insular sub-region; (c) countries of the Southern sub-region; (d) countries of the Western sub-region.

REVIEW OF FISHERIES MANAGEMENT TOOLS IN USE WITHIN THE LARGEST MARINE CAPTURE FISHERIES

Each country respondent was asked to identify up to 3 major commercial/industrial, small-scale, and recreational fisheries for his/her 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 sub-region. As countries did not always identify 3 major fisheries in each sub-sector (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 sub-sector and by sub-region, as noted in Table 3.

Table 3. Numbers of major fisheries identified by country respondents, by fishery sub-sector, and by sub-region.

Fishery Sector	Sub-All sub-regions combined	Central and Northeast Insular Sub-region	Southern Sub-Region	Western Sub-Region
Commercial/ Large-scale	25	3	10	12
Small-scale	39	20	10	9
Recreational	19	9	3	7

General characteristics of fishery & activity trends

Based on data and information from the survey, there were many more vessels involved in small-scale fishing compared to commercial/ large scale operations (Table 4). Notwithstanding, reported landings by the commercial/ large-scale sub-sector 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 ¹	Small-scale	Recreational
Total landings (mt)	1.2 million mt ²	369298 mt ³	No data from majority of countries
Number of vessels	3031 ⁴	63254 ⁴	2358 ⁶
<i>Notes:</i>			
1. 7 of the 16 countries indicated that no commercial fisheries exist in their countries			
2. Estimated recent annual landings provided for and totalled over 15 major commercial/ large-scale fisheries operating in 6 countries (Brazil, Mexico, Nicaragua, Suriname, Trinidad and Tobago and Venezuela)			
3. Estimated recent annual landings provided for and totalled over 36 major fisheries operating in 13 countries (No estimates were available for Caribbean Netherlands, Dominican Republic and Panama).			
4. 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)			
5. Estimated recent number of fishing vessels in 31 major small-scale fisheries operating in 10 countries (No data were available for Brazil, Caribbean Netherlands, Dominica, Dominican Republic, Suriname and Trinidad and Tobago)			
6. Estimated recent number of fishing vessels in 11 major recreational fisheries operating in 7 countries (Aruba, Mexico, Nicaragua, St. Kitts and Nevis, St. Lucia, Trinidad and Tobago, and			

Venezuela)

In 57% of 21 major commercial/ large-scale fisheries, the number of vessels was reported to have decreased over the most recent 10 year period, while this number remain unchanged or increased for 24% and 19% 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% of cases based on data of 35 of the major small-scale fisheries and 100% of cases based on data of 12 major recreational fisheries.

In the majority of cases (96 and 72 % 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 %, 54% of the 25 major commercial and 39 small-scale fisheries respectively, while in the recreational sub-sector they were very uncommon (16% of 19 major fisheries). Most of the major fisheries were also multi-species in nature (80% - commercial fisheries, 72% - small-scale, 79% - recreational) but this aspect was not exactly accounted for within the management schemes (64% - commercial fisheries, 54% - small-scale fisheries, 16% - recreational fisheries). Explicit inclusion of ecosystem considerations was only occasionally made (highest was 24% for commercial fisheries), but there was comparatively better apparent application of the precautionary approach (48% - commercial, 31% - small-scale, 37% - recreational). The major commercial fisheries were much more likely to provide the sole source of income for their participants (76%). Additionally, fish products provided an important food source in 28%, 21% and 32% of the major commercial, small-scale, and recreational fisheries respectively (Figure 17a). The 32% level reported for the recreational fisheries was dominated by the situation of the central and northeast sub-region, 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 multi-species nature of all types of fisheries in the three sub-regions 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 sub-regions, and the small-scale fisheries in the southern sub-region (Figure 17b-d). Generally, countries reported better progress in implementing the precautionary approach compared to the ecosystem approach, with relatively little or no application success for the ecosystem approach in the central and northeast insular and the southern sub-regions. 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. Likewise, the one country in the central and northeast insular sub-region, which reported 3 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% level illustrated in Figure 17b.

The dependence on the fishery as a sole source of income and a sole source of food varied with the sub-region. In the central and northeast insular sub-region, the recreational fishery participants had the highest dependence for income purposes (44% of 9 major fisheries), followed by the small-scale fisheries (20% of 20 major fisheries)

(Figure 17b). In contrast, in the southern sub-region, both the commercial and small-scale fisheries were equally important in providing a sole source of income for the participants (70% of 10 major commercial fisheries and 70% also of 10 major small-scale fisheries) (Figure 17c). In the western sub-region, participants in all 7 major commercial fisheries (100%) were dependent on the fishery as a sole source of income (Figure 17d). Interestingly, participants of both the major commercial and small-scale fisheries of the southern and western sub-region 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 sub-regions did not provide either a sole source of income or food for fishery participants concerned. It is not unreasonable to assume that these sub-regional differences in terms of income and food dependence are likely to be linked to similar sub-regional differences in social and economic factors impacting overall human and social well-being.

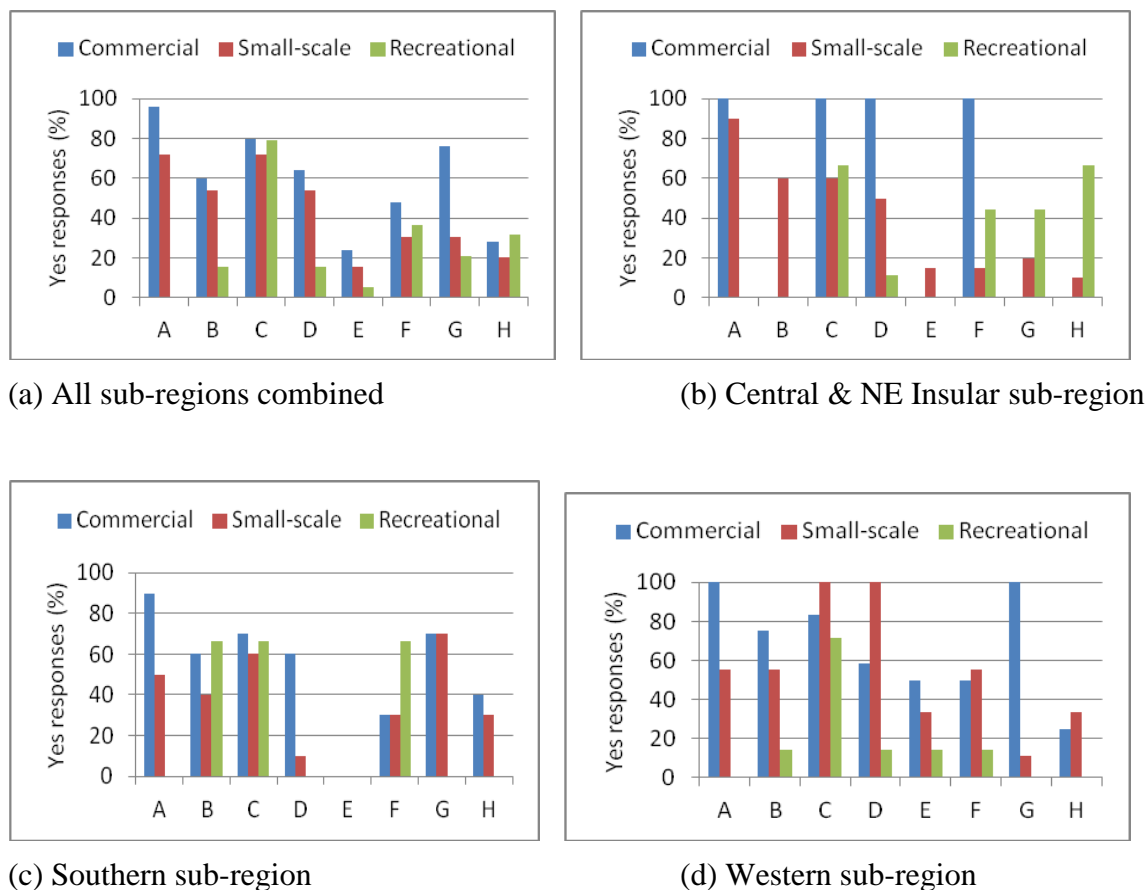


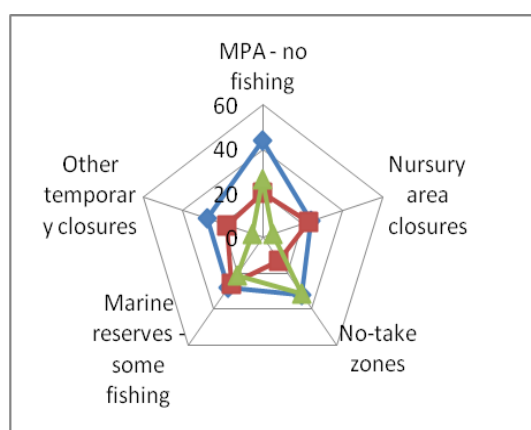
Figure 17. Frequency of occurrence (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of additional characteristics of the top three fisheries from each sub-sector: A - also the top value fisheries; B - have management plans; C - are multi-species 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 sub-regions combined; (b) surveyed

countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

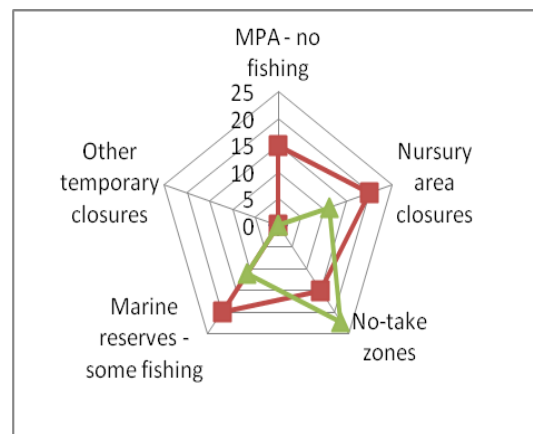
Management tools in use within the major fisheries

The technical measures utilized to manage fisheries were categorised under five themes: 1) spatial restrictions, 2) temporal restrictions, 3) gear restrictions, 4) rights and participatory restrictions, and 5) 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 sub-regions examined, with the highest frequency of such application indicated by countries of the western sub-region (Figures 18b-d). In the central and northeast insular and southern sub-regions, the use of marine reserves and nursery area closures had the highest reported frequencies for the small-scale fisheries compared to other sub-sectors in these sub-regions. In respect of the commercial fisheries, the no take zone was the most popular spatial measure in the southern sub-region, while MPA, nursery area and other temporary closures were more common in the western sub-region. 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 the recreational fisheries, no-takes zones were used the most in the central and northeast insular sub-region, while both no-take zones and MPAs were equally popular in the western sub-region. Spatial measures did not appear to be used to any measurable amount for the recreational fisheries in the southern sub-region.



(a) All sub-regions combined



(b) Central & NE Insular sub-region

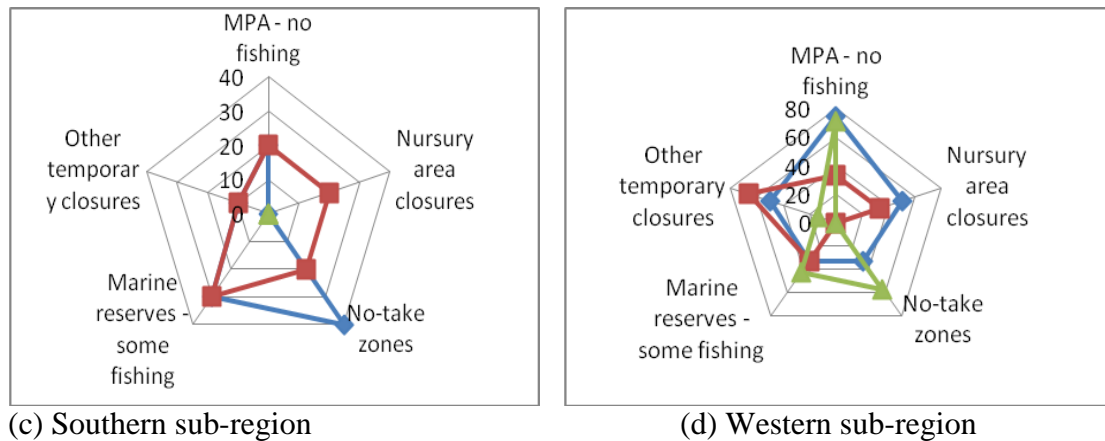
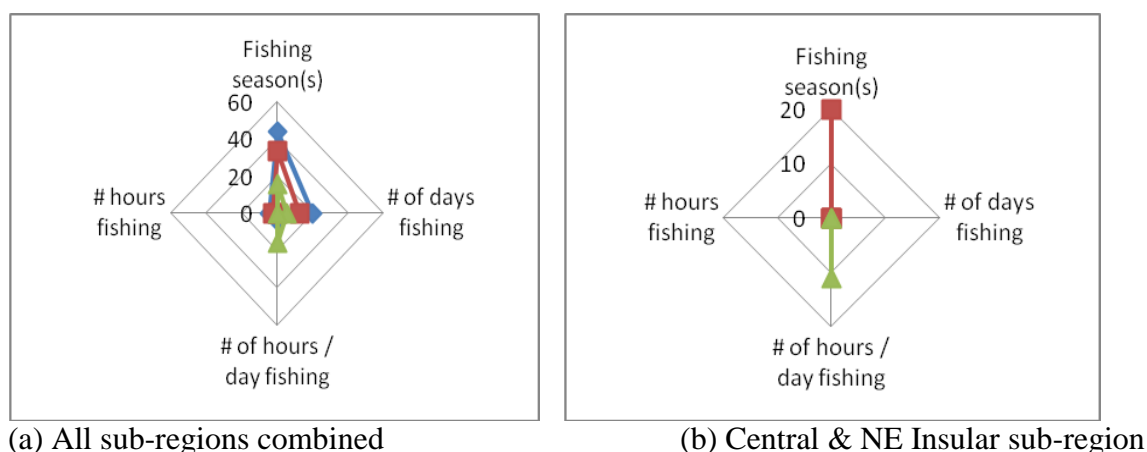


