FAO aquaculture information products

2008–2009

FAO Fisheries and Aquaculture Department
Aquaculture Service
FAO aquaculture information products
2008-2009

This publication is the second issue prepared by the Aquaculture Service of the FAO Fisheries and Aquaculture Department, which provides a list and relevant descriptions of FAO aquaculture information products published during the biennium 2008-2009. Fifty-seven products related to aquaculture, including CD-ROMs and newsletters, have been published and distributed worldwide during that time, in both hard and electronic versions.

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FAO aquaculture information products

2008–2009

Aquaculture Service
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TECHNICAL PAPERS

Farming freshwater prawns. A manual for the culture of the giant river prawn *(Macrobrachium rosenbergii).* Arabic version
New, M.B. Farming freshwater prawns. *FAO Fisheries Technical Paper. No. 428*. Rome, FAO. 2008. 214p.

This manual is a practical guide to the farming of *Macrobrachium rosenbergi*i. Many of the techniques described are also applicable to the culture of other species of freshwater prawns. The principle target audience is farmers and extension workers but it is also addressed to aquaculture lecturers and students. After a preliminary section on the biology of freshwater prawns, the manual covers site selection for hatcheries, nurseries and grow-out facilities, and the management of the broodstock, hatchery, nursery and grow-out phases of rearing. Harvesting and post-harvest handling are also covered and there are some notes on marketing freshwater prawns. The reference and bibliography section contains a list of relevant reviews, as well as other manuals on general aquaculture themes, such as water and soil management, topography, pond construction and simple economics. The manual contains annexes, photographs and drawings.
ISBN: 978-92-5-604811-0

Acuicultura en jaulas – Estudios regionales y panorama mundial. Spanish version
Halwart, M.; Soto, D.; Arthur, J.R. (eds.). *FAO Documento Técnico de Pesca.* No. 498. Roma, FAO. 2008. 255p.

Este documento contiene nueve documentos sobre la acuicultura en jaulas incluyendo una visión global, un estudio sobre China y siete estudios regionales de Asia (excluyendo China), Europa septentrional, el Mediterráneo, el África subsahariana, América Latina y el Caribe, América del Norte y Oceanía, todos los cuales fueron presentados durante la Sesión Especial de la FAO de Acuicultura en Jaulas – Estudios Regionales y Panorama Mundial durante el Segundo Simposio Internacional sobre Acuicultura en Jaulas en Asia de la Sociedad Asiática de Pesca realizado en China en el 2006. Cada revisión, por región geográfica, brinda información sobre la historia de la acuicultura en jaulas; provee un reporte detallado sobre la situación actual; delinea las principales cuestiones y desafíos de la región; remarca los asuntos específicos técnicos, ambientales, socioeconómicos y comerciales a los cuales se enfrenta la acuicultura en jaulas y las necesidades a tomarse en cuenta en el futuro en este sistema de cultivo.
ISBN: 978-92-5-305801-3

State of world aquaculture 2006. Arabic version
FAO Fisheries Department. *FAO Fisheries Technical Paper.* No. 500. Rome, FAO. 2008. 139 p.

Aquaculture is developing, expanding and intensifying in almost all regions of the world. Increasing global population demand for aquatic food products and it is expected that lion's share of this future demand will come from aquaculture. This document analyses the past trends that have led the aquaculture sector to its current status and describes its current status globally.
ISBN: 978-92-5-605631-3

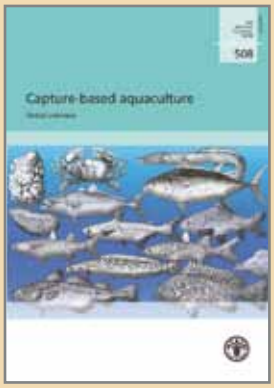
Situation de l'aquaculture mondiale 2006. French version
FAO Département des pêches et de l'aquaculture. *FAO Document technique sur les pêches.* No. 500. Rome, FAO. 2008. 134p.

L'aquaculture se développe, se répand et s'intensifie dans presque toutes les régions du monde. Bien que le secteur semble être capable de faire face à l'écart entre l'offre et la demande future pour les produits aquatiques, afin au moins de maintenir le niveau actuel de la consommation par habitant au niveau mondial, il existe de nombreux obstacles et défis. Ce document examine les tendances précédentes dans le développement de l'aquaculture et décrit sa situation actuelle au niveau mondial.
ISBN: 978-92-5-205631-7

Procedures for the quarantine of live aquatic animals: a manual.
Arthur, J.R.; Bondad-Reantaso, M.G.; Subasinghe, R.P. *FAO Fisheries Technical Paper*. No. 502. Rome, FAO. 2008. 74p.

Quarantine is an important risk management measure and a key activity that should be considered when developing national strategies for aquatic animal health management. It can also be used effectively to increase biosecurity at the farm production level. This manual outlines the technical requirements for setting up quarantine facilities at three levels, based on the general level of risk (as determined by risk analysis) represented by the specific consignment of aquatic animals being moved. This manual should be useful to government policy-makers and responsible national and state agencies in assessing their need for quarantine capacity and in implementing aquatic animal quarantine in an effective and cost-efficient manner within the framework of national and state aquatic biosecurity programmes. It also provides useful guidance to responsible agencies, their technical staff and the private sector in setting up of effective quarantine facilities and their daily operation.
ISBN: 978-92-5-105977-7

Capture-based aquaculture. Global overview.
Lovatelli, A.; Holthus, P.F. (eds). *FAO Fisheries Technical Paper.* No. 508. Rome, FAO. 2008. 298p.



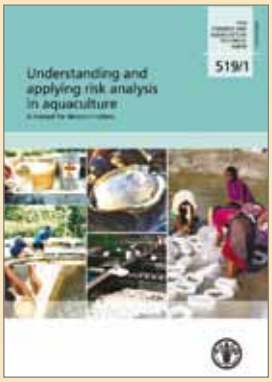
Aquaculture is a diverse and multibillion dollar economic sector that uses various strategies for fish production. The harvesting of wild individuals from very early stages in the life cycle to large mature adults for on-growing under confined and controlled conditions is one of these strategies. This system, referred to as “capture-based aquaculture”, is practised throughout the world using a variety of marine and freshwater species with important environmental, social and economic implications. The need to evaluate the sustainability of this farming practice in light of its economic viability, the wise use of natural resources and socio-environmental impacts as a whole has been extensively discussed at national, regional and international levels. This publication contains two parts. Part 1 consists of two reviews on (a) environmental and biodiversity and (b) social and economic impacts of capture-based aquaculture and Part 2 consists of eleven species review papers.
ISBN: 978-92-5-106030-8

Bivalve depuration: fundamental and practical aspects.
Lee, R.; Lovatelli, A.; Ababouch, L. *FAO Fisheries Technical Paper.* No. 511. Rome, FAO. 2008. 139p.

World bivalve production and consumption has increased significantly in recent years. Furthermore, the development of freight by air and sea and preservation techniques have enabled consumers, in different parts of the world, to enjoy eating bivalves produced in distant waters. Such developments in distribution and trade have in turn led to emerging challenges for consumer protection, particularly in relation to the safety of bivalves from pathogenic micro-organisms. Several species of bivalves are often consumed live, raw or lightly cooked which make them a high risk food product category requiring proper control measures to eliminate or reduce to acceptable levels potential biological, chemical and physical hazards. This document is intended to provide a basic introduction to the public health problems that can be associated with shellfish consumption and to provide guidance to the bivalve industry as to how a depuration centre, and the associated systems, should be planned, constructed and operated.
ISBN: 978-92-5-106006-3

Sea cucumbers - A global review of fisheries and trade.
Toral-Granda, V.; Lovatelli, A.; Vasconcellos, M. (eds). *FAO Fisheries and Aquaculture Technical Paper.* No. 516. Rome, FAO. 2008. 317p.

This paper reviews the worldwide population status, fishery and trade of sea cucumbers through the collection and analysis of the available information from five regions, covering known sea cucumber fishing grounds: temperate areas of the Northern Hemisphere; Latin America and the Caribbean; Africa and the Indian Ocean; Asia; and the Western Central Pacific. In each region a case study of a "hotspot" country or fishery is presented to highlight critical problems and opportunities for the sustainable management of sea cucumber fisheries. The hotspots are Papua New Guinea, the Philippines, Seychelles, the Galapagos Islands and the fishery for Cucumaria frondosa of Newfoundland in Canada. Together they provide a comprehensive and up-to-date evaluation of the global status of sea cucumber populations, fisheries, trade and management, constituting an important information source for researchers, managers, policy-makers and regional/international organizations interested in sea cucumber conservation and exploitation.
ISBN: 978-92-5-106079-7



Understanding and applying risk analysis in aquaculture.
Bondad-Reantaso, M.G.; Arthur, J.R.; Subasinghe, R.P. (eds). *FAO Fisheries and Aquaculture Technical Paper.* No. 519. Rome, FAO. 2008. 304p.

