



# FAN

48 December 2011

## FAO Aquaculture Newsletter



## Biennium 2010-2011 recap and what's in store for biennium 2012-2013

### The biennium that was

In the midst of the ongoing FAO reform, biennium 2010-2011 was a quite busy 2-years for the FAO aquaculture group, as we fulfill our mandate of supporting sectoral development and providing technical assistance as requested by FAO Members.

Among the major highlights was the successful conduct of the Global Conference on Aquaculture 2010 (GCA 2010) and the Fifth Session of the COFI Sub-Committee on Aquaculture (COFI/SCAV), held back to back (22-25 September and 27 September -1 October) in Phuket, Thailand; both events hosted and co-organized by the Thai Department of Fisheries (DoF); the former co-organized with the Network of Aquaculture Centres in Asia and the Pacific (NACA).

More than 650 from 69 countries participated in GCA 2010 representing aquaculture stakeholders from government, academia, education, research and industry sectors. The unique technical programme with two Keynote addresses, three invited Guest lectures, six regional reviews and one global synthesis and 41 thematic presentations covering six broad aquaculture thematic areas – became the basis for drawing a list of recommendations and conclusions – and adoption of the “*Phuket Consensus*” – a re-affirmation of the commitment to the Bangkok Declaration and Strategy as the guidance for aquaculture development. Four side events organized with partner governments and institutions on - improving sustainability of seafood production and trade, aquaculture industry dialogue, aquaculture research opportunities and regional networking in aquaculture - offered additional platforms which particularly brought private sector stakeholders to the aquaculture scene. A fifth side event gave a special focus to the future of aquaculture in the island region of the Pacific.

The last biennium also saw the final stages of the long and engaging journey leading to the approval of the FAO Guidelines on Aquaculture Certification since Member countries requested FAO, in September 2006, to take a lead role in facilitating its development. Backed up by six workshops/consultative fora between 2007- 2008 (in Thailand, Brasil, India, U.K., China and the USA), two sessions of COFI/SCA (SCA IV, Puerto Varas, Chile, 2008; SCA V, Phuket, Thailand, 2010) and an FAO Technical Consultation (Rome, Italy, 2010), the technical guidelines were approved by consensus during COFI/SCAV and officially endorsed by the 29<sup>th</sup> Session of COFI in February 2011.

Three FAO CCRF Technical Guidelines for Aquaculture Development (No. 5) addressing issues of common concern, i.e. Ecosystem approach to aquaculture (Suppl. 4), Use of wild fish as feed in aquaculture (Suppl. 5) and Use of wild fishery resources for capture-based aquaculture (Suppl. 6) were published during the biennium.

Three other milestone regional events were successfully conducted. First, the Aquaculture Network of the Americas (RAA – Red de Acuicultura de las Americas), now an aquaculture inter-governmental organization (IGO) was launched in March 2010 in Brasil with 21 governments of Latin America and the Caribbean signing the agreement and Brasil hosting the network secretariat for the first four years. Second, the Asia Regional Ministerial Meeting on Aquaculture for Food Security, Nutrition and Economic Development (Colombo, Sri Lanka, July 2011) – where high level Asian political leadership in fisheries and aquaculture from 17 countries agreed on the “*Colombo Consensus*” to strengthen aquaculture development through regional cooperation in six strategic areas and four priority themes.



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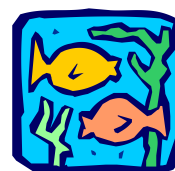
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## COFI Sub-Committee on Aquaculture, Sixth Session

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The Sixth Session of the FAO Committee on Fisheries (COFI) Sub-Committee on Aquaculture (COFI/AQ/VI) will be held in Cape Town, South Africa from 26-30 March 2012. The Session is sponsored and hosted by the Government of South Africa.

Aquaculture is still the fastest growing food producing sector in the world. It currently contributes nearly 50 percent to the global food fish supplies and is expected to continue this contribution in the decades to come and to improve food and nutrition security globally. However, as the global population is growing at an alarming rate and we are expected to be nine billion people on the planet by 2050, maintaining the level of consumption of aquatic food would become a daunting task. Although aquaculture is almost entirely practiced as national ventures, the aquaculture value chain is considerably long and many stakeholders in many parts of the world are involved, thus aquaculture has become more international than national.

Sustainable development and management of any international commodity production sector needs discussions, negotiations, consensus and collective decisions at international level. FAO's COFI is the only dedicated and mandated platform for such discussions and decisions on fisheries and aquaculture among governments and related bodies at the international level. The COFI, a subsidiary body of the FAO Council, was established in 1965. COFI has two Sub-Committees with the same statute. The Sub-Committee on Aquaculture (COFI/AQ) is one such with a clear mandate for addressing aquaculture matters at intergovernmental level.

The main goal of the COFI/AQ is to provide a forum for consultation and discussion on aquaculture and advise COFI on technical and policy matters related to aquaculture and on the work to be performed by the Organization in the subject matter field of aquaculture. In particular, the COFI/AQ identifies and discusses major issues and trends in global aquaculture development; determines those issues and trends of international importance requiring action to increase the sustainable contribution of aquaculture to food security, economic development and poverty alleviation; recommends international action to address aquaculture development needs; advises on the preparation of technical reviews and of issues and trends of international significance; and addresses any specific matters relating to aquaculture referred to it

by its Members, the COFI or the Director-General of FAO.

The Sixth Session in Cape Town is expected to bring together over 75 FAO member states to discuss and decide on several important issues on current aquaculture. Among other issues, the Session will analyze and assess the FAO Fisheries and Aquaculture Department's efforts in implementing the recommendations of the past sessions of the COFI/AQ. It will also look at the progress made on the implementation of the Code of Conduct for Responsible Fisheries (CCRF) provisions relevant to aquaculture and culture-based fisheries.

As aquaculture certification has become an increasingly important issue globally, one of the major discussion items would be the implementation of the FAO technical guidelines on aquaculture certification. The Sub-Committee is expected to advise FAO on how to move ahead with assisting implementation of the FAO guidelines on aquaculture certification, including capacity building and technical assistance to member governments. For the first time, the Sixth Session will also discuss the vital issue of feeding the future aquaculture, addressing the challenges for sourcing animal and plant proteins and other carbohydrates for making fish feed. Apart from the discussion on how to measure and evaluate aquaculture sector performance, the Session will also discuss a future plan of action for the Sub-Committee itself with the view to improve the impact of the Sub-Committee on global aquaculture development. There will also be a special event on genetic resources and technologies in aquaculture development: opportunities and challenges, where several regional presentations on the subject will be made, in addition to the points outlined in the specific working document. During the COFI/AQ/VI, a session of the Commission for Inland Fisheries of Africa (CIFA) will also be held, with participation from the 37 member countries.

All details and technical documentations of COFI/AQ/VI are available at <http://www.fao.org/cofi/aq/en/>



# COFI Sub-Committee on Fish Trade, Thirteenth Session

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The Sub-Committee on Fish Trade will hold its Thirteenth Session from 20-24 February 2012, Hyderabad, India.<sup>1</sup> The Sub-Committee provides an excellent forum for global discussions related to international trade of fish and fishery products. As the contribution of aquaculture to human consumption will soon surpass that of capture fisheries and around fifty-percent of world trade in fish and fishery products is attributed to the aquaculture sector,

the issues addressed by the Sub-Committee on Fish Trade are of vital importance to the continued growth and sustainable development of aquaculture. The emphasis of the FAO on capacity-building on trade-related topics is especially relevant for the growth of aquaculture enterprises, including small-scale industries which are the mainstay for developing countries and economies-in-transition. The work of the Organization highlights the important contribution of the fisheries sector and international trade of fish and fishery products in raising the level of human nutrition, increasing food security, providing employment especially in rural communities and for women, and contributing to the growth of the global economy. The recent global financial crisis depressed real national incomes and raised public debt in many developed economies, leading to fiscal and monetary austerity measures that may have long-term consequences for income and consumer spending patterns. This will also have an impact on the demand for fish in developed countries. Since 50% of internationally-traded fish products originate in developing countries, it is also important to continue efforts in technical assistance to improve food safety practices, ecolabelling, and traceability of developing country fishery export products.

## Key topics

The Sub-Committee informs Member Nations of its work and outcomes since the Twelfth Session and seek guidance on future work priorities. The Twelfth Session commended FAO on the work of the Secretariat in providing scientific support for Codex standard setting, in addition to technical assistance to developing countries to implement the Codex Codes requirements. The Thirteenth Session will review the ongoing work in the area of market access requirements, primarily as related to developments in fish safety and quality

requirements of the major international markets for fish. The Secretariat will report on its trade-related fisheries activities, namely the increased role of decentralization at the national and intra-regional levels, incorporation of gender issues, networking through the Fish Infonet, collaboration with the United Nations Statistics Division and the World Customs Organization, and monitoring of emergencies caused by the two recent tsunamis. The recent developments in fish trade, namely implications on production, consumption, prices, and value-chain developments, especially in relation to small-scale producers will also be reported. Discussions will include the recent state of the WTO negotiations under the Doha Development Round, ongoing cooperation between FAO and other organizations, as well as its CITES-related activities. Several key items for review and discussion include:

- Further assessment and analysis in the area of ecolabelling and the supply chain, starting from fish feed sources all the way to the consumer of the final fishery product. The contribution of ecolabelling schemes to improved fisheries management also requires further analysis.
- A review of the report of the Expert Consultation to develop an FAO evaluation framework in the area of ecolabelling of fish and fishery products from marine capture fisheries which identified benchmarking indicators for the evaluation framework, proposed different types of assessments that could be used, and acknowledged the special circumstances of developing countries and economies-in-transition.
- A review of the three options that were identified in the paper on Best Practices for Traceability of Fish and Fish Products, namely the Secretariat: (1) would develop guidelines and publish them, (2) would develop draft guidelines for consideration at the Fourteenth Session, or (3) explore the possibility of an Expert Consultation to develop best practice guidelines for traceability.

<sup>1</sup>The Sub-Committee on Fish Trade was established by the Committee on Fisheries (COFI) in 1985 and its first session was held in October 1986.

## “Colombo Declaration” strengthens regional cooperation in aquaculture development

A major source of food and livelihoods in Asia comes from fisheries and aquaculture. The Asian region have the highest average food fish consumption rate - estimated at 29 kg per person per year and the highest contribution (80%) to global aquaculture. In order to maintain at least the current level of consumption, and taking into consideration the growing world population, Asia will require an additional 20 million tonnes of fish per year by 2030, which will have to come from aquaculture. This is a major task for the region and there will be hurdles on the road to success.

*“If there is a lesson I can draw from our few successes, it is that political commitment is the key to sustaining the goal of any initiative. Place this in the larger context of our region and political commitment becomes an even more crucial element. This raises the important question as to how, we in the Asian region can direct and sustain political leadership and commitment to fisheries and aquaculture development” says Sri Lankan President Mahinda Rajapaksa in his keynote address.*

The Asia Regional Ministerial Meeting on Aquaculture for Food Security, Nutrition and Economic Development, convened in Colombo, Sri Lanka on 28-29 July 2011, and organized jointly by FAO and the Network of Aquaculture Centres in Asia and the Pacific (NACA) and hosted by the Government of Sri Lanka - discussed issues pertaining to aquaculture and regional cooperation towards improving the contribution of aquaculture to food security and economic development.

This landmark gathering of Asian political leadership in fisheries and aquaculture was attended by delegations headed by ministers and ministerial level officials from seventeen countries in Asia and the Pacific (Bangladesh, Cambodia, China, Fiji, India, Indonesia, DPR Korea, Lao PDR, Malaysia, Maldives, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand, Timor Leste and Viet Nam).

At the meeting, opening remarks were delivered by Dr Árni M. Mathiesen, Assistant Director-General of FAO; Prof. Sena De Silva, Director General of

*“The importance of aquaculture to Asia as well as the importance of Asia to aquaculture is synonymous. Failure to govern the sector properly in accordance with the Code of Conduct for Responsible Fisheries could threaten bio-security, which, in turn could hamper efforts to manage aquatic animal health, conserve aquatic biodiversity and produce fish which is safe for all to eat” Assistant Director-General Arni Mathiesen remarked in his opening speech.*

NACA; and Dr Rajitha Senaratne, Hon. Minister of Fisheries and Aquatic Resources Development, Sri Lanka. Dr Rohana Subasinghe, Senior Aquaculture Officer of FAO made a technical presentation entitled “Aquaculture for Food Security, Nutrition and Economic Development: An Asian Perspective”, which was followed by the Keynote Address by His Excellency, the Hon. Mahinda Rajapaksa, President of Sri Lanka. The opening ceremony was followed by ministerial statements concerning aquaculture, food security, nutrition and economic development and discussion.

The two-day meeting concluded with the “Colombo Declaration”, the first ever political commitment and agreement on aquaculture in the region. The declaration provides a policy framework for Asian governments to collaborate in pursuing these common goals, to share experience and build on each other's strengths for the benefit of all.

FAO was proud to be a partner in the meeting and hopes it will facilitate the region to reinforce its role and meet the global demand for aquatic food in the coming years.

When we consider that the human population of the world is projected to grow from just under 7 billion today to over 9 billion in 2050, the essential role of aquaculture in ensuring food security and improving nutrition now and in the future becomes even clearer.

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R. Subasinghe, FAO

Asian political leadership in fisheries and aquaculture from 17 countries supported this Ministerial Meeting in Colombo

#### Agreed Strategic Areas:

- Supporting and strengthening existing regional organizations whose mandates include fishery and aquaculture development;
- Improving inter-regional collaboration and networking between regional organizations to ensure synergy;
- Enhancing the competitiveness of aquaculture farmers and industries in the world market, developing regional markets and promoting more intra-regional trade;
- Promoting national farmer associations, linkages and relations among national associations, and facilitating the formation of a regional federation;
- Encouraging public private partnership and promoting joint ventures and investments;
- Strengthening the capacity of regional and national institutions and farmers organizations for information development, analysis and dissemination.

#### Recommended Priority Areas:

- Farming systems
- Genetic improvement
- Aquatic animal health
- Response to climate change impacts



R. Subasinghe, FAO

High level support received from key officials of NACA, FAO and Government of Sri Lanka to this milestone regional event. L-R: Former NACA Director-General, Prof. Sena De Silva, FAO Assistant Director-General, Dr Arni Mathiesen, Sri Lanka President Mahinda Rajapaksa, Sri Lankan Fisheries Minister Dr Rajitha Senarathne, Sri Lankan Deputy Fisheries Minister Mr. Susantha Panchinilame and FAO Representative to Sri Lanka Patrick Thomas Evans



# The Colombo Declaration : A Commitment Development for Food Security, Nutrition,

## The Declaration

- We are inspired by the success of aquaculture development in many parts of Asia and recognize that aquaculture now provides more than half of the fish consumed in Asia.
- We are convinced of the immense potential that exists and the need for accelerating the growth and expansion of aquaculture in the region.
- We believe that technical cooperation amongst countries in the region is the way forward; and that this cooperation can be sustained, economic linkages reinforced, and capacities to achieve potentials and meet future needs for food and livelihood security be enhanced by political leadership.

Aquaculture came to be globally recognized as an important economic sector with the Technical Consultation on Aquaculture in Kyoto in 1976<sup>1</sup>, primed for the new millennium with the Bangkok Declaration and Strategy of 2000<sup>2</sup>, and infused with greater vigour by the renewed affirmation of its importance at the Global Conference on Aquaculture in Phuket in 2010<sup>3</sup>.

These events have inspired many national, regional and global initiatives in aquaculture development. These were guided by the provisions of the

Code of Conduct for Responsible Fisheries<sup>4</sup> and the principle of technical cooperation among Countries. They were implemented through practical institutional arrangements among Governments in the region and supported by various mandatory and voluntary instruments to spur responsible advancement of aquaculture and to effectively govern its expansion. A number of countries, individually as well as together, achieved notable progress through technology and progressive policies.

Recognizing that the full potential of aquaculture to contribute to poverty alleviation, human development and social empowerment can be realised with consistent, responsible policies and goals that encourage sustainable development and by sharing experiences and knowledge, many countries and their institutions of the Asian Region generated exemplary models and useful lessons in regional technical and economic cooperation and networking for aquaculture development.

The outcome of such regional cooperation and the economic linkages along with the robust efforts by the countries has been the remarkable increase in aquaculture productivity followed by a steady expansion in its development in most countries of the region. Its benefit to societies has been a more prosperous and a better nourished population.

□

<sup>1</sup>FAO. 1976. Report of the FAO Technical Conference on Aquaculture. Kyoto, Japan, 26 May – 02 June 1976. FAO, Rome. 93pp.

<sup>2</sup>NACA/FAO. 2000. Aquaculture Development Beyond 2000: the Bangkok Declaration and Strategy. Conference on Aquaculture in the Third Millennium, 20-25 February 2000, Bangkok, Thailand. NACA, Bangkok and FAO, Rome. 27pp.

<sup>3</sup>FAO/NACA. 2011. Phuket Consensus; a reaffirmation of commitment to the Bangkok Declaration and Strategy. Global Conference on Aquaculture 2010. 22-25 September 2010. Phuket, Thailand. FAO, Rome (in press).





## to Regional Cooperation in Aquaculture and Economic Development in Asia

However, sustaining the momentum of aquaculture development is a challenge on account of mounting number and severity of risks from adverse processes of nature, and growing scarcity of and increasing competition for resources, driven by an ever increasing demand for its products.

We<sup>5</sup> therefore, on this day the 29<sup>th</sup> July 2011, at Colombo, Sri Lanka, resolve to commit our will, resources and support, and collectively exert our political leadership:

### Our Commitment

1. To strengthen the contribution of aquaculture to food security, nutrition and economic development in Asia;
2. To share and disseminate the achievements from individual national efforts at technological advancement and policy development in aquaculture to help elevate the social and economic status of the countries in the Asian region;
3. To raise the capacities of all nations in the Asian Region to solve persistent, new and future problems of aquaculture on our path to better and sustained productivity, assured food security and social equity by bringing together and harnessing the intellectual and material resources of our countries;
4. To sustain the viability and increase the capabilities of the various institutional arrangements for technical and economic cooperation in the Asian region, and enhance the effectiveness of the relevant regional and international instruments to scientifically develop and wisely govern the development of aquaculture;
5. To make aquaculture development one of the instruments to achieve regional aspirations of social and economic development and to enhance prosperity among our nations and our peoples<sup>6</sup>;
6. To periodically review and follow-up on our commitments outlined in this Declaration and the attached strategy framework, and
7. Invite all stakeholders including the donor and development assistance community to join us in our commitment and resolve.

The Asia Regional Ministerial Meeting on Aquaculture for Food Security, Nutrition and Economic Development was held in the Hotel Hilton, Colombo, Sri Lanka, 28-29 July 2011

<sup>4</sup>FAO. 1995. Code of conduct for responsible fisheries. FAO, Rome. 41pp.

<sup>5</sup>The list of Ministers and Ministerial representatives attended the Asia Ministerial Meeting is given in Annex 1.

<sup>6</sup>The proposed strategy framework for regional cooperation in aquaculture development is outlined in the meeting document entitled "Regional cooperation for improving the contribution of aquaculture to food security, nutrition and economic development in Asia: a strategy."

# “Implications of climate change on fisheries and aquaculture: challenges for adaptation and mitigation in the Asia-Pacific Region” and “Strengthening fisheries and aquaculture assessment”

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The Union Minister of Myanmar addressing the workshop

As the major inter-sessional activities of the Asia-Pacific Fisheries Commission (APFIC), two regional consultative workshops on “Implications of climate change on fisheries and aquaculture: challenges for adaptation and mitigation in the Asia-Pacific Region” and “Strengthening Fisheries and aquaculture assessment” were convened following the recommendations of the most recent APFIC Session in addressing regional priority issues related to fisheries and aquaculture.

## Implications of climate change on fisheries and aquaculture: challenges for adaptation and mitigation

The 31<sup>st</sup> Session of APFIC emphasized that adaptation and mitigation of climate change impacts related to fisheries and aquaculture is a very pressing issue owing to the importance of fisheries and aquaculture in the Asia-Pacific region and the high vulnerability to climate change impacts. The session recommended that APFIC should review the effects of climate change on fisheries and aquaculture in the region and provide advice to member countries on strategic planning for adaptation and mitigation measures for the sector. The APFIC/FAO regional consultative workshop “Implications of climate change on fisheries and aquaculture: challenges for adaptation and mitigation

in the Asia-Pacific Region” was therefore convened on 24-26th May 2011 in Kathmandu, Nepal as a follow-up action, in collaboration with Directorate of Fisheries Development, Ministry of Agriculture and Cooperatives of the Government of Nepal.

