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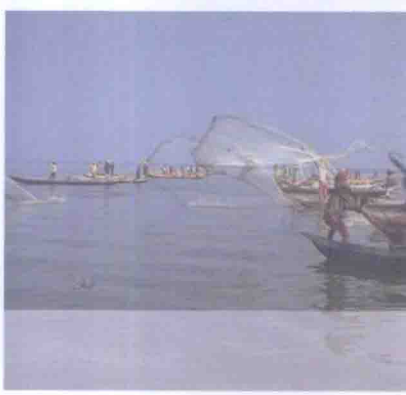
Coastal fisheries of Latin America and the Caribbean





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Dedication

This document is dedicated to the memory of our colleague and friend **Bisessar Chakalall**, former Fishery Officer in the Subregional Office for the Caribbean (SLC) and Secretary to the Western Central Atlantic Fishery Commission (WECAFC). Bisessar was an extraordinary human being who gave testimony to the values he believed in. He was brilliant and humble; dynamic and parsimonious; structured and spontaneous. He was an honest, generous and committed person. He had profound interest in understanding others, their culture and context, and a genuine interest in improving the well-being of fishing communities. Bisessar knew when to listen and when to speak out with his ideas and suggestions. He conducted himself with the passion and wisdom to intelligently explore life in all its dimensions. Bisessar was an excellent and unique friend. His human legacy remains in our hearts and minds.

Preparation of this document

The idea of preparing a state-of-the-art document examining the assessment and management of coastal fisheries in Latin America and the Caribbean grew naturally out of the CoastFish conference of 2004 (see www.mda.cinvestav.mx/eventos/Coastfish/english/welcome). This interdisciplinary conference, held in Mérida, Mexico, brought together individuals from many different institutions and organizations across the region, covering a wide range of perspectives, in order to contribute to a better understanding of coastal small-scale fisheries. The focus was on fishery assessment and management, taking into account biological, socio-economic and policy issues, aiming to examine the extent of information available for different countries and to identify the gaps in knowledge and management. The goal ultimately was to use this understanding to determine desirable directions for future fishery research, as well as governance and management approaches to moving towards sustainable fisheries in the region. This goal remains valid for this document as well.

This document has been prepared as an initiative of the editors – S. Salas, R. Chuenpagdee, A. Charles and J.C. Seijo – in cooperation with a strong set of authors writing about coastal fisheries in twelve countries across Latin America and the Caribbean. Writing and compilation of the document were supported by the European Union through the project Integrating Multiple Demands on Coastal Zones with Emphasis on Aquatic Ecosystems and Fisheries (INCOFISH). The Food and Agriculture Organization of the United Nations (FAO) coordinated the final proofreading, publishing and distribution. References in this document follow international bibliographic standards rather than FAO house style.

Abstract

The importance of fisheries for coastal communities and livelihoods in Latin America and the Caribbean (LAC) is well documented. This is particularly the case for 'coastal fisheries', including subsistence, traditional (artisanal) and advanced artisanal (or semi-industrial) varieties. There are, however, major gaps in knowledge about these fisheries, and major challenges in their assessment and management. Therein lies the key theme of this document, which seeks to contribute to a better understanding of coastal fisheries in the LAC region, as well as to generate discussion about ways to move towards sustainable fisheries. The document includes three main components. First, an introductory chapter provides an overview of general trends in the fisheries of the LAC countries, as well as some of the key challenges they are facing in terms of sustainability. Second, a set of twelve chapters each reporting on the coastal fisheries of one country in Latin America and the Caribbean, collectively covering fisheries of each main subregion: the Caribbean islands (Barbados, Cuba, Dominican Republic, Grenada, Puerto Rico, Trinidad and Tobago), North and Central America (Costa Rica, Mexico) and South America (Argentina, Brazil, Colombia, Uruguay). All these country-specific chapters follow an integrated approach, to the extent possible, covering aspects ranging from the biological to the socio-economic. Third, the final component of the document contains a synthesis of information from the countries examined, an analysis of the main issues and challenges faced by the various fisheries, an outline of policy directions to improve fisheries management systems in the LAC region, identification of routes toward more integrated approaches for coastal fisheries management, and recommendations for 'ways forward' in dealing with fishery assessment and governance issues in the region.

