

# World aquaculture 2010



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# World aquaculture 2010

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## **Aquaculture Service**

Fisheries and Aquaculture Resources Use and Conservation Division  
FAO Fisheries and Aquaculture Department

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# Preparation of this document

Status and trends analysis and reporting on aquaculture are regular activities of the Food and Agriculture Organization of the United Nations (FAO) Fisheries and Aquaculture Department. These are done by using official reports provided to FAO by its Member Countries, as well as through organizing special activities for soliciting information from countries and opinions from experts. *World aquaculture 2010* is the result of the most recent such effort by the FAO Fisheries and Aquaculture Department. The process of preparation of this document consisted of many sequential and parallel activities, as outlined in Chapter 1. This document not only provides a synthesis of six regional aquaculture development trends reviews (see Chapter 1), but also reflects an analysis of data and the opinions of a large number of experts worldwide.

# Abstract

Global production of fish from aquaculture has grown substantially in the past decade, reaching 52.5 million tonnes in 2008, compared with 32.4 million tonnes in 2000. Aquaculture continues to be the fastest-growing animal food producing sector and currently accounts for nearly half (45.6 percent) of the world's food fish consumption, compared with 33.8 percent in 2000. The Asia–Pacific region continues to dominate the aquaculture sector, accounting for 89.1 percent of global production, with China alone contributing 62.3 percent of global production. Moreover, of the 15 leading aquaculture-producing countries, 11 are in the Asia–Pacific region. A few countries dominate the production of some major species, such as carps by China; shrimps and prawns by China, India, Indonesia, Thailand and Viet Nam; and salmon by Chile and Norway. In terms of farming systems, extensive, intensive and semi-intensive systems are practised in all regions. In the Asia–Pacific region, despite major technical developments in the aquaculture sector, small-scale commercial producers continue to remain the backbone of the sector, contributing the bulk of aquaculture production. In the past decade, a number of developments have contributed to the significant growth of the global aquaculture sector, namely: formulation and implementation of policies, strategies, plans and legislation; dissemination and use of applied research; and emergence of new domestic and international markets. Achieving the global aquaculture sector's long-term goal of economic, social and environmental sustainability depends primarily on continued commitments by governments to provide and support a good governance framework for the sector. It is encouraging that the experience of the past decade indicates that many governments remain committed to good governance. As the sector further expands, intensifies and diversifies, it should recognize the relevant environmental and social concerns and make conscious efforts to address them in a transparent manner, backed with scientific evidence. This document provides an overview of global aquaculture status and development trends as a synthesis of such status and trends in six regions of the world: Asia–Pacific, Europe, Latin America and the Caribbean, Near East and North Africa, North America and Sub-Saharan Africa.

**FAO Fisheries and Aquaculture Department.**

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# Preface

The FAO Fisheries and Aquaculture Department is pleased to present *World aquaculture 2010*.

Six regional reviews and the resulting global synthesis, which provided the basis for this document, involved many people, including fish farmers, service providers, policy-makers, scientists, researchers, and intergovernmental and non-governmental organization workers. This rigorous consultative review process has thus shaped this document. If key information is lacking or inadequate for some topics, this is not a shortcoming on the part of the review process, rather this information is simply unavailable; its absence has, in fact, been pointed out in the regional reviews as opportunities for future assessments and information development.

This is the second in the series, the first having been published in 2006, using a similar consultative review process. This process of global cooperation in the review of aquaculture status and trends, led by FAO, will probably have as much impact on the direction and speed of aquaculture development as the other trends revealed by the review, and alongside other desirable trends, it will be fostered and sustained.