As the first international fisheries event ever hosted by the government of Nepal, the workshop received high attention. Mr Nath Prasad Chaudhary, Secretary of Agriculture, Government of Nepal formally opened the workshop with a keynote speech. Mr Vijay Kumar Malik, Director General, Department of Agriculture, Nepal, Ms Bui Thi Lan, FAO Representative to Nepal and Mr Simon Funge-Smith, FAORAP Senior Fishery Officer and APFIC Secretary addressed opening ceremony emphasizing the importance of fisheries and aquaculture sector, threats of climate change impacts and urgent need for timely and effective regional collaborative actions on climate changes in the context of fisheries and aquaculture. The workshop brought together some 50 participants from 16 APFIC member countries and international/regional organizations (SEAFDEC<sup>1</sup>, NACA<sup>2</sup> MRC<sup>3</sup>, WorldFish Centre and FAO<sup>4</sup>). Two FAO Regional projects (BOBLME, RFLP) supported the regional workshop by funding the participants nominated by the project country offices.

The workshop comprehensively assessed specific potential impacts of different types of climate change patterns on marine capture fisheries, inland capture fisheries, coastal aquaculture and inland aquaculture and the strength and weakness of the region in fisheries and aquaculture related climate change adaptation and mitigation and clearly identified the capacity gaps and other constraints of the APFIC member countries in effectively coping with challenge of climate change in order to maintain the sustainability fisheries and aquaculture industry in the region. As the major output, the workshop produced a comprehensive regional strategy document recommending the priority regional actions, which include (i) advocacy for increased policy emphasis and financial resourcing to climate change adaptation

and mitigation in the sector; (ii) strengthening governance and integrating climate change adaptation into decision making and management of fisheries and aquaculture for improving adaptation and resilience to climate change including monitoring, tracking and assessment; (iii) involving communities and local institutions in climate change adaptation as critical for success and recognizing the different gender related impacts of climate change; (v) strengthening capacity and developing accessible information for decision makers (in other sectors). The document also suggested priority areas for targeted research and development, knowledge development and priority actions for FAO, APFIC and regional organizations to support the efforts of member countries and inter-sectoral planning.

### Strengthening fisheries and aquaculture assessment

The 31<sup>st</sup> Session of APFIC encouraged members to undertake fishery/aquaculture assessments where possible to support fishery/aquaculture planning and management decision making for sustainability. The session identified “Strengthening assessments of fisheries and aquaculture in the Asia-Pacific Region” as a priority in the APFIC work programme. The APFIC/FAO regional workshop on Strengthening fisheries and aquaculture assessment was convened from 4-6 October 2011, Yangon, Myanmar as the follow-up action.

H. E. Tin Naing Thein, Union Minister, Ministry of Livestock and Fisheries and Ministry of National Planning and Economic Development, Myanmar officially opened the regional consultative workshop with his keynote remark. Mr Simon Funge-Smith, FAO RAP Senior Fishery Officer and APFIC Secretary delivered a welcome address inducing the workshop objectives, mode of workshop conduction and the expected outputs

The workshop brought together 58 participants from 14 APFIC member countries and various competent regional organization partners (SEAFDEC, NACA, WWF, JICA, BOBLME, RFLP, IFFOO, South China Sea Fisheries Research Institute, Fish Matter Pty. Ltd.-Australia, and Abba Seafood AB-Sweden) to review and analyze the region’s efforts in developing and applying various types of fisheries and aquaculture assessment tools to support the planning and management process and identify the needed regional strategies and actions for promoting application of appropriate fisheries and aquaculture assessment tools.

The workshop reviewed specific fishery and aquaculture assessment case studies from within the APFIC region focusing on methodologies, the purpose/reason for the assessment, how the



Working group session

Weimin Miao, FAORAP

information from the assessment was used to inform or support improved management. It also reviewed some of the tools that have been used for stock assessment and fishery assessments, environmental impact assessment and import risk analysis and how they can be tailored to the characteristics of fisheries/aquaculture within the region (particularly small-scale fisheries). The workshop developed a priority list of recommendations on how the assessment tools can be appropriately applied in data poor situations and small-scale fishery/aquaculture situations that are characteristic of the region and to identify the capacity building needs to support this. The workshop drew the recommendations on promoting the application of appropriate aquaculture assessment tools in the region, which include: (i) initiate a regional process to evaluate the status of the use of various aquaculture assessment tools in the region; (ii) evaluate the usefulness or effectiveness of existing tools for aquaculture development and suggest possible modifications for applicability in the region; (iii) develop generic guidelines (e.g. for marine spatial planning) for use by countries in the region in order to encourage implementation of assessment tools; (iv) conduct cost-benefit analysis of the use of assessment tools and develop mechanisms for sharing benefits through the supply chain from producers to consumers; (v) for international and regional organizations to consider developing a regional programme to support implementation of aquaculture assessment tools in Asia Pacific, within a broader regional approach to ecosystems training programme; and (vi) support the development/revision of national aquaculture strategies so that the assessment tools are included in the national planning/development programs of countries.

<sup>1</sup>Southeast Asian Fisheries Development Center

<sup>2</sup>Network of Aquaculture Centers in Asia-Pacific

<sup>3</sup>Mekong River Commission

<sup>4</sup>Food and Agriculture Organization of the United Nations



# RFLP<sup>1</sup> reduces vulnerability of coastal communities through aquaculture

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*“I now know how to build a fish pond using a tarpaulin. I can even do it in my backyard. It’s simple and does not need high investment; I can hardly wait to start,”* says David D. Laiskodat from Indonesia’s Nusa Tenggara Timur (NTT) province following his enthusiastic participation in recent training for small-scale catfish farming.

This training was just one of a series of aquaculture-related activities carried out by the Spanish-funded, FAO implemented Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP) during 2011.

Aquaculture plays an important role within RFLP as the four-year programme sets out to strengthen capacity among participating small-scale fishing communities and their supporting institutions in Cambodia, Indonesia, the Philippines, Sri Lanka, Timor-Leste and Viet Nam. By doing so RFLP seeks to improve the livelihoods of fishers and their families while fostering more sustainable management of fisheries resources.

RFLP’s approach to aquaculture for vulnerability reduction sees it undertake actions at the regional, national and local levels.

At the regional level, RFLP supported the participation of senior level officials from the six RFLP countries at the Asia Regional Ministerial Meeting on Aquaculture for Food Security, Nutrition and Economic Development held in Colombo, Sri Lanka 28-29 July 2011.

*“Small-scale aquaculture offers both food security and livelihoods options for the coastal communities RFLP works with. It is important that this contribution is fully recognized in regional level policies concerning the sector,”* explains Jose Parajua, RFLP Regional Programme Manager.

Participants from Timor-Leste, whom RFLP supported to attend the event, took the opportunity to discuss joining the Network of Aquaculture Centers in Asia Pacific (NACA) in recognition of the benefits NACA membership could bring.

Aquaculture in Timor-Leste is fairly undeveloped yet the sector offers considerable potential to help reduce food insecurity and address nutritional problems, while also generating household income.

Current fisheries legislation emphasizes marine capture fisheries, with limited attention given to aquaculture, except for licensing and subsidies. There are presently no established procedures for licensing aquaculture production units, site selection or land and water use zoning – all of which are needed to develop an industry that is integrated into inland as well as coastal rural development initiatives.

Developing a national policy for aquaculture is therefore a priority and RFLP in collaboration with WorldFish Centre and the Coral Triangle Support Programme is working with the National Directorate of Fisheries and Aquaculture (NDEFA) in this regard.

Work towards the development of the strategy has seen the analysis of existing aquaculture activities, the identification of potential pilot activities and a value chain analysis of seaweed cultured for export.

The draft aquaculture strategy will be presented at the inaugural meeting of the recently formed Fisheries Cooperatives Federation planned for December 2011.



S. Needham, RFLP

Building capacity: 30 Cambodian Fisheries Administration (FiA) officers received training supported by RFLP on Good Aquaculture Practice in October 2011

### Building capacity at national level

RFLP recognizes the importance of building capacity of government staff, academics and others who can pass on aquaculture skills as well as ensure the availability of brood stock or seed necessary to support small-scale farmers.

In September, RFLP supported four participants from Cambodia, Viet Nam and Sri Lanka to take part in Grouper Hatchery Training in Indonesia. The course, run by the Southeast Asia Fisheries Development Centre (SEAFDEC) saw the participants trained in how to select, maintain and handle brood stock. Production technology and the management of small and medium-scale grouper hatcheries, nurseries and grow-out farms were also covered.

Meanwhile, RFLP in collaboration with the Cambodian Fisheries Administration (FiA) trained 30 FiA officers on Good Aquaculture Practice during October.

Following the training, the Department of Aquaculture Development (DAD/FiA) will select two fishery officers from each cantonment to carry out field extension so that they can help mentor and share their skills with farmers.

### A focus on seaweed

RFLP is focusing on low in the food chain aquaculture systems including seaweeds and molluscs which are low risk, low investment, and low technology while being environmentally friendly.

Villagers in Indonesia's NTT province have been trained in seaweed cultivation and processing techniques. They were also taught how to select and prepare good seedlings as well as plant them using the long-line and off-bottom methods.

"Now, I know why our previous attempts to raise seaweed were a failure," said Mr Fanggidae, one of the participants. "The seaweed was too close to the surface of the water where the heat of the sun damaged it. Now I know that it still needs the sun's rays, but also has to be deeper underwater."

Following seaweed farming training providing by RFLP and the ILO-EAST project it is also hoped that young people will take on seaweed farming as an income generation option.

RFLP's support to Indonesia's seaweed farmers is not limited to boosting harvests. Significant support has been provided to improve processing and packaging techniques as well to have products certified and achieve better market presence. Activities to enhance access to micro-finance for fishing communities are also planned in most RFLP countries as many seaweed farmers lack funds to expand production despite strong demand existing for seaweed products.



S. Needham, RFLP

Backyard catfish farming: Communities in Indonesia's NTT province receive support from the RFLP to farm catfish as an alternative livelihood option

### Farming catfish in Kupang

Also in Indonesia's NTT province, over 40 fisher households will soon be generating alternative income through catfish farming after receiving training from RFLP.

Representatives from the Marine Affairs and Fisheries Agency (DKP) and Fishery Vocational High School also took part in the course which covered catfish farming management, business development and marketing.

"This training supports DKP Kupang Municipality's programme to promote aquaculture development and to boost catfish production to meet local demand," said Ir. Muhammad Hidayat, Head of Production Division of DKP Kupang Municipality.

### Looking to the future

Aquaculture is just one of a number of approaches RFLP is using to decrease the vulnerability of small-scale fishers in South and Southeast Asia. The results of activities will be closely analyzed over the coming year to assess their impact, while case studies and change stories will be gathered to help disseminate lessons learned and to facilitate replication to areas outside of RFLP's geographical scope.

### For more information

For more information about RFLP and its activities see [www.rflp.org](http://www.rflp.org) or visit [www.facebook.com/FisheriesLivelihoods](https://www.facebook.com/FisheriesLivelihoods)

<sup>1</sup>Regional Fisheries Livelihood Programme (RFLP)

# ANAF Web site: data collection and dissemination tools

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The Aquaculture Network for Africa (ANAF) is currently composed of ten African countries, namely: Cameroon, Ghana, Kenya, Mali, Mozambique, Nigeria, Tanzania, Uganda, Zambia and Senegal. One of the key initiatives of this network was to create a Web-based information system (ANAF Web site) to facilitate information exchange in Sub-Saharan Africa and to develop an informal, flexible and efficient network of regional experts to promote and accelerate the development of the sector in the region.

The ANAF Web site has been developed by the FAO Aquaculture Service using the Open Source Content Management System (TYPO3<sup>1</sup>) which has been proven to be an easy to use system, that allows rapid data entry from the administrators and easy retrieval from end users. The ANAF Web site to be launched in March 2012 is under construction, and efforts are currently underway to collect the minimum set of essential data and information to be shared by each country. The Web site is currently hosted by the Lake Victoria Fisheries Organization in Jinja, Uganda and maintained by the Information Technical (IT) Officers of the same organization.

A Technical meeting and training on the “Aquaculture Network for Africa (ANAF) Web site: data collection and dissemination tools” was held at the Paradise Hotel in Jinja, Uganda, from 22 to 25 November 2011. The meeting was attended by 16 aquaculture experts from nine different countries.

The objectives of the meeting were to: (a) provide training to the IT officers and ANAF National Focal Points (NFPs) on the Web site functionalities and receive their feedback for improvement; (b) train NFPs on data collection and dissemination tools recently developed by FAO particularly, the



J. Aguilar, FAO

Training of the ANAF Regional Centre staff on the Typo3

National Aquaculture Sector Overview (NASO) collection ([www.fao.org/fishery/naso/search/en](http://www.fao.org/fishery/naso/search/en)); the NASO map collection Web site ([www.fao.org/fishery/naso-maps/naso-home/en](http://www.fao.org/fishery/naso-maps/naso-home/en)); (c) highlight major data and information gaps for assessing and monitoring the aquaculture sector performance in Sub-Saharan Africa<sup>2</sup>; (d) demonstrate the use of an aquaculture investment decision-making tool<sup>3</sup>; and (e) strengthen collaboration with existing regional networks/information systems.

The meeting was concluded with plenary discussion on the ANAF work plan for 2012 including a number of follow-up activities for upgrading and uploading the minimum set of data and information to the ANAF Web site before the official launching on the Internet.

The participants discussed and agreed on the following: i) data entry and validation process; ii) ANAF work plan for 2012; iii) ANAF User Manual; iv) promotional flyer; v) press release; and vi) overall communication strategy to launch and to further strengthen the ANAF Web site. The NASO map collection was found to be an essential tool to help standardize improve and facilitate reporting of aquaculture statistics.





J. Aguilar, FAO

Participants to the meeting



NASO map collection  
[www.fao.org/fishery/naso-maps/naso-home/en](http://www.fao.org/fishery/naso-maps/naso-home/en)



ANAF Web site

The ANAF NFPs acknowledged the value of the training received and agreed on the importance of sharing aquaculture information through the ANAF Web site to support sustainable aquaculture development in their countries. The FAO Fisheries and Aquaculture Department should continue and increase its role in the Sub-

Saharan Africa Region technically supporting the ANAF activities and particularly assisting in capacity building, promotion and development of aquaculture and improving data collection and analysis on aquaculture to better respond to regional and emerging issues.

<sup>1</sup>TYPO3 is a free Open Source Content Management System for enterprise purposes on the web and in intranets. It offers full flexibility and extensibility while featuring an accomplished set of ready-made interfaces, functions and modules (to see more: [www.typo3.org](http://www.typo3.org)).

<sup>2</sup>The newly published "Regional Review on Status and Trends in Aquaculture Development in Sub-Saharan Africa 2010" (<http://www.fao.org/docrep/014/i2261b/i2261b.pdf>) was used as a base to illustrate the data and information gaps. Knowledge about such gaps would provide guidance for ANAF to better prioritize its efforts in information generation and dissemination according to its comparative advantage.

<sup>3</sup>The investment tool is intended to help fish farmers assess the profitability of their ongoing or potential operations. It was developed under the leadership of FAO Aquaculture Senior Officer Mr Nathanael Hishamunda and has been tested in 3 countries in Sub-Saharan Africa and 2 countries in Latin America.

# Aquafeed production, species diversification and desert and arid land aquaculture development in Namibia

Mohammad R. Hasan and Valerio Crespi

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Following an official request on June 2011 from the Ministry of Fisheries and Marine Resources (MFMR) of the Government of Namibia for technical assistance by the FAO Fisheries and Aquaculture Department, Mohammad R. Hasan and Valerio Crespi (Aquaculture Officers, FIRA) undertook a seven-day scoping mission to Namibia under the South South Cooperation (SSC) Technical Assistance Programme between Namibia and Viet Nam (GCP/NAM/014/SPA) to identify developmental opportunities for the country in the fields of: (a) aquafeed production; (b) species diversification; and (c) aquaculture in the desert and arid lands. Two separate field missions were undertaken by the two FAO officers, i.e. to the northwest (aquafeed and species diversification, Mohammad R. Hasan) and to the south (desert aquaculture, Valerio Crespi) regions of the country where potential areas for aquaculture development as well as ongoing aquaculture projects were visited.

The FAO officers met and held discussions with an extensive number of stakeholders including government officials, researchers, extension workers, community members, private sectors, fish farmers, National Youth Service members and Vietnamese experts and technicians working under the projects to identify together with national authorities the next steps to be followed in order to: (a) produce better quality aquafeed and its better on-farm management; (b) explore the potentiality of new species introduction for increasing aquaculture production; and (c) initiate activities related to desert aquaculture development.

Although aquaculture is still in its initial stage of development, the country has reached a favorable momentum to develop the industry which could generate incomes for the public and private sectors and contribute to poverty alleviation of rural communities throughout the country including those living in remote arid regions.

Namibia already has a feed mill plant based in Ovavivi, which enables the country to produce its own feed (sinking pellet) although the quality of feed needs to be enhanced and there are needs for improvement of on-farm feeding and feed management practices. An extremely limited species base is considered to be one of the major constraints for the expansion of aquaculture and there are needs for species diversification either through introduction of new indigenous species or exotic species in the culture system. Poor seed quality, in the case of the three-spotted tilapia (*Oreochromis andersonii*) was noted to be the major problem in the country due to inbreeding in the rearing/on growing stage, while in case of North African catfish (*Clarias gariepinus*), high mortality during nursery phase was identified as the main reason for the limited supply of fingerling in the country.

The mission visited Kamatjonga Inland Fisheries Institute (KIFI) and noted the excellent facilities that can provide support to aquaculture development through research and pilot studies. It was observed that some of the infrastructure facilities may not be proportionate/complimentary to each other and these facilities are mostly underutilized due to lack of necessary manpower. The FAO officers also noted that in the south region of the country, the surface extension of arid lands along with the presence of surface and/or subsurface water resources provide a favorable environment for desert aquaculture development. The main goal in promoting and developing aquaculture in desert and arid lands is to maximize the sustainable use of existing water resources for food production also through doable integrated agriculture-aquaculture systems. Farmed fish could, therefore, represent an additional crop and income for small-scale farmers, as well as ensuring food fish supply in communities distant from the coast. One of the most positive aspects noted with appreciation is that through the assistance of unilateral/multilateral donors and international agencies, the Namibian Directorate of Aquaculture

V. Crespi, FAO



Concrete tanks inside a greenhouse in the Hardap Inland Aquaculture Centre

(DAq) is providing incentives/support to farmers. This will expand the aquaculture production base which is critical in the early stages of aquaculture development in the country. These initiatives need to be continued and supported until the private sectors can take over it at which time the government will provide more emphasis on policy support. However, many of the above activities are hindered by the lack of qualified manpower/skill base in the country, thus human capacity and resource assessment will be necessary.

### Recommendations

Exotic species introduction should not be considered as a priority because of the risks involved which need to be carefully assessed.

- Domestication of new indigenous species may be initiated on a limited scale to expand aquaculture production base. However, the major emphasis should be placed on improving management practices of existing species as domestication of new indigenous species is time consuming and may not always prove to be economically viable.
- Improving the survival rate of North African catfish during hatchery and nursery phase and addressing the inbreeding problem of three-spotted tilapia should be considered as priority task.
- Ensuring availability of quality feed so that the momentum of the growth of the sector can be sustained; thus, all possible options to improve feed production process and quality of locally produced industrial feed should be explored. Issues of feed management at farm level should be considered as a priority.
- Providing assistance to small-scale farmers on activities related to production of farm-made feed on demonstration level should be explored.
- Organizing a national workshop to address issues related to aquaculture in arid land and on-farm feed management and production of farm-made aquafeed targeting the small-scale fish farmers and other stakeholders.

V. Crespi, FAO



Broodstock of hybrid red tilapia (*Oreochromis niloticus* x *Oreochromis mossambicus*)

- While capacity building is a priority element of the SSC work plan and since the DAq does not have enough capacity to undertake many of the activities outlined in SSC work plan, it is recommended that some of the activities for example: i) a technical feasibility study to incorporate steam boiler in the existing feed mill plant at Onavivi IAC, ii) an exercise to improve feed formulation of the pellets produced by the feed plant at Onavivi IAC, iii) improvement of the survival rate of North African catfish during hatchery and nursery phase and addressing the inbreeding problem of three spotted tilapia] be taken up immediately in collaboration with universities/research institutions from neighboring countries (including those of South Africa and Nigeria) and elsewhere. FAO may provide direct collaborative assistance or facilitate in establishing linkages with appropriate universities/institutions.