Figure 18. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of the use of spatial restrictions for management of the major fisheries identified in the three sub-sectors (blue = commercial, red = small-scale, green = recreational) for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

Generally, fishing season was the most popular temporal measure applied for both the commercial and small-scale sub-sectors (Figure 19a). Regarding the small-scale fisheries, fishing season was the most popular temporal measure of the insular and southern sub-regions (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 sub-regions, though 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 the recreational fisheries. While fishing season was most used (43%) for these fisheries of the western sub-region, notable applications of hours per fishing day (29%) and number of fishing days (14%) were also reported. Hours per fishing day was also the main measure indicated for the recreational fisheries of the insular sub-region, when used (11% of the major fisheries identified) (Figure 19 b, d).



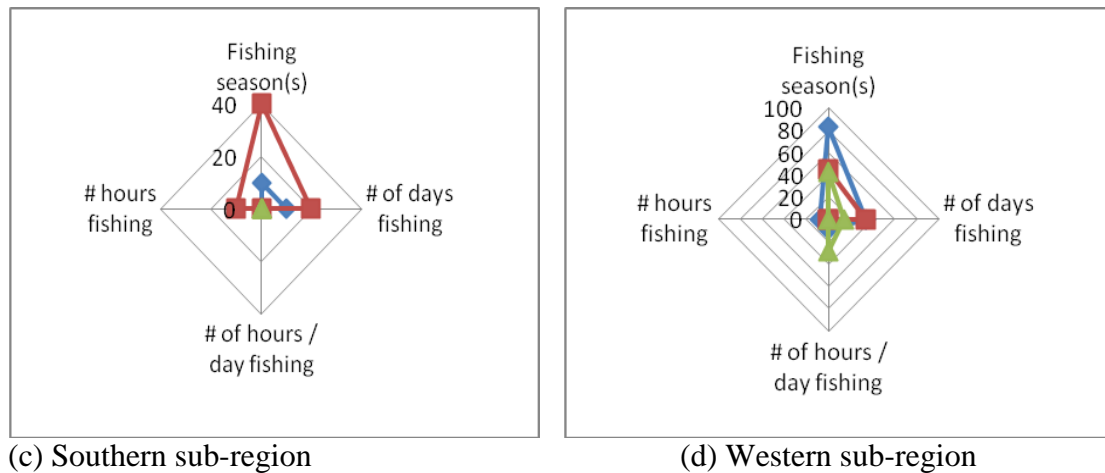
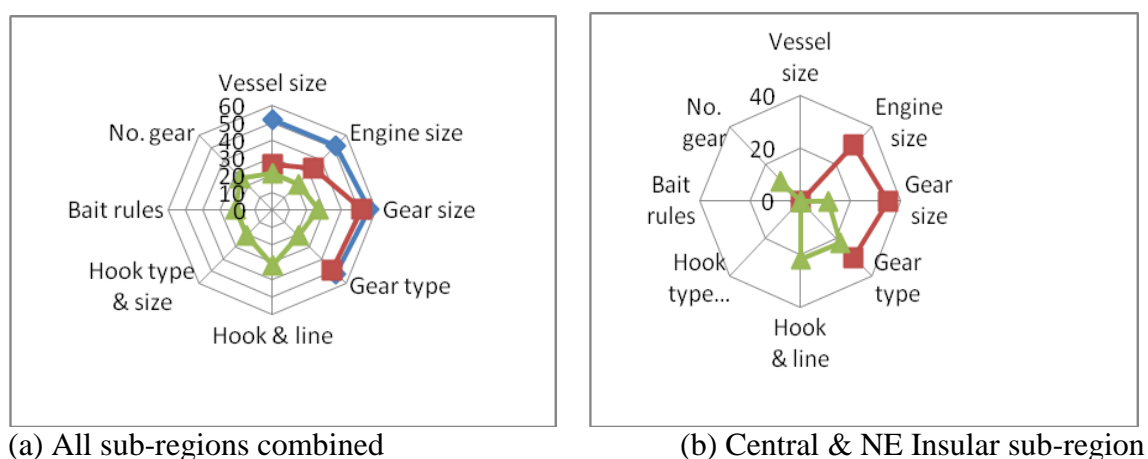


Figure 19. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of the use of temporal restrictions for management of the major fisheries identified in the three sub-sectors (blue = commercial, red = small-scale, green = recreational) for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

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% of major fisheries respectively), and hook and line measures most frequent in the case of the recreational fisheries (32% of major fisheries) (Figure 20a). Regarding sub-regional differences, vessel size measures were most popular for commercial fisheries (40% of major fisheries) in the southern sub-region, followed by engine size and gear size (30% of major fisheries in each case) (Figure 20b). On the other hand, in the case of small-scale fisheries in the southern sub-region, gear type was the most frequent measure (60% of major fisheries), followed by gear size (40% of major fisheries). On the other hand, in the western sub-region, gear size and type were the most frequently used fishing effort restriction for commercial fisheries (92% of major fisheries in each case), and gear size and vessel size were the most used for small-scale fisheries (100% and 89% 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 sub-region (Figure 20b-d).



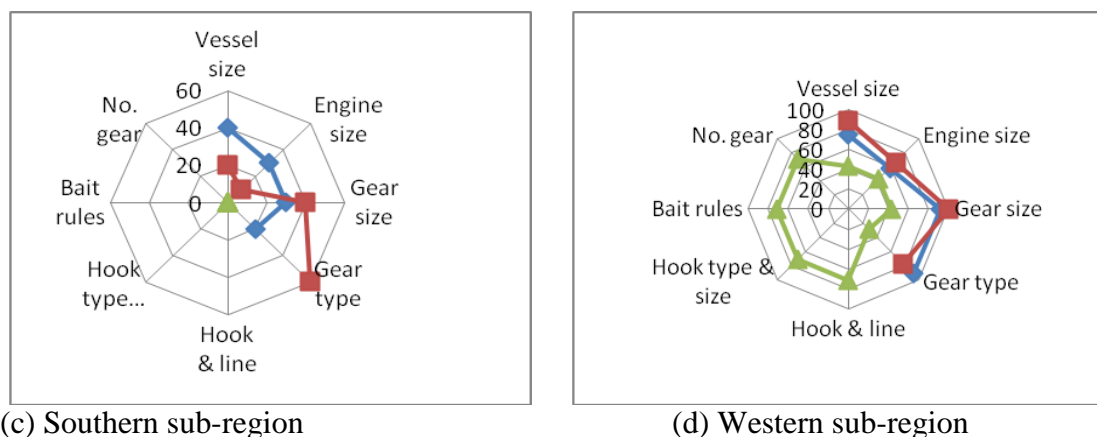
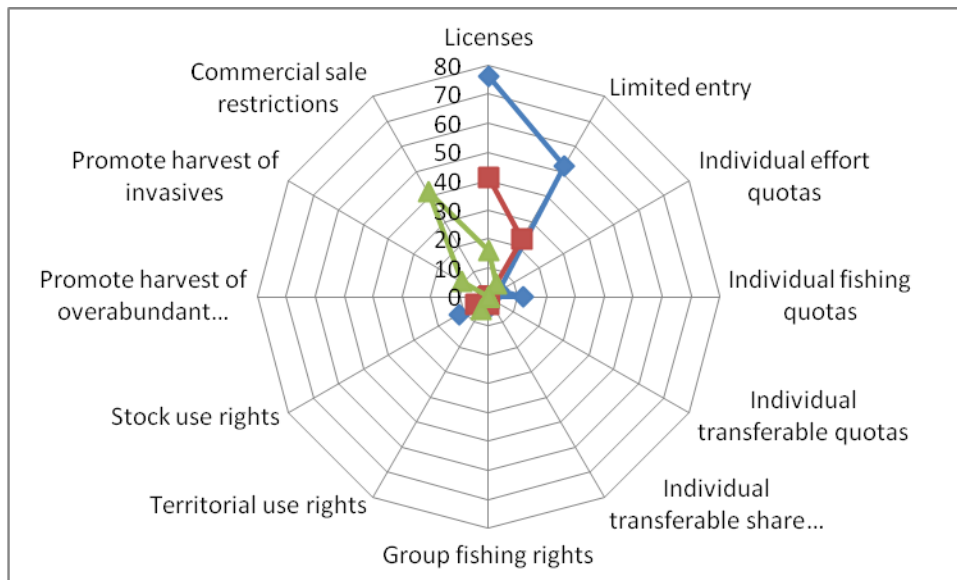
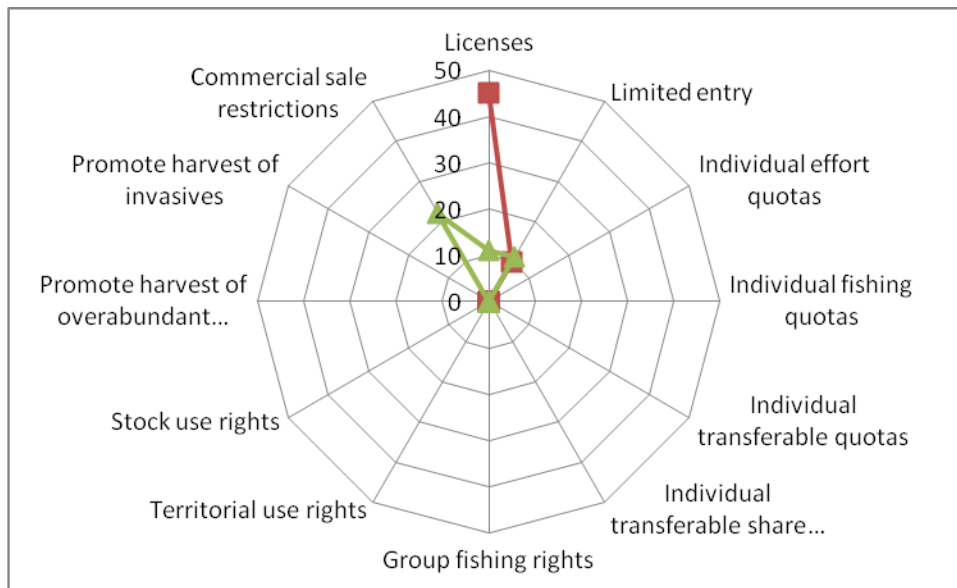


Figure 20. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of the use of fishing effort restrictions for management of the major fisheries identified in the three sub-sectors (blue = commercial, red = small-scale, green = recreational) for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