Part 1 of the above document consists of 12 peer-reviewed technical papers relevant to the application of risk analysis to aquaculture that were prepared by 23 specialists on: general principles of risk analysis, food safety and public health risks associated with products of aquaculture, pathogen risk analysis, application of risk analysis to genetic issues in aquaculture ecological risk assessment and management of exotic organisms, introduced marine species risk assessment, guidelines for ecological risk assessment of marine fish aquaculture, the aquaculture insurance industry risk analysis process and risk analysis experiences from small-scale shrimp farmers in India. Part 2 contains the detailed outcomes of the deliberations of 42 experts who developed the contents of a Manual on the Application of Risk Analysis to Aquaculture, discussed in great length the seven risk sectors and reached general conclusions and specific recommendations to enhance the application of the risk analysis process to aquaculture production.
ISBN: 978-92-5-106152-7

PROCEEDINGS

Atelier régional d'experts de la FAO sur la pisciculture en cage en Afrique.
Entebbe, Ouganda, 20-23 octobre 2004.
Halwart, M.; Moehl, J.F. (éds). *FAO Comptes rendus des pêches.* No. 6. Rome, FAO. 2008. 129p.

Ce document contient le compte rendu de l'Atelier régional d'experts de la FAO sur la pisciculture en cage en Afrique, tenu à Entebbe, Ouganda, du 20 au 23 octobre 2004. L'atelier a vu la participation de 71 représentants, y compris les participants régionaux des secteurs public et privé des conseillers techniques venant d'Italie, de Norvège, de Thailande, du Royaume-Uni de Grande-Bretagne et d'Irlande du Nord et du Zimbabwe, des observateurs, le Secrétariat technique et le personnel de soutien de la FAO. L'assemble tait unanime conclure que la pisciculture en cage représente une opportunité de développement importante pour de nombreux pays africains, opportunité qui exigera un cadre de politique efficace susceptible de permettre de surmonter les contraintes structurelles du développement et d'assurer un développement quitable et durable. Le succès du développement de la pisciculture en cage dépendra de nombreux facteurs. Le défi que le gouvernement et le secteur privé doivent relever consiste à collaborer en vue d'aborder complètement ces questions.
ISBN: 978-92-5-205609-6

The future of mariculture: a regional approach for responsible development in the Asia-Pacific region.
FAO/NACA Regional Workshop . Guangzhou, China, 7–11 March 2006. Lovatelli, A.; Phillips, M.J.; Arthur, J.R.; Yamamoto, K. (eds). *FAO Fisheries Proceedings.* No. 11. Rome, FAO. 2008. 325p.

Aquaculture in Southeast Asia has been growing over the last few decades, requiring more space to accommodate it. The search for additional areas to expand the industry and the identification of new farming species to satisfy local and export markets are pushing the sector in some countries to broaden activities in the sea, including further offshore where more space is available and where competition is not so intense. The Fisheries and Aquaculture Department of the Food and Agriculture Organization (FAO) in collaboration with the Network of Aquaculture Centres in Asia-Pacific (NACA) organized the workshop entitled "The future of mariculture: a regional approach for responsible development in the Asia-Pacific region" from 7 to 11 March 2006. The workshop was convened in response to requests from FAO Member countries to identify key trends and issues affecting mariculture growth in the region and to strengthen regional collaboration for future responsible development of mariculture.
ISBN: 978-92-5-106007-0

Estado actual del cultivo y manejo de moluscos bivalvos y su proyección futura: factores que afectan su sustentabilidad en América Latina.
Puerto Montt, Chile, 20–24 de agosto de 2007. Lovatelli, A.; Farías, A.; Uriarte, I. (eds). *FAO Actas de Pesca y Acuicultura.* No. 12. Roma, FAO. 2008. 359p.

Los documentos que figuran en este informe se han preparado como material de apoyo para el Taller Regional sobre el Estado actual del cultivo y manejo de moluscos bivalvos y su proyecciòn futura: factores que afectan su sustentabilidad en Amrica Latina. El taller organizado por la Organizaciòn de las Naciones Unidas para la Agricultura y la Alimentaciòn (FAO) se celebra en Puerto Montt, Chile, del 20 al 24 de agosto de 2007, con la colaboraciòn de la Universidad Austral de Chile (UACh). El taller reuniò a expertos de los pases de America Latina y del Caribe con el objetivo de (i) discutir aspectos tecnicos y socioeconomicos relacionados con el cultivo y manejo de bivalvos; (ii) identificar las necesidades de investigaciòn para el desarrollo futuro e inmediato; (iii) definir estrategias para aprovechar oportunidades y superar amenazas que enfrenta este tipo de producción animal; y (iv) recomendar medidas para la sustentabilidad de la industria productora de bivalvos.
ISBN: 978-92-5-306115-0

Building an ecosystem approach to aquaculture.
FAO/Universitat de les Illes Balears Expert Workshop. 7–11 May 2007, Palma de Mallorca, Spain. Soto, D.; Aguilar-Manjarrez, J.; Hishamunda, N. (eds). *Fisheries and Aquaculture Proceedings.* No. 14. Rome, FAO. 2008. 221p.

Aquaculture growth worldwide involves the expansion of cultivated areas, a higher density of aquaculture installations and farmed individuals, and greater use of feed resources produced outside the immediate culture area. To ensure that such development of the sector does not carry negative impacts on the environment and on parts of society due to weak regulation or poor management, an ecosystem approach for aquaculture (EAA) is encouraged. “An ecosystem approach for aquaculture is a strategy for the integration of the activity within the wider ecosystem in such a way that it promotes sustainable development, equity, and resilience of interlinked social and ecological systems”. These proceedings present the output of an expert workshop organized by FAO and the Univesitat de les Balears from 7–11 May 2007 in Palma de Mallorca, Spain. It includes contributed papers on definitions, principles, scales and management measures, human dimensions, economic implications and legal implications that are relevant for an ecosystem-based management in aquaculture.
ISBN: 978-92-5-106075-9

CIRCULARS

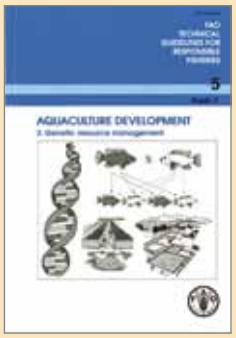
A review on culture, production and use of spirulina as food for humans and feeds for domestic animals and fish.
Habib, M.A.B.; Parvin, M.; Huntington, T.C.; Hasan, M.R. *FAO Fisheries and Aquaculture Circular.* No. 1034. Rome, FAO. 2008. 33p.

This circular reviews the existing knowledge on the culture, production and use of spirulina for human consumption and feeds for domestic animals and fish. Spirulina are multicellular and filamentous blue-green microalgae belonging to two separate genera Spirulina and Arthrospira. Of these, Arthrospira platensis is the most common and widely available spirulina. In many countries of Africa, it is used as human food as an important source of protein and is collected from natural water, dried and eaten. It has gained considerable popularity in the human health food industry and in many countries of Asia it is used as protein supplement and as human health food. Spirulina has been used as a complementary dietary ingredient of feed for poultry and increasingly as a protein and vitamin supplement to aquafeeds. Spirulina appears to have considerable potential for development, especially as a small-scale crop for nutritional enhancement, livelihood development and environmental mitigation.
ISBN: 978-92-5-106106-0

TECHNICAL GUIDELINES

Aquaculture development. 5.
FAO Technical Guidelines for Responsible Fisheries. No. 5. Rome, FAO. 2008.

This document provides annotations to the Principles of Article 9 of the Code of Conduct for Responsible Fisheries. These annotations are meant to serve as general guidance, and should be taken as suggestions or observations intended to assist those interested in identifying their own criteria and options for actions, as well as partners for collaboration, in support of sustainable aquaculture development. Given the diversity in aquaculture and the sometimes different perceptions of “sustainability”, more balanced and informed approaches are required to address developmental and environmental issues at any given location. Commitment for collaboration, constructive dialogues among responsible partners, and participation of aquafarmers and their communities are important when assigning responsibilities for sustainable development of aquaculture. Providing an enabling environment for sustainable development and commitment to understanding, fairness and responsible attitudes in consultations and negotiations between interested stakeholders, countries or regions will help sustainable aquaculture development.
ISBN: 978-92-5-403971-4 Russian version; ISBN: 978-92-5-603971-2 Arabic version
ISBN: 978-92-5-503971-3 Chinese version



Aquaculture development. 5. Suppl. 3. Genetic resource management.
FAO Technical Guidelines for Responsible Fisheries. No. 5, Suppl. 3. Rome, FAO. 2008. 125p.