M.R. Hasan, FAO

Feed production plant at Onavivi Inland Aquaculture Centre, Outapi, Omusati Region



# Western Central Atlantic Fishery Commission (WECAFC)

Raymon Van Anrooy  
[Secretary, WECAFC](#)

## Fishery Commission reactivated

During 2011, the Western Central Atlantic Fishery Commission (WECAFC), an Article VI Regional Fishery Body under the FAO Constitution was re-activated. Partnerships were re-established with organizations and programmes active in fisheries and aquaculture in the region - the Caribbean Regional Fisheries Mechanism (CRFM), the Gulf and Caribbean Fisheries Institute (GCFI), the Organization of Fishing and Aquaculture in Central America (OSPESCA), the Centre for Resource Management and Environmental Studies (CERMES), the Caribbean Network of Fisherfolk Organizations (CNFO), the French Research Institute for Exploitation of the Sea (IFREMER), the National Oceanic and Atmospheric Administration (NOAA), and the Caribbean Large Marine Ecosystem Project (CLME).

Knowledge management and dissemination also increased due to WECAFC's website being updated and made available in Spanish and French. Furthermore, over 50 WECAFC publications from its nearly three decades of history were added to the document repository that is available under FAO's website.

## Organization of 5th session of the Scientific Advisory Group

FAO organized the 5th session of the Scientific Advisory Group (SAG) of the Western Central Atlantic Fishery Commission (WECAFC) in Mexico in October 2011. Some of the main fisheries and aquaculture researchers of the region gathered to discuss developments in the sector and the priorities for research in the region.

## Achieving improved fisheries and aquaculture management and utilization in the Wider Caribbean Region

In close collaboration with the Government of Barbados and CERMES of the University of the West Indies, and FAO experts, WECAFC organized a large regional policy and planning workshop in Barbados from December 6-9, 2011. The Regional Workshop on the "FAO Code of Conduct for Responsible Fisheries in the Caribbean: Achieving improved fisheries management and utilization in the Wider Caribbean Region" was attended by 11 Caribbean countries and 17 organizations. The workshop discussed the constraints encountered when applying the Code in the Caribbean region and identified solutions that would enable stakeholders to further mainstream their policies, strategies and management plans with the Code.

The WECAFC Scientific Advisory Group draws the attention of WECAFC and its members to the following research priorities aimed at improving current fisheries resource assessment and management:

- Comprehensive fisheries assessment
- Building capacity for research, assessment and management
- Aquaculture development and management
- Incorporating social, economic and livelihood considerations
- Impacts of climate change and variability on fisheries
- Governance of marine resources incorporating ecosystem approaches

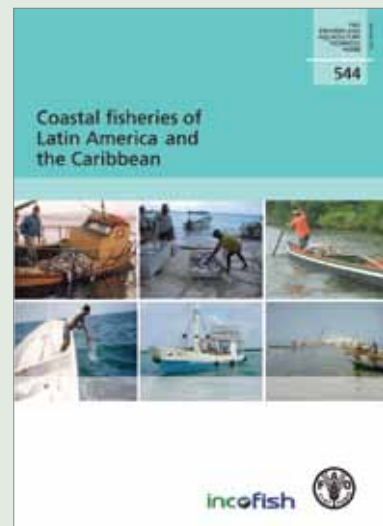
*"FAO is committed to assisting Caribbean countries to manage fisheries and aquaculture more effectively. Challenges exist, as over-exploitation of various fish stocks, including important reef fish species, continues"*

The workshop paid particular attention to increasing awareness and capacity in the region on the Ecosystem Approaches to Fisheries (EAF) and Aquaculture (EAA), International Plan of Action for the conservation and management of Sharks (IPOA-Sharks) and the ongoing work on the Voluntary Guidelines on securing sustainable Small-scale fisheries.

### WECAFC in 2012

As FAO and WECAFC plan ahead for fisheries and aquaculture interventions in 2012, several activities have already been initiated. These include:

- Preparation of a strategy and action plan for Integrating disaster risk management, climate change adaptation and fisheries and aquaculture, with a focus on small scale fisheries and aquaculture in close collaboration with FAO headquarters, CRFM and CDEMA (Caribbean Disaster Emergency Management Agency).
- Preparations for the 14th Session of WECAFC, Panama City, Panama, February 6 – 9, 2012. The WECAFC work plan for 2012-2013 includes major activities such as:
  - ◆ organization of a Regional Workshop: Towards ensuring the long-term sustainability of deep-sea fish stocks in the high seas of the Western Central Atlantic Ocean
  - ◆ providing support to the establishment of a regional shellfish hatchery for the Wider Caribbean
  - ◆ organization of WECAFC Working Group meetings on spiny lobster, queen conch, flying fish, etc., in close collaboration with regional partners
- Preparation of a Project Identification Form (PIF) on Climate change adaptation in Caribbean fisheries management for GEF support under its Special Climate Change Fund. This is a joint activity with the CaribSave Partnership Inc., CERMES, CRFM and national authorities in the region



In 2011, FAO published an *FAO Fisheries and Aquaculture Technical Paper* (No. 544) entitled, “Coastal fisheries of Latin America and the Caribbean”. Numerous experts from the region have contributed to this publication. The publication can be downloaded from: <http://www.fao.org/docrep/014/i1926e/i1926e00.htm>



R. Van Anrooy, FAO

Participants to the workshop

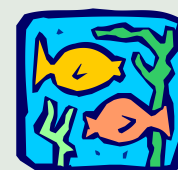
For more information please contact:

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# Training course on aquaculture zoning and carrying capacity

José Aguilar-Manjarrez

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During a meeting of the Network of Aquaculture of the Americas (RAA), in Cancun, Mexico, in March 2011, RAA's technical committee identified "Aquaculture zoning and carrying capacity" as one of the priority themes for the network because most countries in the region lack the capacity to zone and regulate aquaculture activities. The delegates of the member countries indicated the importance of providing training in the areas of aquaculture zoning and carrying capacity in the region to limit, control and regulate maximum production at any site to ensure ecological and socio-economic sustainability.

Within the framework of the project GCP/RLA/190/BRA and as part of RAA's biennial work programme for 2011–2012, the RAA and FAO organized the training course on "Aquaculture zoning and carrying capacity" (7–8 November 2011 and 9–11 November 2011) which targeted 19 government aquaculture technical personnel from 13 countries in Latin America and the Caribbean (including Argentina, Belize, Bolivia [Plurinational State of], Brazil, Chile, Colombia, Ecuador, Guatemala, Mexico, Panama, Paraguay, Peru and Uruguay).

## Outcomes

This first course proposed and funded by the RAA was a timely initiative given that zoning, site suitability and carrying capacities are salient aquaculture issues across the world.

The course gave emphasis on spatial planning tools and its key aspects for aquaculture zoning. Key concepts such as the ecosystem approach to aquaculture (EAA), marine spatial planning and the different types of carrying capacities were provided. The understanding of the concept of aquaculture zoning and carrying capacities and the use of tools to estimate these, including the adequate monitoring of environmental and socio-economic indicators, are fundamental to the implementation of the EAA. The course also offered guidance on the zoning process, e.g. the importance of zoning, criteria for zoning assessments, sources of information for zoning, issue of compatibility with national programmes of land and/or water use management, and follow-up activities to implement aquaculture zoning. The lessons learned from this course will undoubtedly enable participants to practically apply the concepts to aquaculture zoning initiatives in their respective countries.

## Conclusions and recommendations

Country presentations confirmed that most countries in the region lack the capacity to zone and regulate aquaculture activities. However, there are a number of interesting initiatives in each country (e.g. Uruguay is in the initial planning phase of zoning, while other countries such as Brazil, Chile and Peru have developed aquaculture zoning projects, Web sites and/or tools.

The participants agreed that zoning requires: (i) clear and concrete objectives, (ii) full understanding of the needs of the study area and country priorities and capacities, and (iii) voice and opinion on the demands and expectations of the communities that are involved and/or affected by zoning. The course also concluded that zoning is an essential tool to ensure the sustainable management of aquaculture, and the process should be multisectoral, participatory and transparent supported by a legal basis to become effective.

Key recommendations include: creation of instruments and/or tools to facilitate information exchange; guidance to zoning processes and initiatives; support to aquaculture zoning projects in the region; longer-term and more in-depth training courses; and preparation of aquaculture zoning "facts sheets" to summarize and share the experiences and knowledge on aquaculture zoning from each country.



Group exercise to identify key issues, criteria, tools and initiatives on aquaculture zoning from each country

J. Aguilar-Manjarrez, FAO

[Continued on page 43](#)



# New Aquaculture TCP Projects in the Pacific

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Three TCP projects have been approved in late 2011 in connection with the Food Security and Sustainable Livelihoods Programme (FSSLP) in the Pacific. They are briefly described below.

## TCP/PNG/3301 – Community aquaculture project development in Papua New Guinea

This TCP facility project on community aquaculture project development in PNG was formulated and approved in August 2011 with a total budget of USD 20426. The main objective of the project is to improve and sustain mullet production in Loniu Community, Manus Province, PNG. Under the project, an assessment on the current status of mullet resources and impact of mullet fishing was carried out through field work and stakeholder consultation meetings; appropriate technology packages and preliminary outline designs for mullet farming were recommended. In addition, a TCP project proposal on mullet production will be drafted. The FAO TCDC Expert was distached to PNG, 11 November to 2 December 2011, to carry out the above-mentioned assignments.

## TCP/MAS/3301 - Management of coastal and aquaculture resources for food security in Marshall Islands

A TCP project on the management of coastal and aquaculture resources for food security in Marshall Islands was formulated and approved in September 2011 with a total budget of USD 296,000. The aim of this project is to sustainably manage Marshall Islands' coastal resources in order to improve food security and sustainable livelihoods of farmers, fishermen and aqua-farmers, and the people of the Marshall Islands in general. The project has three components: (i) identify and protect the areas that are most vulnerable to soil erosion and inundation; (ii) implement new re-plantings of suitable species to mitigate negative impacts on food patches; and (iii) identify viable aquaculture options and formulate aquaculture development project frameworks for the country as well as recognize the need to protect the vulnerable inshore areas that have potential for aquaculture activities.

Under the third component, the following outputs are expected.

- Identification of potential aquaculture commodities, and formulation of aquaculture development project frameworks.
- Collection of data on aquaculture, natural resources and proposed locations for future aquaculture in selected areas in the outer islands, and analysis of potential sites for aquaculture.
- Enhancement of on-going aquaculture practices and establishment of community-based aquaculture projects.

In consultation with the government authority, project implementation will commence in early 2012.

## TCP/TUV/3301 - Development of community-based aquaculture system and management of inshore fisheries for food security in Tuvalu

A TCP project on the development of community-based aquaculture system and management of inshore fisheries for food security in Tuvalu was formulated and approved in October 2011 with a total budget of USD 293 000. The overall objectives of the project are: (i) to develop small-scale aquaculture (milkfish) through up-scaling of traditional aqua-farmers knowledge; (ii) to provide new fishing techniques (i.e. FADs) in attracting offshore fisheries resources; and (iii) to manage inshore/offshore fisheries resources through the community-based ecosystem approach to fisheries management (CEAFM) for food security and sustainable livelihoods. The project consists of three components: (i) development of community lagoon-based aquaculture systems; (ii) increase inshore/offshore fish catches in a sustainable manner; and (iii) sound management of inshore/offshore fisheries resources in island communities.

Under the first component, the following outputs are expected.

- grow-out ponds established in Vaitupu Island in 2012.
- community lagoon-based aquaculture systems established in 8 islands of Tuvalu by 2013.

In consultation with the government authority, project implementation will commence in early 2012.

# Development of a Pacific Aquaculture Regional Cooperative Programme

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M. Reantaso, FAO

Group photo: more than 50 participated in the regional workshop

The FAO/SPC Regional Scoping Workshop - Development of a Pacific Aquaculture Regional Cooperative Programme<sup>1</sup> was successfully held at the Tanoa International Hotel in Nadi, Fiji, from 11-14 October 2011. The regional workshop was one of the recommendations from the Informal Pacific Meeting (side event)<sup>2</sup> held during the Global Conference on Aquaculture in Phuket, Thailand, in September 2010. The workshop, jointly implemented with the Secretariat of the Pacific Community (SPC), was hosted by Fiji's Ministry of Fisheries and Forests and was graced by the Honorable Minister of Fisheries and Forests of Fiji who opened the workshop, stayed on for 3 full days and hosted a dinner on evening of Day 3.

The workshop was participated by representatives from 18 Pacific Island countries and territories (PICTs: American Samoa, Cook Islands, Fiji, Federated States of Micronesia, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Palau, Papua New Guinea, Tonga, Tuvalu, Samoa, Vanuatu and Wallis & Futuna) and supported by the private sector (Vate Ocean Gardens Ltd. and Pacific Seaweed Ltd.) and

7 regional institutions (ACIAR, FFRC-China, JICA, Kasetsart University, Queensland University of Technology, NACA, SEAFDEC-AQD, and WFC-Solomon Islands)<sup>3</sup>. The total number of participants is 55 (including the Honorable Minister). ACIAR provided special technical and financial support to the workshop.

The regional workshop engaged the governments of PICTs and development partners active in the region in a dialogue to assess the needs and map out a coordinating strategy and actions for all major regional and international agencies and other relevant stakeholders working on aquaculture development in the region.

The 4-day workshop (including a short field trip) was informed by the following sessions, namely:

**Session 1:** Understanding past and recently completed activities, existing national and regional strategies/development plans and the current status of aquaculture in the region, including an analysis of progress. This session was divided into:

**Session 1.1** on national and regional aquaculture aspirations and constraints as well as institutional presentations (mandates, ongoing work in the Pacific region and interests for future cooperation)

**Session 1.2:** Thematic presentations on biosecurity, biodiversity, networking, cluster management, statistics and information and research & technology development. Altogether there 14 presentations during these sessions aimed at setting the scene and acquiring relevant information and knowledge that prepared the participants for Working Group sessions.

**Session 2:** Working group discussions

**Session 3:** Developing and refining a draft regional aquaculture strategy and agreeing on a way forward.

### Outcomes and follow-ups

After a series of break-out groups and reporting back to plenary, the workshop agreed on the objectives and elements of a regional aquaculture strategy which will contain the following draft sections: Introduction, Snapshot of aquaculture status, Constraints and opportunities, Purpose of the strategy, Vision, Overall outcomes, Guiding principles, Programmes, Outcomes and activities, Cross-cutting issues and Implementation.

The agreed Vision of the strategy is

*“A sustainable aquaculture sector that meets food security and livelihood requirements based on economically viable enterprises supported by enabling governance arrangements”*

The following six major programmes were identified as priority for the region.

Programme 1: Biosecurity

Programme 2: Capacity building

Programme 3: Feasibility assessment

Programme 4: Statistics and data

Programme 5: Markets and trade

Programme 6: Technology transfer and improvement

A number of cross-cutting issues were also identified. These include gender, climate change and environmental sustainability, governance and research. As to the way forward, the following actions jointly agreed by FAO and SPC were presented at the regional workshop:

### Regionally coordinated initiatives

To continue to find resources and other appropriate mechanisms to take up some of the identified national or regional activities:

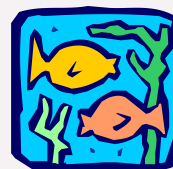
- Assist in the development of a regional biosecurity framework to include an assessment of capacity and performance survey
- Capacity building for fisheries and aquaculture statistics (collection and reporting at national level)
- Initiate action to establishing a PICTs sub-regional aquaculture network (e.g. Micronesia network as a starting point) and strengthen collaboration with other region (i.e. through, e.g. NACA, SEAFDEC, WFC, etc.)

### National level initiatives

- Report the outcomes of the workshop (make presentations) to the highest aquaculture authorities in the countries.
- Establish/update national plans and consider the outcomes of the workshop and the regional strategy.
- Develop proposals to generate funding support to implement some of the activities.

Further information can be obtained by email to:

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<sup>1</sup>FAO. 2011. FAO/SPC Regional Scoping Workshop: Development of a Pacific Aquaculture Regional Cooperative Programme, FAO Aquaculture Newsletter, No.47, June 2011, pp.31.

<sup>2</sup>FAO. 2010). Building on Progress: an Evening on Pacific Aquaculture, FAO Aquaculture Newsletter No. 46, December 2010, pp.4-7.

<sup>3</sup>ACIAR: Australian Centre for International Agricultural Research; FFRC: Freshwater Fisheries Research Center; JICA: Japan International Cooperation Agency; SEAFDEC-AQD: Aquaculture Department of the Southeast Asian Fisheries Development Center; WFC: World Fish Center).



# Future Sub-regional Aquaculture Network in Micronesia, the Pacific

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J. Jia, FAO



Representatives from Guam, Marshall Islands, Federated States of Micronesia, Nauru, Palau, Kiribati, Tuvalu, SPC and FAO participated in the informal consultation meeting on sub-regional aquaculture networking in Micronesia

It has been a busy year for Pacific aquaculture. The latest among a series of activities to further develop aquaculture in the region is the plan to establish an aquaculture network in Micronesia. The need to establish an organization for aquaculture management and development cooperation has been generally recognized by the governments of the Micronesian group, as well as the broader Pacific Region. A number of national, sub-regional, as well as regional workshops conducted in the past three years by governments of the Micronesia group and the Pacific region, with the assistance of FAO and other institutions and governments, have expressed the desirability of forming a regional cooperation arrangement. A specific arrangement that was proposed is a Micronesian Association for Sustainable Aquaculture (or MASA).

On the request of the governments of Marshall Islands, Nauru, Palau and Federated States of Micronesia in 2011 and as recommended at the 9th Meeting of FAO South West Pacific Ministers for Agriculture held in Vava'u, Tonga, 5-7 April 2011, the FAO Sub-regional Office for the Pacific Islands considered the establishment of a sub-regional aquaculture network in Micronesia as one of priority activities in the Pacific region in line with the outcomes of the Informal Pacific Meeting (side event) held during the Global Conference on Aquaculture in Phuket, Thailand, in September 2010. In preparation for the formulation of a regular TCP project to support the establishment of a sub-regional network in Micronesia in 2012, two TCP facility projects on national consultation on the establishment of a sub-regional aquaculture network were formulated and approved for Nauru (TCP/NAU/3301)<sup>1</sup> and Palau (TCP/PAL/3301)<sup>2</sup> in September 2011.

## Informal Consultation Meeting on Sub-regional Aquaculture Networking

Taking advantage of the presence of regional representatives participating in the FAO/SPC Regional Scoping Workshop - Development of a Pacific Regional Cooperative Programme held in Nadi, Fiji, 11-14 October 2011, an informal consultation was organized on 15 October with support of the FAO Aquaculture Service (J. Jia, Chief of Aquaculture Service, FIRA, and M. Reantaso, Aquaculture Officer, FIRA) and participated by the following Micronesian countries and territory (Guam, Marshall Islands, Federated States of Micronesia, Nauru, Palau, Kiribati), Tuvalu and the Secretariat of the Pacific Community (SPC). Preliminary discussions were held that included the technical and legal processes of establishing starting, and sustaining a network organization. Lessons and experiences from the establishment and development of the regional aquaculture networks such as NACA (Asia),

NACEE (Central and Eastern Europe), ANAf (Africa), RAA (Latin America and the Caribbean) and the Fish Health Section of the Asian Fisheries were presented. These provided the government representatives from Micronesia a good overview of the different processes involved in the establishment of an aquaculture network, the requirements for success, the pitfalls, and what can be done in the start-up process. The interim focal points of governments for the proposed TCP project to establish the network were designated and their responsibilities agreed on.



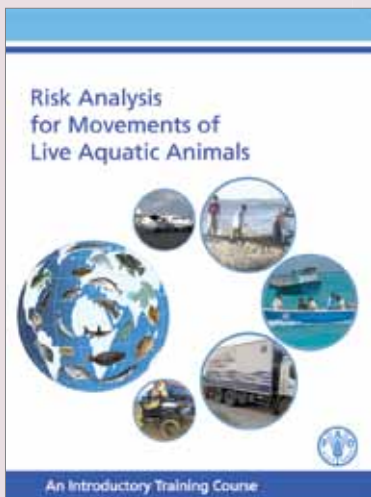
Informal consultation meeting at the Tanoa International Hotel in Nadi, Fiji, 15 October 2011

Under the twin TCP facility projects (TCP/NAU/3301 and TCP/PAL/3301), further national consultations were planned. In the Nauru visit (16-19 October 2011), it was assured by the Government of Nauru of its commitment to the initiative to establish a Micronesian aquaculture network. A consultation visit to Palau (and Guam) has been scheduled early 2012 under the TCP/PAL/3301. The results of the questionnaire survey analysis show a high level of agreement among the government experts that (a) a regional or sub-regional network in Micronesia has generally good reception; (b) its benefits are well recognized; (c)

its functions are well understood; and (d) the constraints to creating and sustaining it are seen as minimal.