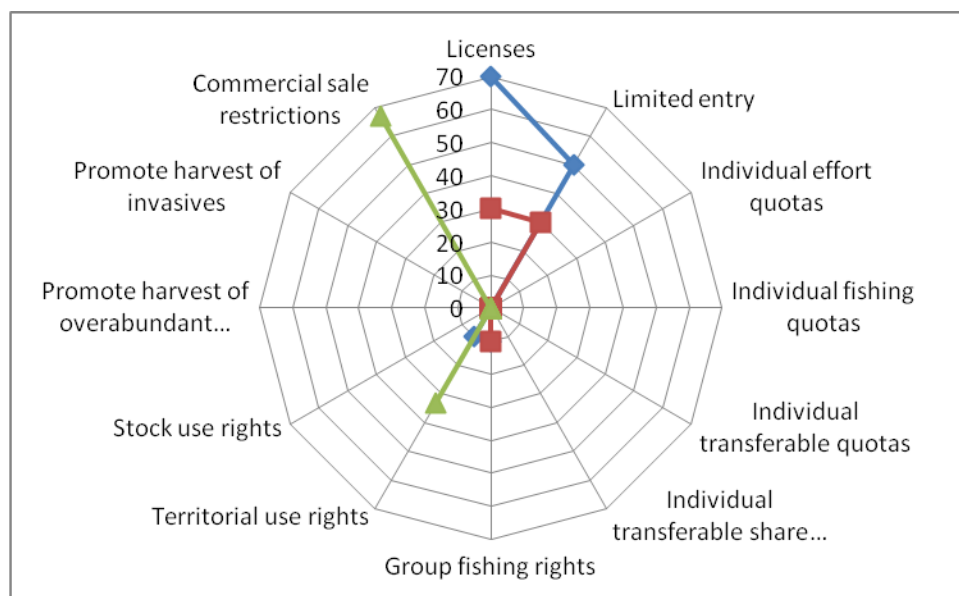
For regulating participation levels, a licensing system was the most common tool used, followed by use of limited entry, in both commercial and small-scale fisheries across the region, while commercial sale restrictions was the most popular of such measures in respect of the recreational fisheries (Figure 21a). This pattern was generally reflected in each of the sub-regions, with generally a higher frequency usage of licensing systems reported for the commercial fisheries compared to the small-scale fisheries (Figure 21 b-d). Among the sub-regions, the southern sub-region reported the lowest application of licensing for the small-scale fisheries. In addition, a few other rights and participatory restriction measures were also in use: in the southern sub-region, territorial use rights for the recreational fisheries (33% of major fisheries) and group fishing rights for both the commercial and small-scale fisheries (in each case, 10% of major fisheries); in the western sub-region, stock use rights for the commercial and small-scale fisheries (25% and 22% of major fisheries), individual fishing quota allocations for the commercial fisheries (25% of major fisheries), promotion of harvest of invasive species for the recreational fisheries (29% of major fisheries) (Figure 21c, d).



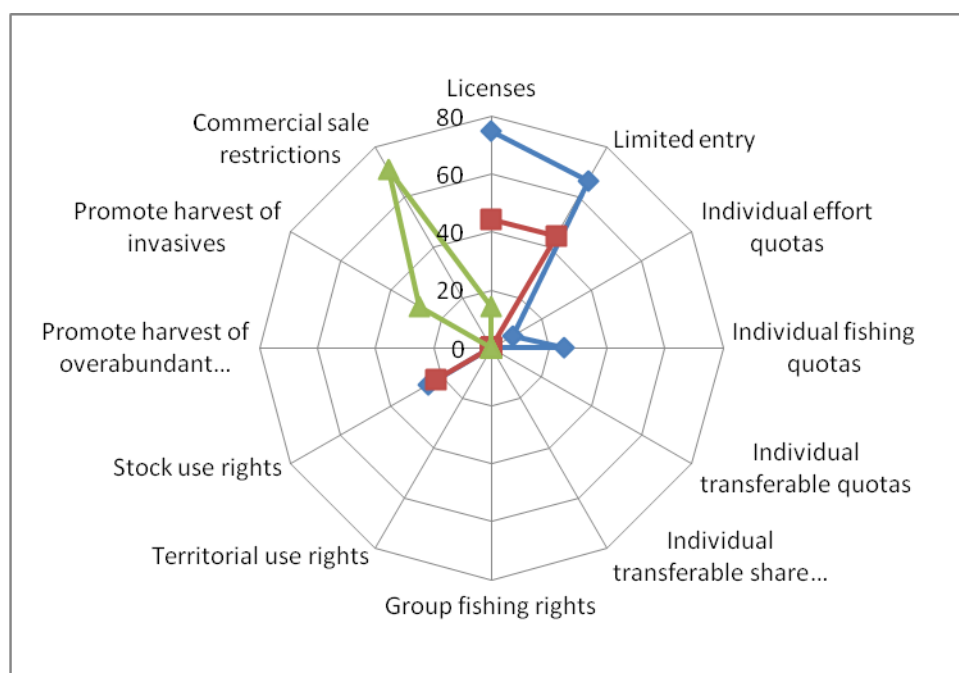
(a) All sub-regions combined



(b) Central & NE Insular sub-region



(c) Southern sub-region



(d) Western sub-region

Figure 21. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of the use of rights/ incentive adjusting restrictions for management of the major fisheries identified in the three sub-sectors (blue = commercial, red = small-scale, green = recreational) for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

Generally, regarding catch/ harvest restrictions, total allowable catch (TAC) and size restrictions were the most common for the commercial and small-scale fisheries, and the broadest range of measures was indicated for the recreational fisheries (Figure 22a). In the central and northeast insular sub-region, size restrictions was the most commonly

indicated, being applied in 25% of the major small-scale fisheries identified (Figure 22b). On the other hand, TAC, size and vessel catch limits appeared to be used more or less equally in the southern sub-region for the small-scale fisheries, being applied in about 10% of the major fisheries identified in each case. In this sub-region, size restrictions were more frequently applied to the commercial fisheries (30% of major fisheries) compared to the use of TAC (20% of major fisheries) (Figure 22c). In the case of the western sub-region, TAC was the most commonly applied catch restriction measure for both the commercial (75% of major fisheries) and small-scale fisheries (56% of major fisheries) (Figure 22d). To a much lesser extent in the western sub-region, size restrictions and individual vessel quotas (each used in 25% of major fisheries) were applied to the commercial fisheries, and individual vessel quotas were applied to the small-scale fisheries (11%). In contrast, recreational fisheries in the western sub-region were subjected to a broad range of catch restriction measures, with 71% of major fisheries identified using bag limit measures (Figure 22d).

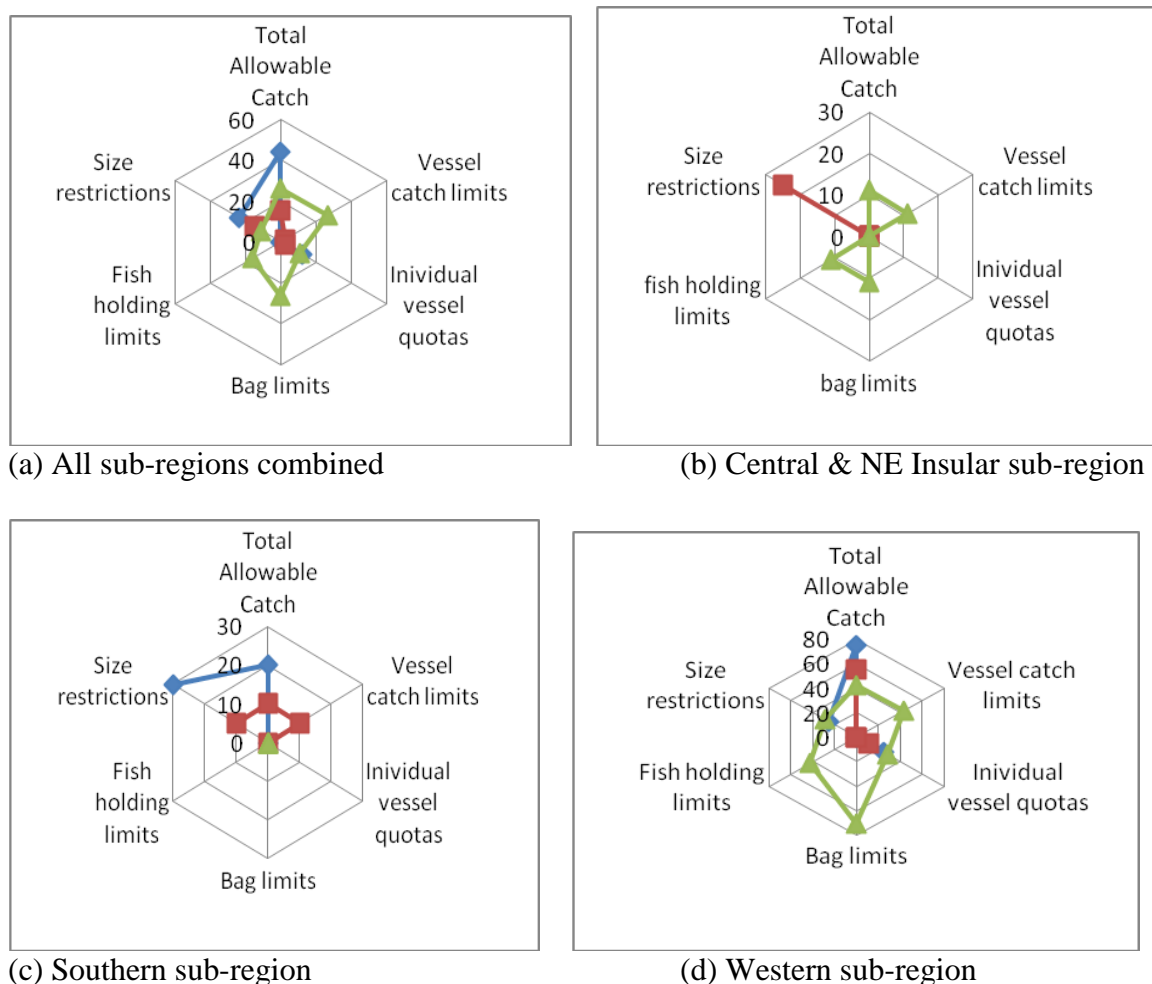


Figure 22. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of the use of catch and size restrictions for management of the major fisheries identified in the three sub-sectors (blue = commercial, red = small-scale, green = recreational) for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

It should be noted that over the last 10 years, the measures that have been used with increasing frequency by the commercial/ large-scale fisheries have been international regulations (16% of the 25 major commercial fisheries identified), followed by spatial measures (14% of major fisheries) and then use of size restrictions and taxes (increases in 12% of major fisheries in each case). On the other hand, in the small-scale sub-sector, tools which have grown the most in usage over the past 10 years included: spatial and gear measures (in each case, increases reported by 19% of the 39 major small-scale fisheries identified), followed by size measures being used increasingly in 15% of these fisheries. For the recreational fisheries, few applications of measures were indicated. Where indicated and over the past 10 years, there has been the most increased usage of spatial measures, reported for 12% of the 19 major recreational fisheries identified, followed by gear measures with increased usage reported for 9% of cases.

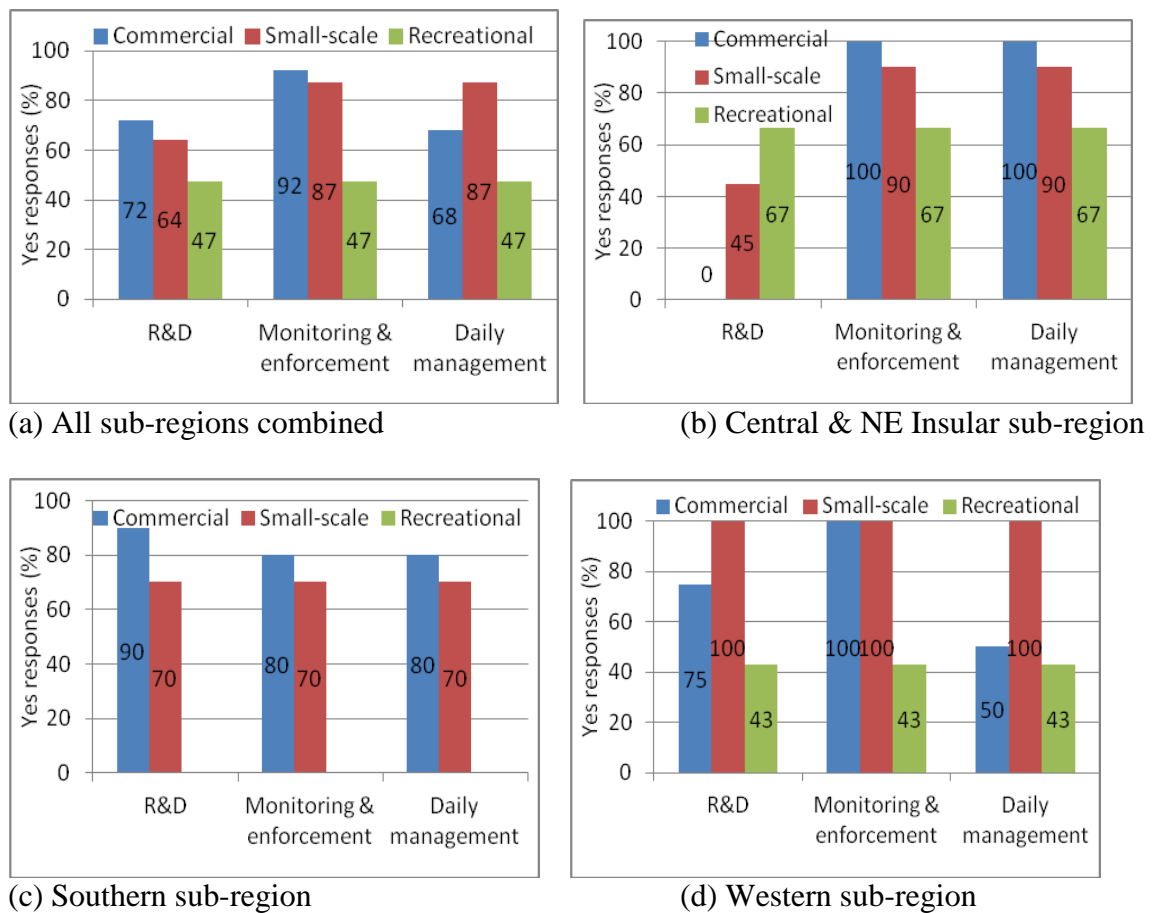


Figure 23. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of application of government management budget outlays for the major fisheries identified (commercial (blue), small-scale (red) and recreational (green) across all surveyed countries for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