These technical guidelines have been developed to support sections of FAO's Code of Conduct for Responsible Fisheries on aspects of genetic resource management in aquaculture. Guidance is provided on broodstock management and domestication, genetic improvement programmes, dissemination programmes for genetically improved fish, economic considerations in genetic improvement programmes, risk assessment and monitoring, culture-based fisheries, conservation of fish genetic resources, gene banks, a precautionary approach and public relations. The effective management of genetic resources, risk assessment and monitoring can help promote responsible aquaculture by increasing production output and efficiency, and help minimize adverse impacts on the environment. The benefits of the responsible application of genetic principles to aquaculture should be communicated to consumers, policy-makers, scientists and others interested in responsible fisheries and aquaculture.
ISBN: 978-92-5-106045-2

FAO AQUACULTURE NEWLETTER

FAO Aquaculture Newsletter 39 - April 2008
FAO. FAN - Rome, FAO. 2008. 40p.

The effects of global food prices on aquaculture was the subject of the editorial. Four articles described activities/results of FAO aquaculture projects (in Tunisia, Uruguay, Mexico, Saudi Arabia); one article dealt with the outcomes of the FAO disease investigation task force on a serious fish disease outbreak in south Africa's Chobe-Zambezi river system. Other articles included: FAO aquaculture online fact sheets; workshop on safety of shellfish from harmful algae and biotoxins; application of risk analysis in aquaculture; celebrating the 30th anniversary of the Asia-Pacific Regional Research and Training Center for Integrated Fish Farming; outcomes of the high-level special meeting on FAO's Special Programme on Aquaculture Development; and announcement on the XI Session of the COFI Sub-Committee on Trade. A list of accomplishments of the Aquaculture Service for the biennium 2006-2007 was also presented, including short descriptions of a number of meetings. One new staff profile and nine recent aquaculture publications were also provided.

FAO Aquaculture Newsletter 40 - August 2008
FAO. FAN - Rome, FAO. 2008. 52p.

FAN 40, a special issue dedicated to the Fourth Session of the Sub-Committee on Aquaculture (SCA IV, October 2008, Chile) focused on the relation between aquaculture and 'the right to food': for mutual supportiveness in its editorial. Nine articles provided current status of aquaculture development in Africa, Central Asia, Latin America and the Carribean, Near East and North Africa, the history of SCA, the role of FAO and FAO's Regional Fishery Bodies on aquaculture development, regional aquaculture networks; and FAO's Special Programme on Aquaculture Development in Africa. Other relevant articles include: outcomes of the 11th Session of FAO's COFI Sub-Committee on Fish Trade; FAO and aquatic biosecurity in the Pacific islands; a workshop on bivalve aquaculture in Latin America (workshop); and other important issues affecting aquaculture such as climate change, certification and information. Two new staff profiles and new aquaculture publications were also included.

REPORTS

Report of the EIFAC ad hoc Working Party on Handling of Fishes in Fisheries and Aquaculture.
Utrecht, The Netherlands, 24-26 March 2004 (Published only online)
FAO/European Inland Fisheries Advisory Commission. *EIFAC Occasional Paper.* No. 40. Rome, FAO. 2008. 88p.
ftp://ftp.fao.org/docrep/fao/010/i0218e/i0218e00.pdf

This document presents the results of the EIFAC Ad Hoc Working Party on Handling of Fishes in Fisheries and Aquaculture, including the report of its workshop held from 24 to 26 March 2004 in Utrecht, Netherlands. The welfare of fishes has become a subject of attention in recent years. Concerns have been raised about the potential for infringed fish welfare in fisheries, aquaculture and fisheries research. The Ad Hoc Working Party agreed that handling of fishes must be carried out in a responsible way. Fishes show reactions to injurious stimuli. These stimuli result in physiological stress responses. Depending on the duration and intensity of the exposure to the stressor, the stress response varies from acute to chronic. To ensure the welfare of fish in commercial fisheries, recreational fisheries and aquaculture, sufficient legislation and regulation is necessary.
ISBN 978-92-5-106016-2

Report of the 2007 session of the Joint EIFAC/ICES Working Group on Eels.
Bordeaux, France, 3–7 September 2007.
FAO European Inland Fisheries Advisory Commission; International Council for the Exploration of the Sea. *EIFAC Occasional Paper.* No. 39. ICES CM 2007/ACFM: 23. Rome, FAO/Copenhagen, ICES. 2008. 138p. (Includes a CD-ROM).

This publication is the report of the 2007 session of the Joint European Inland Fisheries Advisory Commission (EIFAC) and International Council for the Exploration of the Sea (ICES) Working Group on Eels, held in Bordeaux, France from 3 to 7 September 2007.
ISBN: 978-92-5-105925-8

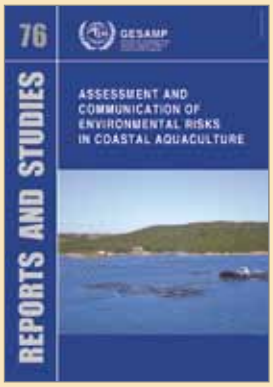
Report of the Fourth Meeting of Directors of the Network of Aquaculture Centres in Central-Eastern Europe (NACEE).
Galati, Romania, 27–29 September 2007

The Research Institute for Fisheries, Aquaculture and Irrigation (HAKI), Szarvas, Hungary, as Coordinating Institution of the Network of Aquaculture Centers in Central-Eastern Europe (NACEE) organized the Fourth Meeting of NACEE Directors in Galati, Romania, between 27-29 September 2007. The Meeting was hosted by the "Dunarea de Jos" University, Galati, Romania and the Institute of Research and Development for Aquatic Ecology, Fishing and Aquaculture (ICDEAPA), Galati, Romania. The Meeting was partly supported by the Aquaculture Management and Conservation Service, FAO Fisheries and Aquaculture Department, Rome. The main objectives of the Meeting were to review the last year''s progress of NACEE in general and its Working Groups in particular, to decide on relevant organizational, technical and financial issues, and to find ways to improve collaboration, with special regard to joint project activities. Particular emphasis was given to the development of project proposals and related fund-raising opportunities.

EIFAC Workshop on a European Cormorant Management Plan.
Bonn, Germany, 20–21 November 2007 (Published only online). FAO European Inland Fisheries Advisory Commission. *EIFAC Occasional Paper.* No. 41. Rome, FAO. 2008. 34p.
http://www.fao.org/docrep/011/i0210e/i0210e00.htm
ftp://ftp.fao.org/docrep/fao/010/i0210e/i0210e00.pdf

A workshop of the EIFAC ad hoc Working Party on Prevention and Control of Bird Predation was held in Bonn, Germany from 20 to 21 November 2007 with the participation of 29 representatives from 13 EIFAC member states. The ad hoc Working Party discussed cormorant – fisheries issues and reviewed the legal situation for the protection and control of cormorants in EIFAC member countries. On the basis of these discussions four recommendations were formulated, including the promotion of preparation and effective implementation of a European Cormorant Management Plan.
ISBN: 978-92-5-106013-1

GESAMP - Assessment and communication of environmental risks in coastal aquaculture.
GESAMP (IMO/FAO/UNESCO-IOC/UNIDO/WMO/IAEA/UN/UNEP Joint Group of Experts on Scientific Aspects of Marine Environmental Protection) 2008. Rome, *FAO. Reports and Studies* GESAMP No. 76. 198p.



This publication presents a set of objectives, goals, methodologies and a checklist for assessment and communication of environmental risks which may be associated with coastal aquaculture. It is structured to improve risk communication and to ensure that risk assessment is carried out as a scientific exercise in predicting environmental change. Six case studies are presented to illustrate the use of the environmental risk assessment methodologies in coastal aquaculture. These examples of environmental interactions span a range of cultured species from fin fish to molluscs and shrimp. The type of effects studied includes effects on carrying capacity, phytoplankton, kelp, benthic fauna, the genome of wild fishes and salinisation of soils.
ISBN: 978-92-5-1059-47-0

Incidence and impacts of escaped farmed Atlantic salmon *Salmo salar* in nature.
Thorstad, E.B., Fleming, I.A., McGinnity, P., Soto, D., Wennevik, V. & Whoriskey, F. Norwegian Institute for Nature Research (NINA), NINA Special Report 36. Trondheim. 110p.