The justifications for formulating a sub-regional TCP project proposal and its objectives and outputs will be clarified through the outcomes of the above-mentioned informal consultation meeting, consultation visits to the countries, and the results of the questionnaire survey.

<sup>1</sup>and <sup>2</sup>National consultation on the establishment of a sub-regional aquaculture network in Micronesia



Arthur, J.R. and Bondad-Reantaso, M.G. 2012. Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals. FAO SAP, Samoa. 167p. (in press).

This manual, an Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals, was conceived by Ms Melba G. Bondad-Reantaso, Aquaculture Officer, Aquaculture Service (FIRA) as a means of presenting risk analysis training materials (working group exercises and supporting lecture materials, i.e. powerpoint presentations) developed through FAO activities in a format that could be easily adapted for use in short courses (four days duration) by regional and national experts charged with preparing risk analysis training course offerings for local participants.

This manual draws particularly on (i) a series of Working Group Exercises and supporting materials (including case studies) that were developed as part of the FAO/FSM Department of Resources Development "National Workshop on Risk Assessment in Aquaculture Development", which was held in Pohnpei, Federated States of Micronesia (FSM) from 24 to 27 May 2010. Aquaculture Officer of the FAO Subregional Office for the Pacific Islands (SAP).

# Training course on aquaculture, aquatic animal health and food safety for fisheries/aquaculture specialists and veterinarians

## Purpose

The purpose was to conduct an introductory basic training course targeting veterinary and fisheries personnel from 4 countries: Algeria, Mauritania, Morocco and Tunisia as basis for discussing regional issues pertaining to aquaculture development and aquatic animal health management and draw recommendations for future activities. This presents a welcome and unique initiative from FAO fisheries/aquaculture and animal health officers from the Subregional Office for North Africa (SNE) to bring together national staff from the fisheries/aquaculture and veterinary authorities to exchange knowledge and discuss issues concerning aquaculture development in the region with special focus on aquatic animal health/biosecurity and food safety.

## Participants

Veterinary and fisheries personnel from 3 countries - Mauritania, Morocco and Tunisia participated in this course which was facilitated by Mr C. Toueilib and Dr M. Bengoumi (FAO SNE). Training course resource experts included: Drs Subasinghe and Reantaso from FAO (Rome) and two local experts, Dr Talbaoui (INRH, Morocco) and Prof Abdelaziz El Haraiki.

## Process

Implemented over 4 days (October 24–28, 2011), the course consisted of lectures by resource experts on the following topics:

- Aquaculture and aquatic animal health challenges: a global perspective
- Clinical examination and sampling techniques and methods in aquatic animals
- Introduction to diseases of aquatic animals I: Cause of disease
- Introduction to diseases of aquatic animals II: Parasites and fungi
- Introduction to diseases of aquatic animals III: Bacteria and virus
- Introduction to diseases of aquatic animals IV: Nutritional disorders
- Aquatic animal diseases and product safety
- Managing aquatic animal health: opportunities and challenges
- Therapeutics and use of veterinary drugs in aquaculture
- International agreements, voluntary guidelines, and role of OIE in aquatic animal health
- Development of a national strategy on aquatic animal health
- Discussion on regional cooperation in aquaculture development and aquatic animal health management and draw recommendations for future activities.

At the beginning of the course, a global overview of aquaculture was presented by Dr Subasinghe; national experts also presented country reports from fisheries/aquaculture and veterinary services.

The last session on discussion of regional cooperation in aquaculture development and aquatic animal health management drew a number of recommendations for future activities at regional and national levels. The main recommendation was that sub-regional cooperation in the field of aquaculture development in general and specifically fish pathology need to be strengthened. The participants indicated that the following national and regional level recommendations are considered priorities by all countries as development partners of FAO and also directed to FAO as a specialized technical agency.

National level recommendations:

- Assist and support the development of national strategies on aquatic animal health particularly in the areas of (i) national disease surveillance and biosecurity management in aquaculture and (ii) emergency response for notifiable diseases





M. Reantaso, FAO

Participants (from Mauritania, Morocco and Tunisia) to the training course held in Tangier, Morocco from 24-29 October 2011

- Further training of national staff involved in aquatic animal health particularly practical aspects such as sampling, necropsy, communication and dissemination of aquaculture techniques including biosecurity, animal husbandry and health monitoring
- Review of legal/regulatory framework concerning aquaculture and aquatic animal health
- Conduct of specific studies on pathogens affecting mollusk and fish farming
- Promote the responsible use veterinary medicines especially antibiotics to minimize antibiotic resistance
- Conduct research on virulence factors and molecular techniques for better or more accurate and rapid disease diagnosis as well as molecular epidemiological studies on various strains of pathogens
- Create an enabling national environment for aquaculture development particularly identification of potential aquaculture sites
- Develop a practical manual on disease diagnosis for the most important aquatic animal diseases in the Maghreb
- Develop a North African publication series covering pathology of aquatic animals as mechanism for exchanging scientific and technical information
- Maintain ongoing cooperation with FAO for technical support regarding the introduction of new aquaculture species in terms of regulations and procedures for aquaculture animals being translocated from one place to another.
- Encourage sub-regional cooperation on scientific and technical research aspects of aquaculture particularly self-sufficiency in the supply of fry and feeds for fish and bivalve mollusks
- Establish working groups on diseases of aquatic animals among North African researchers
- Continue training efforts in areas such as pathology in aquaculture, risk analysis, quarantine, nutrition and water quality

#### Regional level recommendations:

- Support sub-regional technical cooperation in aquatic animal health management, particularly farm level biosecurity at molluscan farms; sub-regional networking through annual meetings to acquire and share knowledge and experiences and promote aquaculture products
- Organize sub-regional workshops to assess aquaculture potential in the Maghreb looking at strengths, weaknesses/limitations, opportunities and threats in aquaculture development

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# Building adaptation to climate change in fisheries and aquaculture

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Climate change is bringing an ocean of change to the world's fisheries, which are already in crisis from over-fishing and poor management. [Increasing temperatures](#) will likely result in, for example, changes in distributions of both freshwater and marine species and increased disease outbreaks. [Rising sea levels](#) displace brackish and fresh waters in river deltas, wiping out some aquaculture practices and destroying wetlands. Climate change is increasing the [acidification of oceans](#), with particularly severe consequences for shellfish and squid, mangroves, tropical coral reefs and cold water corals. [Increased storm activity](#) presents additional threats for the reefs and mangroves and changes the stratification of nutrients in the waters, robbing nutrients from species in the depths and bringing them to species in warmer surface waters.

Fisheries- and aquaculture-dependent economies, coastal communities and fisherfolk and fishfarmers are expected to experience the effects of climate change in a variety of ways. These include: displacement and migration of human populations; effects on coastal communities and infrastructure due to sea level rise; and increased dangers and losses due to changes in the frequency, distribution or intensity of tropical storms. One must note that many fishing and coastal communities already subsist in precarious and vulnerable conditions because of poverty and rural underdevelopment, with their wellbeing often undermined by overexploitation of fishery resources and degraded ecosystems. As the vulnerability of fisheries and fishing communities depends not only on their exposure and sensitivity to change, but also on the ability of individuals or systems to anticipate and adapt, these communities tend to be among the most vulnerable.

Over the past three years, the FAO has worked with partners to better understand these impacts and how they may affect the communities and economies that depend on aquatic resources for food and nutrition security, livelihoods, trade and market benefits and contributions to Gross Domestic Product<sup>1</sup>. An expert workshop leading into the 2008 High Level Conference on World Food Security and the Challenges of Climate Change and Bioenergy identified and reviewed the key issues of climate change in relation to fisheries and aquaculture, recommendations on priority areas for action, and provided the basis for a seminal publication on potential impacts of climate change on fisheries and aquaculture and developing and implementing adaptation and mitigation frameworks<sup>2</sup>.

## Knowledge basis for improving adaptive capacity

In addition to the global review of issues and adaptation strategies mentioned above, the FAO has been downscaling knowledge on regional and local level impacts and adaptation options through several projects working in, for example, Latin and Central America, Caribbean islands, Pacific islands, Benguela Current, Lake Chad Basin, Vietnam, and Lake Tanganyika to increase our knowledge of community-level vulnerabilities to climate change. Efforts are also underway to mainstream climate change and disaster risk management (DRM) into existing projects, such as the Bay of Bengal Programme and the Regional Fisheries Livelihoods Programme for South and Southeast Asia, as well as through the implementation of the Ecosystem Approach to Fisheries and Aquaculture.



S. Venturi, FAO

Woman cultivating seaweed on the beach, Zanzibar

### Prioritizing and coordinating adaptation actions

As strategic planning, partnerships and collaboration are of prime importance in addressing the complex and cross-cutting challenges of climate change, the FAO has supported the development of the Global Partnership on Climate, Fisheries and Aquaculture (PaCFA)<sup>3</sup>, a voluntary partnership comprising international organizations and sector bodies sharing a common concern for climate change interactions with global waters and living resources and their resulting social and economic consequences. In addition, the FAO has developed a five-year Strategy for Fisheries, Aquaculture and Climate Change<sup>4</sup> with the goal of assisting people, communities and states meet their social and development goals effectively; while taking into account and responding to the additional challenges imposed by climate change on fisheries and aquaculture. The FAO is also actively exploring options for increasing its technical support to Members on climate change adaptation as well as making explicit links to DRM as a key approach for reducing vulnerability of fishing and fish farming communities to the impacts of natural disasters.

### Increasing visibility of fisheries and aquaculture

Although fishing and aquaculture communities tend to be among the highly vulnerable, global awareness and understanding of climate change impacts on the aquatic systems and the special needs of those who depend on aquatic resources for their food and livelihoods remains low. Therefore, FAO and its partners participate actively in the United Nations Framework Convention on Climate Change processes to inform about climate change issues specific to the sector. In this vein, the FAO produced an analysis<sup>5</sup> of the formal climate change adaptation strategies of the least developed countries (LDC) to familiarize fisheries and aquaculture decision-makers with the climate change process for prioritizing adaptation actions and ensuring financing for their implementation as well as to provide those in the climate change arena with an understanding of the particular needs and vulnerabilities of the sector. For example, special efforts are being made to facilitate access of countries to funding of adaptation actions in different regions. This and other activities within FAO aim to promote the inclusion of a traditionally under-represented but potentially highly vulnerable sector in the planning and implementation of climate change adaptation strategies.

<sup>1</sup>For a review of regional body requests for FAO assistance in climate change matters, please refer to the FAO COFI 29th Session document, COFI/2011/6 Fisheries and aquaculture in our changing climate: adaptation and mitigation measures in fisheries and aquaculture, available at [ftp://ftp.fao.org/FI/DOCUMENT/COFI/COFI\\_29/default.htm](ftp://ftp.fao.org/FI/DOCUMENT/COFI/COFI_29/default.htm)

<sup>2</sup>Cochrane, K.; De Young, C.; Soto, D.; Bahri, T. (eds). 2009. Climate change implications for fisheries and aquaculture: overview of current scientific knowledge. *FAO Fisheries and Aquaculture Technical Paper*. No. 530. Rome, FAO. 212pp. Available at <http://www.fao.org/docrep/012/i0994e/i0994e00.htm>.

<sup>3</sup><http://www.climatefish.org>

<sup>4</sup>[http://www.fao.org/docs/eims/upload/290007/climate\\_change\\_2011.pdf](http://www.fao.org/docs/eims/upload/290007/climate_change_2011.pdf)

<sup>5</sup>Vadacchino, L., De Young, C. and Brown, D. 2011. The fisheries and aquaculture sector in national adaptation programmes of action: importance, vulnerabilities and priorities. *FAO Fisheries and Aquaculture Circular*. No. 1064. Rome, FAO. 2011. 60pp. (<http://www.fao.org/docrep/014/i2173e/i2173e.pdf>).



# Social media and responsible fisheries and aquaculture

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**Question:** *What do Pope Benedict XVI, Mr Barack Obama, President of the United States of America, Ms Maria Damanaki, European Commissioner for Maritime Affairs and Fisheries, Mr Árni Mathiesen, Assistant Director General of the Fisheries and Aquaculture Department FAO, and the authors of this article have in common?*

**Answer:** *They all have recently opened social networking accounts.*



Many influential people, such as H.E. Pope Benedict XVI (above), are using social media to spread important messages (photo used with permission of the Photographic Service L'Osservatore Romano)

This note is a general introduction to social networking and its potential uses for the FAO Fisheries and Aquaculture Department. Social networking refers to the category of Internet platforms and tools that people and organizations use to share information and communicate ideas. Currently the most popular social networking platforms are Facebook, LinkedIn, Twitter and Wikipedia (Figure 1). For a knowledge organization such as FAO, these tools can be used *inter alia* to promote accurate information, encourage responsible practices, solicit feedback, stimulate discussion, respond to others' ideas, and evaluate

communication products. The use of these tools is not widespread in the Fisheries and Aquaculture Department (FI) or FAO at present, but could present significant opportunities to promote responsible fisheries and aquaculture in the future.

## Key social media platforms<sup>1</sup>

Whenever discussing topics related to the Internet, it is important to remember that due to its dynamic nature:

- once seemingly established services have stumbled and failed;
- unknown start-ups can achieve overnight successes; and
- the most popular and important platforms are likely to change.

## Facebook

<https://www.facebook.com>

<https://www.facebook.com/UNFAO> (FAO site)

<https://www.facebook.com/1billionhungry>  
(1billionhungry site)

Sign in and “Like” FAO and 1billionhungry!

Facebook is the world's most popular social networking platform. Currently, over 750 million people actively use the website. If Facebook were a nation, it would be the third most populous on Earth, behind only China and India.

FAO has one unified corporate Facebook page, which posts relevant news stories, and updates from the organization to over 35,000 fans. Additionally, FAO manages *The 1billionhungry* project's Facebook page, a public awareness campaign designed to engage people around the world about the problem of world hunger. *The 1billionhungry* sends its updates to almost 82,000 fans. Both of these outlets can be used by individual departments with goals of spreading public awareness about particular projects and of promoting knowledge that should be available to a popular audience.

According to the FAO social media guidelines, FAO departments are discouraged from creating their own Facebook pages, but are strongly encouraged to send posts to the office operating the FAO Facebook page.

**Other examples of fisheries and aquaculture related pages at Facebook include:**

- Seat at KU: <http://www.facebook.com/#!/profile.php?id=100003315191156>
- SARNISSA Sustainable Aquaculture Research Networks for Sub-Saharan Africa: <http://www.facebook.com/#!/pages/Sarnissa-Sustainable-Aquaculture-Research-Networks-for-Sub-Saharan-Africa/193723127373>
- Asian Fisheries Society: <http://www.facebook.com/#!/pages/Asian-Fisheries-Society/295633947150237>
- SEAFDEC Philippines: <http://www.facebook.com/#!/pages/SEAFDEC-Philippines/170535522971216>
- AFS Gender in Aquaculture and Fisheries: <http://www.facebook.com/#!/pages/AFS-Gender-in-Aquaculture-and-Fisheries/181176555231544>
- Group Kesehatan Ikan Indonesia (an informal group of aquatic animal health and aquaculture professionals and practitioners in Indonesia (and their supporters) : <http://www.facebook.com/#!/groups/321859181160132/>
- United States Fish and Wildlife Service: <https://www.facebook.com/usfws>
- US National Oceanic and Atmospheric Administration: <https://www.facebook.com/usnoaagov>
- Fisheries Queensland: <https://www.facebook.com/FisheriesQueensland>
- Inland Fisheries Ireland: <https://www.facebook.com/inlandfisheriesireland>

## LinkedIn

<http://www.linkedin.com/>

LinkedIn is designed as a “Facebook” for a more professional environment. Instead of profiles consisting of updates from friends and interesting photos of fish, LinkedIn profiles resemble CV’s, promoting individuals’ past work experience, and featuring recommendations from past bosses and co-workers. The platform is rapidly growing, and this month, LinkedIn announced that two new users join every second. LinkedIn provides a forum for finding individuals or groups with specific skills or interests, such as inland fishery expert or aquaculturist.

A powerful feature of LinkedIn is the ability to create and join special interest groups such as ‘Aquaculture’ or ‘The Seafood Network’.

## Twitter

<http://www.twitter.com>

[@FAOfish](http://twitter.com/faofish) (FAO Fisheries and Aquaculture Department)

[@FAOnews](http://twitter.com/faonews) (FAO)

[@1billionhungry](http://twitter.com/1billionhungry) (1billionhungry)

Follow Us!

Twitter is a service that allows users to post 140-character updates called tweets that their followers then read in their own timelines. These updates can, and often do contain links to photos, news stories, websites, publications, and videos. Because of the bite-sized nature of these updates, Twitter is an especially popular platform for users with mobile devices. Many Twitter apps exist for various smartphones and tablet computers, and the service can even be entirely operated from any mobile phone with SMS text messaging.

As opposed to LinkedIn or Facebook where ‘connections’ and ‘friends’ are equal two-way relationships, Twitter divides relationships into ‘following’ and ‘followers’. If an Account A is ‘following’ Account B that means that Account A will receive tweets from Account B. This relationship allows important and influential organizations and individuals to send updates to interested parties, and receive relevant updates from organizations and individuals of interest to them.

If a user wants to share another account’s tweet with their following, the user can ‘retweet’ it and the tweet will be forwarded to his or her own following. Users can reply to other tweets and link their tweets to other accounts by including the account’s name preceded by a “@”. For example, tweeting @FAOfish as a part of a tweet will alert the people working on FI’s twitter account of the tweet, and will also give viewers of that tweet a link to the account. This feature is known as an @Mention.

Twitter hosts a highly search-able database of updates on and reactions to live events. Two features take especial advantage of Twitter’s search capabilities:

- Hashtags allow Twitter users to tag their tweets as related to a particular topic by adding a pound sign (#) before a word in the tweet. This then creates a link in the tweet to every other tweet with the same hashtag. For example, a tweet with the hashtag #salmon will link to every other tweet with the hashtag #salmon.

[Continued on page 46](#)

# Milkfish farming and post-harvest training in Kiribati

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At the official request of the Government of Kiribati (GoK) in September 2010, a project was formulated under Regular Programme budget of the FAO Sub-regional Office for the Pacific Islands in Samoa to assist the Ministry of Fisheries and Marine Resources Development (MFMRD) and other stakeholders in the further improvement of milkfish (*Chanos chanos*) farming and post-harvest activities in Tarawa and Christmas Islands. Under the project, the current status of milkfish post-harvest activities and its local market were reviewed by the FAO TCDC<sup>1</sup> Expert and training workshops on milkfish post-harvest value-added products (filleting, deboning and stuffing) were also conducted with assistance of the MFMRD staff in November-December 2010.

## Milkfish farming

Milkfish farming in Kiribati dates back to the 1970's when the GoK developed a 4-ha milkfish pilot farm in Ambo, Tarawa, with technical assistance of FAO. The farm was established primarily to meet the baitfish requirements of pole and line fisheries, which later on became unsuccessful due to tilapia infestation in ponds and relocation of target consumers. Villagers then resorted to culture milkfish as subsistence food as it was more favourable than tilapia and as a culture tradition in the island. This farm was expanded to a 5-ha pond and is presently managed by the Technical Mission of Taiwan Province of China called Ambo Farm.

In the other part of the Tarawa lagoon in the late 1970's, a 40-ha farm was constructed and further expanded to an 80-ha in the years after. The farm is now called Eco-farm and is presently being operated by the MFMRD with the technical assistance of Technical Mission of Taiwan Province of China. To improve milkfish production, continuous efforts have been made by the MFMRD to eradicate tilapia which infested ponds.

Under the project, the TCDC Expert in milkfish farming and post-harvest (filleting, deboning and stuffing) was dispatched to Kiribati for four weeks in November and December 2010, and provided technical advice and conducted a training in Tarawa



Milkfish harvest activities (gill netting) in Christmas Island

J.E. Basco, TCDC Expert



One-day stakeholder workshop on milkfish deboning and stuffing at Ecofarm, Tarawa

J.E. Basco, TCDC Expert

and Christmas Island. The scope of the technical advice and activities include:

### In Tarawa:

Existing milkfish farming practices and its aquaculture development plan were reviewed.