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# Abbreviations and acronyms

ACRDP	Aquaculture Collaborative Research and Development Program
ADB	Asian Development Bank
AIMAP	Aquaculture Innovation and Market Access Program
ALSC	Aquaculture Livelihood Service Center
AQ	Aquaculture Group (of the CWP)
ASEM	Asia–Europe Meeting
BMP	better management practice
CBA	capture-based aquaculture
CFIA	Canadian Food Inspection Agency
CFP	Common Fisheries Policy
COFI	Committee on Fisheries
COFI-AQ	Committee on Fisheries, Sub-Committee on Aquaculture
CWP	Coordinating Working Party
DFID	Department for International Development
DFO	Fisheries and Oceans Canada
EAA	ecosystem approach to aquaculture
EC	European Commission
EIA	environmental impact assessment
EU	European Union
EUS	epizootic ulcerative syndrome
FCR	feed conversion ratio
FEAP	Federation of European Aquaculture Producers
FishNet	Fisheries University Network
GCA	Global Conference on Aquaculture
GDP	gross domestic product
GESIT	genetically supermale Indonesian tilapia
GIFT	genetically improved farmed tilapia
GIS	geographic information system
HACCP	Hazard Analysis and Critical Control Point (system)
ICT	information and communications technology
IMTA	integrated multitrophic aquaculture
INGA	International Network on Genetics in Aquaculture
ISA	infectious salmon anaemia
LFFRT	live food fish restaurant trade
MOU	memorandum of understanding
NACA	Network of Aquaculture Centres in Asia-Pacific
NACEE	Network of Aquaculture Centres in Central-Eastern Europe
NEI	not elsewhere included
NEPAD	New Partnership for Africa’s Development
NGO	non-governmental organization
NMAI	National Marine Aquaculture Initiative
NOAA	National Oceanic and Atmospheric Administration
NORAD	Norwegian Agency for Development Cooperation
OIE	World Organisation for Animal Health
PA	producer association

<b>PaCFA</b>	Global Partnership on Climate, Fisheries and Aquaculture
<b>PCR</b>	polymerase chain reaction
<b>R&amp;D</b>	research and development
<b>RECOFI</b>	Regional Commission for Fisheries
<b>SPS Agreement</b>	Agreement on the Application of Sanitary and Phytosanitary Measures
<b>SSOP</b>	Standard Sanitary Operation Procedure
<b>TBT Agreement</b>	Agreement on Technical Barriers to Trade
<b>TCDC</b>	Technical Cooperation among Developing Countries
<b>UNDP</b>	United Nations Development Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VoIP</b>	voice-over Internet protocol
<b>WGA</b>	Working Group on Aquaculture
<b>WTO</b>	World Trade Organization
<b>WWF</b>	World Wide Fund for Nature

# Executive summary

Global production of fish from aquaculture has grown substantially in the past decade, reaching 52.5 million tonnes in 2008, compared with 32.4 million tonnes in 2000. Aquaculture continues to be the fastest-growing animal food producing sector and currently accounts for nearly half (45.6 percent) of the world's food fish consumption, compared with 33.8 percent in 2000. With stagnating global capture fishery production and an increasing population, aquaculture is perceived as having the greatest potential to produce more fish in the future to meet the growing demand for safe and quality aquatic food. According to FAO, it is estimated that by 2012 more than 50 percent of global food fish consumption will originate from aquaculture.

Although precise data are lacking, it is acknowledged that, with growth in volume and value of aquaculture production in the past decade, aquaculture has made a positive contribution to national, regional and global economies, poverty reduction and food security. Nonetheless, it is recognized that proper positioning of the aquaculture sector's contributions, based on precise data, is important to formulate well-informed policies, strategies and plans that governments and development partners will consider favourably for increased support and funding.

Global aquaculture, however, has not grown evenly around the world. There are marked intraregional and inter-regional and country variations in a number of areas, such as production level, species composition, farming systems and producer profile. The Asia-Pacific region continues to dominate the aquaculture sector, accounting for 89.1 percent of global production, with China alone contributing 62.3 percent of global production. Moreover, of the 15 leading aquaculture-producing countries, 11 are in the Asia-Pacific region.