Funding outlays and cost-recovery in fisheries management within the major fisheries

Government funding for management of the major fisheries included, *inter alia*, research and development, monitoring and enforcement, and daily management. Generally and as may be expected, the available funding targeted commercial and/or small-scale fisheries more heavily than recreational fisheries (Figure 23a). Additionally, monitoring and enforcement and daily management activities consumed most of the budget allocations. In the central and northeast sub-region where only 3 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 so it is interesting to note also that available funds were also being spent mostly on monitoring and enforcement and daily management (90% of major fisheries identified), with 50% of these fisheries also receiving funds for research and development 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 sub-region (67% of fisheries covered for each activity) (Figure 23b).

In comparison, in the southern sub-region, 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). Furthermore, research and development activities for commercial fisheries were also more frequently supported than monitoring and enforcement and daily management tasks (Figure 23c), while the small-scale fisheries enjoyed equally distributed funding among the three types of management activities. In contrast, no government funding was indicated for the 3 major recreational fisheries identified in the southern sub-region.

In the western sub-region, availability of government funding was indicated for all fishery types (commercial, small-scale and recreational fisheries), although least frequently for the recreational fisheries (Figure 23d). While 100% of the 12 major commercial fisheries received funding for monitoring and enforcement, 75% were being covered for research and development tasks and 50% for daily management. In comparison, government funds were used to cover equally the three management tasks for all 9 major small-scale fisheries and for 43% of the 7 major recreational fisheries identified for this sub-region (Figure 23d).

Generally on average, across the major fisheries it should be noted that 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 sub-sector (Figure 24a). Management cost recovery for 23% of the 39 major small-scale fisheries and for 5% of the 19 major recreational fisheries also depended also on licence fees paid by fisheries in other sub-sectors. Resource rents were also applicable for 8% of the major small-scale fisheries (Figure 24a). This general pattern of highest dependency by the commercial and recreational fisheries on licence fees obtained from the fisheries directly affected was apparent in all the sub-regions (Figure 24b-d). However, some differences should be noted. The very high use of licensing for commercial fisheries in the central and northeast sub-region could be explained by the fact that this reflected data for the 3 fisheries operated within 1 country; besides this difference, the central and northeast pattern is similar to the general pattern for the overall region. The lowest application of

any management recovery mechanisms was reported in the southern sub-region: applied in 10% of the major commercial fisheries identified, and no application for small-scale and recreational fisheries (Figure 24c). Also, in the western sub-region, there was low application of cost recovery efforts for the small-scale fisheries: only 11% 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 will to retain top-down management arrangements and/or a lack of will by stakeholders to share more management costs.

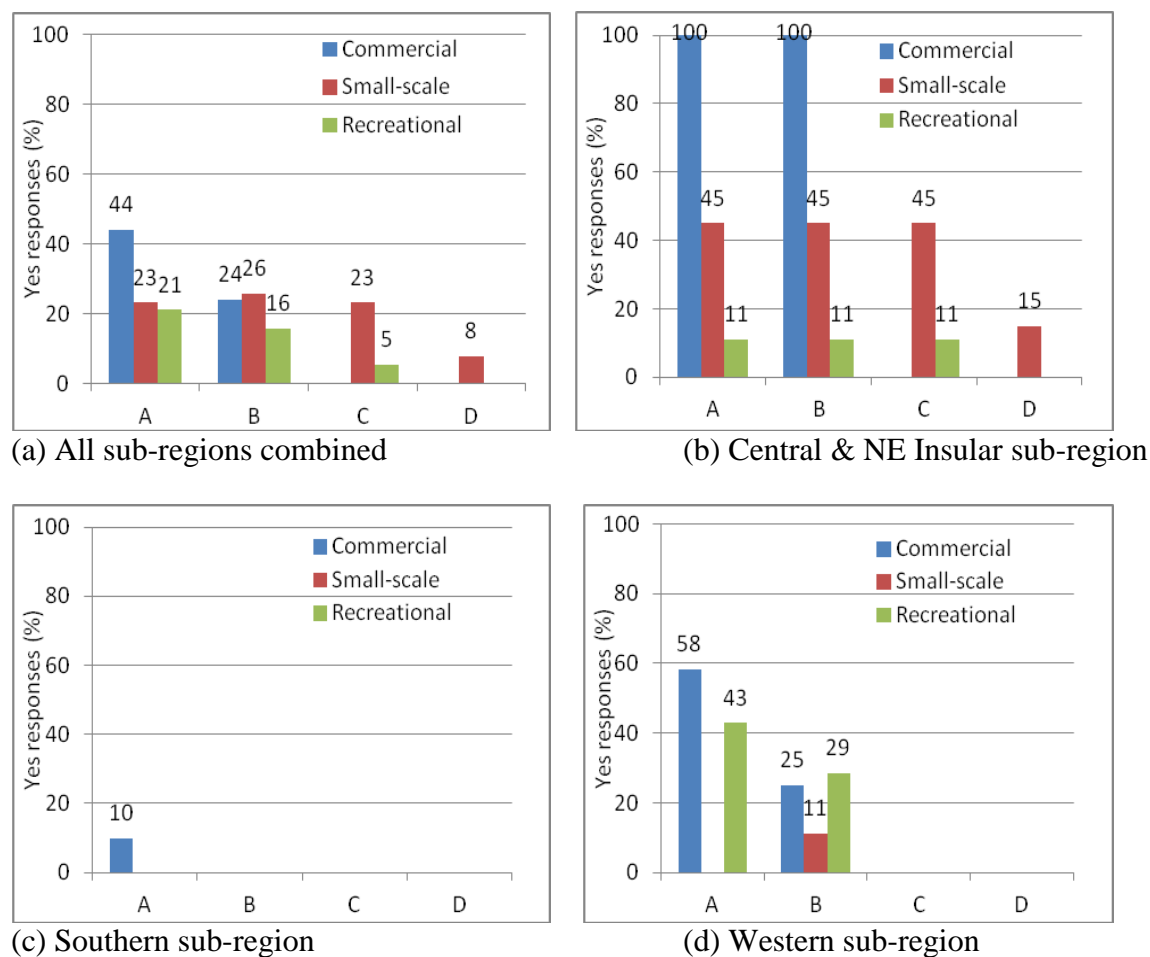
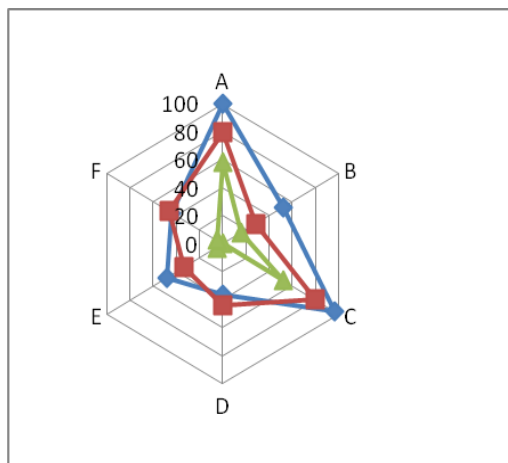


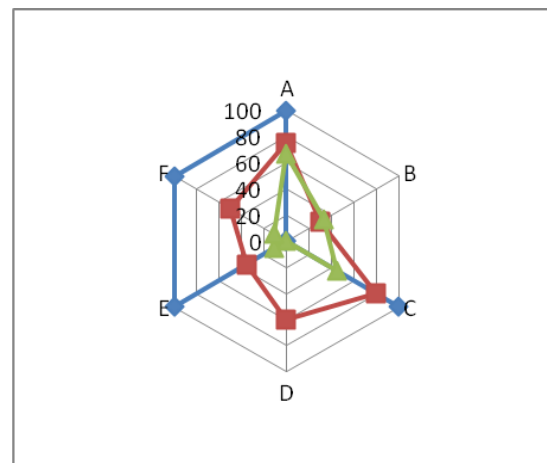
Figure 24. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of usage of fisheries management cost recovery sources provided for in national legislation covering the top three fisheries in each sub-sector: A - licence fees in the fishery; B - licence fees in other fisheries of the sub-sector; C - licence fees in other fisheries of other sub-sectors; D - resource rents. The information is illustrated for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (c) surveyed countries of the Western sub-region.

These mechanisms have not facilitated recovery of the full management costs. Hence in the commercial sub-sector, increasing costs of fisheries management were

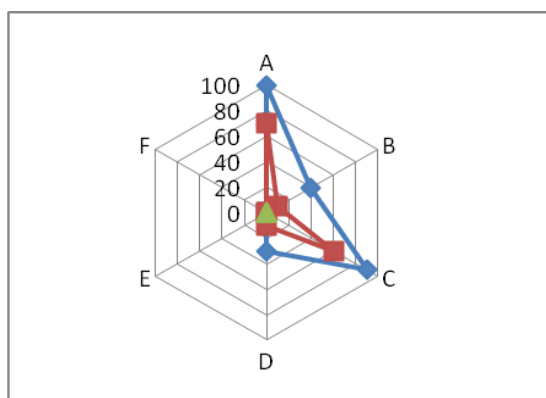
predominantly being funded by increased government spending (52% of 25 major fisheries) rather than through participants in the fishery (32%) or other sources (24%). Government funding was also primarily relied upon to cover increasing costs in the small-scale sub-sector: 28% from government, compared to 20% obtained through fishery participants. However, other sources were nearly as important as government funding for covering increasing costs in 27% of the 39 major small-scale fisheries identified. This trend was not apparent in the recreational sub-sector, with government funding at 12% of the 19 major fisheries identified, compared to 10% of fisheries receiving funding from participants and 9% of fisheries being covered also by other sources. In the commercial and small-scale fishery sub-sectors, 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, because fishery participants feel that they have no control, such participants 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.



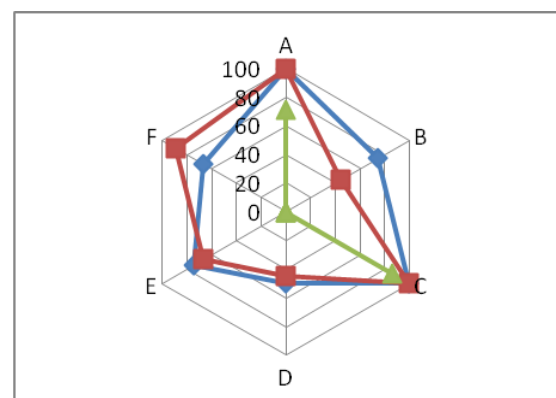
(a) All sub-regions combined



(b) Central & NE Insular sub-region



(c) Southern sub-region



(d) Western sub-region

Figure 25. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of reported participatory mechanisms in the major fisheries identified among the three sub-sectors (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 sub-regions combined; (b) surveyed countries comprising the Central and NE Insular sub-region; (c) surveyed countries comprising the Southern sub-region; (d) surveyed countries of the Western sub-region.

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 that 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).