Proper fry collection techniques, collecting gears (e.g. skimming net and push net), fry storage, proper handling, transport and stocking procedures were introduced.

Proper procedures on pond preparation for the eradication of unwanted species (e.g. tilapia) were introduced by the use of tea seed powder;



Constraints	Recommendations
Milkfish harvest using gillnet normally leaves a mark around the nape of the milkfish thus lowering its price value	It is effective to use a simple fish trap/collector that will gather fish in the catching area/cage. There are 2 types of designs of traps that may be used in front of the pond gates (shallow area) and inside the lagoons (deep area, 5-10 meters).
Lean milkfish are sometimes harvested along with the fatty ones	This system ensures good quality of milkfish to be harvested by selecting only fat and good size. Damage of the nape of the fish will be eliminated because of the small netting materials used in this gear (Black net; 5 mm diameter).
There is no certainties on the volume of milkfish to be collected during the harvest schedule, thus spending more time to harvest the target volume of fish	Using the above gear will ensure the volume of fish to be harvested in a short period of time.
Poaching problems	There is a need to assign Fisheries staff to regularly monitor and visit the Fisheries' ponds/lagoons to prevent poaching problems.  It would be better to assign permanent staff in a routine basis to stay in the pond facility to discourage poaching and maintain the harvesting gear.
Limited domestic market, unestablished international market and lack of post harvest experiences to further improve market value	With the abundance of milkfish in Christmas Island, an international market like Hawaii should be looked into in consideration of employing post-harvest/value-added technology for the milkfish.
StopPage of inter-island ferry of the Central Pacific Producers Limited (CPPL) from Christmas Island to Tarawa affected the demand for milkfish of the island	There is a need to re-establish inter-island ferry from Christmas Island to Tarawa to supply their needed milkfish and to increase Christmas Island milkfish production and income.

computation of appropriate concentrations was discussed.

Proper pond utilization schedule including calculation of appropriate stocking densities and ideal pond preparation procedures (e.g. fertilization) was discussed to achieve continuous monthly harvest of marketable-sized milkfish (300 grams).

The importance of maintaining good water quality was emphasized through regular monitoring of water parameters, such as temperature, salinity, transparency and dissolved oxygen for ideal growth and survival of milkfish.

A one-day stakeholder workshop on milkfish post-harvest value-addition (filleting, deboning and stuffing) was conducted in two separate locations. -

The first workshop was conducted at the Eco-farm with a total of 20 participants, and the second workshop was held at the Central Pacific Producers Ltd. also with a total of 20 participants.

### In Christmas Island:

Existing milkfish farming practices and its aquaculture development plan were reviewed.

Constraints and recommendations for further improvement of their existing harvest techniques and market strategies were listed in the table on page 27. A one-day stakeholder workshop on milkfish post-

harvest value-added products (filleting, deboning and stuffing) was conducted at the Ministry of Line and Phoenix Island Development (MLPID) with a total of 20 participants.

### Training workshop on milkfish filleting, deboning and stuffing

Milkfish is sold as frozen or fresh. Due to its spiny features, people are apprehensive to buy and eat milkfish. However, the process of filleting and deboning milkfish enhances its palatability and acceptance to consumers as a cheap source of protein. There are a total number of 196 to 208 spines in a milkfish. It is most important to know the exact location of these spines especially the intramuscular spines. Another post-harvest technique (milkfish stuffing) popularly known as "relleno" in the Philippines was introduced. In the stuffing, milkfish is mixed with other ingredients that make it more palatable and acceptable. In the workshops, the steps in the filleting, deboning and stuffing process were introduced, and actual filleting, deboning and stuffing were demonstrated by the TCDC Expert. All participants participated in the actual practice of milkfish filleting, deboning and stuffing. The workshops were attended by women's group, youth group, government staff and private sector.

<sup>1</sup>TCDC – Technical Cooperation among Developing Countries

## List of 2010-2011 Aquaculture Projects

### Asia-Pacific

**TCP/BGD/3301** TCP Facility: Identification and understanding of key technical, economic and social constraints to seed and feed production and management in Bangladesh (Hasan, Miao)

**TCP/CPR/3202** : Better management of freshwater aquaculture in Pingjiang County, Hunan Province (Subasinghe, Reantaso, Miao)

**TCP/DRK/3302** TCP Facility: TCP Formulation mission on ark shell and sea urchin (Miao, Lovatelli)

**TCP/DRK/3304:** Capacity building in seed production and juvenile rearing of ark shell and sea urchin species (Miao, Lovatelli)

**TCP/INS/3301** TCP Facility: Project formulation on IMNV emergency and contingency plans (Reantaso)

**TCP/MAS/3301:** Management of coastal and aquaculture resources for food security in the Marshall Islands (Izumi, Subasinghe)

**TCP/MIC/3201** TCP Facility: Risk assessment in Aquaculture Development in Federated States of Micronesia (Izumi, Reantaso)

**TCP/NAU/3301** TCP Facility: National consultation on the establishment of a sub-regional aquaculture network in Micronesia (Izumi, Reantaso)

**TCP/NEP/3303:** Improving national carp seed production system in Nepal (Miao, Halwart, Hett)

**TCP/PAL/3301** TCP Facility: National consultation on the establishment of a sub-regional aquaculture network in Micronesia (Izumi, Reantaso)

**TCP/PNG/3301** TCP Facility: Community aquaculture project development in PNG (Izumi)

**TCP/RAS/3203:** Reducing the dependence on the utilization of trash fish/low value fish as feed for aquaculture of marine finfish in the Asian region (Hasan, Miao)

**TCP/RAS/3306** TCP Facility: Support to regional training for capacity building in laboratory diagnosis and surveillance programmes for IMNV in ASEAN member countries (Miao, Reantaso)

**TCP/SRL/3203:** Aquaculture development in the Southern Province (Subasinghe)

**TCP/SRL/3301** TCP Facility: Preparation of inland fisheries sector development programme and implementation strategy (Subasinghe)

**TCP/THA/3201** TCP Facility: Support to identification of options and potential scheme for aquaculture insurance in Thailand through a joint workshop by FAO and Thai DOF (Liao, Miao, Siar)

**TCP/THA/3202:** Certification of small-scale aquaculture in Thailand (Subasinghe, Ababouch, Yamamoto)

**TCP/THA/3304:** Aquaculture information management system in Thailand (Miao, Aguilar-Manjarrez)

**TCP/TUV/3301:** Development of community-based aquaculture system and management of inshore fisheries for food security in Tuvalu (Izumi, Subasinghe)

### Africa

**TCP/CHD/3302:** Assistance to the elaboration of an aquaculture development plan in the Chad (Hishamunda, Brugère)

**TCP/CMR/3205:** Elaboration of a development plan for sustainable aquaculture – Phase II of project TCP/CMR/3103 (Brugère, Halwart, Aguilar-Manjarrez, Hishamunda)

**TCP/CVI/3301:** TCP Facility: Identification of relevant actions for aquaculture development in Cape Verde (Dasylyva)

**TCP/CVI/3302:** Aquaculture planning and piloting in Cape Verde (Moehl)

**TCP/DJI/3202:** TCP Facility: Formulation of TCP project on aquaculture (Lovatelli)

**TCP/DJI/3301:** Assistance to the development of marine aquaculture (Lovatelli, Talla)

**TCP/GAM/3203:** Sustainable aquaculture systems (Moehl)

**TCP/GBS/3202** TCP Facility: Feasibility study to assist fish culture development in Guinea-Bissau (Braganca Gomes)

**TCP/GBS/3301:** Promotion of fish culture development in Guinea-Bissau (Moehl)

**TCP/GHA/3301** TCP Facility: Implementation of the Ghana aquaculture strategic framework (Moehl, Aguilar-Manjarrez)

**TCP/GHA/3301:** Assistance to the Ministry of Environment, Science and Technology to assess current issues affecting the livelihoods of lagoon communities in Ghana (Jallow)

**TCP/KEN/3202:** Strengthening fish production through adoption of improved aquaculture technology (Moehl)

**TCP/KEN/3203** TCP Facility: Formulation of aquaculture strategy and development plan (Moehl)

**TCP/KEN/3301** TCP Facility: Support to development of markets and linkages for aquaculture products (Moehl)

**TCP/LES/3201** TCP Facility: Development of fisheries strategy and action plan (Moehl)

**TCP/MLI/3304:** Validation and dissemination of integrated rice-fish farming systems through Farmer Field Schools in Mali (Moehl, Halwart)

**TCP/MLW/3204:** Support to small-scale fish farming enterprises - Phase II of TCP/MLW/3101 (Moehl)

**TCP/MOZ/3302** TCP Facility: Formulation of a TCP project for the development of the aquaculture sub-sector (Moehl)

**TCP/NIR/3203:** Sustainable aquaculture systems for Nigeria (Moehl)

**TCP/RAF/3304** TCP Facility: Consolidation of aquaculture networking in the Africa region (Moehl)

**TCP/SAF/3301:** Project formulation for Camdeboo Satellite Aquaculture Project (CSAP) (Moehl)

**TCP/SEN/3305:** Assistance to strengthen capacities for input production for the sustainable development of freshwater aquaculture (Moehl, Hishamunda)

**TCP/SEN/3307:** Assistance to strengthen capacities for input production for the sustainable development of brackishwater aquaculture (Moehl, Hishamunda)

**TCP/TOG/3305:** Elaboration of a strategy and a development plan for aquaculture in Togo (Moehl, Hishamunda, Brugere)

**TCP/UGA/3302** TCP Facility: Formulation of aquaculture plan and TCP proposal (Moehl)

**TCP/ZAM/3202** TCP Facility: Implementation of the aquaculture strategy (Moehl)

**TCP/ZAM/3203** Support to Zambian aqua-farmers (Moehl)

## Latin America and the Caribbean

**TCP/RLA/3208** TCP Facility: Project formulation to strengthen and extend technology transfer on inland aquaculture and fisheries between South American countries (Bojanic Helbingen)

**TCP/ARG/3202:** Support to rural aquaculture in the Central and Northern regions by means of less expensive feed (Flores-Nava)

**TCP/BOL/3204:** New fisheries and aquaculture legislation of Bolivia (Flores-Nava, Bullón)

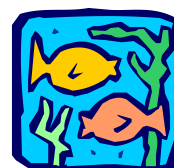
**TCP/CHI/3201** TCP Facility: Spatial aquaculture planning in the Chilean Magallanes and Antártica regions (Bojanic Helbingen)

**TCP/GUY/3301** – TCP Facility Component 1: Development of a policy and a strategic plan for inland fisheries in Guyana (Flores-Nava, van Anrooy)

**TCP/JAM/3301** TCP Facility: Formulation of an aquaculture development plan for Jamaica (Soto, VanAnrooy, Hishamunda)

**TCP/NIC/3201:** Assistance for the formulation of the National Rural Aquaculture Development Strategy (Flores-Nava)

**TCP/VEN/3301** Fostering aquaculture in urban and peri-urban economically-depressed communities (Flores-Nava)





## Europe and Central Asia

**TCP/GEO/3301** TCP Facility: Upgrading Georgian fish farm facilities and supporting the restart of fish seed production (Moth-Poulsen)

**TCP/RER/3205:** Advice to Central Asian Governments on the feasibility of commercial fish and livestock feed production (Van Anrooy, Hasan)

**TCP/RER/3206** TCP Facility: Assistance to Western Balkan countries for improving compliance with international standards for aquatic animal health (Reantaso)

**TCP/RER/3203** TCP Facility: Support to the establishment of a regional fisheries and aquaculture organization for Central Asia and the Caucasus (Van Anrooy)

**TCP/TUR/3202** Recovery of sturgeon population in Turkey: habitat assessment and restocking (Van Anrooy, Hasan, Marmulla, Altan)

## Extra-budgetary funds (EBF)/Unilateral Trust Fund (UTF)/FAO Multi-Donor Partnership Programme (FMPP)

**FMM/GLO/003/MUL:** FAO Multi-Partner Programme Support Mechanism (FMM):- Voluntary contributions` support to Strategic Objective C: "Sustainable management and use of fisheries and aquaculture resources" (Willmann, Subasinghe)

**FMM/GLO/003/MUL:** FAO Multi-Partner Programme Support Mechanism (FMM) : Voluntary contributions` support to Strategic Objective C: "Sustainable management and use of fisheries and aquaculture resources" Baby 2- Implementation of the ecosystem approach to fisheries and aquaculture - Pilot implementation activities in Nicaragua, Central America Countries and Lake Volta watershed in Africa) (Soto, Bianchi, Aguilar-Manjarrez, Bartley, Josupeit)

**GCP/INT/253/JPN** Component 2: Impacts of climate change on fisheries and aquaculture: Developing case studies to identify vulnerability and adaptation potential in fisheries and aquaculture in different countries and regions (e.g. Vietnam, Lake Chad in Africa, Benguela Current, Depto Loreto in Peru, Gulf of Fonseca Central America, Chile) (De Young, Soto, Brown, Bahri, Van Anrooy)

**GCP/GLO/322/NOR:** Climate Change, Fisheries and Aquaculture: testing a suite of methods for understanding vulnerability, improving adaptability and enabling mitigation - Developing a pilot integrated monitoring program of environmental variables in the Gulf of Fonseca, Central America to enhance adaptation in aquaculture and fishery communities (Soto, De Young, Aguilar-Manjarrez)

**GCP/HAI/022/OPF:** Promotion of small-scale poultry farming and aquaculture for the improvement of food security (Phase II GCP /HAI/017/OPF) (Crespi)

**GCP/KYR/003/FIN:** Support to fishery and aquaculture management in the Kyrgyz Republic (Van Anrooy)

**GCP/NAM/014/SPA:** Support to the South-South Cooperation Technical Assistance Programme between Namibia and Viet Nam (Hasan, Crespi)

**GCP/RAF/463/MUL** Programme: Support to the implementation of the FAO Strategy for Fisheries and Aquaculture in Africa (FIR, FIP, FID, RAF, SEC, LEG)

**GCP/RAF/466/EC:** Central Asia Regional Programme for Fisheries and Aquaculture Development (FISHDEV - CA) (Van Anrooy)

**GCP/BIH/006/NOR:** Support to Krusnica fish hatchery in Bosnia and Herzegovina (Moth-Poulsen)

**UTF/BRA/066/BRA:** Development of coastal communities (Flores-Nava)

**UTF/BRA/084/BRA:** Toward sustainable development of aquaculture in Brazil (Flores-Nava, Soto, Aguilar-Manjarrez)

**UTF/MEX/099:** A diagnóstico of the fisheries and aquaculture sectors of the State of Campeche, Mexico, as a basis for the formulation of the Sectoral Development Plan (Flores-Nava)

**UTFN/SAU/017/SAU:** Support to the Fish Farming Center, Jeddah, KSA (Lovatelli, Reantaso)

**TFD-09/BIH/001:** Support the income generation for war invalids through operation of a fish hatchery in Bosanka Krupa (Moth-Poulsen)

13th session COFI Sub-Committee on Fish Trade. Hyderabad, India. 20-24 February 2012 (Emerson)

6th Session of the COFI Sub-Committee on Aquaculture. Cape Town, South Africa. 26-30 March 2012 (Subasinghe)

Inception workshop for the Aquaculture for Food Security, Poverty Alleviation and Nutrition (AFSPAN) project. Penang, Malaysia. 23-26 April 2012 (Subasinghe, Yamamoto)

EIFAAC: European Inland Fisheries and Aquaculture Advisory Commission. 27th Session, Hämeenlinna, Finland 11-15 June 2012 (Marmulla)

FAO Scoping Workshop on Regional Cooperation Programme for Responsible Aquaculture and Fisheries Development in the Central Asian and Caucasian countries. Urumqi, Xinjiang, China, 4-8 June 2012 (Jia, Hasan, Fersoy)

FAO/NACA Regional Expert Workshop on use of aquaculture assessment tools in aquaculture planning and management for sustainability in Asia. Thailand, June 2012 (Miao, Funge-Smith)

30th Session of the Committee on Fisheries (COFI), FAO Headquarters, Rome, Italy, 9-13 July 2012 (Watanabe)

FAO/NACA Regional Expert Consultative Meeting on promoting sustainable intensification of aquaculture in Asia and the Pacific. Bangkok, Thailand, August 2012 (Miao, Funge-Smith)

APFIC: Asia-Pacific Fishery Commission – 4th Regional Consultative Forum Meeting. Danang, Vietnam, September 2012 (Funge-Smith)

APFIC: Asia-Pacific Fishery Commission- 32nd Session Danang, Vietnam, September 2012 (Funge-Smith)

CIFAA: Committee for Inland Fisheries and Aquaculture of Africa 17th Session. (Moehl)



TCP/CAF Assistance to the elaboration of a plan for sustainable aquaculture development in Central Africa (Moehl)

TCP/GUI Strengthening the capacities of professional organizations of the Fisheries and Aquaculture sectors (Moehl)

TCP/IND Development of preventative aquatic animal health protection plan and enhancing emergency response capacities to shrimp disease outbreaks in Indonesia (Reantaso)

TCP/JOR/3401 Project Formulation - Improvement of fish aquaculture production in Jordan (Lovatelli)

TCP/RER/3304 Assistance for improving compliance with international standards on aquatic animal health in the Western Balkan (Reantaso)

TCP/SAF Development and implementation of public understanding of aquaculture (PUA) Programme (Moehl)

TCP/SYR Strengthening of aquaculture in the Syrian Arab Republic (Lovatelli)

TCP/SUR Strengthening aquatic animal health protection systems in Suriname (Reantaso, Van Anrooy, Subasinghe)

TCP/URT Support for capacity building for government of the United Republic of Tanzania for IUU in the fisheries sector (Moehl)

TCP/VIE/3303 (E): Emergency assistance to control the spread of an unknown disease affecting shrimps (Reantaso, Yamamoto)

TCPF/LEB Formulation of technical recommendations for the restoration of the Batroun Oceanographic and Fishing Institute and a preliminary evaluation of current freshwater farming practices (Lovatelli)

TCP/INT (Asia/LAC) Strengthening biosecurity governance and capacities for dealing with a serious shrimp disease, Infectious myonecrosis virus (IMNV) (Reantaso)

GCP /GLO/363/EC Aquaculture for food security, poverty alleviation and nutrition (Subasinghe, Yamamoto)

GCP/NAM/014/ SPA South-South Cooperation Technical Assistance Programme between Namibia and Viet Nam for the development of aquaculture in Namibia (Crespi)

GCP/HAI Support to the development of freshwater aquaculture in Haiti (Crespi)

GCP/TUN Strengthening the role of women in small-scale carpet hard clam fisheries along the Tunisian coast for sustainable development of local economy (Diei-Ouadi/Lovatelli)

MTF/BGD/046/STF Building trade capacity of small-scale shrimp and prawn farmers in Bangladesh - Investing in the bottom of the pyramid

# Prospective milkfish industry in Palau

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A study on “Status of Milkfish (*Chanos chanos*) Industry in Palau” was undertaken by the FAO Sub-regional Office for the Pacific Islands through the services of a National Aquaculture Consultant and in close collaboration with the staff of the Bureau of Marine Resources (BMR) of the Ministry of Natural Resources, Environment and Tourism and other government departments, the tuna fishing industry and other stakeholders. This study assessed the status of the milkfish industry and the impact of the FAO Sub-regional Project on Sustainable Aquaculture Development in Pacific Micronesia (TCP/RAS/3101-3208) on aquaculture activities and socio-economic development in Palau. The study was carried out

## Milkfish industry in Palau

The milkfish industry is currently supported by three milkfish farms, namely, the Ngatpang State Milkfish Farm (NSMF), the Shallum Etpison Palau Aquaculture (SEPA) and the Melwert Tmetuchel Airai Fish Farm (MTAFF) – all provide fresh milkfish for local consumers and bait fish for the tuna long-line fisheries. There are three finfish hatcheries, namely, the Palau Mariculture Demonstration Center, the Palau Community College’s Cooperative Research and Extension and the Ngaraberas Association Rabbitfish Hatchery. While these hatcheries are not currently producing milkfish fry, it is expected that they will play an important role in the near future since they are in preparing for the production of milkfish fry, which would be given to farmers to further support the milkfish industry. Farmers continue to import milkfish fry from the Taiwan Province of China and the Philippines. It must be noted that there was no commercial production of milkfish in Palau before 2009.