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Acknowledgements

This document is a product of collaboration among a wide range of scientists and researchers in Latin America and the Caribbean, who share common interests and concerns about coastal fisheries and the well-being of coastal communities in the region. We want to thank first the authors of the country-specific chapters in this document, who have continued to believe in the project of this document, and made strong efforts to gather the available information about coastal fisheries in their respective countries. Most of the contributors presented their initial results at the CoastFish conference. We are also grateful to conference participants who contributed to the discussion on existing assessment tools and management approaches – highlights of this discussion are included in this volume.

The document could have not been produced without funding from the European Union through the project Integrating Multiple Demands on Coastal Zones with Emphasis on Aquatic Ecosystems and Fisheries (INCOFISH) (Project No. INCO 003739). We also thank the Food and Agriculture Organization of the United Nations (FAO) for support at the publication stage. We thank Drs Rainer Froese and Silvia Opitz (INCOFISH), Dr Cornelia Naun (European Union), and Dr Kevern Cochrane (FAO) for their strong support and encouragement.

We are grateful to Kathryn Goetting, Carlos Zapata Araujo, Miguel A. Cabrera and Patricia González for their help with the translation, formatting and editing. Much appreciated as well are the patient efforts of Kevern Cochrane and Johanne Fischer at FAO in guiding the document through to publication, and of Maria Giannini and Michèle S. Kautenberger-Longo, also at FAO, for excellent proofreading and formatting. Finally, Anthony Charles acknowledges financial support from a research grant from the Natural Sciences and Engineering Research Council of Canada, and Ratana Chuenpagdee is grateful for financial support from the Social Sciences and Humanities Research Council of Canada and the Canada Research Chairs Program.

Preface

Along the coasts of Latin America and the Caribbean (LAC), fisheries are inherently complex – notably as a result of the heterogeneity of gears, boats and species, as well as the diversity of geophysical, bio-ecological and socio-economic characteristics. Coastal fishers in the region are especially vulnerable to the impacts of fisheries declines, given their livelihood and income dependence on local resources. Meanwhile, only limited technical and financial support exists for the assessment and management of coastal fisheries.

As a result, while the importance of coastal fisheries in the LAC region is clear, their assessment is highly challenging. Limitations in the knowledge base for coastal fisheries have become more and more evident. Within the environments in which coastal small-scale fisheries operate, data are typically lacking or relatively less available and, in particular, quantitative information is relatively sparse. For instance, while information about fisheries landings has regularly been gathered at a national level and aggregated to regional and global levels by international organizations like FAO, there is often no distinction made between landings from small-scale fisheries and from larger-scale commercial ventures. There are also gaps in knowledge about the various management methods used in the region. The shortfall between the information available and that needed for proper understanding of coastal fisheries makes it difficult to determine management schemes that can best fit the context of such fisheries.

We hope that this document represents a significant contribution to filling some of the many information gaps on fishery assessment and management in LAC coastal fisheries. Over the years, there have been remarkably few examinations of fisheries in the region, and certainly not many taking an integrated and broad-based perspective. This document can be seen as complementing past publications, such as those of FAO and the World Bank, among others, while also providing an integrated approach to examining fisheries of the region. We hope readers will find the volume useful, and that it might contribute both to increasing the attention paid to coastal small-scale fisheries across Latin America and the Caribbean and to identifying the ingredients for their successful management and their long-term sustainability.

The editors

Contents

1. Coastal fisheries of Latin America and the Caribbean region: issues and trends

Silvia Salas,* Ratana Chuenpagdee, Anthony Charles and Juan Carlos Seijo

Salas, S., Chuenpagdee, R., Charles, A. and Seijo, J.C. (eds). 2011. Coastal fisheries of Latin America and the Caribbean region: issues and trends. *In* S. Salas, R. Chuenpagdee, A. Charles and J.C. Seijo (eds). Coastal fisheries of Latin America and the Caribbean. *FAO Fisheries and Aquaculture Technical Paper*. No. 544. Rome, FAO. pp. 1–12.