A few countries dominate the production of some major species, such as carps by China; shrimps and prawns by China, Thailand, Viet Nam, Indonesia and India; and salmon by Norway and Chile. In terms of farming systems, while all three systems – extensive, intensive and semi-intensive – are practised in most regions, intensive systems are more prevalent in North America and in advanced aquaculture-producing countries in Europe and Latin America. In the Asia-Pacific region, despite major technical developments in the aquaculture sector, small-scale commercial producers continue to remain the backbone of the sector, contributing the bulk of aquaculture production. Small-scale producers and small and medium entrepreneurs are also important players in Africa. Commercial and industrial-scale producers dominate in Latin America, but there is strong potential for the development of small-scale production.

In the past decade, a number of developments have contributed to the significant growth of the global aquaculture sector, namely: formulation and implementation of policies, strategies, plans and legislation; dissemination and use of applied research; and emergence of new domestic and international markets.

An encouraging trend is that an increasing number of countries have formulated or are in the process of formulating fisheries policies, strategies, plans and legislation that will facilitate the growth and efficient management of the aquaculture sector. For example, in Africa, the spectacular development of aquaculture in countries such as Egypt, Mozambique, Nigeria and Uganda has been due to government policies that favour the private sector. In Europe, the European Union's 2002 aquaculture strategy achieved its objectives of ensuring an environmentally sound industry, providing safe aquatic food, and guaranteeing animal health and welfare. Moreover, as part of its good governance principle, the follow-up strategy for sustainable development of European

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aquaculture was prepared in consultation with stakeholders. There are also cases of many countries adapting and strengthening their aquaculture legislation to address competition for scarce land and water resources from other economic development activities such as agriculture and tourism through zoning, licensing, environmental assessment, management and control measures.

In the past decade, the Asia–Pacific region has witnessed two significant research and development (R&D) programmes: the development of the genetically improved farmed tilapia strain of Nile tilapia (*Oreochromis niloticus*), which has been hailed as a landmark achievement in the history of genetic improvement of tropical finfish; and the closing of the life cycle of the southern bluefin tuna (*Thunnus maccoyii*), although the commercial production of bluefin tuna seed is still a long way away.

Research and development achievements in Europe have also contributed to improved efficiency of farming systems, leading to the production of better-quality fish. Examples of new technologies include the development of underwater surveillance to manage feeding and biomass, the upscaling of recirculation systems, the development of cages and nets that can be used in higher energy locations, and the application of the integrated multitrophic aquaculture concept into production. In addition, to address the issue of the sustainability of the use of fishmeal and fish oil in aquafeeds, global research efforts continue to find affordable and high-quality plant and animal-based feed ingredients. The regional networks of aquaculture centres have also been playing a vital role in conducting collaborative R&D programmes and disseminating research findings.

In line with the increased growth of global aquaculture production, there has been an impressive development of trade in many aquaculture products. Two aquatic products from the Asia–Pacific region stand out: a significant shift from the indigenous giant tiger prawn (*Penaeus monodon*) to the exotic whiteleg shrimp (*Litopenaeus vannamei*) and the explosive growth in production of the striped catfish (*Pangasianodon hypophthalmus*) in Viet Nam. Moreover, there has been an increasing globalization of the fisheries value chain, including the outsourcing of certain processing operations to countries with lower labour costs. Another parallel development is the integration of producing and processing activities, as in the case of salmon by large producers in Chile. While the demand for aquaculture products continues to increase, there is growing recognition of the need to address consumers' concerns for quality and safe products and animal health and welfare. Thus, issues such as food safety, traceability, certification and ecolabelling are becoming increasingly important and considered as high priority by many governments.

Achieving the global aquaculture sector's long-term goal of economic, social and environmental sustainability depends primarily on continued commitments by governments to provide and support a good governance framework for the sector. It is encouraging that the experience of the past decade indicates that many governments remain committed to good governance. As the sector further expands, intensifies and diversifies, it should recognize the relevant environmental and social concerns and make conscious efforts to address them in a transparent manner, backed with scientific evidence. In the process, the sector should also prepare itself to face the potential impacts of climate change and global economic crisis, and make special efforts to further assist small-scale producers by organizing them into associations and through promotion of better management practices, as has been successfully demonstrated in many countries. It is hoped that, as the new decade unfolds, a stronger and more confident sector will stand ready to face and overcome the future challenges and move further along the path to sustainability.