The 7-hectare NSMF, operated by Filipino technical workers employed by the Ngatpang State Government, harvested 101 671 lbs (50.8 tonnes) of milkfish from April 2009 to December 2010, with a value of USD 188091 at USD 1.85/lb.

Milkfish are sold at a central location in Koror every Thursday while additional orders are placed every Monday at the main consumer outlets such as the Surangel & Sons Company (S&SC) and the Western Caroline Trading Company Shopping Center (WCTC), both in Koror.

The SEPA is a private farm, with a total area of 950 m<sup>2</sup>. The company continues to import 50 000 fry from the Taiwan Province of China, with harvests sold every month; the company may expand their sales up to 3x/mo in the very near future. Milkfish fry are first raised in the farm and then transferred to the cage culture grow-out until marketable size. The SEPA harvested 29 460 pounds (14.7 tonnes) from April 2009 to December 2010, with a value of USD 54278.

The MTAFF is a 2-hectare private milkfish farm in operation since 2009. In March 2010, the MTAFF started to supply bait fish to the two long-line fishing companies in Koror, namely the KFC and the PITI. The MTAFF harvested 290462 pieces of live bait fish from April to December 2010, with a value of USD 127792.

## Local markets

Two major supermarkets, the S&SC and the WCTC, and other small businesses play an integral role in the demand of milkfish from producers. Demand for local fresh milkfish is high and has already reduced tonnes of milkfish importation into Palau. This is a positive sign of the import substitution, money are not be spent externally, and stay within the local economy; most businesses are very supportive of the local initiatives in the milkfish industry.

The S&SC is a family-owned and a major importer of milkfish and a business partner of the NSMF. According to the S&SC, importation of milkfish from the U.S. and the Philippines has been dramatically reduced because of the local supply from the NSMF. In 2010, the S&SC stopped milkfish importation with last orders of 680 cases



of milkfish (40 lbs/case) in April 2010 and 200 cases in October 2010. The WCTC's recent import of milkfish was 4 tonnes in November 2010 from Guam and more than 50 percent of the stock has not been sold yet. According to the WCTC, the company will stop importation in 2011 because of the availability of local supply.

### Recommendations

Imported boneless milkfish in the country are more expensive selling at USD 4.99/lb while local fresh boneless milkfish are sold at USD 3.50/lb - a good indication for the positive development of the local milkfish industry. Local businesses are supportive of the milkfish industry and urge farmers to provide a consistent supply of products. To further develop and promote the milkfish industry in Palau, it is recommended to take the following actions.

- Establishment of a farmers association is recommended to share information and resources. Members of the association could work collectively to meet the country's demand for milkfish. In the future, commercial expansion could be explored with exporting the surplus of milkfish production to neighboring countries, e.g. Guam, Saipan and the rest of Micronesia.
- Inter-agency cooperation/collaboration between the BMR, the Bureau of Agriculture (BOA), non-government organizations and other government agencies must be encouraged in order to address issues relating to aquaculture. The BMR is requested to secure technical assistance from the FAO or other regional/international organizations to further assist in developing the capacity of farmers in farm operations and management.
- The BMR is encouraged to work with the Attorney General's Office to review the Fisheries and Marine Resources Act, to include the National Aquaculture Strategy and as well as the Medium-Term Development Strategy. There is a need for a comprehensive aquaculture framework that will integrate approval and permit processes of all relevant government agencies and to define the authority and responsibilities of each agency.
- The BMR is also encouraged to collaborate with the BOA to review the quarantine regulations along with the Application of Quarantine Permit and Aquaculture Project (Aquaculture Information Package).



M. Izumi, FAO

Ngatpang State Milkfish Farm in Palau



J.E. Basco, TCDC Expert

Milkfish cage culture at SEPA, Koror



J.E. Basco, TCDC Expert

Harvested milkfish for sale in Koror



M. Izumi, FAO

Longline fishing vessels in Malakal, Koror

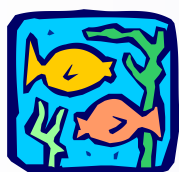
# Assisting Royal Thai Government on small-scale aquaculture certification

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The FAO Technical Cooperation Programme (TCP) project TCP/THA/3202 (D) - Certification for small-scale aquaculture (SSA) in Thailand - was designed to assist the Royal Thai Government in effectively certifying SSA farmers (shrimp and tilapia) using cluster management approach, for sustainable production of aquatic food. The underlying concept was that improving certification systems will ensure the future competitiveness of SSA farmers in Thailand for international trade. The project which started in early 2010, had a significant impact on improving the aquaculture certification sector in Thailand. Thai aquaculture is dominated by small-scale farmers and the project empowered five groups of farmers on a pilot basis, and provided them with measures to improve their ability to increase access to markets thereby increasing their resilience to increasing global market pressures and stringent market compliance.

The three most important outcomes of the project were: (a) identification of improvements to existing systems for certification of aquaculture products in Thailand, in line with international guidelines and norms on aquaculture; (b) establishment of methodologies for certification of aquaculture products from groups or clusters of SSA farmers, thus allowing farmers to participate in trade of certified aquaculture products; and (c) strengthening capacity of government and non-government agencies, including farmer organizations, for certification of aquaculture products for domestic and international markets.



## The Project Terminal Workshop

The five-day Project Terminal Workshop held in September 2011 in Bangkok, with the participation of officials from the Royal Thai Department of Fisheries (DoF), the Network of Aquaculture Centres in Asia and the Pacific (NACA), FAO, and representatives from aquaculture producers, academia, certification bodies (e.g., GlobalGap, Aquaculture Certification Council, FairTrade) and government representatives from Cambodia, India, Indonesia, Lao PDR, Malaysia, the Philippines, Sri Lanka, Thailand and Viet Nam.

Day 1, dedicated for a National Workshop, shared the project findings, methodologies/guidelines developed and lessons learned, developed scaling-up strategies at the national level, and developed recommendations for sustaining the project outputs and expand the work in Thailand and in other countries of the region. The discussion groups concluded with some of the strategies for scaling-up including extending technical assistance, implementing capacity building activities to support operation of small farmer groups especially in areas of record keeping, and functioning of Internal Control System (ICS).

Days 2 and 3, spent on training of trainers, a programme conducted for government and Thai Fisheries officials and cluster/group leaders in support of building capacity for setting up more groups and preparing them for their participation in group certification programmes. Presentations were provided by the project consultants, followed by the group discussion to consider applications in the field. The training programme was highly appreciated by the Thai DoF officials who were pleased that they could now interact more closely with small-scale farm clusters and make them work towards improving conformity with better certification standards.





K. Yamamoto, FAO

During the TCP certification project terminal workshop, a panel discussion was organized on group certification and scaling up strategies. Panelists included tilapia farmer Group leader, DOF officials, representatives from NACA, FAO and WFC

Day 4, was the Asia Regional Seminar, which shared project findings, outputs and lessons learned to enhance regional capacity and awareness, discussed small farmer certification issues in Asia and developed regional scaling-up strategies. The importance of demonstrating incentives to farmers for participating in group certification schemes was discussed intensively; the importance of scaling-up the process in Thailand and initiating such programmes in other regional countries were highlighted. Vertically-integrated supply chain models (i.e. farmer groups working with processors, feed manufactures, and including certification aspects) were considered good examples of mechanisms that could bring strong incentives through reduction of transit costs in the supply chain.

There was unanimous consensus on the need for capacity building on aquaculture certification in the region. Participants thought that regional and international organizations have a role to play in this regard, and the findings and lessons learned from this FAO TCP certification project should be disseminated widely

within the country and also in the region by using established communication mechanisms.

Following the regional seminar, Day 5, developed, through a round table discussion, mechanisms for the regional and national implementation of the FAO Guidelines on Aquaculture Certification<sup>1</sup>, to enhance cooperation and networking among public and private certification schemes and to develop tools for benchmarking, harmonization and establishing equivalence. There is a clear need for benchmarking certification schemes against the FAO Guidelines so that it can be used consistently across certification programmes both public and private. However, the methodologies for benchmarking needs further clarification, which may include such aspects as external/independent review, conflict of interest and credibility, and contents (both standards and implementation mechanisms itself). Since the completion of the workshop in 2011, some major aquaculture certifiers are now working closely with the Thai DoF in harmonizing certification procedures to avoid duplication of efforts

and reducing the unnecessary financial burden to the resource-poor small-scale farming communities,

The meeting recommended that international organizations (e.g. FAO, NACA, WFC) should take up further work on benchmarking so that public and private aquaculture certification programmes can move towards better harmonization and equivalence.

FAO has recently received a grant from the European Union Directorate on Fisheries (DG Fish) towards developing a compliance monitoring or conformity assessment tool which can be used by anyone involved in aquaculture certification to benchmark their certification schemes against the FAO aquaculture certification guidelines.

<sup>1</sup>FAO. Technical Guidelines on Aquaculture Certification. Rome, FAO. 2011. 122pp.



# Supporting African rice farmers in their diversification efforts through aquaculture

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Aquaculture Service

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The importance of rice farming and aquaculture in the lives of many Africans cannot be over-emphasized. Per capita food fish supply in Africa is 8.5 kg/year whereas the corresponding world average is 14.6 kg/year. Aquaculture production in Sub-Saharan Africa has made tremendous increase in some countries and the number of attributing development and projects were highlighted in the recent article FAN 45 (pp 6–7). This article intends to show some of the recent activities conducted in relation to aquaculture in rice-based production system in Sub-Saharan Africa, such as in Mali.

In a country like Mali where 80 percent of the population depends on agriculture it is imperative to ensure that natural resources are used in the most efficient way. The Technical Cooperation Project TCP/MLI/3304 on validation and dissemination of aquaculture in rice-based production systems in Mali has the overall objective to augment the production and availability of fish following a Farmer Field School (FFS) approach in Ségou, Sélingué and Mopti. The approach ensures not only improvement of technical aspects of production but also social context through adequate participation approaches of communities<sup>1</sup>. Principal beneficiaries were farmers who participate in the weekly FFSs with about 900 families benefitting from the interventions that will be facilitated by a total of 12 extension agents. The project runs in two cycles: the first one allows farmers to test and validate various techniques and practices with the help of experienced facilitators; the second disseminates the successful results obtained by the farmers themselves. Importantly, the TCP connects with other ongoing projects in particular the sub-regional GCP/RAF/009/NET “Sub-regional Programme for Integrated Production and Pest Management through Farmer Field Schools (IPPM/FSS): Benin, Burkina Faso, Mali and Senegal”. A similar approach is foreseen in Burkina Faso after the present strengthening of

capacities of the Direction Générale des Ressources Halieutiques and other stakeholders involved in integrated aquaculture-agriculture in Burkina Faso in the areas of Niassan, Bama and Bagré.

In addition to the above TCPs, the Japan-funded FAO project GCP/INT/053/JPN “Intra-African Training and Dissemination of Technical Know-how for Sustainable Agriculture and Rural Development with Africa-ASEAN Countries Cooperation within the Framework of South-South Cooperation Project” has been supporting rice farming and aquaculture productivity increase in Sub-Saharan African countries since 2008. This was done through, particularly, organization of regional and national workshops. A mid-term review of the project, completed in early 2011, reported that participating stakeholders commanded these workshops as an important instrument for identifying major bottlenecks to their development both regionally and nationally, as well as for discussing strategies to overcome them. This same review, however, recommended, inter-alia, that the project should give more emphasis to national level activities and on achieving clear and targeted outputs.

In line with the recommendation, the project held the first national workshop in Dar Es Salaam, Tanzania<sup>2</sup> from 14-18 November 2011. The week-long workshop brought together about 145 participants from the government (e.g. extension agents and officers from district, regional and central levels), aquaculture and rice producers, rice processing plants, academia, and other international agencies such as The Coalition for African Rice Development (CARD), the Japanese Embassy and the Japan International Cooperation Agency (JICA). Workshop participants discussed resource availabilities and needs for national rice farming and aquaculture development. The main needs in aquaculture pertain to basic infrastructure



K. Yamamoto, FAO

Tilapia farmers in front of the pond which was dried and conditioned with lime ready for the stocking

for research, seed and feed production and dissemination, capacity building and efficient technologies. Consequently, the workshop developed three project concept notes, namely; 1) promotion of sustainable aquaculture for food and income, 2) promotion of aquaculture through cluster and contractual farming with special reference to aquaculture in rice-based production systems, pond/cage tilapia farming, and shrimp farming; and 3) empowering women through aquaculture. On the other hand, The main needs identified in rice farming were; infrastructure and human capacities for seed production, quality of fertilizers, mechanization of production, and quality control and improvement in post harvest practices.

It is important to note that there are increasing collaborations between agriculture and aquaculture professionals in the countries and supporting agencies including FAO. This concerted effort towards improving both rice farming and aquaculture is believed to be the major driving force for ensuring sustainable food security and alleviating poverty in Sub-Saharan Africa.

<sup>1</sup>The details of approach can be found in FAO publication: Halwart, M. and Settle, W. 2008. Participatory training and curriculum development for Farmer Field Schools in Guyana and Suriname -A field guide on Integrated Pest Management and aquaculture in rice. FAO, Rome. p.124. <http://www.fao.org/docrep/012/al356e/al356e00.htm>

<sup>2</sup>In Tanzania where 71 percent of national land is used for agriculture and 75 percent of the population depends on agriculture activities, there is strong interests and need for expanding rice-based farming system.

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**Training course logistics:** Giselle Rósimo Duarte, Consultora Técnica. Cooperação Técnica FAO/MPA, Brazil. **Training course lecturers:** Carrying capacity: Dr Jeanete Koch Coordenadora do CVTEC de São Gonçalo do Amarante, Brazil. Aquaculture zoning: Dr José Aguilar-Manjarrez (FAO-FIRA) with the support of Dr Philip Conrad Scott, Universidade Santa Úrsula, Brazil.

# Inclusive aquaculture - business at the bottom of the aquatic pyramid

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**B**ottom of the Pyramid – the term coined by C.K.Prahalad in his landmark book “The Fortune at the Bottom of the Pyramid” – refers to the opportunities for business investment in providing goods and services to the poor and generating profits whilst creating social and economic good. This approach, according to Bill Gates, “offers an intriguing blueprint for how to fight poverty with profitability” and setting the scene for the emergence of social impact investment that we see growing fast today.

Through a SIDA -funded project on small-scale fisheries FAO and partners have been supporting WorldFish Center research into small-scale aquaculture investment. Studies of projects in Bangladesh, India and Indonesia suggest significant outcomes from investment, and start to show the potential for new avenues for investment in aquaculture that have potential to deliver not only aquaculture products and profitable businesses for smallholders, but also social and economic goals. Some of the highlights are provided below.

Investments in Indonesia, India and Bangladesh  
In Indonesia, US\$ 1.9 million of donor investments was estimated to be made in a technical and organizational assistance program in the Province of Aceh during 2007-2010, to support rehabilitation of aquaculture infrastructure after the earthquake and tsunami disaster of 2004. Over 95 percent of aquaculture farmers in the province are small-scale, owning or operating brackishwater shrimp and fish ponds of around 1 ha per household. Technical assistance supported adoption of better management practices (such as

stocking of healthy shrimp seed, improved pond management), and organizational support to rebuild and strengthen farmer groups. Forty seven volunteer farmers joined the program in 2007 – in 2010 that number had risen to over 2600, creating significant improvements in income in this poor region of Indonesia. Total income generated from all participating farms from 2007 – 2010 was US\$ 2.39 million, with a total net profit of US\$ 1.44 million, not yet returning all the investments made, but with trends towards overall profitability in 2010 (Table 1).

In India, investments made from 2002-2006 by MPEDA and NACA into small-scale commercially-oriented shrimp farm improvements were investigated. An estimated US\$ 191 000 was invested into wide dissemination of better management practices to small-scale shrimp farmers through local technical services and farmer groups. Five farmers volunteered to this initiative in 2002. The number grew to 730 in 2006 (and beyond that to 17,147 farmers under NaCSA in 2011). Better management practices, building farmer networks and delivery of technical advice through village-based extension staff created significant economic outcomes; US\$ 8.9 M of revenue from farm gate shrimp sales and US\$ 3.52 M of profits to farmers during 2002-2006, a substantial return on the investments made (Table 1).

Bangladesh provides the most significant value creation among the case studies. The USAID-funded project “Greater Harvest and Economic Returns from Shrimp” (GHERS) provided



**Table 1**

Outcomes from technical and organizational investments through three aquaculture projects

	Aceh (Indonesia)	India	Bangladesh	Methodological notes
Years	2007-2010	2002-2006	2008-2011	Project start and finish years for analysis
Number of farmers	47 > 2,639	5 > 730	2,772 – 22,670	Number of farmers voluntarily engaged in the programs/projects from first to final year
Total investment (US\$ million)	\$ 1.90 M	\$ 0.19 M	\$0.84 M	Cumulative investment in US\$ over in technical/organizational assistance of project
Total farm revenue (US\$ million)	\$ 2.39 M	\$ 8.90 M	\$52.5 M	Total revenue from sale of aquaculture products during project period
Total farm profit (US\$ million)	\$ 1.44 M	\$ 3.52 M	\$20.6 M	Total profit from sale of aquaculture products (excluding baseline year) during project period
Profit/investment ratio	0.73	18.5	24.5	Ratio of total farm profit divided by total project investment
Farmer income (US\$ revenue from sales)	\$215 – \$684	\$1,113- \$6,621	\$1,500 - \$2,498	Income per farmer per year in US\$ in start and finish years, over baselines (India baseline is from 2001)
Farmer profit (US\$)	\$73 > \$435	\$278 – \$2,648	\$356 – \$1,104	Profit per farmer per year in US\$ in start and finish years, over baselines (household labor excluded) (India baseline is from 2001)

Source: WorldFish Center. 2012. Investing in small aquaculture enterprises (Manuscript in preparation)

technical and organizational assistance from 2008 to 2011 to mostly small-scale shrimp and fish farmers. The intent of this project was to improve shrimp and fish farm management in the southern coastal areas of Bagerhat, Khulna and Shatkhira districts. Total investment over two years in technical and organizational assistance to small-scale farmers, farmer groups and local services was US\$ 841 713. This investment helped scale out the project to include 22,670 farmers and generated \$USD 52.5m in income and \$USD 20.6m in profits in 2011. (Table 1).

### Lessons learned

The cases showed significant economic returns from the investments made. While more such analyses are required, from a commercial perspective, they start to show the significant values that, under the right conditions, might be created by investments into small-scale aquaculture. Some key points arising from these experiences are as follows.

The critical first step is to identify those areas in each country in which farmers have **common burning issues (drivers)** such as poor yields, disease problems, environmental constraints, hurdles to market access or other constraints that would gain the most from the provision of consistent and relevant improvement. Typically, such areas have low productivity, poor management systems and no farmer support mechanism. Interventions associated with each case study generated improved pond productivity and profitability and began to build incentives for farmers to engage.

Second, having **farmer-oriented services**, comprising local teams with technical and organizational skills, were a crucial part of each project. Such technical help was provided by grant funding, but for sustainability, a business-oriented approach to servicing would be better. Our analysis shows that there is a business case for such services, but it takes time to generate a return and scale out.

Third, **collective action** through group approaches is necessary to reach large numbers of farmers. Economies of scale and knowledge transfer are among the advantages of collective action, but group organization and capacity building takes time. Research on business models and investment strategy is needed to understand the costs and returns of such investments. Our experience suggests opportunities for investing through cooperatives and other producer organisations.

Four, **market connections** to input suppliers (seed, feed) provides groups with bargaining power for better prices. Benefits to farmers in the cases examined were largely achieved through scaling out simple management and organizational improvements, with some limited integration of seed and feed suppliers; market connections are still developing. Longer-term, market connections could provide opportunities for cooperative or group businesses to harness more efficiencies and profits for members.

Five, *financing is essential*. Small-scale household farms are not well served by credit, and potential growth can be stifled by underfunding. Economic outcomes from investment can be substantial, but financing systems that provide time for building scale and capacity are needed. A viable business model needs to be at the core of the enterprise.

Six, *local conditions* are important. Aquaculture is very site and country specific; one size does not fit all. Stakeholder numbers vary, but more importantly social and cultural context, institutional frameworks, value chain structure and efficiencies, power relations among stakeholder groups and governance also vary. Understanding local context, and local service teams accepted by local stakeholders, appear key to successful investment.

Seven, *it takes time* to achieve reasonable returns on investment. So it requires patience, focus, and dedicated and consistent efforts to achieve the goals and profitability on investments made.