1. INTRODUCTION

The importance of fisheries for coastal communities in Latin America and the Caribbean (LAC) has been highlighted in many forums and reports, including those of the Food and Agriculture Organization of the United Nations (FAO) and other development agencies such as the World Bank and the Organisation for Economic Co-operation and Development (OECD). Coastal and small-scale fishers often have considerable livelihood and income dependency on local resources – making them highly vulnerable to negative trends in the fisheries, such as declining catches and degrading habitats, and particularly to the risk of downturns and collapse (Staples *et al.*, 2004; World Bank, 2004; Bené *et al.*, 2007).

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These realities reinforce the importance of understanding, assessing and effectively managing coastal fisheries. This is the key theme of the document – to examine the various approaches and challenges arising in the assessment and management of coastal fisheries within the LAC region. For the purpose of this document, the term 'coastal fisheries' refers to three main types: subsistence fisheries, traditional fisheries (artisanal), and advanced artisanal (or semi-industrial) fisheries. The adaptability of fishers, which enables them to switch gears and target species, makes it difficult in some cases to differentiate among these three types, but broadly the main distinction made here is between coastal fisheries and industrial or recreational fisheries. Coastal fisheries tend to share certain features, such as high mobility of fishers, transboundary issues related to shared resources, high competition among user groups, seasonal use of resources, and multiple livelihoods (Beltran, 2005; Agüero and Claverí, 2007; Salas *et al.,* 2007; Chakalall *et al.*, 2007).

This volume strives to contribute to a better understanding of coastal fisheries in the region, in terms of their assessment and management, as well as to generate discussion about ways to move towards sustainable fisheries in the region. The heart of the document is a set of twelve chapters each reporting on the coastal fisheries of one country in the LAC region. Specifically, these 'country chapters' include information on the fisheries of each of the main subregions of Latin America and the Caribbean: the Caribbean islands (Barbados, Cuba, Dominican Republic, Grenada, Puerto Rico, Trinidad and Tobago), North and Central America (Costa Rica, Mexico) and South America (Argentina, Brazil, Colombia, Uruguay).

The twelve countries included in the document provide reasonable geographical coverage, but the information presented herein is certainly not exhaustive. The heterogeneity and complexity of coastal fisheries in the LAC region is clear, given its large number of countries and their diverse geophysical, bio-ecological and socio-economic characteristics. Accordingly, this document reflects only a sampling of the region's fisheries – but it does highlight many issues and challenges shared by fisheries in the region, especially regarding assessment and management. It also provides an analytical discussion and directions for future fishery research and management.

The document is organized into three main sections. In this introductory chapter we provide an overview of the general trends in the fisheries of the LAC countries as well as some of the key challenges they are facing in terms of sustainability.

Following this is the set of 12 'country chapters' described above, which present a range of contexts, and discuss common problems as well as particularities that illustrate the complexity of the fisheries in the region. All the country-specific chapters follow the same format, to the extent possible, in terms of content, ranging from biological to socio-economic information. The focus of each one varies, however, depending on key characteristics of the fisheries in the corresponding country, and the range of disciplines and specialization of the authors. Each also

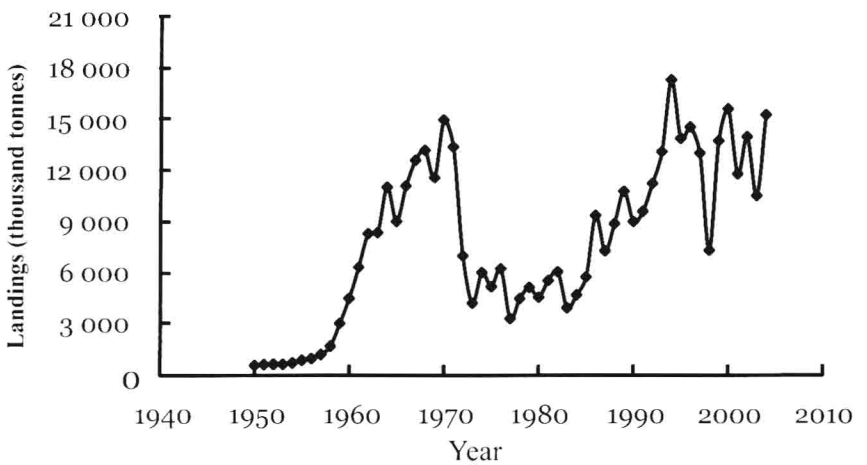
reflects the existing availability of information and the authors' judgements of issues that need to be discussed in order to improve assessment and management of coastal fisheries in the LAC region.