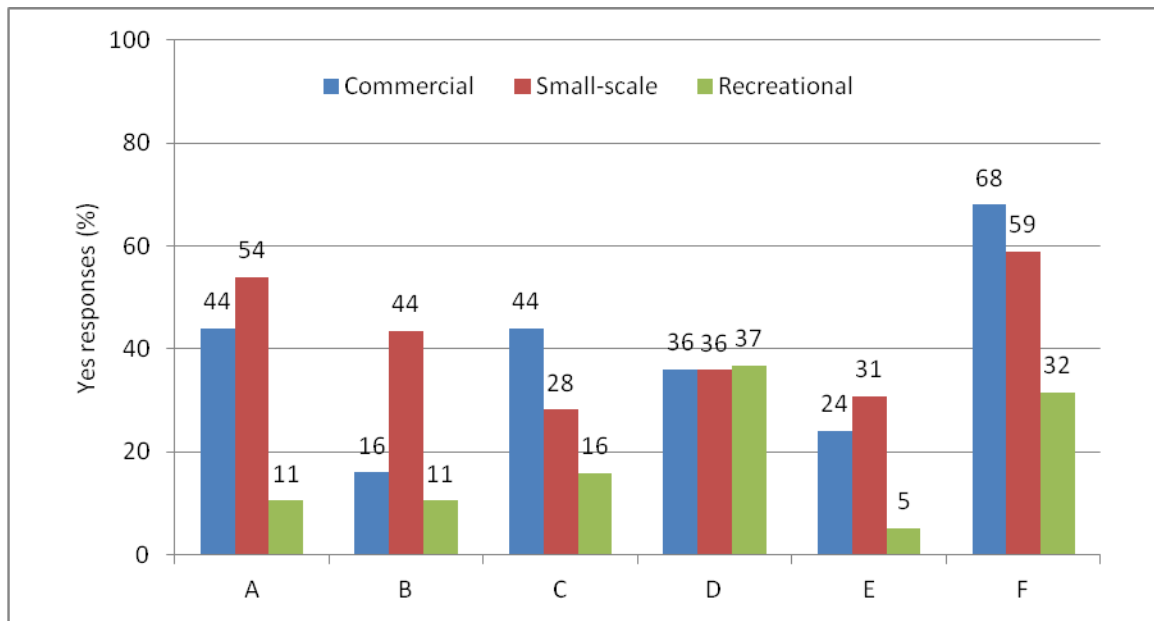
Overall, a formal definition of stakeholders in management plans was not common for the commercial fisheries, was less for small-scale fisheries and least for recreational fisheries. Generally, in all three major sub-sectors, efforts to engage stakeholders focused mostly on identifying such stakeholders 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% of the 25 major commercial fisheries and in 33% of the 39 major small-scale fisheries, but only 5% of major recreational fisheries. The success rate of the participatory approach, as currently practiced, in helping to reduce conflict was reported to be 44% and 46% for the commercial and small-scale sub-sectors respectively, while it was minimal for the recreational sub-sector (5% of major fisheries). In terms of creating incentives and reasons for stakeholders to voluntarily practice “responsible” fisheries stewardship, the success rate was highest for the small-scale sub-sector at 44%, followed by a 36% success rate for the commercial sub-sector. However, a 0% rate was reported in terms of incentives for voluntary stewardship among major recreational fisheries (Figure 25a).

Compared to 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 sub-region, where such fisheries are the most common and largest (Figure 25b). The achievements in stakeholder participation for the recreational sub-sector were also slightly better than the general regional picture in all aspects, except consultation where it was slightly less (44% of 9 major fisheries compared to 53% 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%. In the case of the 3 major commercial fisheries identified in only 1 country, there was a 100% success rate recorded for stakeholder identification, consultation, quickening the management process and conflict reduction.

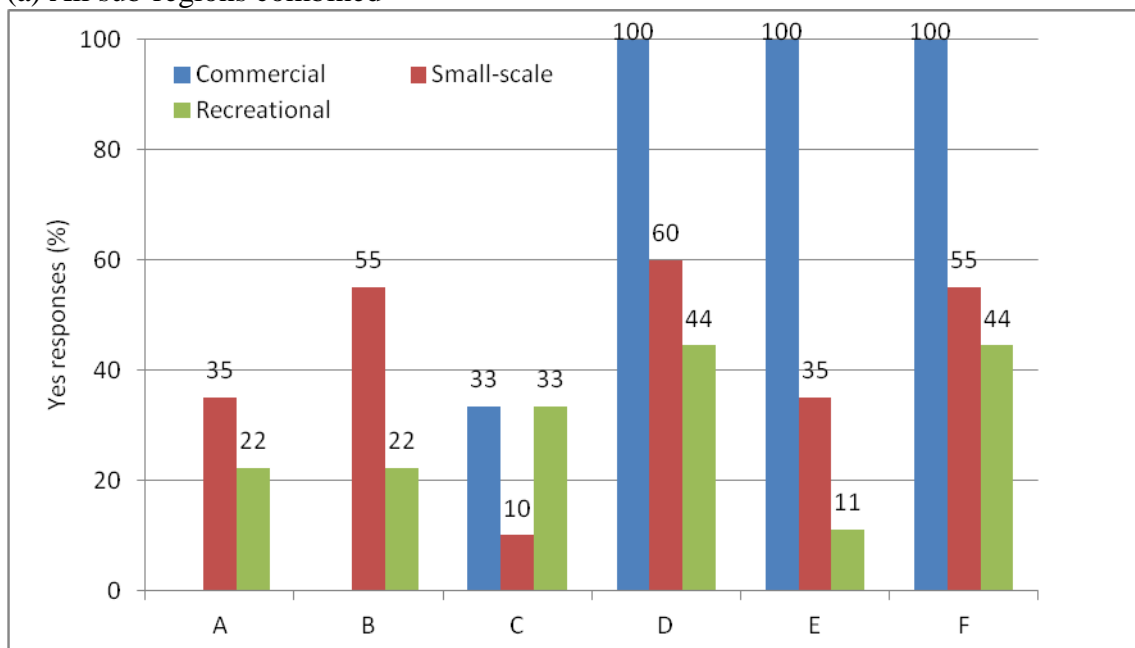
In the southern sub-region, participatory management achievements were more frequently reported only for stakeholder identification (100% of the 10 major commercial fisheries identified for the southern sub-region and 70% of the 10 major small-scale fisheries) and consultations (90% and 60% of the major commercial and small-scale fisheries respectively) (Figure 25c). Defining stakeholders in management plans and achieving voluntary stewardship were reported for about 40% and 30% respectively of the 10 commercial fisheries, with only a 10% success rate reported for both actions for the 10 small-scale fisheries. Additionally, no aspects of participatory management were apparently occurring to any measurable extent for the 3 major recreational fisheries identified in the southern sub-region (Figure 25c). It should be noted that in the southern sub-region, the performance levels for stakeholder involvement were usually less than the levels indicated for all sub-regions combined (overall regional levels), except for stakeholder identification performance in respect of the major commercial fisheries where it was equal.

Similar to the other sub-regions, stakeholder identification and consultation were most frequently practiced in the western sub-region (Figure 25d). These activities were taking place in all (100%) the 12 major commercial and 9 major small-scale fisheries. In the 7 major recreational fisheries, stakeholder identification had taken place in 71% of these fisheries, and consultations in 86% 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 the commercial and small-scale fisheries, with slightly higher frequencies noted for the commercial fisheries generally compared to the small-scale fisheries, except for conflict reduction where a higher success rate was noted for the small-scale fisheries. Besides stakeholder identification and consultation, other areas and benefits of participatory management were not reported for the recreational fisheries (Figure 25d). Compared to the performance levels for the various participatory approach indicators observed at the wider regional level for all sub-regions combined, the corresponding performance levels were usually higher in the western sub-region for all three major sub-sectors.

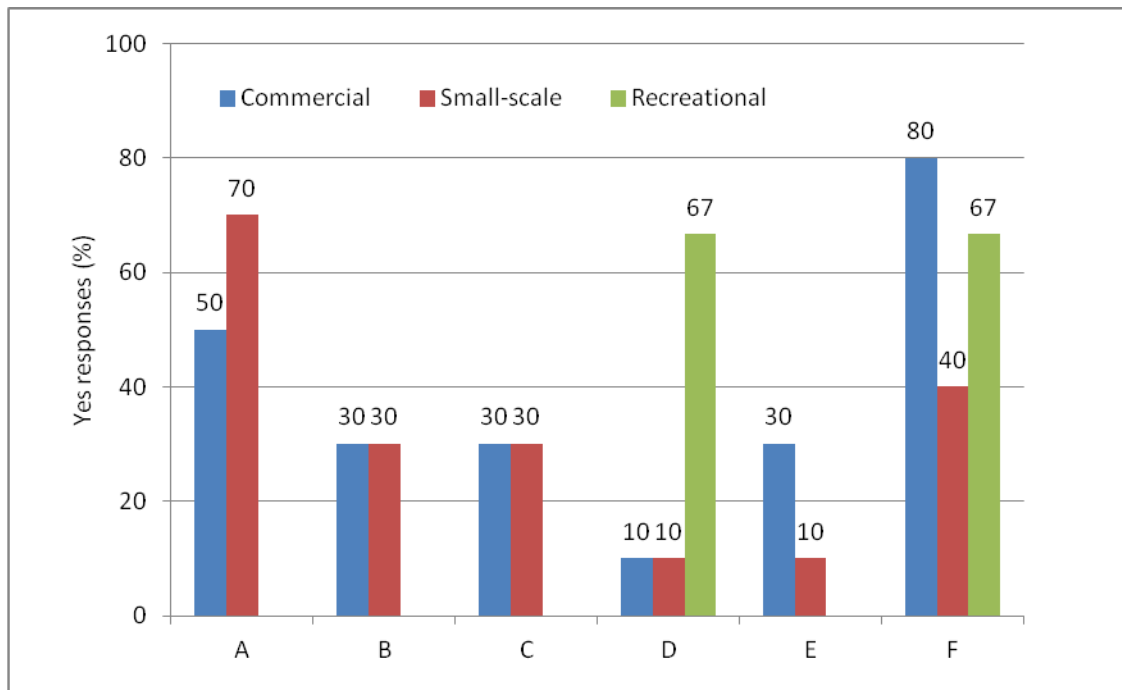
Generally, although it was found that participatory measures had assisted to reduce conflict within and among fisheries, conflicts were found to be increasing in 40%, 44%, and 21% of the 25 major commercial, 29 major small-scale and 19 major recreational fisheries respectively: decreases in conflict were reported in 24%, 21%, and 0% of cases respectively. Conflict within the commercial and small-scale sub-sectors appeared to be primarily the result of conflicts: with other fisheries (68% and 59% of the major fisheries respectively), with other types of vessels (44% and 54% of the major fisheries respectively), competition for use of the same sea areas (44% and 28% of the major fisheries respectively), competition among the same types of vessels in the particular case of the small-scale fisheries (44% of the major fisheries), (Figure 26a). The main source of conflict in the recreational fisheries was competition with other fisheries, commercial or otherwise.



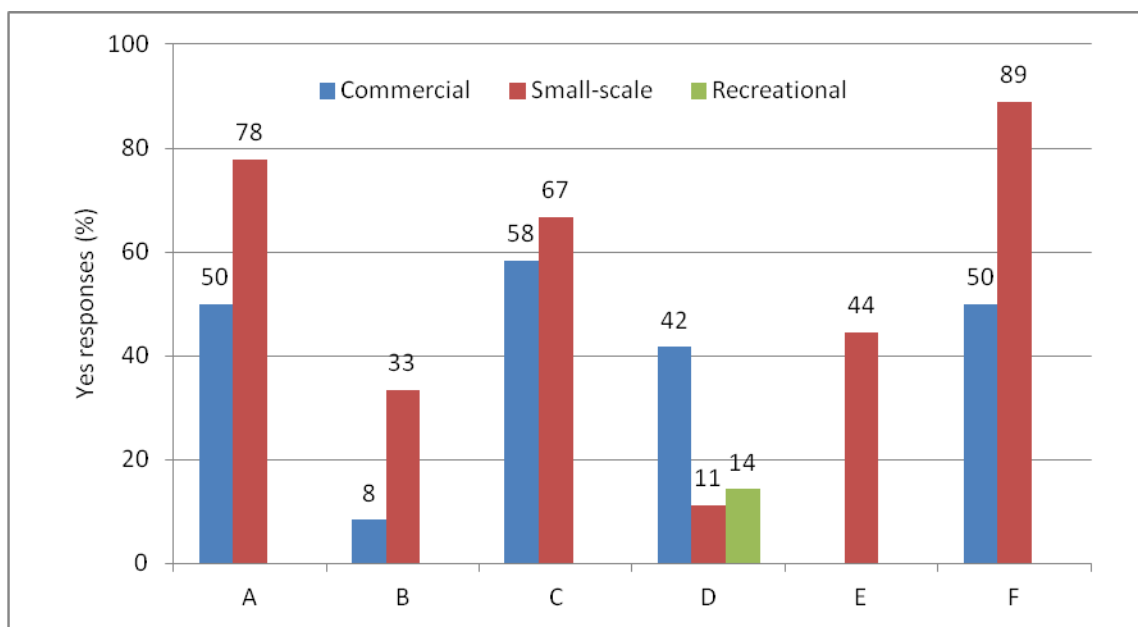
(a) All sub-regions combined



(b) Central & NE Insular sub-region



(c) Southern sub-region



(d) Western sub-region

Figure 26. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, 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 sub-sector; C - competition for gear deployment in the same area; D - between the commercial and recreational sub-sectors; E - with the other industries; F - with other fisheries. The information is illustrated for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

