

# Cage aquaculture

Regional reviews and global overview



**Cover photo:**

Large salmon cages in the Reloncavi Fjord in southern Chile. D. Soto/FAO.

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Regional reviews and global overview

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Edited by

**Matthias Halwart**

Fishery Resources Officer (Aquaculture)  
Aquaculture Management and Conservation Service  
FAO Fisheries and Aquaculture Department  
Rome, Italy

**Doris Soto**

Senior Fishery Resources Officer (Aquatic Resource Management)  
Aquaculture Management and Conservation Service  
FAO Fisheries and Aquaculture Department  
Rome, Italy

and

**J. Richard Arthur**

FAO Consultant  
Barriere  
British Columbia, Canada

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## Preparation of this document

This document contains nine FAO commissioned papers on cage aquaculture including a global overview, one country review for China, and seven regional reviews for Asia (excluding China), northern Europe, the Mediterranean, sub-Saharan Africa, Latin America and the Caribbean, northern America and Oceania. The content of the papers is based on the broad experience and sound knowledge of the authors with advice and help received from many experts and reviewers around the globe. The papers were presented to a distinguished audience of some 300 participants from over 25 countries during the FAO Special Session on Cage Aquaculture – Regional Reviews and Global Overview at the Asian Fisheries Society (AFS) Second International Symposium on Cage Aquaculture in Asia (CAA2), held in Hangzhou, China, from 3 to 8 July 2006.

The commissioning of the papers and the presentations at the FAO Special Session were organized by the Aquaculture Management and Conservation Service (FIMA) of the FAO Fisheries and Aquaculture Department and financially supported by regular as well as extra-budgetary programme funds, specifically the Japanese Trust Fund Programme Towards Sustainable Aquaculture: Selected Issues and Guidelines and the Global Partnerships for Responsible Fisheries (FAO FishCode Programme).

Many colleagues from the FAO Fisheries and Aquaculture Department as well as from the FAO Subregional and Regional Offices have contributed to this publication with their expertise and time which is gratefully acknowledged. Particular thanks are due to the current AFS President, Dr Chan-Lui Lee, whose initiative and support have made CAA2 a success.

The final revisions and inputs for the papers were provided by the technical editors, M. Halwart, D. Soto and J.R. Arthur.

## Abstract

Cage aquaculture has grown rapidly during the past decades and is presently undergoing swift changes in response to pressures from globalization and an escalating worldwide global demand for aquatic products. There has been a move toward clustering existing cages as well as toward the development and use of more intensive cage-farming systems. In particular, the need for suitable sites has resulted in cage aquaculture accessing and expanding into new untapped open-water culture areas such as lakes, reservoirs, rivers and coastal brackish and marine offshore waters.

This report aims to assess the current situation and the future prospects of cage aquaculture around the globe. It is organized into nine chapters including a global overview and eight reviews covering China, Asia (excluding China), northern Europe, the Mediterranean, sub-Saharan Africa, Latin America and the Caribbean, North America and Oceania. The report recognizes the tremendous importance of cage aquaculture today and its key role for the future growth of the aquaculture sector. Each review, by geographic region, informs about the history and origin of cage aquaculture; provides detailed information on the current situation; outlines the major regional issues and challenges; and highlights specific technical, environmental, socio-economic and marketing issues that cage aquaculture faces and/or needs to address in the future. The global overview discusses trends in cage aquaculture based on the most recent and complete data available; summarizes the information on cultured species, culture systems and culture environments; and explores the way forward for cage aquaculture, which offers especially promising options for multitrophic integration of current coastal aquaculture systems as well as expansion and further intensification at increasingly offshore sites.

**Halwart, M.; Soto, D.; Arthur, J.R. (eds.)**

Cage aquaculture – Regional reviews and global overview.

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# Contributors

## Cage aquaculture: a global overview

- Albert G.J. Tacon Aquatic Farms Ltd  
49–139 Kamehameha Hwy, Kaneohe, HI 96744, United States of America
- Matthias Halwart Fisheries and Aquaculture Department, FAO, Rome 00153, Italy

## A review of cage aquaculture: Asia (excluding China)

- Sena S. De Silva Network of Aquaculture Centres in Asia-Pacific  
PO Box 1040, Kesetsart Post Office, Bangkok 10903, Thailand
- Michael J. Phillips Network of Aquaculture Centres in Asia-Pacific  
PO Box 1040, Kesetsart Post Office, Bangkok 10903, Thailand

## A review of cage and pen aquaculture: China

- Jiixin Chen Yellow Sea Fisheries Research Institute, Qingdao, China
- Changtao Guang Yellow Sea Fisheries Research Institute, Qingdao, China
- Hao Xu Fishery Machinery and Instrument Research Institute, Shanghai, China
- Zhixin Chen Fishery Machinery and Instrument Research Institute, Shanghai, China
- Pao Xu Freshwater Fisheries Research Institute, Wuxi, China
- Xiaomei Yan Freshwater Fisheries Research Institute, Wuxi, China
- Yutang Wang National Station of Aquaculture Technical Extension, Beijing, China
- Jiafu Liu Ningde Large Yellow Croaker Association, Ningde, Fujian Province, China