### Moving forward

These case studies provide insights into the substantial economic and social added value that can be created by investment in the small-scale aquaculture sector. The cases also provide evidence of conditions for successful commercial investment. Sharing more of such experiences needs to be encouraged, as is building coalitions of partners to extend and scale-up successful models. There does appear to be business at the bottom of aquaculture's pyramid, which could generate positive economic, social and environmental outcomes. The key now is in moving forward towards implementation.

<sup>1</sup>Prahalad, C. K. 2010. The Fortune at the Bottom of the Pyramid: Eradicating Poverty Through Profits. Revised and Updated Fifth Anniversary Edition. Prentice Hall, Upper Saddle River, New Jersey 07458, USA. 2010. 407 pp.

<sup>2</sup>Swedish International Development Cooperation Agency

<sup>3</sup>Padiyar, P. A., Phillips, M.J., Ravikumar, B., Wahju, S., Muhammad, T., Currie, D.J., Coco, K. and Subasinghe, R. P. 2011. Improving aquaculture in post-tsunami Aceh: experiences and lessons in better management and farmer organizations. Aquaculture Research. Online edition. 13 Oct. 2011 <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2109.2011.02986.x/abstract>

<sup>4</sup>Marine Export Development Authority, Ministry of Commerce and Industry, Kochi, India

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<sup>6</sup>Umesh, N.R., Mohan, A.B.C., Ravibabu, G., Padiyar, P.A., Phillips, M.J., Mohan, C.V. and Bhat, B.V. 2009. Shrimp farmers in India: empowering small-scale farmers through a cluster-based approach, pp 43-68. In: S.S. De Silva and F.B. Davy (eds.), Success Stories in Asian Aquaculture, Success Stories in Asian Aquaculture. [http://web.idrc.ca/openbooks/461-1/#page\\_43](http://web.idrc.ca/openbooks/461-1/#page_43)

<sup>7</sup>National Center for Sustainable Aquaculture – <http://nacsampeda.org>

<sup>8</sup>The term “projects” is used, but in Aceh at least the investments were made by multiple donor projects, but within an integrated program.



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- Twitter trends show which topics are most commonly tweeted about at a particular moment. Twitter Trends can be viewed worldwide or by particular geographical regions. Though sometimes frivolous, Twitter trends are important to monitor as they can reveal activity around a particular events. For example, during the FAO conference to elect a new Director-General, FAO was one of the most tweeted topics worldwide.
- Aquaculture Hub: @aquaculturehub
- International Collective in Support of Fishworkers Europe: @ICSF\_EU
- The World Fish Center: @WorldFishCenter
- Maria Damanaki, European Commission on Maritime Affairs and Fisheries: @MariaDamanakiEU
- United States Fisheries and Wildlife Service: @USFWSfisheries
- US National Oceanic and Atmospheric Administration: @usfisheriesgov

Other examples of fisheries and aquaculture related pages on Twitter include:

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## Mainstreaming gender in fisheries and aquaculture management and development: a stock-taking and planning exercise

Three services, namely the Aquaculture Service (FIRA), the Fishing Operations and Technology Service (FIRO) and the Policy, Economics and Institutions Service (FIPI) of the Fisheries and Aquaculture Department (FI), are undertaking a gender mainstreaming stock-taking and planning exercise from January to March 2012. This initiative is part of an assessment and learning endeavour of the department to systematically review gender mainstreaming in its programme and its progress in pursuing commitment to gender equality. The exercise will set up an initial baseline on the status and performance on gender mainstreaming, and identify critical gaps and challenges.

The specific objectives of this exercise are to:

1. generate understanding of the extent to which gender equality and gender mainstreaming have been internalised and acted upon by management and technical and administrative staff;
2. assess the extent of gender mainstreaming in terms of the development and delivery of programmes/projects;
3. identify mechanisms, practices and attitudes that have made positive contribution in mainstreaming gender in fisheries and aquaculture;
4. assess the level of resources allocated and spent on gender mainstreaming and gender activities;
5. examine the extent to which human resources policies and practices are gender-sensitive; and
6. make recommendations for improvement and suggest possible strategies to better implement gender mainstreaming, including measuring progress and performance

Quantitative information will be obtained concerning resources, activities, progress and results on gender mainstreaming. Additionally, the exercise will probe and explore deeper insights and reality beyond gender and fisheries and

aquaculture data, statistics, and experiences. As such, the exercise will use a range of methods, namely: document reviews, interviews with as much number of staff as possible, and a planning workshop. Such approach will also enable cross-checking and wide consultation and participation among key management and programme staff.

Using the Gender and Development (GAD) framework, the analysis will focus on 9 key areas, namely:

1. Current global and regional gender issues and gender debates affecting fisheries and aquaculture development, and interactions with national gender machineries and key stakeholders
2. FI gender mainstreaming strategy: objectives, programme and budget
3. Mainstreaming of gender equality concepts and tools in the design and implementation of programmes and technical cooperation activities
4. Existing gender expertise and strategy to build gender competence
5. Gender information and knowledge management
6. Gender analysis, monitoring and evaluation systems and tools
7. Planning and decision-making on gender mainstreaming
8. Organisational culture (including personnel policies and procedures)
9. Perceptions and attitudes on achievement of gender equality

The outcome of the stock-taking and planning exercise will be reported in future issues of FAN.

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<sup>1</sup>Based on a concept note developed by the gender consultant, Ms Esther Costales Velasco



# Aquaculture information management system in Thailand

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Aquaculture development in Thailand has been growing consistently for the past 25 years. Sectoral development policies have been directed towards intensification and expansion of the sector. With these, emerging problems related to environmental degradation and losses due to diseases affected production. The decentralization of authority for planning to the provincial and district levels was another development which required more effective guidance to local planners. The Department of Fisheries (DOF) has the mandate to recommend how aquaculture could be planned and zoned, to enable local government to protect their environmental quality, as well as ensure that aquaculture development does not end up creating problems for itself, leading to economic losses and hardship for producers. However, information needs for decision-making has to be scaled and tailored to meet the government needs.

In response to a request to FAO for technical assistance by the Royal Thai Government's Department of Fisheries (DoF) to upgrade and strengthen the aquaculture information management system for informed sectoral policy-making, planning and effective management to support the sustainable development of aquaculture in Thailand, the project TCP/THA/3304 "Aquaculture information management system in Thailand" was approved in early 2011. The expected outputs from this project are: (1) establishment of system and mechanisms to convey management information and decision-making needs from stakeholders to the responsible DoF divisions and research centers and to expedite solutions back to stakeholders; (2) development and operation of the Aquaculture Information Management System (AIMS) with a basic geo-framework and attributes in two provinces; (3) development and testing of aquaculture zoning and sitting tool/model for



Seabass cage culture Farms at Pak Payun District.  
Hand-written records are completed and made available to the Department of Fisheries

two provinces; (4) development and testing of ecological carrying capacity modelling for bivalve and finfish culture in two provinces (research centers); and (5) improving capacities through training on AIMS and other decision-making tools at different level.

The first major activity, an Inception Planning Workshop convened in Bangkok, Thailand, from 11–12 July 2011, was aimed at:

- discussion of project concept, rationale, envisaged outputs and broad outline of activities; and
- finalization of the overall work plan including time-frame of implementation and responsibilities of all project stakeholders.



Group photograph of workshop participants

The 2-day workshop, hosted by the DoF, was attended by 50 participants representing fish farmers, private sector, industry professionals, academia, research organizations, intergovernmental organization, relevant DoF divisions and provincial offices.

Prior to the workshop, officers from FAO/RAP and FAO/FIRA, the national project director, international and national consultants and national and local DoF project staff travelled to the provinces of Chiang Rai (5–6 July) and Songkhla (8–9 July) and met with project partners and relevant stakeholders to identify key issues relating to the management of the aquaculture sector which could be resolved through a comprehensive aquaculture information management system (AIMS) for Thailand. Visits were also made to three fish farms (fish cages, fish ponds, and fish hatcheries) in Chiang Rai and four farms (two shrimp ponds and two fish cages) in Songkhla to gain an appreciation of current procedures on farmer's data recording and information exchange.

### Outcomes and way forward

Data collection, information flow and communication and the use of tools to manage aquaculture information, including those for monitoring of environmental and socio-economic indicators are fundamental to the implementation of this project. There is a need to: determine key information to be recorded by farmers; provide incentives to farmers for keeping good records; and facilitate information dissemination throughout the DoF including the results of analyses to aid decision-making at local levels.

Farm registration is essential and will provide the baseline information for zoning and monitoring. One example of farmer incentive that encourages farmer registration is the compensation scheme for

damages caused by natural disasters as in the case of farmers in Songkhla.

Due to the lack of space available for aquaculture development, proper zoning, good understanding of the carrying capacity of the system and determining ways to limit, control and regulate maximum production to ensure ecological and socio-economic sustainability are important considerations which need to be addressed.

The implementation of this project will improve operational decision-making on aquaculture management and development and expand aquaculture planning and policy capabilities through the implementation of AIMS operated by provincial and district DoF personnel and research centers, but used by personnel at all levels as well as other departments, ministries and NGOs.

This TCP will promote and facilitate multi-sectoral dialogues and collaboration and make available state-of-the-art geospatial information and communication technologies that could serve as a "model" and could be upscaled in other countries of the region. An intergovernmental organization like the Network of Aquaculture Centres in Asia and the Pacific can be an important dissemination arm for this information technology.

The commitment of the DoF, with its well-equipped and skilled Geo-Informatics Group, will secure/sustain the use of AIMS at all administrative levels but strong commitment and collaboration by all partners and stakeholders will also be required so that AIMS can be fully integrated and utilized for managing aquaculture in Thailand.

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# Improving aquaculture food safety in Hubei Province

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This project TCP/CPR/3203 (D) was initiated at the request of the Government of the People's Republic of China in the context of the high priority given to improve food safety. The expected outputs of the project were: (a) key provincial government officials and fish farmers trained on good aquaculture practices (GAP), good hygienic practice (GHP), aquatic animal health management, Hazard Analysis Critical Control Point (HACCP) and risk analysis in fish safety management; (b) farm productivity and quality and safety of farmed fish in demonstration ponds in Hubei Province improved; (c) stakeholders in different sectors of the supply chain have increased awareness about GAP, GHP, HACCP based measures; and (d) market access for fish from Hubei Province improved. Dr Shuai Qirong, Ministry of Agriculture, Hubei was the National Project Director and was supported by the following National Consultants: Dr Liu Jiashou and Dr Zhang Tanglin from the Institute of Hydrobiology, Hubei; Mr Li Jiaxin and Mr He Weidong from the Aquaculture Bureau, Songzi; Dr N. Sarangi from India, Dr Paiboon Sithithaworn and Dr Supanoi Subsinserm from Thailand served as consultants on aquaculture practices and aquaculture food safety, respectively. FAO technical support was provided by Dr Iddya Karunasagar (Lead Technical Officer), Mr Miao Weimin and Dr Rohana Subasinghe.

Project implementation commenced during the Inception Planning Workshop held in Songzi from July 30 – August 03, 2009. This was followed by an analysis of prevailing aquaculture practices and identification of food safety risks through the following activities: (a) questionnaire-based study of ongoing aquaculture practices, common disease problems encountered, use of chemicals and antimicrobials; (b) collection of samples of water and sediment from the ponds to perform analysis at the Institute of Hydrobiology, Chinese Academy

of Sciences, Hubei. Based on these analysis and discussion with fish farmers, National and TCDC consultants, GAPs suitable for the local conditions were developed. The GAP developed included: (a) desiltation of the demonstration ponds (Fig 1); (b) improvement of water intake channels; (c) selection of healthy seeds from hatcheries adopting good practices; (d) quarantine of seeds before stocking; (e) modifying stocking ratio; (f) monitoring of water and sediment quality at regular intervals and taking remedial actions such as water exchange and aeration as required; (g) reducing feed wastage; (h) minimizing use of chemicals, use of some herbal remedies for infection and occasional use of water disinfectant in case of disease outbreak in neighbouring ponds; and (i) use of laboratory services for technical support like monitoring pond water and sediment quality and disease diagnosis.

The stocking ratio recommended were: grass carp (56%), silver carp (12%), bighead carp (12%), crucian carp (10%), blunt snout bream (2%), and mandarin fish (8%). Mandarin fish, a carnivorous species was used to replace channel catfish farmers used earlier because of its ability to keep the weed fish under control and higher market price.

Non-demonstration farms had lower proportion of grass carp (40%), higher proportion of silver carp (24%) and bighead carp (13%), crucian carp (13%) and blunt snout bream (10%), but did not have mandarin fish. Training was provided for staff of the Aquaculture Bureau of Songzi area, who would be overseeing the implementation of GAPs. The project chose 10 demonstration ponds for implementation of GAPs. Farmers were trained in GAP implementation and during the course of implementation, about 100 farmers from non-demonstration ponds were also trained and they witnessed the implementation in the demonstration ponds. Two officers from Aquaculture Bureau of





Desiltation of ponds in progress



Laboratory training session for staff of Sonzi Aquaculture Bureau

Songzi went on a study visit to Thailand to see the aquaculture practices and also to exchange information on fish inspection and certification system practices. The Songzi Fishery Bureau laboratory was supported with some equipment to improve their skills required for monitoring the implementation of the GAP. In addition, a training workshop on analytical aspects was conducted for the laboratory staff (Fig 2). Further technical support was provided by the national consultants from Institute of Hydrobiology, Chinese Academy of Science, Hubei. The progress of implementation of GAP, aquaculture production in demonstration and non-demonstration ponds was reviewed during the project terminal workshop held from 19-23 December, 2010.

### Observations

- (a) Desiltation resulted in water depth being increase by an average of 76 cm in demonstration ponds;
- (b) Fertiliser input was less (average 79 kg/mu in demonstration ponds compared to 89 kg/mu in non-demonstration ponds) despite of increased water volume available for fish stocked;
- (c) Water quality in demonstration ponds was better as evidenced by statistically significant ( $P < 0.05$ ) increase in dissolved oxygen levels and significant ( $P < 0.05$ ) decrease in content of ammonium nitrogen ( $\text{NH}_4^+$ ), un-ionized ammonia ( $\text{NH}_3$ ), nitrite nitrogen ( $\text{NO}_2^-$ ) and bioavailable phosphorus;
- (d) Monitoring of sediment quality indicated that in demonstration ponds, organic matter, total nitrogen were significantly ( $P < 0.05$ ) reduced; while in demonstration ponds, only water disinfecting agents, chlorine dioxide and trichloroisocyanuric acid were reduced;
- (e) Occasional infection (e.g., bacterial enteritis, red skin, gill rot, fungus *Saprolegnia* and parasites such as *Trichodinia*, *Sinergasilus*) were managed by water treatment and use of Chinese herbal medicines;
- (g) Fish production per unit area (mu) for 10 demonstration ponds ranging from 576 kg to 974 kg, averaging 752 kg, increased by 26.2% (156) compared to that of the 10 non-demonstration ponds (596 kg). In the demonstration ponds, the production of swallow-feeding fish with high value (all fish exclude silver carp and bighead carp) was 520 kg/mu, accounting for 70% of the total, whereas the production for the non-demonstration ponds was 390 kg/mu, accounting for 66% of the total.
- (h) Average output value per unit area (mu) in the demonstration ponds was 6066 Yuan, increasing by 47.3% than that of the non-demonstration ponds (4188 Yuan);
- (i) Production costs per unit area (mu) in the demonstration ponds ranged from 2375 to 4565 Yuan, averaging 3384 Yuan, an increased of 6.7% compared to that of the non-demonstration ponds (3170 Yuan). The costs of chemicals and drugs, fuel and electricity and fertilizers, decreased by 25.2%, 27.0% and 28.4%, respectively in the demonstration ponds. Pond sludge removal, improved water quality and modulating fish stocking ratios contributed to the decrease in production cost.
- (j) Profit per unit area (mu) in the demonstration ponds was 2682 Yuan, increasing by 183% than that of the non-demonstration ponds (948 Yuan).

# Improving national carp seed production system in Nepal

Miao Weimin

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In order to assist the Nepalese government in effectively addressing the problem with deteriorating fish seed quality, a key technical bottleneck problem hindering the carp culture industry, an FAO TCP “Improving national carp seed production system in Nepal” (TCP/NEP/3303) was approved in November 2010 and implementation commenced in January 2011 through a successful project inception workshop. As the first aquaculture- focused TCP since 1994, the project received the full support from various stakeholders and achieved substantial progress in the implementation.

A major activity, three Technical Cooperation among Developing Countries (TCDC) consultants on carp genetics, Chinese carp hatchery/nursery operation and fish seed production regulation and quality control from China and India carried out their first field missions during the period May-August 2011. In order to support the field project activities, the project Lead Technical Officer undertook a backstopping mission in

conjunction with the field missions of the two TCDC consultants.

Important accomplishments during the field missions include the following activities. First, a training course was conducted for 20 DIFD<sup>1</sup>, NARC<sup>2</sup> and provincial technical staff involved in the project implementation on conventional and modern fish breeding methodologies, fish broodstock management and other fish genetic improvement related subjects, held at the Begnas Fisheries Research and Development Center of NARC in Pokhara. Second, a pilot carp selective breeding program was designed and to be implemented during and beyond the project implementation at the centre. The pilot selective breeding program on carp was launched through a pair-mating of selected common carp brooders from four different sites. The national project staff also learnt how to use PIT to tag the fish with equipment provided by the project. Third, a 3-day training on molecular genetic analysis of fish was conducted at the Biotechnology Unit of NARC in Kathmandu. The training involved genomic DNA extraction, PCR amplification of the microsatellite markers of common carp and electrophoresis of amplified products.

In addition to the above, comprehensive suggestions were provided by the carp hatchery and nursery operation TCDC consultant on improvement of carp hatchery and nursery facilities, management operation and broodstock management based on visits to a number of government and private carp hatcheries in Janakpur provinces and interaction with hatchery operators and local technical staff. The consultant also conducted



Training on fish molecular genetic analysis

Dong Zaijie, FFRC, Wuxi, China

a 3-day training course on carp hatchery and nursery operation and management for some 30 technical staff working in government and private hatcheries. During the first field mission of the consultant on fish seed production regulation and quality control, the existing quality control and regulatory system for fish seed production in Nepal was thoroughly reviewed. Preliminary recommendation has been drawn in setting up an effective system and mechanism to ensure the quality of fish seed production in Nepal.

With the facilitation of Freshwater Fisheries Research Centre (Wuxi, China), 20000 carp seeds

(grass carp, silver carp, bighead and common carp) from original stock maintenance station were successfully reintroduced to Nepal from China following strict biosecurity protocols including animal health quarantine procedures before the transportation and after the arrival of the fish seed, etc. The successful reintroduction will provide important material base for improvement of broodstock of the carp species in the country.

<sup>1</sup>Directorate for Fisheries Development

<sup>2</sup>National Agriculture Research Council

[Continued from page 46](#)

## Wikipedia

<http://www.wikipedia.org/>

Wikipedia is a user-generated and user-edited encyclopedia. With articles in over 250 languages and frequently the first item on google search results, Wikipedia has established itself as a leading knowledge center. This is where “common knowledge” is generated and accessed. Studies of the site have shown it to be roughly as accurate as the Encyclopedia Britannica, though it should still never be relied upon as the sole source of information for a publication.

Each Wikipedia page has tabs to allow users to edit, discuss, and view the history of the page. In the edit tab, one can view the page in its markup language and edit the page, updating sources, adding relevant information, and updating or deleting inaccurate information. However, if the change is not adequately justified in the edit summary, volunteer Wikipedia editors will flag the change and require justification.

Wikiprojects are coordinated efforts to organize and develop pages related to a particular topic. For example, one Wikiproject is devoted to improving pages related to Fisheries and Fishing.

FAO encourages FAO staff to contribute to Wikipedia in their field of expertise; the Office of Knowledge Exchange will work with individuals to promote proper Wikipedia practice. The website has a strict anti-self-promotion policy that excludes any contributors that appear to be promoting their own work. For this reason, FAO discourages staff from editing Wikipedia using the FAO building's Internet and also discourages the citation of one's own articles.

## Conclusion

As Internet connectivity continues to increase around the globe more and more people are using social media services to communicate and share content. Former Director of the Fisheries Resources Division in FAO, Serge Garcia wrote in SOFIA 2010,

*‘...more use of dedicated social network services would facilitate the emergence of more effective regional or global epistemic communities...’*

Social media may provide indicators to assist with implementation of FAO's “Results-Based Management”. By posting announcements of new publications, projects or other FI activities, it is possible to ask readers to evaluate the product. Although not perfect, these evaluations would be an indicator of how the product was received.