This report was commissioned by the Salmon Aquaculture Dialogue. The Salmon Dialogue is a multi-stakeholder, multi-national group which was initiated by the World Wildlife Fund in 2004. Participants include salmon producers and other members of the market chain, NGOs, researchers, retailers, and government officials from major salmon producing and consuming countries. The goal of the Salmon Aquaculture Dialogue is to develop and implement verifiable environmental and social performance levels that measurably reduce or eliminate key impacts of salmon farming and are acceptable to stakeholders. The group will also recommend standards that achieve these performance levels while permitting the salmon farming industry to remain economically viable. The Salmon Aquaculture Dialogue focuses their research and standard development on seven key areas of impact of salmon production including: social; feed; disease/parasites; escapes; chemical inputs; benthic impacts and siting; and, nutrient loading and carrying capacity.
ISBN: 978-82-426-1966-2

Report of the fourth session of the Regional Commission for Fisheries.
Jeddah, Kingdom of Saudi Arabia, 7–9 May 2007.
FAO Regional Office for the Near East. *FAO Fisheries Report.* No. 847. Rome, FAO. 2008. 48p. Bilingual version English/Arabic.

The session was attended by delegates from seven Members of the Commission and by observers from international, regional and national fishery bodies and institutions. The meeting was organized to evaluate the progress of intersessional activities relating to recommendations of earlier sessions, address regional fisheries and aquaculture issues of concern and review plans for short- and medium-term activities. The Commission endorsed the work plan of its Working Group on Aquaculture (WGA), stressed the importance of developing and implementing national plans of action to prevent, deter and eliminate illegal, unreported and unregulated (IUU), fishing noted the increasing importance of fish food safety, and urged RECOFI Members and FAO to increase their efforts in improving fisheries information systems and methods of reporting of stock status in the region. In examining its role, responsibilities and future challenges, the Commission decided to expand its current Working Group on Statistics to a wider Working Group on Fisheries Management. Further, the Commission made recommendations concerning the organizational arrangements for its next session, agreed on its programme of work and adopted its budget for 2007–2008.
ISBN: 978-92-500593-41

National Workshop on Aquatic Biodiversity and nutrition from rice-based ecosystems: Enhancing biodiversity and agricultural productivity.
4-5 June 2008, Vientiane, Lao PDR. FAO/Lao PDR Ministry of Agriculture and Forestry. Rome, FAO. 2008. 53p.

The main goal of this National Workshop was to bring various stakeholders together to discuss aspects of aquatic biodiversity and nutrition in rice-based ecosystems, with a view to enhancing the aquatic biodiversity while at the same time increasing the production of rice. The workshop provided a forum to share experiences on the importance of aquatic biodiversity from rice-based ecosystems, discuss good management practices, and discuss the role and potential of aquatic biodiversity to alleviate malnutrition. The meeting concluded that agricultural biodiversity in Lao PDR is the basis for food security of the Lao people, and recommended that the ricefield ecosystem and its associated biodiversity, in particular the aquatic part, needs to be given highest priority in future research and development projects. Further recommendations include improvement of information on the root causes of malnutrition in Lao PDR, documentation of successful examples of multiple enhancements, promotion of connectivity between natural and agricultural wetlands, and development of a strategy for dissemination of information to farmers, schools and technical agencies.

WEB-BASED INFORMATION RESOURCES

African Water Resource Database.
A set of data and custom-designed tools, combined in a geographic information system (GIS) analytical framework aimed at facilitating responsible inland aquatic resource management with a specific focus on inland fisheries and aquaculture.
http://www.fao.org/fishery/gisfish/id/1038

Cultured Aquatic Species Information Programme.
Technical fact sheets on the most commercially important species produced by aquaculture.
http://www.fao.org/fishery/culturedspecies/search/en

FAO Glossary of aquaculture.
A multilingual glossary containing more than 2 500 terms and definitions. It has been produced to serve as a reference to all those interested in aquaculture, and to facilitate communication among experts and scientists involved in aquaculture research and development.
http://www.fao.org/fi/glossary

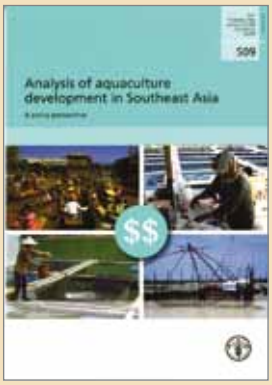
Global Gateway to Geographic Information Systems (GIS), Remote Sensing and Mapping for Aquaculture and Inland Fisheries.
A “one stop” Web site from which to obtain the global experience on Geographic Information Systems (GIS), Remote Sensing and Mapping as applied to Aquaculture and Inland fisheries.
http://www.fao.org/fishery/gisfish

National Aquaculture Legislation Overviews (NALO).
Multilingual country reports on aquaculture laws and regulations for FAO member countries.
http://www.fao.org/fishery/nalo/search/en

National Aquaculture Sector Overview (NASO).
Multilingual national reports providing a general overview of aquaculture aspects and related issues at the national level for FAO member countries.
http://www.fao.org/fishery/naso/search/en

TECHNICAL PAPERS

Analysis of aquaculture development in Southeast Asia: a policy perspective.
Hishamunda, N.; Bueno, P.B.; Ridler, N.; Yap, W.G. *FAO Fisheries and Aquaculture Technical Paper.* No. 509. Rome, FAO. 2009. 69p.

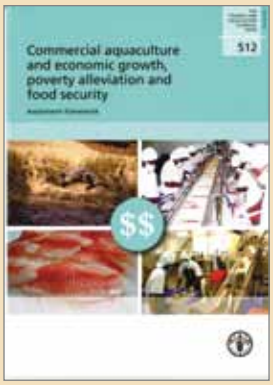


This paper argues that in many countries in Southeast Asia, aquaculture expanded rapidly in response to domestic and international market demand and developed because entrepreneurs could benefit from these profit opportunities; government involvement was minimal. It also developed because of its endorsement by governments as a source of livelihood and/or export earnings, but without generous incentives. Recently, in some cases, governments have deliberately promoted the sector with incentives, motivated by its contribution to economic development, food security and the balance of payments. In other instances, governments maintain an enabling role but, intervene with regulations to limit laisser-faire excesses. Unavailability of land and fresh water, shortage and price of good quality feed, adequate energy supply and its rising cost, pollution and environmental degradation problems and limited expertise among government officials, could limit further development of aquaculture in the region, but aquaculture is likely to remain important there for many more years.
ISBN 978-92-5-106339-2

Bivalve depuration: fundamental and practical aspects. Arabic and Chinese versions
Lee, R.; Lovatelli, A.; Ababouch, L. *FAO Fisheries Technical Paper.* No. 511. Rome, FAO. 2009. 135p.

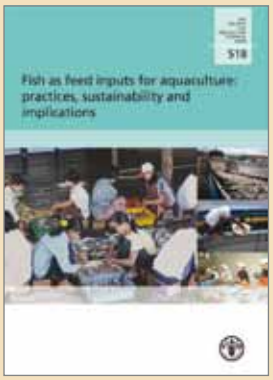
World bivalve production and consumption has increased significantly in recent years. Furthermore, the development of freight by air and sea and preservation techniques have enabled consumers, in different parts of the world, to enjoy eating bivalves produced in distant waters. Such developments in distribution and trade have in turn led to emerging challenges for consumer protection, particularly in relation to the safety of bivalves from pathogenic micro-organisms. Several species of bivalves are often consumed live, raw or lightly cooked which make them a high risk food product category requiring proper control measures to eliminate or reduce to acceptable levels potential biological, chemical and physical hazards. This document is intended to provide a basic introduction to the public health problems that can be associated with shellfish consumption and to provide guidance to the bivalve industry as to how a depuration centre, and the associated systems, should be planned, constructed and operated.
ISBN: 978-92-5-606006-8 Arabic version
ISBN: 978-92-5-506006-9 Chinese version

Commercial aquaculture and economic growth, poverty alleviation and food security. Assessment framework.
Hishamunda, N.; Cai, J.; Leung, P. *FAO Fisheries and Aqaculture Technical Paper.* No. 512. Rome, FAO. 2009. 58p. Available in French.