## A review of cage aquaculture: Latin America and the Caribbean

- Alejandro Rojas Aquaculture Resource Management Limitada  
Traumen 1721, Casilla 166, Puerto Varas, Chile
- Silje Wadsworth Bluefin Consultancy, N-4310, Hommersåk, Norway

## A review of cage aquaculture: North America

- Michael P. Masser Department of Wildlife and Fisheries Sciences  
Texas A&M University, College Station, Texas, United States of America
- Christopher J. Bridger Aquaculture Engineering Group Inc.  
73A Frederick Street, St. Andrews, New Brunswick, E5B 1Y9, Canada

## A review of cage aquaculture: northern Europe

- Jon Arne Grøttum Norwegian Seafood Federation, PB 1214, N-7462 Trondheim, Norway
- Malcolm Beveridge WorldFish Center, PO Box 1261, Maadi, Cairo, Egypt

## A review of cage aquaculture: Mediterranean Sea

- Francesco Cardia Via A. Fabretti 8, 00161 Rome, Italy
- Alessandro Lovatelli Fisheries and Aquaculture Department, FAO, Rome 00153, Italy

### A review of cage aquaculture: sub-Saharan Africa

Patrick Blow                      Lake Harvest, Box 322, Kariba, Zimbabwe  
Shivaun Leonard                68 Jones Circle, Chocowinity, NC 27817, United States of America

### A review of cage aquaculture: Oceania

Michael A. Rimmer            Queensland Department of Primary Industries and Fisheries  
Northern Fisheries Centre, PO Box 5396, Cairns, Queensland, Australia  
Benjamin Ponia                Secretariat for the Pacific Community  
B.P. D5 98848, Noumea Cedex, New Caledonia

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**D. Soto** (pages 72 top, 101 top and 101 bottom)

## Foreword

The cage aquaculture subsector has grown very rapidly during the past 20 years and is presently undergoing rapid changes in response to pressures from globalization and a growing global demand for aquatic products. Recent studies have predicted that fish consumption in developing and developed countries will increase by 57 percent and 4 percent, respectively. Rapid population growth, increasing affluence and urbanization in developing countries are leading to major changes in supply and demand for animal protein, from both livestock and fish. Within aquaculture production systems, there has been a move toward the clustering of existing cages as well as toward the development and use of more intensive cage-farming systems. In particular, the need for suitable sites has resulted in the cage aquaculture subsector accessing and expanding into new untapped open-water culture areas such as lakes, reservoirs, rivers and coastal brackish and marine offshore waters.

Within the Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations (FAO), the Aquaculture Management and Conservation Service (FIMA) is responsible for all programmes related to development and management of marine, coastal and inland aquaculture and conservation of aquatic ecosystems, including biodiversity. The Service provides information, advice and technical assistance to FAO Members on improved techniques and systems for the culture of fish and other aquatic organisms in fresh, brackish and marine waters, promoting sound, environmentally friendly practices in lakes, rivers and coastal areas, in accordance with modern assessment and management standards and best practices for aquaculture. It ensures cooperation and coordination with other institutions and programmes in and outside FAO, both governmental and non-governmental, concerned with responsible aquaculture.

It is within this context that, in 2004, FIMA convened an expert workshop on cage culture in Africa that was held in Entebbe, Uganda, from 20 to 23 October 2004.<sup>1</sup> This activity was given a high priority considering the rapidly-growing interest in cage culture in the region. Among the background papers that FIMA commissioned for this workshop were an overview of the status, lessons learned and future developments of finfish cage culture in Asia; a review of small-scale aquaculture in Asia; and cage culture experiences from selected countries, all of which were highly appreciated by the African workshop participants as valuable background information to shape their own way forward for developing the cage aquaculture subsector in the region. Given the dynamic nature of the cage aquaculture subsector, the value of national and regional experiences, and ongoing FAO activities on developing National Aquaculture Sector Overviews and a Japanese Trust Fund Project “Towards Sustainable Aquaculture – Selected Issues and Guidelines”, FIMA decided to commission reviews also for the other regions in the world.

In 2005, an invitation was received from the Asian Fisheries Society (AFS) to become a partner for the Second International Symposium on Cage Aquaculture in Asia. FIMA welcomed this invitation as a unique opportunity to present the reviews in an international setting and to get feedback on the reviews from the many knowledgeable experts who gathered at this important event. Ultimately, the presentations of the national, regional and global reviews were organized in groups of two or three, bringing together all the participants in plenary before breaking up into parallel symposium sessions (see Annex 1–3).

<sup>1</sup> See Halwart, M. and Moehl, J. F. (eds.) 2006. FAO Regional Technical Expert Workshop on Cage Culture in Africa. Entebbe, Uganda, 20–23 October 2004. FAO Fisheries Proceedings. No. 6, 113 pp. Rome, FAO.

As the 2004 workshop highlighted, the successful development of cage aquaculture will depend on many factors. The challenge for both government and private sector is to work together to address these issues comprehensively – at farm, local, national and regional levels. This is true for all regions and all forms of cage aquaculture. It is hoped that the information provided in this document will serve a wide audience of researchers, development practitioners and planners, and provide part of the information base that is needed for informed public-private partnerships and informed policy decisions.



**Jiansan Jia**  
Chief

Aquaculture Management and Conservation Service  
FAO Fisheries and Aquaculture Department