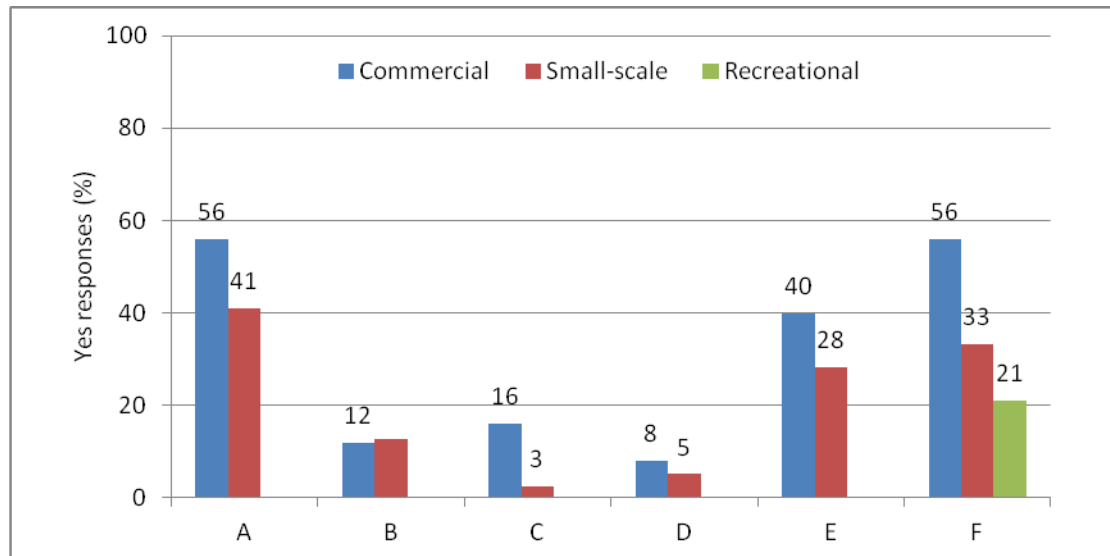
In the central and northeast insular sub-region where small-scale fisheries predominated, a variety of conflicts occurred with notable extent, with the most important sources of conflict being: competition between the small-scale and recreational fisheries (60% of 20 major fisheries), followed closely by both competition among the same types of vessels and with other fisheries in general (55% of major fisheries for both sources) (Figure 26b). Conflict with other industries was reported for 35% of the major small-scale fisheries, and for all 3 major commercial fisheries identified. Similar to the general regional pattern, conflict with other fisheries was prominent for the commercial and recreational sub-sectors (Figure 26b). In contrast to the general pattern, competition for use of the same sea areas was less of a problem in this sub-region for the commercial and small-scale sub-sector. For the recreational fishery, there were also some reported conflicts among the same and different vessels, and between the recreational fisheries and other industries.

Responding countries of the southern sub-region 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%), followed by competition between with different types of vessels (50%) (Figure 26c). In comparison, competition between different vessels was the most frequent problem (70%) for the 10 major small-scale fisheries, followed by competition between different fisheries (40%). Of the 3 major recreational fisheries in this sub-region, 67% experienced conflict with other fisheries only (Figure 26c).

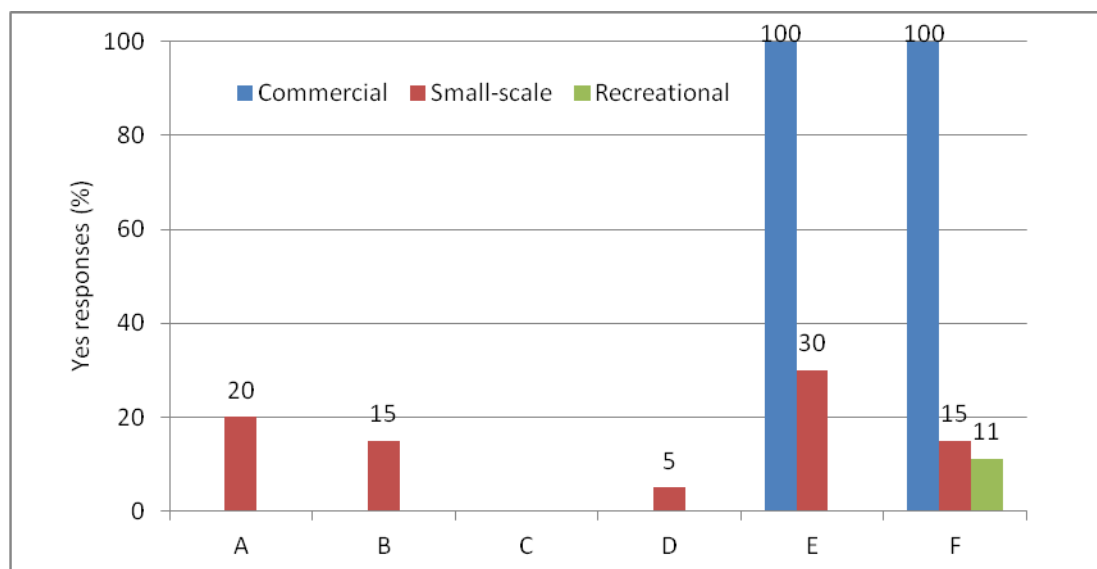
In the western sub-region, both the 12 major commercial and 9 major small-scale fisheries were experiencing similar sources of conflict, with the most important being: competition with other fisheries (50% and 89% of cases respectively), between different types of vessels (50% and 78% of cases respectively),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

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 the 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 sub-sectors) (Figure 27a). In the case of the recreational sub-sector, limited access was the only tool being applied. This general pattern was observed in the sub-regions also, with some notable differences. In the central northeast and insular region, education was used the most for the small-scale sub-sector (30% of major fisheries), which was also the largest sub-sector, while both education and limited access by fisheries was applied to all 3 major commercial fisheries identified by one country (Figure 27b). In the southern sub-region, education was used comparatively little compared to other sub-regions and only for the small-scale sub-sector (10% of major fisheries), while limited access was a relatively widely applied approach for the 3 major recreational fisheries identified (Figure 27c). Besides the more popular approaches already mentioned, the western sub-region reported notable use also of resource allocation within the fishery (33% of 12 major commercial fisheries and 11% of 9 major small-scale fisheries), followed by stock

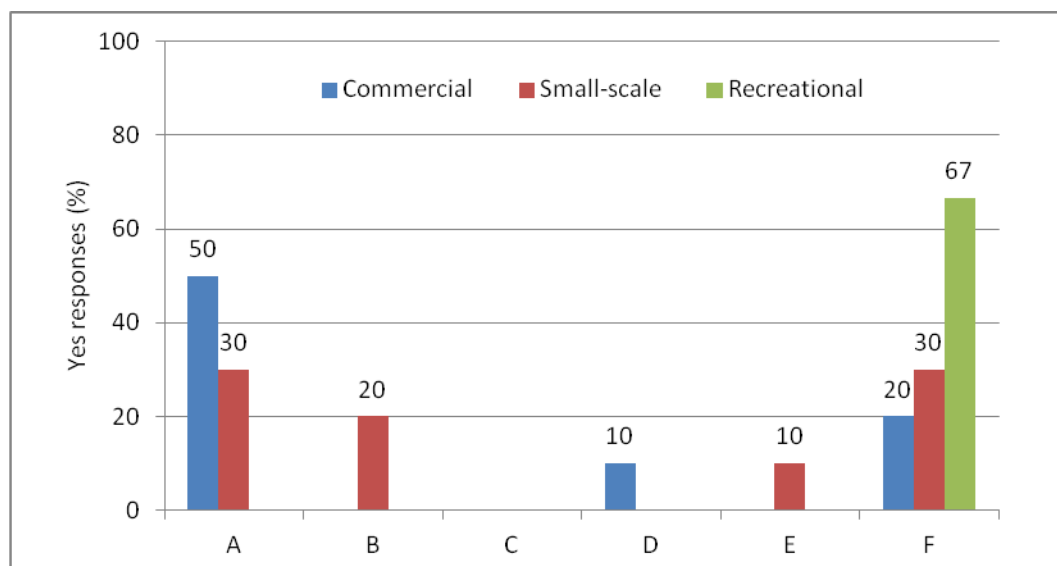
enhancement approaches (25% of the major commercial fisheries), and resource allocation between the fishery and other sectors (8% of major commercial fisheries and 11% of 9 major small-scale fisheries) (Figure 27d).



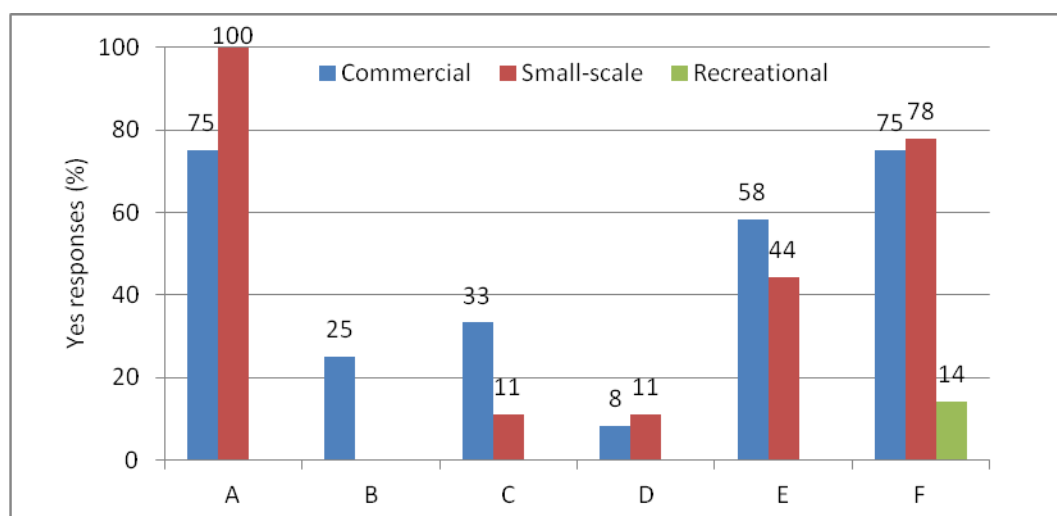
(a) All sub-regions combined



(b) Central & NE Insular sub-region



(c) Southern sub-region



(d) Western sub-region

Figure 27. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, 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 sub-sectors; E - education about sharing resource; F - limited access to certain areas for certain types of fishers. The information is illustrated for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

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).