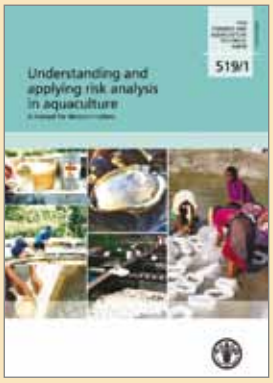
This paper proposes some methods for quantifying the contribution of aquaculture to national economies, poverty alleviation and food security. Aquaculture's contribution to a country's economy can be measured by "aquaculture value-added multiplier while its contribution to poverty alleviation can be done through "aquaculture employment multiplier". The contribution to food availability, one of the three dimensions of food security, can be assessed through the "net sum of protein-equivalent" (direct contribution) and the "ratio between the aquaculture net foreign exchange earning and the total value of food imports" (indirect contribution). "Aquaculture labour-income and employment multipliers" can be used to quantify aquaculture's contribution to food access, the second dimension of food security. Aquaculture tax multiplier and the "aquaculture ratio between the net foreign exchange earning" and the "whole economy net foreign exchange earning" can be used to estimate the sector's contribution to food utilization, the third dimension of food security.
ISBN 978-92-5-106337-8

Fish as feed inputs for aquaculture: practices, sustainability and implications.
Hasan, M.R.; Halwart, M. (eds.). *FAO Fisheries and Aquaculture Technical Paper*, No. 518. FAO, 2009. 407p.



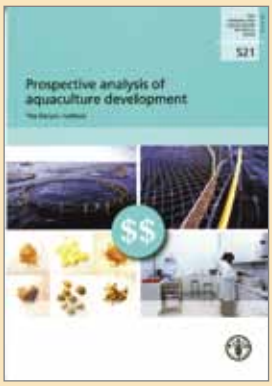
This technical paper provides a comprehensive review of the use of wild fish as feed input for aquaculture and discusses the existing practices, analyses the sustainability of feed/reduction fisheries and reviews the implication. It comprises of four regional reviews, three country-specific case studies from Latin America, a global synthesis and a review on the use of wild fish from the perspective of poverty alleviation and food security. The regional reviews specifically addressed the role of feed and reduction fisheries that may impinge on food security and poverty alleviation in these four regions and elsewhere, including sustainability of these finite resources and environmental implication of the direct use of fish as feed. On the basis of the four regional reviews and the five case studies (three from Latin America and two from Asia), an attempt was made to develop a global perspective on the status, trends, issues and challenges confronting reduction fisheries and

use of fish as feeds. Based on the information presented in the global synthesis, regional reviews, and three case studies and through the fresh analysis of the information presented elsewhere, a review was prepared on the use of wild fish as aquaculture feed from the perspective of poverty alleviation and food security.
ISBN: 978-92-5-106347-7



Understanding and applying risk analysis in aquaculture: a manual for decision-makers.
Arthur, J.R.; Bondad-Reantaso, M.G.; Campbell, M.L.; Hewitt, C.L.; Phillips, M.J.; Subasinghe, R.P. *FAO Fisheries and Aquaculture Technical Paper.* No. 519/1. Rome, FAO. 2009. 113p.

Abstract: This manual aimed to promote wider understanding and acceptance of the applications and benefits of risk analysis in aquaculture development and management, provides an overview of the process as applied to aquaculture and demonstrates the variety of ways in which risk can manifest in aquaculture operations. Section 1 provides a background to the aquaculture sector and an introduction to the concepts of risk analysis. Section 2 presents the operating environment, i.e. relevant international framework, for risk analysis for the aquaculture sector. Section 3 discusses a general risk analysis process for aquaculture. Section 4 provides brief overviews of the process as applied in each of the seven risk categories. Section 5 briefly summarizes actions that need to be taken by FAO Members to promote the wider use of risk analysis for aquaculture development. Section 6 discusses future challenges to aquaculture and the role risk analysis might play in addressing them.
ISBN 978-92-5-106414-6



Prospective analysis of aquaculture development: the Delphi method.
Hishamunda, N.; Poulain, F.; Ridler, N.
FAO Fisheries and Aquaculture Technical Paper. No. 521. Rome, FAO. 2009. 93p.

Through a Delphi analysis, this paper evaluates the major impediments to aquaculture in different regions of the world, a sector where discontinuities exist and where historic trends cannot be easily extrapolated into the future development. It also indicates opportunities for its expansion. The recent global expansion of aquaculture is unlikely to continue at the same pace. Because of a plentiful natural resource base and sufficient demand for fish products there, aquaculture is likely to grow in Latin America and the Caribbean; the principal concern was lack of financing and of human capacity. Other regions such as Eastern Europe were less sanguine partly because of problems with species or external factors such as negative public perceptions towards aquaculture. There was a consensus in all regions that aquaculture should be encouraged due to its contribution to food security and poverty alleviation or its role in reducing pressure on wild fisheries.
ISBN 978-92-5-106338-5

Strengthening aquaculture health management in Bosnia and Herzegovina.
Bondad-Reantaso, M.G.; Arthur, J.R.; Subasinghe, R.P. (eds). *FAO Fisheries and Aquaculture Technical Paper.* No. 524. Rome, FAO. 2009. 83p.

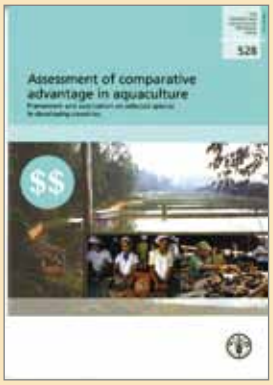
The FAO Technical Cooperation Programme (TCP) Project TCP/BiH/3101 “Strengthening Aquaculture Health Management”, implemented between late 2006 and mid-2009, was aimed at increasing the effectiveness and efficiency of the State Veterinary Office of Bosnia and Herzegovina on aquatic animal health management to support sustainable and healthy aquaculture production of the country. The project developed national policies on aquatic animal health and strengthened the capacity of veterinary administration, inspectors, laboratories and producers in improving compliance with international health and food safety and quality requirements and practices. The project also assisted in disseminating the lessons learned to neighbouring trading partners in order to promote future regional cooperation in aquaculture and aquatic animal health management. This publication, one of the major documentation outputs of the above TCP, contains a series of seven contributed papers that were presented by national consultants and international experts to participants attending the series of workshops organized by the project.
ISBN: 978-92-5-106415-3

Environmental impact assessment and monitoring in aquaculture: requirements, practices, effectiveness and improvements.
FAO Fisheries and Aquaculture Technical Paper. No. 527. Rome, FAO. 2009. 57p. Includes a CD-ROM containing the full document, 648p.

This publication includes four regional reviews on EIA and monitoring in aquaculture in Africa, Asia-Pacific, Europe, Latin America and North America, a special study on EIA in salmon aquaculture, a global review and synthesis, and a workshop report. Most aquaculture is small scale and is not subject to EIA or rigorous monitoring. Where EIA is applied there is mixed experience. Several weaknesses were identified, including lack of

consistency in assessment; lack of appropriate standards; lack of integration between levels and divisions of government; inadequate or ineffective public consultation; lack of assessment skill and capacity; limited follow-up in terms of implementation and monitoring; and excessive bureaucracy and delays. More emphasis needs to be placed on environmental management frameworks which can address the environmental issues associated with large numbers of small scale developments – including strategic environmental assessment, risk analysis, management plans for waterbodies and/or groups of farms, monitoring and response procedures.
ISBN: 978-92-5-106383-5

Assessment of comparative advantage in aquaculture: framework and application on selected species in developing countries.
Cai, J.; Leung, P.; Hishamunda, N. *FAO Fisheries and Aquaculture Technical Paper.* No. 528. Rome, FAO. 2009. 73p. Available in French.



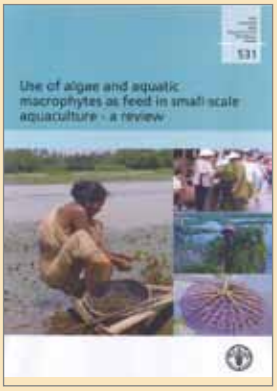
How successful a country is in competing against other producers depends in part on transport and on satisfying food standards, but also on its production costs. Comparative advantage is a means of assessing relative costs and indicating the species and markets where there is the greatest likelihood of success. This paper discusses this concept and two methods that can be used for its assessment, namely the "Domestic Resource Cost" (DRC) method, which relies on production cost data to compare efficiency, and the "Revealed Comparative Advantage" (RCA) method, whereby comparative advantage is inferred from an ex post assessment of actual trade and specialization. Through two case studies (the shrimp exports and the freshwater aquaculture production of carp, catfish and tilapia) the paper illustrates how this concept can be assessed and discusses some of its policy implications. The RCA method is used for this purpose.
ISBN: 978-92-5-106432-0

Integrated mariculture: a global review.
Soto, D. (ed.). *FAO Fisheries and Aquaculture Technical Paper*. No. 529. Rome, FAO. 2009. 183p.