The final part of the document contains conceptual and analytical chapters, as well as concluding remarks. A synthesis of information from the twelve country chapters and an analysis of the main issues and challenges faced by each fishery are presented in Chapter 14. Then Chapter 15 outlines policy directions to improve fisheries management systems in the LAC region, and suggests how to move towards a more integrated approach to coastal fisheries management. The final chapter consolidates the lessons learned from discussions in the document, and provides recommendations for the ways forward in dealing with assessment and governance issues.

2. MAJOR TRENDS IN COASTAL FISHERIES OF LATIN AMERICA AND THE CARIBBEAN

Catch trends of the twelve countries covered in this document, as well as other key countries in the LAC region, show important fluctuations in the last five decades (Figure 1). Landings increased from 1960 to 1970 before dropping sharply; the recovery was gradual until it reached a peak in 1994. One of the main contributors of Latin America has been Peru, with close to 60% of landings. In addition to Peru, major contributors to the LAC region's fisheries are Chile, Argentina, Mexico, Brazil and the Bolivarian Republic of Venezuela. Countries from the Caribbean islands, despite small landings, receive important foreign exchange from their catches (Agüero and Claverí, 2007; Salas *et al.*, 2007).

FIGURE 1
Total landing trends of main countries that operate in the Latin America and Caribbean region



Source: Sea Around Us project database: www.seaaroundus.org.

The major contribution to the region's total landings comes from pelagic species landed by industrial fisheries. For example, the fluctuations in landings, such as the sharp rises in 1970, 1994 and 2000 and the declines in 1972, 1983 and 1994 were due largely to fluctuations on landings from purse seine fisheries in Peru and Chile. Also, high squid landings in these two countries in recent years contributed significantly to the total increase. Similar to Peru and Chile, catches from Mexico come mainly from purse seines (about 42% in 2004). On the other hand, in Argentina and Brazil, the majority of the landings come from trawling (about 72% and 50% of total country landings in 2004, respectively).

If we focus on coastal landings, by excluding from the data catches from gears operating mostly in offshore areas (i.e. bottom trawls, midwater trawls and purse seines), the contributions from Peru and Chile are reduced from 84% to about 44% of the total within our reference group of 14 countries. While this does not change the top five countries in Table 1, in terms of total landings, the importance of coastal fisheries becomes evident in countries like the Dominican Republic, Grenada, Puerto Rico, and Trinidad and Tobago, in each of which landings from gears used mostly in coastal waters exceed 50% of the total landings for that country (Table 1). Peru and Chile, on the other hand, provide far less of their catches from coastal fisheries, with landings from this sector contributing only about 2% and 9% respectively to the total for each country. Incidentally, these proportions are the lowest among the LAC countries examined here.

Mexico and most countries in Central America have fleets both on the Pacific and Caribbean coasts, and they are highly dependent on coastal fisheries, especially as a source of jobs and food. Reports by FAO (2000) for these countries indicate that catches appear to be higher on the Pacific than on the Caribbean coasts in most cases. In the latter, a lower volume seems to be compensated for by the capture of profitable species like conch, lobster and shrimp, among others, which contribute significant foreign currency to these countries. Total export of catches in the LAC region (excluding aquaculture) by the year 2001 was close to US$7 million; five countries made up 73% of this contribution (Agüero and Claverí, 2007).

Accurate figures on fishing effort in coastal fisheries of the LAC region are generally not available, and when they do exist there is typically a shortage of consistent information. Even though catch records began in the 1950s in some countries, information on fishing effort started to be collected much later. Such data are important in the evaluation of fishing capacity and labour capacity relative to catch trends. In general, the number of people involved in fishing and fish farming has more than doubled in the last three decades (FAO, 2006a; Salas *et al.*, 2007), with many of these people entering the coastal fisheries industry. In contrast to global trends (Figure 1), it is evident when evaluating landings only from coastal fisheries that between the early 1970s and the mid-1990s there was an increasing trend in catches in South America, with a declining trend after this period (Figure 2). In the Caribbean, the trend has been generally upward for three decades, afterward a sharp decline has changed the general trend.