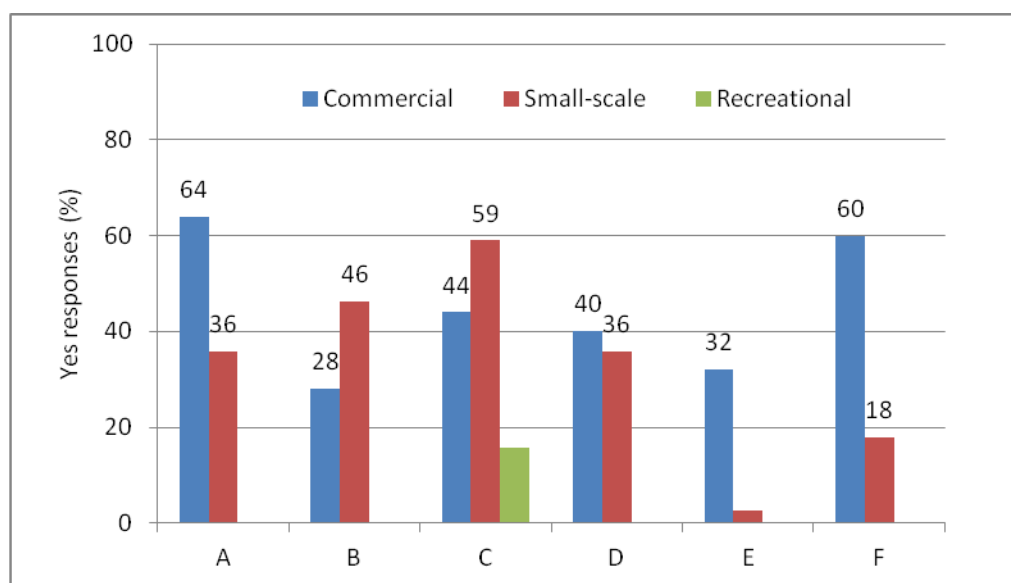
Among the major fisheries of the WECAFC region considered in the present study, fleet capacity was being measured in 64% of the 25 major commercial fisheries and 36% of the 39 major small-scale fisheries identified, but none of the recreational fisheries (Figure 28a). Across the region, overfishing was believed to be present in 28% and 46% of the major commercial and small-scale fisheries respectively. In terms of reported constant/ decreasing catch rates however, higher percentages of occurrence, compared to overfishing, were reported: 44%, 59% and 16% of the major commercial, small scale and recreational fisheries respectively. Despite a “sense” that overcapacity existed in 36-40% of the commercial and small-scale sub-sectors and even higher percentages of occurrence quoted earlier in respect of decreased/ constant catch rates, capacity reduction programmes were being applied with less frequency, especially to small-scale fisheries (only 3% of major fisheries). Additionally, regulations aimed at reducing fishing efforts impacts were indicated more often for commercial fisheries, even higher than the corresponding perceived levels of overcapacity and overfishing (60% of major fisheries), than were indicated for the small-scale fisheries (18% 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 sub-region where there was a predominance of small-scale fisheries, fishing capacity measurement was being conducted in 20% 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% of 20 major small-scale fisheries and 33% of 9 major recreational fisheries) compared to the reported confirmation of overfishing (35% of cases in the small-scale sub-sector and 0% of the major recreational fisheries) or sense of overcapacity (15% of major small-scale fisheries and 0% of major recreational). No capacity reduction programmes have been implemented for any fishery type. However, regulations to reduce fishing effort were identified for 20% of the small-scale fisheries, a figure comparable with the overcapacity indication level. All 3 commercial fisheries identified by one country were also subjected to regulations to reduce fishing effort (Figure 28b).

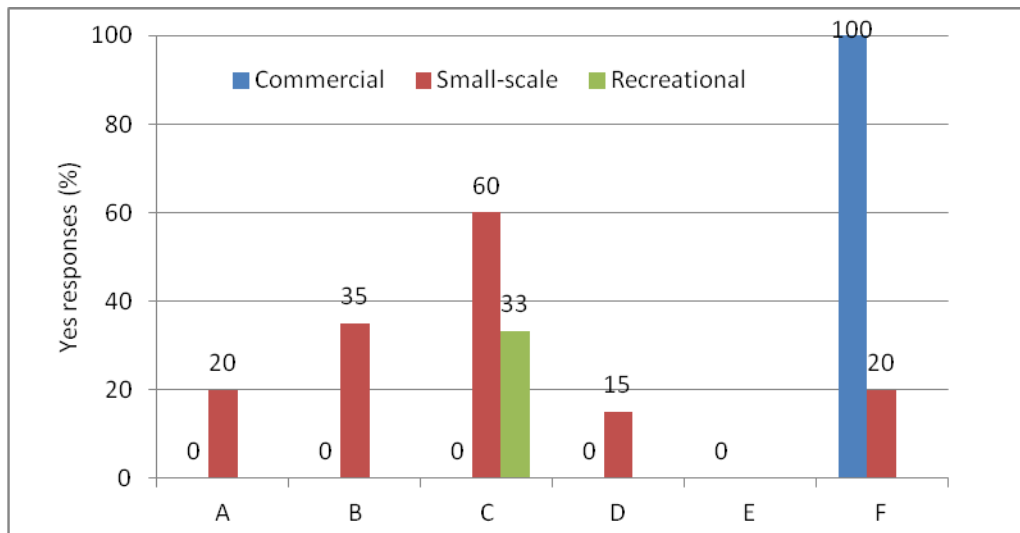
In the southern sub-region, the major commercial and small-scale fisheries reported similar levels of performance in respect of fishing capacity measurements, as well as perceived problems of overfishing and overcapacity (Figure 28c). However, the small-scale fishery was perceived to be experiencing a much higher incidence of constant or decreasing catch rates (60% of 10 major fisheries) compared to the major commercial fisheries (30% of 10 major fisheries). Despite this, capacity reduction programmes and regulations to reduce fishing effort were directed more frequently at the commercial fisheries (50% in each instance) than at the small-scale fisheries (10% in each instance). The situation within the recreational fisheries appeared to be unknown.

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

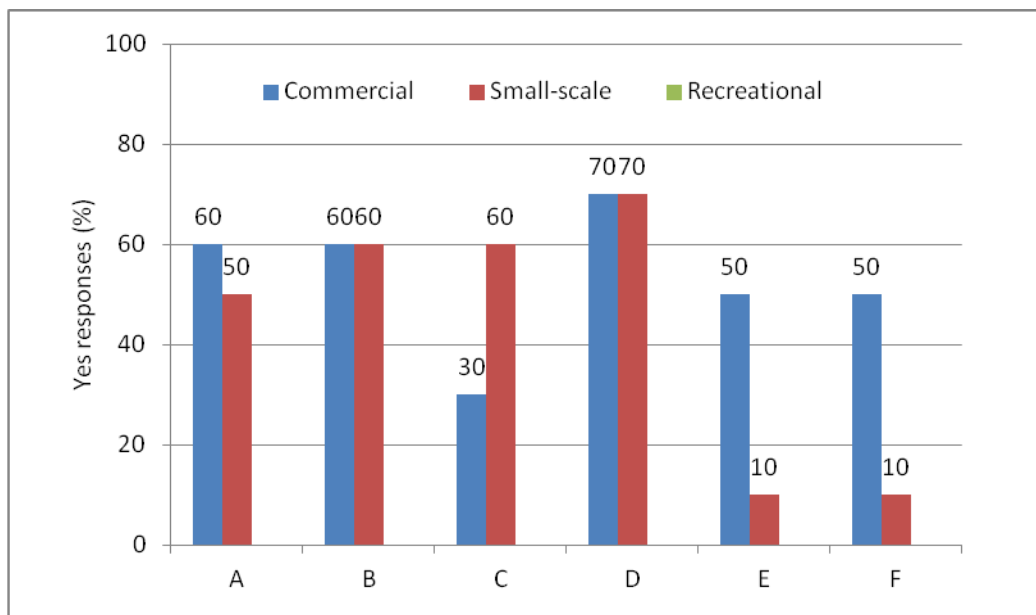
These trends suggest that, compared to the commercial fisheries, the small-scale fisheries have been posing real challenges with regard to fishing capacity measurement, as well as achieving fishing capacity and effort reductions. As small-scale fisheries can often include participants with lower income 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.



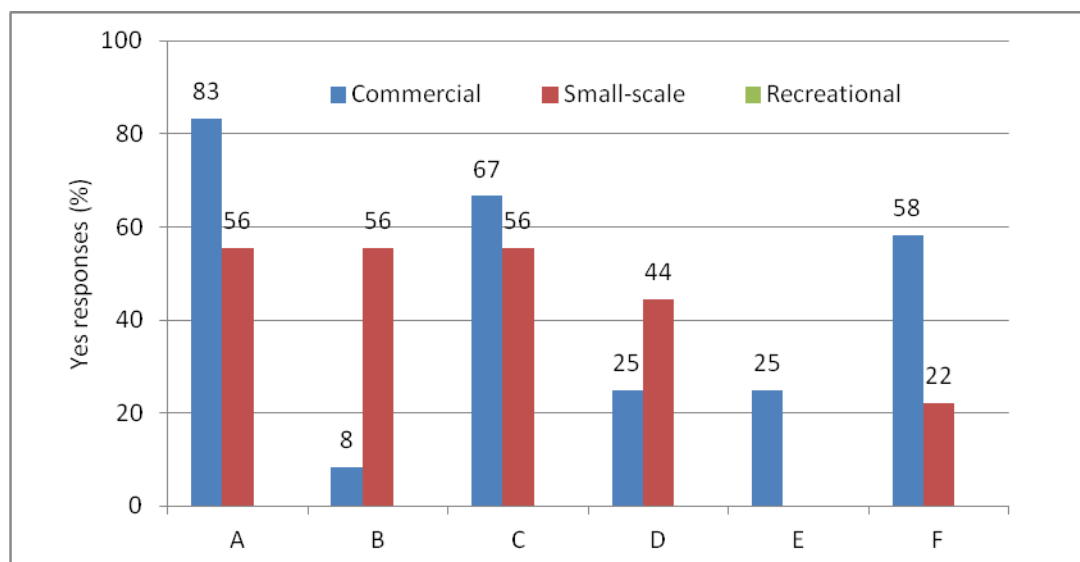
(a) All sub-regions combined



(b) Central & NE Insular sub-region



(c) Southern sub-region



(d) Western sub-region

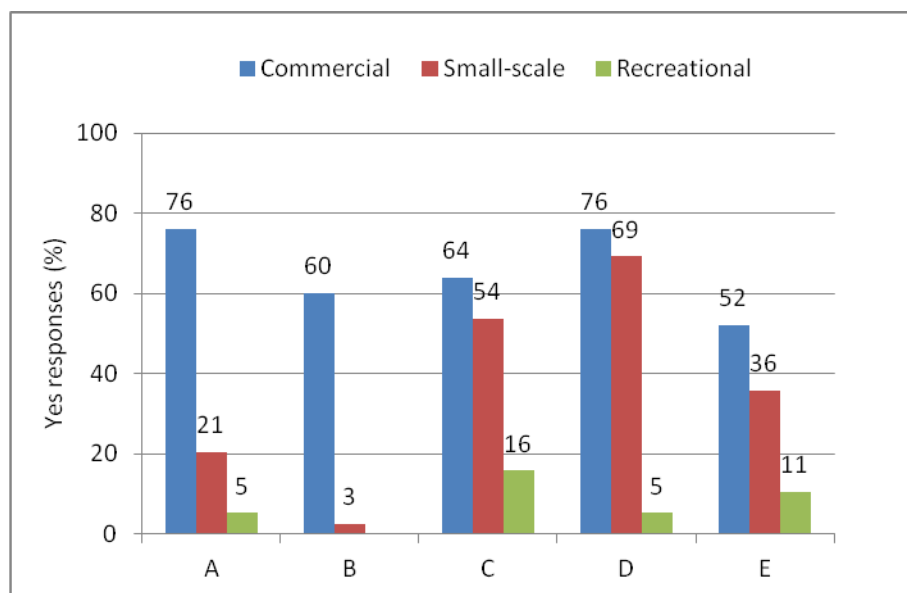
Figure 28. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of reported fishing capacity management indicators based on five questions asked of respondents: A - Is fleet capacity measured?; B - Does overfishing exist officially?; C - Is catch per unit area constant or decreasing?; D - Is there a sense that overcapacity exists?; E - Have capacity reduction programs been used?; F - Have regulations in last 2-3 years focused on reducing fishing effort or harvest? The information is illustrated for: (a) all sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries comprising the Western sub-region.

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

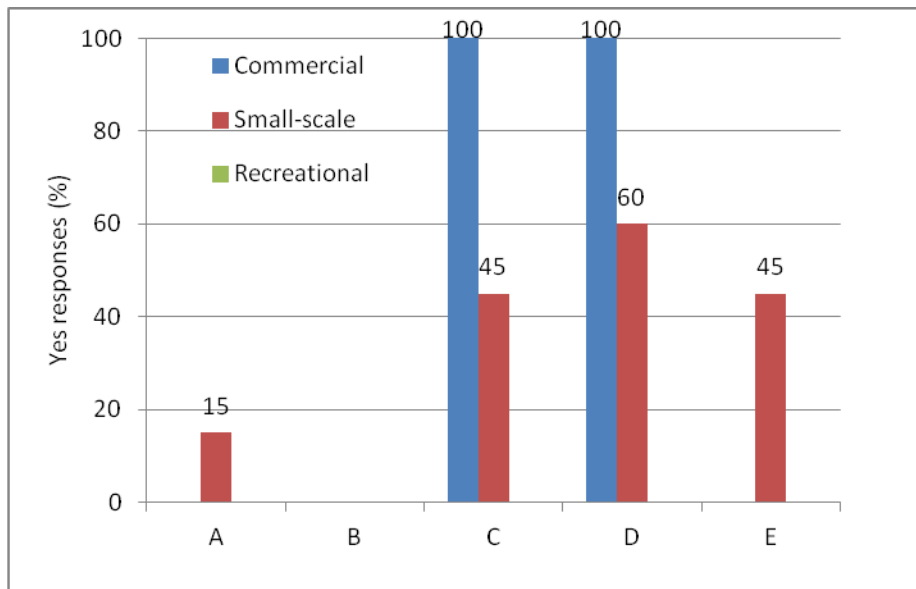
The pattern and frequency of the monitoring, control and enforcement mechanism applied in the central and northeast sub-region was the same as those already noted for the region in general, especially for the small-scale fisheries that dominate in this sub-

region (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 3 major commercial fisheries identified by one country in the central and northeast sub-region. Similarly, the tools for monitoring, control and enforcement in the southern sub-region were consistent with the general regional pattern. That noted, VMS was notably the most popular tool applied for the commercial fisheries (70% of the 10 major fisheries), and routine landing site inspections were the most popular for the small-scale sub-sector (60% of the 10 major fisheries). Additionally, VMS and routine landing site inspections were not used at all for the recreational fisheries in the southern sub-region (Figure 29c).