This technical paper provides a comprehensive review of current integrated mariculture practices around the world in three papers covering temperate zones, tropical zones and one semi-enclosed ecosystem, the Mediterranean Sea. Integrated mariculture includes a diverse range of co-culture/ farming practices, from integrated multitrophic aquaculture to the more specialized integration of mangrove planting with aquaculture, called aquasilviculture. Modern integrated mariculture systems must be developed in order to assist sustainable expansion of the sector in coastal and marine ecosystems thus responding to the global increase for seafood demand but with a new paradigm of more efficient food production systems. Successful integrated mariculture operations must consider all relevant stakeholders into its development plan, there is also a need to facilitate commercialization and promote effective legislation for the support and inclusion of integrated mariculture through adequate incentives particularly considering the reduction of environmental costs associated to monoculture farming. Bioremediation of fed aquaculture impacts through integrated mariculture is a core benefit but the increase of production, more diverse and secure business and larger profits should not be underestimated as additional advantages.
ISBN: 978-92-5-106387-3

Climate change implications for fisheries and aquaculture: overview of current scientific knowledge.
Cochrane, K.; De Young, C.; Soto, D.; Bahri, T. (eds). *FAO Fisheries and Aquaculture Technical Paper.* No. 530. Rome, FAO. 2009. 212p.

The document provides overview of available scientific knowledge on climate change implications for fisheries and aquaculture through three technical papers that were presented and discussed during an Expert Workshop in April 2008. The first paper reviews the physical and ecological impacts of climate change to marine and inland capture fisheries and aquaculture. It also outlines a series of scenarios of climate change impacts on fish production and ecosystems. The second paper tackles the consequences of climate change impacts on fisheries and their dependent communities by analyzing their exposure, sensitivity and vulnerability and providing examples of adaptation as well as indicating the sector's contribution to greenhouse gas emissions and mitigation. The third paper addresses the impacts of climate change on aquaculture providing a synthesis of direct and indirect impacts, in terms of biodiversity, fish disease and fishmeal provision. Contribution of aquaculture to climate change and mitigation are also addressed.
ISBN 978-92-5-106347-7



Use of algae and aquatic macrophytes as feed in small-scale aquaculture: a review.
Hasan, M.R.; Chakrabarti, R. *FAO Fisheries and Aquaculture Technical Paper.* No. 531. Rome, FAO. 2009. 123p.

This technical paper presents a global review on the use of aquatic macrophytes as feed for farmed fish, with particular reference to their current and potential use by small-scale farmers. The review is organized under four major divisions of aquatic macrophytes: algae, floating macrophytes, submerged macrophytes and emergent macrophytes. Under floating macrophytes, Azolla, duckweeds and water hyacinths are discussed separately; the remaining floating macrophytes are grouped together and are reviewed as 'other floating macrophytes'. The review covers aspects concerned with the production and/or cultivation techniques and use of the macrophytes in their fresh and/or processed state as feed for farmed fish. Results of laboratory and field trials and on-farm utilization of macrophytes by farmed fish species are presented. The paper provides information on the different processing methods employed (including composting and fermentation) and results obtained to date with different species throughout the world with particular reference to Asia.
ISBN: 978-92-5-106420-7

Measuring the contribution of small-scale aquaculture: an assessment.
Bondad-Reantaso M.G.; Prein, M. (eds). *FAO Fisheries and Aquaculture Technical Paper* No.534. Rome, FAO. 2009. 180p.

An "FAO Expert Workshop on Methods and Indicators for Evaluating the Contribution of Small-Scale Aquaculture to Sustainable Rural Development", held in Nha Trang, Viet Nam from 24 to 28 November 2008, attempted to develop an indicator system which can measure the contribution of small-scale aquaculture (SSA) to sustainable rural development (SRD). The major outcome was the development, through an iterative process, of an indicator system thought to provide a good measure of the contribution of SSA using an analytical framework (i.e. the Sustainable Livelihood Approach or SLA) and agreed criteria (accuracy, measurability and efficiency or AME). This publication contains two parts: Part 1 contains the report of the above expert workshop; Part 2 contains 10 technical papers presented during the expert workshop and an additional paper which provides a detailed account of the processes undertaken in the development of an indicator system to measure the contribution of SSA to SRD.
ISBN: 978-92-5-106416-0.

Feed ingredients and fertilizers for farmed aquatic animals: sources and composition.
Tacon, A.G.J.; Metian, M.; Hasan, M.R. *FAO Fisheries and Aquaculture Technical Paper.* no. 540. Rome, FAO. 2009. 209p.

This technical paper presents an up-to-date overview of the major feed ingredient sources and feed additives commonly used within industrially compounded aquafeeds, including feed ingredient sources commonly used within farm-made aquafeeds, and major fertilizers and manures used in aquaculture for live food production. Information is provided concerning the proximate and essential amino acid composition of common feed ingredient sources, as well as recommended quality criteria and relative nutritional merits and limitations, together with a bibliography of published feeding studies for major feed ingredient sources by cultured species. The main body of the document deals with the nutritional composition and usage of major feed ingredient sources in compound aquafeeds, as well as the use of fertilizers and manures in aquaculture operations. Major feed ingredient and fertilizer groupings discussed include: animal protein sources, plant protein sources, single cell protein sources, lipid sources, other plant ingredients, feed additives, and fertilizers and manures.
ISBN: 978-92-5-106421-4

Impact of rising feed ingredient prices on aquafeeds and aquaculture production.
Rana, K.J.; Siriwardena, S.; Hasan, M.R. *FAO Fisheries and Aquaculture Technical Paper*. No. 541. Rome, FAO. 2009. 63p.

The present technical paper investigates the underlying reasons for the recent dramatic rise in prices of many of the commodities commonly used in aquafeed production and its consequences for the aquafeed industry, with particular reference to Asia and Europe. This paper also discusses issues related to availability and access to land and water resources, and the impact of other users of these resources on the direction of aquaculture. In view of increase in competition for land and water in major aquaculture producing countries, there will be increasing pressure to improve aquaculture productivity through intensification by using more of commercial feeds than farm-made feeds. Because of the increasing prices of ingredients, the prices of commercial aquafeeds may increase further and the shortfall in their local supply will compel imports. A brief overview of coping strategies to strengthen national capacity to address aquafeed supply and to mitigate rising aquafeed ingredient prices are given.
ISBN: 978-92-5-106422-1

CIRCULARS

Regional review on aquaculture development. 5. Central and Eastern European Region – 2005. FAO/Network of Aquaculture Centres in Central-Eastern Europe (NACEE). *FAO Fisheries Circular. No. 1017/5.* Rome, FAO. 2007. 92p. Russian version.
ISBN: 978-92-5-405826-5

TECHNICAL GUIDELINES

Desarrollo de la acuicultura. 3. Gestión de los recursos genéticos.
FAO Orientaciones Técnicas para la Pesca Responsable. No. 5, Supl. 3. Roma, FAO. 2009. 148p. Spanish and French versions.

Estas Directrices técnicas han sido desarrolladas con el fin apoyar secciones del Código de Conducta para la Pesca Responsable de la FAO en los aspectos de la gestión de recursos genéticos. Se proveen sugerencias en la administración y domesticación de las reservas de genitores, programas de mejoramiento genético, programas de difusión para los peces mejorados genéticamente, consideraciones económicas en los programas de mejoramiento genético, monitoreo y evaluación de riesgos, pesca basada en el cultivo, conservación de los recursos genéticos pesqueros, bancos de genes, un enfoque preventivo y relaciones públicas. El manejo efectivo de los recursos genéticos, la evaluación y supervisión de los riesgos pueden ayudar a promover la acuicultura responsable aumentando la producción económica y el rendimiento y ayudando a minimizar los impactos negativos sobre el medioambiente. Los beneficios resultantes de la aplicación responsable de los principios genéticos en la acuicultura deberían comunicarse a los consumidores, formuladores de política, científicos y otros interesados en la pesca responsable y en la acuicultura.
ISBN: 978-92-5-306045-0 Spanish version
ISBN: 978-92-5-206045-1 French version

FAO AQUACULTURE NEWLETTER

FAO Aquaculture Newsletter. No. 41. December 2008. (printed in 2009)
Rome, FAO. 2009. 53p.