TABLE 1

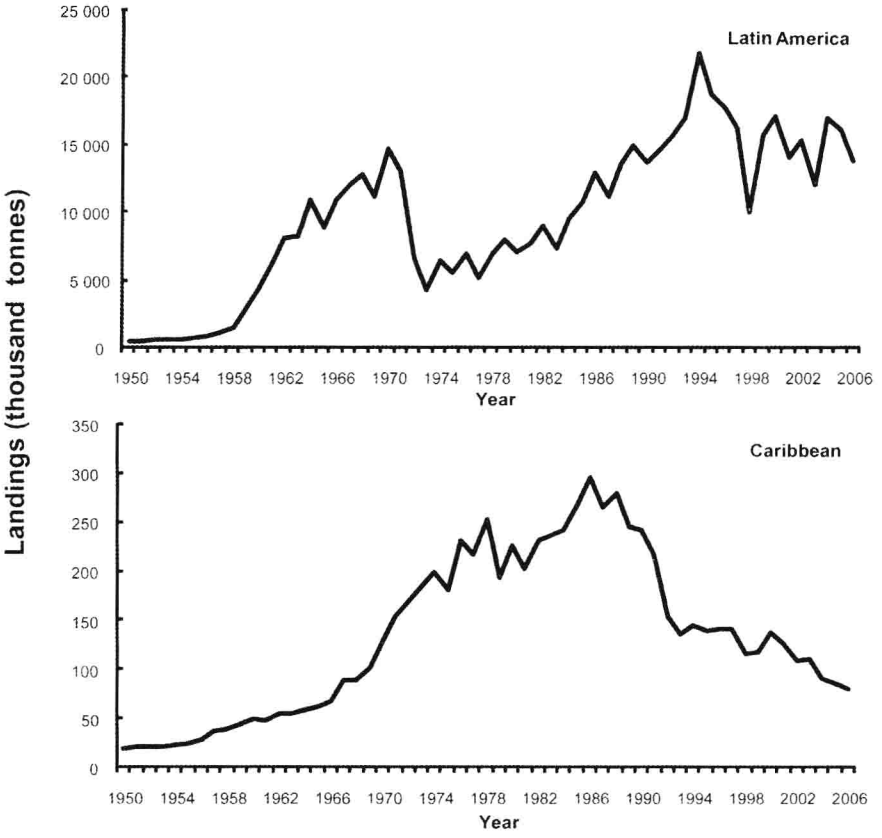
Catches for those countries included in this document plus Peru and Chile in 2004. Total landings integrate catches from all gears[1] and landings from 'coastal gears'[2] include all gears except bottom trawl, mid-water trawl and purse seines

Country	Total landings for all gears ('000 tonnes)	% of total landings of all listed countries	Landings from 'coastal gears' only (tonnes)	% of coastal landings in total for the country
Peru	9 611.94	52.68	151.27	1.57
Chile	5 317.31	29.14	492.18	9.26
Mexico	1 286.57	7.06	134.60	10.46
Argentina	945.94	5.18	187.36	19.81
Brazil	746.21	4.09	130.66	17.51
Colombia	124.95	0.68	13.82	11.06
Uruguay	122.98	0.67	15.38	12.51
Cuba	36.14	0.20	16.21	44.85
Costa Rica	20.85	0.11	3.64	17.46
Dominican Republic	14.22	0.08	7.28	51.20
Trinidad and Tobago[1]	10.03	0.06	5.10	50.84
Puerto Rico	6.12	0.03	3.50	57.18
Barbados[1]	2.14	0.01	0.92	43.00
Grenada[1]	2.03	0.01	1.80	89.00

Source: [1] FAO (2004: http://www.fao.org/fishery/geoinfo/en); [2] data from Sea Around Us, 2004 (www.Seaaroundus.org) adapting FAO data.