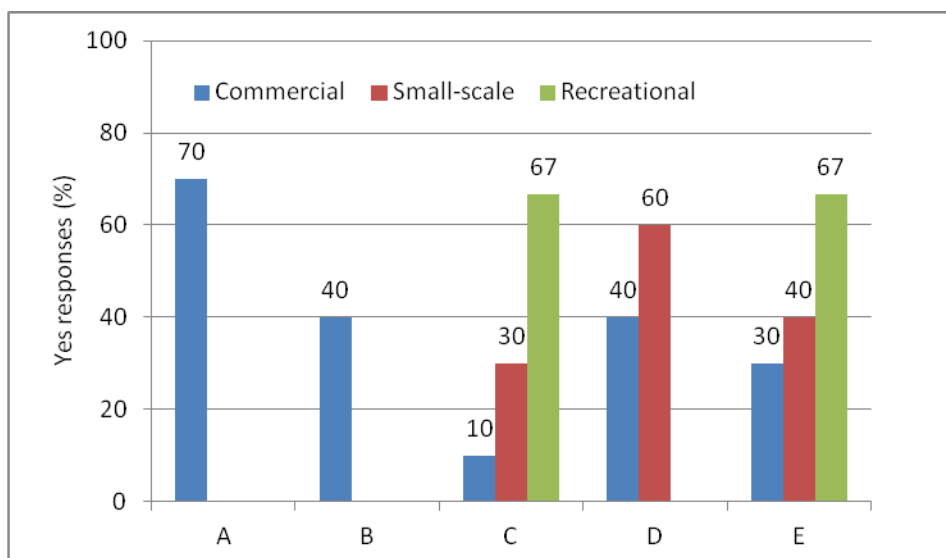
On the other hand, countries within the western sub-region reported a high level of usage of the full range of monitoring, control and enforcement tools for their commercial fisheries (Figure 29d). All 12 major commercial fisheries were using VMS and subjected to random dockside and routine landing site inspections, with the latter 2 tools applied also to all 9 major small-scale fisheries. VMS was also used for the small-scale and recreational fisheries more frequently than in the other two sub-regions (56% of 9 major small-scale fisheries and 14% of 7 major recreational fisheries respectively), while at sea boarding and inspections was used comparatively little for the small-scale fisheries (11% of cases) and not at all for the recreational fisheries (Figure 29d).



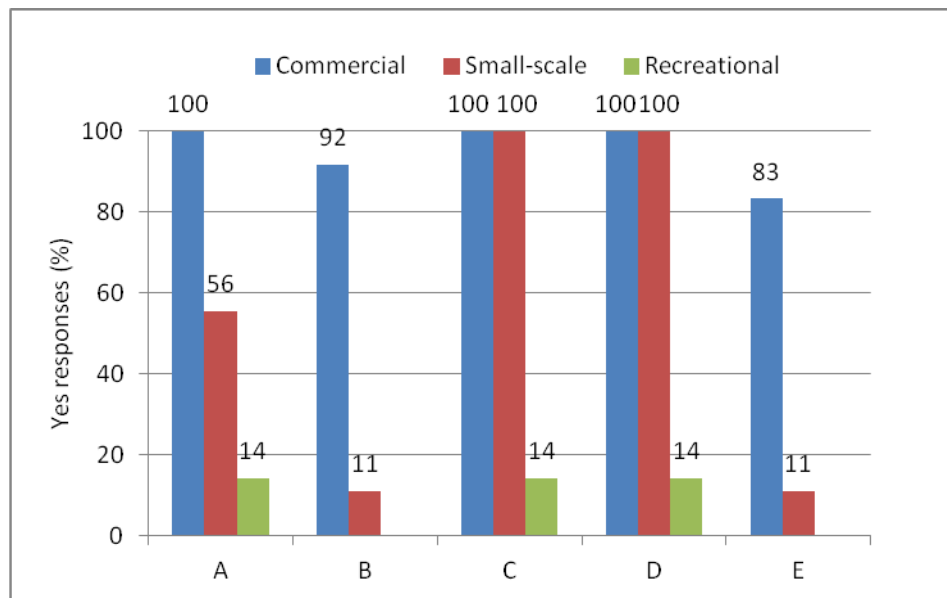
(a) All sub-regions combined



(b) Central & NE Insular sub-region



(c) Southern sub-region



(d) Western sub-region

Figure 29. Frequency (% of the total number of major fisheries identified by sub-sector and sub-region, as noted in Table 3) of compliance and enforcement mechanisms in use, by sub-sector: 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 sub-regions combined; (b) surveyed countries of the Central and NE Insular sub-region; (c) surveyed countries of the Southern sub-region; (d) surveyed countries of the Western sub-region.

STATUS OF STOCKS

In 2011, FAO published the latest version of the review of the State of the World Marine Fishery Resources, and separate chapters were devoted to fishery resources in the different FAO Statistical Areas (FAO, 2011). The WECAFC region 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 there were few quantitative and reliable stock assessments 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. 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 to over-exploited, while the status of others remained unknown. Only in 7 instances was there low uncertainty associated with the assessment results, suggesting that the data and information base for supporting fisheries management remained rather weak. Of course, assessment efforts had been directed at commercially important species such as the Atlantic menhaden (*Brevoortia tyrannus*), Gulf menhaden (*Brevoortia patronus*), Caribbean spiny lobster (*Panulirus argus*), queen conch (*Strombus gigas*), Atlantic Seabob (*Xiphopenaeus kroyeri*), northern brown shrimp (*Penaeus aztecus*) and round sardinella (*Sardinella aurita*). Moreover, most of the country-led assessments had been done for stocks fished by the USA (e.g. ASMFC 2010, Vaughan and Merriner 1991, Vaughan *et al.* 2007) Mexico, and

Venezuela (e.g. Mendoza *et al.* 1994, Gonzalez *et al.* 2000). Some other assessments, especially of Eastern Caribbean 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, FAO, 2000, FAO, 2001, FAO, 2010). In the case of several countries that were members of the Caribbean Regional Fisheries Mechanism (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 the International Commission for Atlantic Tunas and represented stock conditions that spanned beyond the WECAFC region (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 full or over-exploitation and 2 stocks considered to be below full exploitation. It should be noted though that Brazil was a major fishing country of only 5 of the stocks/ species groups occurring in Area 41: Argentine croaker (*Umbrina canosai*) and whitemouth croaker (*Micropogonias furnieri*) that were reported to be fully to over-exploited, Brazilian sardinella (*Sardinella brasiliensis*) that was reported to be over-exploited, 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 were 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 region, 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 queen 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 impacted sufficiently to have broad-scale impacts at the regional-scale ecosystem level. Additionally, 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 in the level of fisheries management performance being achieved in actual practice both at the national level and at the level of the WECAFC region, and particularly the data and information base supporting such management.

SUMMARY AND CONCLUSIONS

Countries 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.

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- 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 to 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, 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% of major commercial and small-scale fisheries respectively, but only 16% of major recreational fisheries had such plans.
 - Multi-species fisheries were common, but this 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% 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 email, 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% of countries had completed this task for all their marine capture fisheries, with other countries prevented from doing so, mostly due 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% of countries indicating that they had national level fisheries management plans, 38% having regulations governing national fisheries, and 25% supported by routine scientific monitoring. The corresponding performance levels for regional and local levels of management were generally less optimistic. Moreover, nearly 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 to comparatively much less to small-scale fisheries than to the 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 the 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 and 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 10 years, primarily due to increasing demands for monitoring and enforcement activities. Despite this, and the fact that an increasing number of fisheries were requiring 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 timeframes 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 have to include also 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 not only to establish but to adhere to a formal management process, which should involve establishment and implementation of management plans that identify prioritized objectives, activity steps and timeframes for completion and evaluation. This process should be carried out in partnership with all the relevant stakeholders, and the roles and responsibilities of all parties concerned should be identified in the management plans. If 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. Clearly, the management process would need 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 that were 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. Likewise, 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, if this is not yet so. Furthermore, 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 sub-sector, 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 warrant 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. Additionally, 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 impact fisheries management performance, whether from the biological/ecological or socio-economic standpoint. By this 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 loss of such opportunities.
- Public education and awareness – The work of the fishing industry should be promoted 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:

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, OSPESCA 2011, CRFM 2010b, FAO, 2012b), 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, 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 impacts on fisheries management, these provisions could be used to support the fisheries management process.

Participatory Approach:

The performance levels observed either 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; CLME, 2013, Fanning *et al.*, 2009, Fanning *et al.*, 2011). 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, CRFM 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 sector. Additionally, 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. If funds are restricted to employ permanent staff having such skills and expertise, then such could be accessed on a part-time basis as needed from other government ministries. Such an arrangement should be formalized of course, 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, CRFM 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; 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 by national fisheries authorities.

The 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 earlier will help to improve the management process, especially the education, 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 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 CARSEA (2007) initiative, and some efforts began during the Caribbean Large Marine Ecosystem Project (CLME 2013, McIvor 2012). 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 do 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 much 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 1

The top three fisheries, where these exist and have been identified, for each of commercial, small-scale, and recreational sub-sectors within the WECAFC countries. In some instances, the top fisheries were multi-species 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 (<i>Cynoscion</i> spp.)	Croaker (<i>Micropogonias furnieri</i> & <i>Micropogonias undulatus</i>)	Skipjack (<i>Katsuwonus pelamis</i> , <i>Auxis thazard</i> , and <i>Euthynnus alletteratis</i>)
Caribbean Netherlands	n.a	n.a	n.a
Colombia	Tuna (<i>Thunnus albacares</i> , <i>Thunnus obesus</i> , <i>Katsuwonus pelamis</i>)	Shallow water shrimp (<i>Litopenaeus</i> , <i>Farfantepenaeus</i> , <i>Xiphopenaeus</i> , <i>Trachypenaeus</i> , <i>Protrachypene</i> , <i>Solenocera</i> , <i>Heterocarpus</i> spp.)	Deep water shrimp (<i>Solenocera</i> spp., <i>Heterocarpus</i> spp.)
Dominica	n/a	n/a	n/a
Dominican Republic	Snapper	Grouper	Lobster
Mexico	Sardine	Shrimp	Tuna
Nicaragua	Caribbean spiny lobster (<i>Panulirus argus</i>)	Shrimp – Noted for Pacific & Caribbean coasts (<i>Farfantepenaeus</i> , <i>Litopenaeus</i> spp.)	Caribbean queen conch
Panama	Small pelagic	Tuna	Large pelagic species
St. Kitts and Nevis	n/a	n/a	n/a
St. Lucia	n/a	n/a	n/a
Suriname	Finfish	Seabob	Shrimp
Trinidad and Tobago	Trawl	Fishpot & line	Longline
Venezuela	Tuna	n.a.	n.a.

Note: 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	Caribbean spiny lobster
Aruba	Wahoo	Grouper	Snapper
Brazil	Stripped weakfish (<i>Cynoscion spp.</i>)	Seabob shrimp (<i>Xiphopenaeus kroieri</i>)	Spiny lobsters (<i>Panulirus argus</i> , <i>P. Laevicauda</i>)
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	Multi-species		
St. Kitts and Nevis	Coastal pelagic	Reef & bank	Conch
St. Lucia	Tuna	Dolphinfish	Wahoo
Suriname	Mixed species		
Trinidad and Tobago	Monofilament (transparent) gillnet	Fillet (green twine) gillnet	Live bait line fishing
Venezuela	turkey wing ark clam (<i>Arca zebra</i>)	Sardines (<i>Sardinella aurita</i>)	Blue crab (<i>Callinectes sp.</i>)

Note: 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	Billfishes, dolphinfish	n.a.	n.a.
Panama	Billfish	pelagic	bottomfish
St. Kitts and Nevis	Large pelagic	Reef	
St. 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	Large pelagics - Billfish	Large Pelagics - Dolphinfish, Wahoo, Serra Spanish mackerel, Tuna	n/a

Note: n/a = not applicable; n.a. = not available

Annex 1

Country Reports

These reports are available from the Secretariat upon request. They have not been inserted due to formatting difficulties.