FAN 41 editorial was dedicated to biosecurity as a new challenge for aquaculture developers. Thirteen articles presented in this issue covered: a UTF project for the State of Puebla in Mexico; an FAO/NACA regional cooperation project to reduce the dependence on the utilization of trash fish/low value fish as feed in the Asian region; regional collaboration on fisheries and aquaculture in Central Asian and Caucasus countries; outcomes of the fourth session of the COFI Sub-committee on Aquaculture; governance experiences of several countries as presented during a special event during SCA IV; regional workshop on aquatic animal health in the RECOFI region; FAO CCRF technical guidelines on aquaculture; project updates in DPR Korea, Kingdom of Saudi Arabia, Tanzania, Latin America and the Caribbean; and impacts of rising feed ingredient prices on aquafeed. Two new staff profiles and new aquaculture publications were also included.

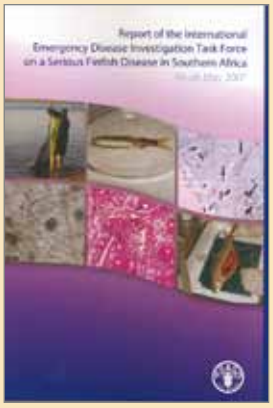
FAO Aquaculture Newsletter 42 - April 2009.
Rome, FAO. 2009. 44p.

Managing health and ensuring food safety, the subject of FAN 42 editorial, provided good arguments on the importance of ensuring animal health improving at the same time food safety. FAN 42 announced the organization of the Global Conference on Aquaculture 2010 which is intended to review the present status and trend of aquaculture and evaluate the progress made in the implementation of the 2000 Bangkok Declaration and Strategy. A wide range of articles were presented in this issue such as the outcomes of several meetings and workshops on such subjects as ecosystem approach to aquaculture, aquatic biosecurity, indicators for evaluating the contribution of small-scale aquaculture, and cage aquaculture; technical articles on regional aquaculture information systems, melamine in aquaculture, feed additives and probiotics. Project and/or activity updates in Algeria, Central Asia, Thailand and Malaysia were also provided including two GIS-related articles (one on a training course and another on a GIS award). This issue also included an FAO press release on a killer fish disease in Africa and new aquaculture publications.

FAO Aquaculture Newsletter 43 - December 2009.
Rome, FAO. 2009. 36p.

The editorial of FAN 43 highlighted the role of aquaculture to food security, presenting aquaculture as a viable solution to food security challenges confronting the global population and an invitation to participate in the Global Conference on Aquaculture 2010. This issue of FAN provided articles describing technical cooperation projects dealing with aquaculture in Kyrgyzstan, Turkey, Uzbekistan, Cook Islands, DPR Korea, Saudi Arabia, Algeria, Cameroon, Mauritania and Pacific Micronesia. One article presented the main issues discussed at the fifth session of the Regional Commission for Fisheries (RECOFI); two articles announced the convening of two FAO workshops on prudent and responsible use of veterinary medicines and methods for aquaculture policy analysis, formulation and implementation; and one article described the birth of a network in the Americas. Release of 11 new aquaculture publications was announced.

REPORTS



Report of the International Emergency Disease Investigation Task Force on a Serious Finfish Disease, in Southern Africa
18-26 May 2007. Rome, FAO. 2009. 70p.

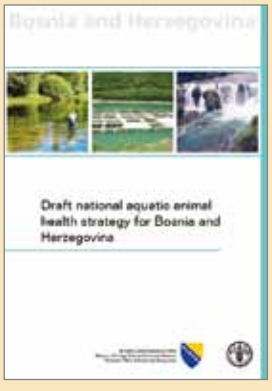
Responding to a request from the Government of Botswana in connection with a serious disease affecting freshwater fishes in the Chobe-Zambezi River system reported since October 2006, FAO formed an International Emergency Disease Investigation Task Force aimed to undertake an emergency assessment of the fish disease outbreak in order to identify, as far as possible, the causative agent; to provide recommendations to prevent further spread of the disease; to recommend control measures if applicable; to develop an emergency response and contingency plan for future outbreaks to concerned governments; and to develop a possible regional project. This report provides comprehensive information on the outcomes of the 2007 Task Force investigation, further updates on the occurrence of epizootic ulcerative syndrome in southern Africa based on an active surveillance programme implemented by FAO and government partners in late 2007 until 2008, and other ongoing activities and developments towards enhancing aquatic biosecurity in southern Africa.
ISBN: 978-92-5-106238-8

Report of the FAO Workshop on the Development of an Aquatic Biosecurity Framework for Southern Africa.
Lilongwe, Malawi, 22–24 April 2008. *FAO Fisheries and Aquaculture Report.* No. 906. Rome, FAO. 2009. 55p.

The above FAO workshop participated by eighteen officials representing nine countries (Angola, Botswana, Kenya, Malawi, Mozambique, United Republic of Tanzania, Uganda, Zambia and Zimbabwe) and representatives from FAO and OIE, identified a number of recommended actions to address aquatic biosecurity in the region. These include a request to FAO to develop a followup project, to assist in reviewing institutional and legal frameworks concerning aquatic biosecurity; for countries in the region to work closely in collaboration with FAO and OIE and regional partners to collectively address matters pertaining to aquatic animal health and biosecurity; to recognize the University of Zambia as a potential regional diagnostic centre and Uganda as a regional coordinating centre; to develop a regional model/template on import risk assessment for introductions and transfers of live aquatic animals; and to convene a ministerial level meeting for southern African countries to raise the issue of aquatic animal biosecurity.
ISBN: 978-92-5-106386-6

Report of the FAO Western Balkan Regional Seminar/Workshop on Aquatic Animal Health.
Sarajevo, Bosnia and Herzegovina, 19−21 May 2008. *FAO Fisheries and Aquaculture Report.* No. 879. Rome, FAO. 2009. 25p.

The Western Balkan Regional Seminar/Workshop on Aquatic Animal Health (TCP/BiH/3101) held in Sarajevo, Bosnia and Herzegovina, from 19 to 22 May 2008 was participated by a total of forty representing fisheries and veterinary authorities and the private sector from Western Balkan countries (Bosnia and Herzegovina, Croatia, Montenegro, Serbia and The Former Yugoslav Republic of Macedonia) including representatives from the FAO and OIE. The regional seminar/workshop successfully disseminated the outcomes of TCP/BiH/3101 (Strengthening Aquaculture Health Management in Bosnia and Herzegovina); exchanged information on the status of aquaculture and aquatic animal health, diseases affecting aquaculture, and programmes for disease diagnosis and prevention in Western Balkan countries; and identified opportunities for seeking solutions to common problems related to pathogen issues affecting regional trade between Balkan states and other key European Union trading partners; and discussed and formulated a possible programme for regional cooperation.
ISBN: 978-92-5-106265-4

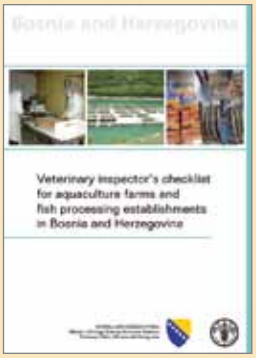


Draft national aquatic animal health strategy for Bosnia and Herzegovina/Nacrt nacionalne strategije zazdravlje akvaticnih životinja uBosni i Hercegovini.
Government of Bosnia and Herzegovina, State Veterinary Office/Vijece ministara BiH, Ured za veterinarstvo. Rome, Rim FAO. 2009. 47p.

As an output of FAO Project TCP/BIH/3101 “Strengthening aquaculture health management in Bosnia and Herzegovina”, the National Aquatic Animal Health Strategy (NAAHS) was developed jointly by representatives of the government and private sectors to assist in formulating policy and planning towards improving national aquatic animal health status, achieving international recognition of the high quality of Bosnia and Herzegovina’s aquaculture products and assisting their entrance onto international markets. The draft strategy expresses a Statement of purpose; Vision; Guiding principles; and... implementation; and outlines nine major programmes of activity: (1) Policy, legislation and institutional framework; (2) Risk analysis and quarantine; (3) Diagnostics and health certification; (4) Surveillance, monitoring and reporting; (5) Emergency preparedness;

(6) Capacity building; (7) Research and development; (8) Communication and international collaboration; and (9) Resources and funding. Within each major programme are presented its objectives, current status, and a number of projects that are to be accomplished during the initial phase of implementation. The NAAHS will be further developed by the State Veterinary Organization for funding and implementation.
ISBN: 978-92-5-006354-6

Veterinary inspector's checklist for aquaculture farms and fish processing establishments in Bosnia and Herzegovina/ Ček lista za veterinarske inspektore na farmama akvakulture i objektima za preradu riba u Bosni i Hercegovini.