As in other parts of the world, the expansion in catches in the LAC region has been due to technological development and an increase in the size of the fleet, an expansion of the fishery workforce, exploration of new fishing grounds, and related impacts of government financial transfers (FAO, 2006a; OECD, 2006; Gréboval, 2007). In the last decade, in many of these countries the most important resources are considered to be at their maximum level of exploitation (World Bank, 2004; FAO, 2006b; Agüero and Claverí, 2007). Despite this situation, the status of many fisheries in the region is poorly known. Agüero (1992) states that one of the problems these countries face has been the lack of consistency in the way catches have been recorded and fisheries analysed. Fisheries institutes in many of these countries were created in the 1960s to conduct research, but they have not achieved sufficient technical capacity (human and logistic) due to limited financial support (Agüero and Claverí, 2007).

FIGURE 2
Landing trends of coastal fisheries by area from main countries that operate in Latin America and the Caribbean



Source: Sea Around Us project database (www.seaaroundus.org).

3. FACTORS AFFECTING SUSTAINABILITY OF LAC COASTAL FISHERIES

Many factors have contributed to the unsustainability of fisheries, and these in turn have led to excess capacity (Gréboval, 2002; Swan and Gréboval, 2004; Gréboval, 2007). These factors include: (i) a lack of solid governance structures; (ii) fishery complexities, incomplete knowledge and the associated uncertainties; (iii) inadequate incentives and subsidies that stimulate overcapacity; (iv) stock fluctuations due to natural causes; (v) growing demand for limited fish resources; and (vi) poverty and a lack of alternatives for coastal development. These factors are examined below as well as throughout the document.

3.1 Fisheries complexities

Scientific literature and public media have extensively reported problems that fisheries in many areas of the world are facing. While it is generally known that overexploitation, habitat degradation and unintended catches and discards are common causes of such crises, their effects on the ecosystem and the economy of the nations involved, especially in the context of coastal fisheries, are not always properly addressed. This is due mainly to the complexity of these fisheries, which makes assessment and management difficult (Cochrane, 1999; Mahon *et al.*, 2008, 2009). For instance, many coastal fishers switch among alternative fishery resources using various fishing gears throughout the year, making it difficult to determine fishing effort. Some fishers engage in other occupations such as tourism, salt mining or aquaculture to supplement their fisheries income. As coastal areas around the world continue to attract migrants, conflicts between various uses of coastal resources accelerate and consequently affect the livelihoods of the coastal communities. Balancing between uses and conservation in coastal areas has thus become more challenging, especially when information to foster comprehensive understanding of those fisheries is insufficient.

3.2 Growing demand for scarce resources

In the last few decades the increase in food consumption has been oriented to protein intake in many countries, especially in Europe and Asia. This trend has been favoured by an improvement in food technology which has provided added value to diverse products including those coming from the sea. According to FAO, the per capita consumption of fish in the world has increased from 9 kg in 1961 to 16.5 kg in 2003 (FAO, 2006b). Even though consumption in developing nations is lower than that of developed nations, the market still offers incentives to enter the fishing industry. The increase in tourism in coastal areas also keeps up the demand for marine products.

An increase in coastal population has resulted in steeper competition for a reduced level of resources. At the same time, degradation of habitats from the expansion of different activities along the coast has had an impact on the corresponding ecosystems, on their resources, and on the people depending on them.

The sharp rise in fisheries production outlined above has been caused by many factors, including uncontrolled capacity in the industry, technological improvements, an increase in demand for seafood, and a lack of governance. A general pattern of overcapacity and resource degradation has been reported in countries from the LAC region (Ehrhardt, 2007; Ormaza, 2007; Salas *et al.*, 2007; Vasconcellos *et al.*, 2007; Wosnitza *et al.*, 2007). It is important to note that while some general patterns can be observed in the whole LAC region, the situation in each country is context specific, and an understanding of the issues and challenges faced in each location, taking into account particular geopolitical conditions, could provide useful insights for the whole region (Agüero and Claverí, 2007; Chakalall *et al.*, 2007). This, we hope, will be one key outcome of this document.