Government of Bosnia and Herzegovina. State Veterinary Office/Vijece ministara Bosne i Hercegovine. Ured za veterinarstvo. Rome, Rim, FAO. 2009. 28p.

This document developed as one of the outputs of FAO Technical Cooperation Project TCP/BIH/3101 "Strengthening Aquaculture Health Management in Bosnia and Herzegovina", presents a checklist of information that will provide guidance to veterinary inspectors of Bosnia and Herzegovina (BIH) in conducting veterinary inspection of aquaculture farms and fish processing establishments in the country. The Veterinary inspector's checklist may be applied to several types of aquaculture farms and fish processing establishments, i.e. fish hatcheries, cage-culture facilities, concrete ponds, earthen ponds, fish transporting systems and fish processing facilities. The checklist includes information on aspects of inspections, parameters to be analysed/tested or activities to be performed, samples to be collected and frequency of inspection. The legal reference to which the inspection procedure needs to be carried out is also indicated. These legal decisions ensure that appropriate sanitary practices (for fish, water, feed, facilities, etc.) and monitoring of veterinary health of fish and safety and quality of fishery products are in place. This veterinary checklist will assist in the implementation of the National Aquatic Animal Health Strategy (NAAHS) for BIH and help to protect and improve the country's national aquatic animal health status, enhance the nation's ability to meet international aquatic animal health and food safety standards and obligations, promote sustainable aquaculture and facilitate access to international markets for aquaculture and fishery products.
ISBN: 978-92-5-006355-3

Committee on Fisheries Sub-Committee on Aquaculture COFI - Report of the fourth session of the Sub-Committee on Aquaculture.

Puerto Varas, Chile, 6-10 October 2008. Trilingual English/French/Spanish
FAO Committee on Fisheries. *FAO Fisheries and Aquaculture Report* No. 891. 2009. 69p.

The Committee on Fisheries Sub-Committee on Aquaculture was attended by 38 Members of FAO, by representatives from one specialized agency of the United Nations and by observers from six intergovernmental and three international non-governmental organizations. Several working documents, including Technical guidelines on aquaculture certification, Towards better governance in aquaculture and Opportunities for addressing the challenges in meeting the rising global demand for food fish from aquaculture, were presented by the Secretariat for information, discussion and decision by the Sub-Committee. The Secretariat also held a special event on the FAO Fisheries and Aquaculture Department's Special Programme for Aquaculture Development in Africa (SPADA). All technical documents presented and the activities conducted were well received. The Sub-Committee requested the Secretariat to ensure the implementation of priority activities during the intersessional period. The Sub-Committee expressed its appreciation to the Government and people of Chile for their hospitality and the excellent facilities provided for the session. The Sub-Committee agreed that its next session should be held in 2010 and appreciated the offer made by the Government of Thailand to host it.
ISBN: 978-92-5-006194-8 English/French/Spanish version
ISBN: 978-92-5-606194-2 Arabic version
ISBN: 978-92-5-506194-3 Chinese version
ISBN: 978-92-5-406194- 4 Russian version

Report of the Regional Technical Workshop on Sustainable Marine Cage Aquaculture Development.

Muscat, Sultanate of Oman, 25–26 January 2009. FAO/Regional Commission for Fisheries. *FAO Fisheries and Aquaculture Report*. No. 892. Rome, FAO. 2009. 135p.

The Regional Commission for Fisheries (RECOFI) Regional Technical Workshop on Sustainable Marine Cage Aquaculture Development, held from 25 to 26 January 2009 in Muscat, Sultanate of Oman, was organized in view of the growing importance and interest of this aquaculture sub-sector across the region. The workshop focus was on environmental impact assessment and monitoring, and aquaculture licensing for marine aquaculture cage systems and aimed at identifying constraints and shortcomings that required to be dealt with to support the development of the cage industry and facilitate investments from the private sector. The document contains a set of suggestions and recommendations with regards to technical and policy requirements needed to

support the growth of the aquaculture sector as a whole and more specifically cage fish farming. The report also contains three review documents on marine cage aquaculture in the region, regulation of Norwegian net-cage fish farming, and a review on cage aquaculture licensing procedures prepared as background discussion papers for the workshop. With specific regard to environmental impact assessment (EIA) the discussions held at the workshop clearly indicate that there is a need for the region and individual Commission members to develop an ad hoc EIA format based on the conditions of the local marine environment. A proposed cage aquaculture licence procedure was discussed and proposed at the workshop based on the format developed and adopted by the Sultanate of Oman.
ISBN: 978-92-5-106224-1

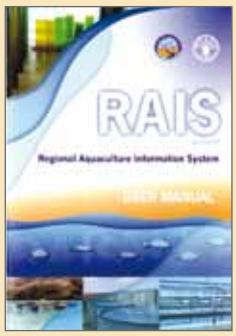
Report of the fourth meeting of the Working Group on Aquaculture.
Muscat, Sultanate of Oman, 27–28 January 2009. FAO/Regional Commission for Fisheries. *FAO Fisheries and Aquaculture Report*. No. 895. Rome, FAO. 2009. 44p.

The fourth meeting of the Working Group on Aquaculture (WGA) of the Regional Commission for Fisheries was held in Oman, from 27-28 January 2009. The WGA reviewed the recommendations and decisions of the Commission made at its fourth session (May 2007) and noted that all endorsed WGA activities had been implemented. The meeting discussed the final inputs to the Regional Aquaculture Information System (RAIS) in view of its launching in March 2009. The participants agreed on the RAIS User Manual, promotional flyer, press release, and on the communication strategy to launch the system. The WGA finalized its work programme for the new intersessional period based on the recommendations resulting from its previous activities and emerging issues. The activities proposed include: application of risk analysis to aquaculture, environmental monitoring in cage aquaculture, impacts of red tides to aquaculture, development of national strategies on aquatic animal health, spatial tools and aquaculture zoning, and aquaculture recirculation strategies.
ISBN: 978-92-5-106227-2

MISCELLANEA

What you need to know about epizootic ulcerative syndrome (EUS): an extension brochure.
FAO, Rome. 33p.

This extension brochure provides simple facts or frequently asked questions about EUS and is intended to a wide range of audience from fish farmers and fishermen to extension officers as well as policy makers as a public information campaign to make available factual information about the disease so that awareness may be raised for better understanding of its potential impact. It contains answers to questions such as: what is EUS; what does EUS do to the fish; when does EUS occurs; how is EUS diagnosed; which species are susceptible or affected; how is EUS spread; what factors cause the fish to get infected; why and where is EUS a problem today; is it safe to eat EUS fish?; can EUS-infected fish be treated? can infection by EUS be prevented? what can one do in the event of a disease outbreak? can I collect EUS samples for laboratory examination?



RAIS - Regional Aquaculture Information System - User manual (version 1.0).
Crespi, V.; Lovatelli, A. RAIS - Regional Aquaculture Information System. User manual. Version 1.0. Rome, FAO. 2009. 52p. Bilingual English/Arabic

The Regional Aquaculture Information System (RAIS) is a Web site based on open source Typo3 software (a Content Management System). It has been established by the Food and Agriculture Organization of the United Nations (FAO) under the aegis of the Regional Commission for Fisheries (RECOFI) to facilitate the exchange of aquaculture information in the Gulf area among regional experts and stakeholders, and to promote and develop a sustainable aquaculture industry. This simple user manual is addressed to all RAIS authorized users who wish to gain a better understanding on how the system works and to exploit all its functionalities.

CD-ROM - Cultured Aquatic Species Fact Sheets (Multilingual).
Cultured aquatic species fact sheets. Edited and compiled by Valerio Crespi and Michael New. Rome, FAO. 2009. CD-ROM (multilingual).

This CD-ROM contains 50 cultured aquatic species fact sheets produced by the Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations. The fact sheets are written in simple technical language and focus on the practical aspects of aquaculture, from seed supply to farming systems including harvesting techniques and marketing issues. All fact sheets are available in five FAO languages (Arabic, Chinese, English, French and Spanish), easily accessible through an introductory page and printable.
ISBN: 978-92-5-006410-9

FAO aquaculture information products 2008-2009

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Rome, FAO. 2010.