The trend towards more social networking will certainly continue and it is important for FAO's departments to become active on these services. This effort could not only promote FI's work, but could also advance FAO's mission of making knowledge accessible internationally.

As we struggle with work overload, email overload and spam, it may be difficult to embrace fully these new platforms of information exchange. However, this is where the future of mass communication seems to be going. It is a bit daunting for many of us (especially those of us over the age of 40). We recommend asking your kids for guidance or hiring an FAO intern to help with the transition.

<sup>1</sup>Please see FAO guidelines on social media at [http://webguide.fao.org/web\\_publishing/social\\_media/en/](http://webguide.fao.org/web_publishing/social_media/en/)



# Empowering women through streamlining clam collection and marketing in Zaboussa, Tunisia

Yvette DieiOuadi<sup>1</sup> and Alessandro Lovatelli<sup>2</sup>

<sup>1</sup>Products, Trade and Marketing Service (FIPM)  
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The Tunisian clam value chain represents a key income generating activity, with most of the production exported to Italy and Spain. This important industry provides employment and social stability in the country, particularly in rural coastal communities. About 3 800 women are involved in collection of the clam *Ruditapes decussatus* in the Gulf of Gabes, the main clam producing area in Tunisia. The low literacy of fishers in addition to limited access and control over such services as transportation and depuration has kept their income levels at a very low level despite the critical role of the fishery sector. This situation prompted the the Tunisian Government to request, in 2008, for FAO's assistance through the project TCP/TUN/3203 "Renforcement du role de la femme dans la filière pêche à pied de la palourde en Tunisie" (Strengthening the role of women in the clam fishing industry in Tunisia) to improve the conditions of clam collectors in the Zaboussa Region.

## Highlights of project implementation

**Institutional capacity and gender issues.** The project confirmed the lack of any organizational structure among



A. Lovatelli, FAO

Tunisian clam fishers in Zaboussa, Gulf of Gabes

the fishers, the poor integration of women into the existing local clam resource management arrangements and their weak influence over buyers and service providers. In 2004, a formal association known locally as "Groupement de développement et d'exploitation de la palourde" or GDP was established to support the clam fishery. Even as the association was supposed to empower women and recognize their contribution to the sector, it lacked any female representative in its management board. The association served as a "business" entity with little attention to women, who were often left at the mercy of the middlemen, transporters and depuration agents. Women had no say in the decision process of the business which did not help improve their working or living conditions.

A study tour to Morocco, participated by two strongly opinionated Tunisian fishers, became instrumental in raising awareness among project beneficiaries.

As a result and with the help of the project's legal consultant, two local women associations were created to act as legal entities through which interests of the fishers, including capacity development, technical assistance and commercial business partnership, can be voiced. The project also created the environment for equal representation of women and men in the management board of the local GDP.

**Technical capacity development.** Fishers were trained on improved clam collection, sustainable fishing and handling practices.

Pre-project practices resulted to accidental collection of about 10 percent of the catch not meeting the minimum regulatory size of 35 mm and which were either discarded or sold illegally in internal markets representing lost income opportunity for women had they been properly disposed of at sea. To turn this malpractice for the benefit of the fishers and the industry as a whole, the possibility of growing these clams to marketable size was assessed. The pilot aquaculture trials proved that high survival and growth rates could be achieved if seeds were released in the right bottom conditions and densities. Introduction of such husbandry practices enabled women to increase their annual revenue by at least 20 percent. Furthermore, to sustain the interest of the fishers and encourage sustainable fishing and management practices of the resource, the project provided to the authorities the necessary legal

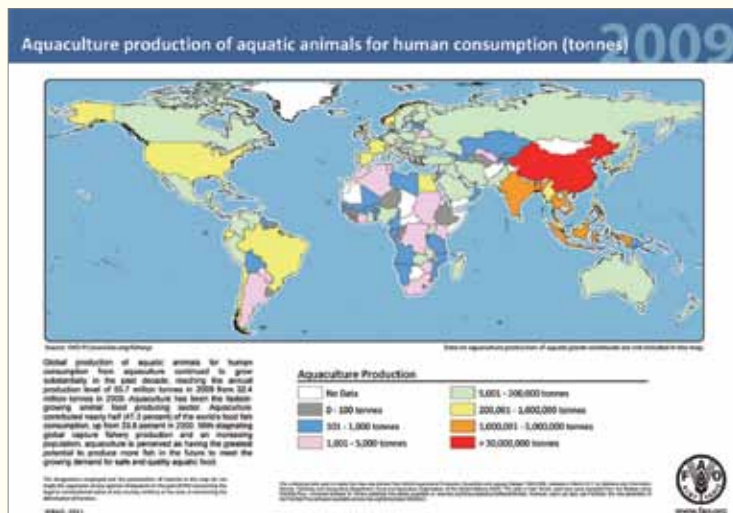


Clam collectors waiting to have their catch sorted and weighted

information and implication concerning the lease of seabed areas for clam farming. An overall development strategy was formulated in support of this local fishery industry.

Other FAO Officers involved in the project:  
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The Fisheries and Aquaculture Department of FAO is pleased to announce the release of the first global **interactive map on Aquaculture production of aquatic animals for human consumption (tonnes) for 2009**. The map is part of the National Aquaculture Sector Overview (NASO) map collection.



The main purpose of the National Aquaculture Sector Overview (NASO) map collection is to illustrate, in general, where aquaculture is taking place. The key information features that accompany the administrative units or individual farms include; cultured species, technology used, culture systems, environments, farm characteristics and respective production quantities, and main issues (credit, diseases, environmental impact, etc.). The collection now includes national statistics on aquaculture production for 2009 and efforts are underway to include statistics related to land and water use in aquaculture during 2012. The collection is being developed by the Aquaculture Service of the FAO Fisheries and

Aquaculture Department in close collaboration with Fisheries and Aquaculture Statistics and Information Service, and FAO's Information Technology Division.

Web site: [www.fao.org/fishery/naso-maps/naso-home/en](http://www.fao.org/fishery/naso-maps/naso-home/en)

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# AFSPAN aquaculture for food security and poverty alleviation

Rohana Subasinghe and Koji Yamamoto

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It is widely accepted that aquaculture's contributions to food security, nutrition, employment creation, income generation and women's empowerment are significant globally, and must be enhanced. However, it is also recognized that the current knowledge and understanding of aquaculture's contribution to human development, particularly poverty alleviation, food security and nutrition, is inadequate and that better tools, and more systematic and quantitative assessments are needed to improve the current knowledge and information base. Better understanding of this contribution is expected to assist Low Income Food Deficit Countries (LIFDC)<sup>1</sup>, and development partners to develop and implement sustainable policies, strategies and plans for improving the livelihoods of millions of poor people dependent on the sector.

FAO is coordinating the newly approved European Commission's Seventh Framework Programme (FP7) titled "Aquaculture for Food Security and Poverty Alleviation (AFSPAN)". The objective of this project is to better understand the current status of the contribution of aquaculture to food and nutrition security and poverty alleviation. In particular, the project will: (a) review the current knowledge on the contribution of aquaculture to food and nutrition security and poverty alleviation; (b) develop methodologies for better assessment of the contribution; (c) disseminate widely the knowledge gained among countries, governments and civil society; and (d) elaborate strategies for improving the contribution of aquaculture to food and nutrition security and poverty alleviation.

Project partners include key institutions with strong technical competence in the areas of research, development project implementation and dissemination which are needed for the success of the project. They are: WorldFish Center (WFC), the Institute of Development Studies (IDS), the Centre for the Economics and Management of Aquatic Resources (CEMARE),

University of Copenhagen (UCPH), University of Stavanger (UiS), the Network of Aquaculture Centres in Asia and the Pacific (NACA) and the Southeast Asian Fisheries Development Center (SEAFDEC). Eleven national partners from Asia (Bangladesh, China, India, the Philippines and Vietnam), Africa (Kenya, Uganda and Zambia) and Latin America (Brazil, Chile and Nicaragua) will conduct field-based research and activities to gather grass-root information and data, as well as verify national information collected during the review process. The project focuses on review of literature and information, development and verification of assessment methodologies, national reviews/ assessments/ case studies, and a final synthesis of research findings.

The project work plan and the implementation strategy consider that a "value chain approach" is essential to better understand the interdependencies of the sector and to include all stakeholders in the assessment. The information and baseline data expected to be brought in by the project will raise awareness of the importance of aquaculture and will facilitate improved policy and decision-making processes. These will assist, at the national level, integration of aquaculture information into existing surveys and statistical systems, as well as ensuring that national development plans and poverty alleviation strategies take into account the needs of the sector and the people involved. This project will present novel and innovative strategies to development partners, in particular the European Commission (EC), and contribute to promoting enhanced coordination and stimulate synergies between Member States' and EC initiatives related to international cooperation aiming at developing aquaculture as means for combating food insecurity.

Further information about the AFSPAN project can be obtained by email to above authors.

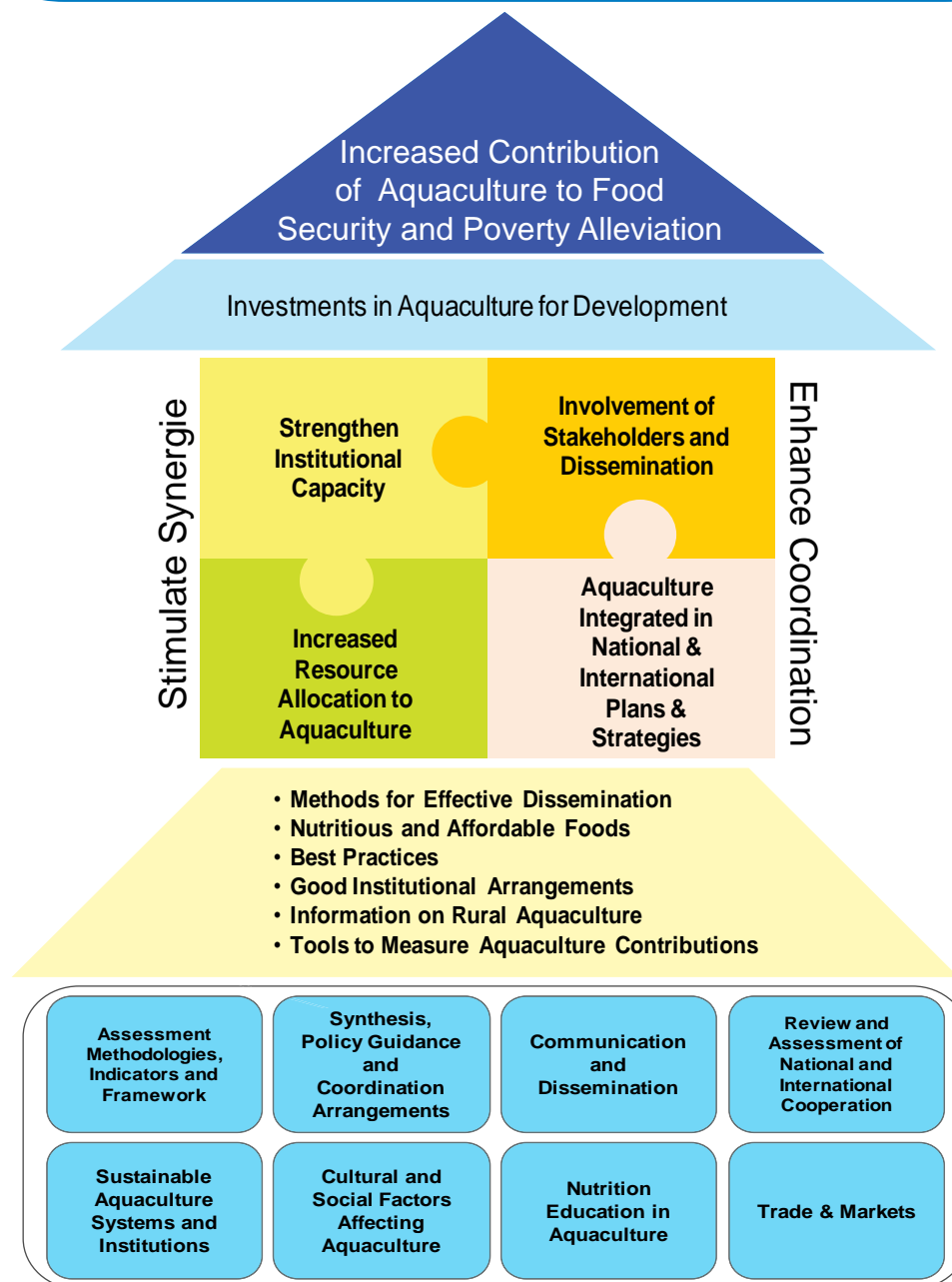


## Conceptual Framework of the AFSPAN project

**Millennium Development Goals**

MDG 1: Eradicate poverty and hunger  
 MDG 3: Promote gender equality and empower women  
 MDG 4: Reduce child mortality rate

MDG 5: Improve maternal health  
 MDG 7: Ensure environmental sustainability  
 MDG 8: Develop a global partnership for development



<sup>1</sup>There are 70 LIFDCs in 2009. The list available at <http://www.fao.org/countryprofiles/lifdc.asp>

## Victoria Chomo Fishery Industry Officer

Ms G. Victoria Chomo joined the Products, Trade and Marketing (FIPM) team within the Fisheries and Aquaculture Policies and Economics Division at FAO headquarters in Rome in December 2011. An American with a B.Sc. and an M. Sc. in Agricultural Economics, and a Ph.D. in Economics from North Carolina State University, she specialises in international trade and finance, with research emphasis on linkages between trade policy and environment, as well as economic development.



Ms Chomo has over 10 years of teaching experience at the American University, Washington, DC and Sultan Qaboos University, Muscat; worked for the U.S. Department of Agriculture from 1991 to 1995 and the U.S. International Trade Commission in Washington, DC from 1999 to 2002. In 2002, Ms Chomo joined the United Nations with the WTO and Trade Issues Team, UN Economic and Social Commission for Western Asia in Beirut. In 2008 she participated in the UN managed mobility exercise, transferring to the UN Conference on Trade and Development in Geneva where she managed donor-funded technical cooperation projects in 16 Middle Eastern and Central Asian countries.

Her practical experience in the fisheries sector includes empirical studies on: the impact of the North American Free Trade Agreement on capture fisheries, Seafood HACCP implementation in fish processing plants in Oman, WTO (Fisheries Subsidies, SPS Agreement and Agreement on Agriculture), modeling consumer demand characteristics for fishery products, and non-market valuation of eco-tourism demand at a turtle reserve. At FAO, her focus will be on international trade and market research, impact and relevance of the various WTO agreements on the fisheries sector, servicing the COFI Sub-Committee on Fish Trade, and contributing to GLOBEFISH.

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## Tran Chinh Khuong Programme Officer

Mr Tran Chinh Khuong, a Vietnamese national, earned a Bachelor of Science degree in Biology majoring in marine ecology in 1997 and Master of Science degree in Environmental Management in 1999 from Hanoi University of Sciences of Viet Nam.

After graduation, Mr Tran worked for the Ministry of Fisheries of Viet Nam (now merged with the Ministry of Agriculture and Rural Development) from 1999 to 2002 as aquaculture and environment specialist.

In 2002, Mr Tran moved to work for World Wildlife Fund (WWF) Greater Mekong Programme as a manager for a number of projects related to marine resource and biodiversity management/conservation; and sustainable aquaculture development.

During period between September 2006 to September 2008, under the support of Vlaamse Interuniversitaire Road (VLIR) scholarship programme of Belgium, Mr Tran took a master course on Marine Ecology at Vrije University of Brussels and Ghent University. During the last two years (2010 and 2011), Mr Tran was the aquaculture coordinator of WWF and worked directly on moving Pangasius and black tiger shrimp farming industry of the Mekong Delta of Viet Nam toward sustainable direction through certification process.

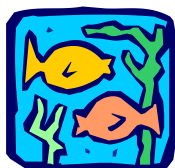


In September 2011, Mr Tran joined FAOR Viet Nam as Programme Officer. Currently, Mr Tran is involved as technical backstopping officer for three projects: (1) Regional Fisheries Livelihood Programme for south and southeast Asia, Viet Nam component in Quang Nam, Quang Tri and TT Hue provinces, funded by Spanish Government; (2) Integrated Management of Lagoon Activities (IMOLA Phase 2) Project, funded by Italian Government; and (3) Strengthening capacities to enhance coordinated and integrated disaster risk reduction actions and adaptation to climate change in agriculture in the northern mountain regions of Viet Nam, One UN fund of Viet Nam.

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## Raymon van Anrooy, Fisheries and Aquaculture Officer

Raymon van Anrooy, a Dutch national, started in mid-2011 as the new Sub-regional Fisheries and Aquaculture Officer for the Caribbean region, based at the FAO Sub-regional Office for the Caribbean (SLC) in Barbados. Raymon graduated in 1997 from Wageningen Agricultural University in the Netherlands with a Master in Rural Development Economics, specializing in aquaculture and marketing. In 2004, he obtained a Ph.D. degree in Fisheries Products Marketing from Madison University, Gulfport, USA. Starting his career as associate expert for a Dutch Government funded fisheries project on the Caribbean coast of Nicaragua, he then moved to work for FAO since 2000, based in Vietnam, Italy and Turkey. In his last post (2007-2011), he was Sub-regional Fishery and Aquaculture Officer for Central Asia and served as Secretary of the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission (CACFish). His main areas of expertise are fisheries and aquaculture policy development and management, institutional strengthening, fisheries and aquaculture economics, fish marketing, emergency assistance, fisheries credit and insurance and recreational fisheries. In his current post, he will also act as Secretary of the Western Central Atlantic Fishery Commission (WECAFC). Raymon can be reached at +1(246) 426 7110 and e-mail: [Raymon.vanAnrooy@fao.org](mailto:Raymon.vanAnrooy@fao.org)



## John Valbo Jorgensen, Fisheries and Aquaculture Officer

As of 1 November 2011, John Valbo Jorgensen transferred from Rome to the Sub-regional Office for Central America (FAO SLM) where he will serve as Fisheries and Aquaculture Officer.

Starting his FAO career in 2004, John worked with the inland fisheries group of the Department of Fisheries and Aquaculture (FI) at FAO Headquarters (HQ) for seven years as fisheries resources officer.

John has an M.Sc. degree in biology from the University of Copenhagen. After his graduation in 1994, he was involved in research in Paraguay, and was on study tours to the Colombian Amazon and Peru. From 1997 to 2001, he shifted to Asia to work for the Mekong River Commission (MRC) as a fisheries biologist. During this time he was mainly working on the spawning and migration of commercially important fish species using local knowledge, and surveying juvenile and larval fishes in the Mekong Delta. From 2001 until he started working with FAO, he worked as a freelance consultant with inter alia the Living Aquatic Resources Research Centre in the Lao People's Democratic Republic, Danida, and MRC. John has written and contributed to multiple technical publications targeted at different audiences.

At FAO SLM, John will be responsible for: monitoring the fishery and aquaculture situation in the six countries of the Central American subregion, i.e. Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama; study and analyse their technical assistance needs; and support the regional fishery bodies COPESCAALC and WECAFC and regional networks concerned with fisheries and aquaculture in the subregion.

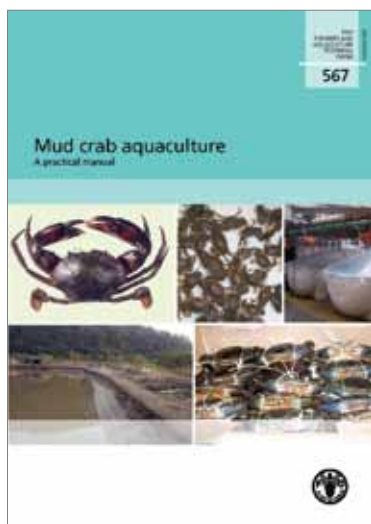
He will further provide technical backstopping to field projects in the subregion as required through assisting in the identification, formulation, implementation and review of project activities with respect to inland and marine capture fisheries and aquaculture production.

John will keep contact and will collaborate closely with colleagues in HQ and will liaise and coordinate with FI to identify, plan and implement programmes for the development and management of fisheries and aquaculture in the subregion.

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Shelley, C. and Lovatelli, A. 2011. Mud crab aquaculture – A practical manual. *FAO Fisheries and Aquaculture Technical Paper*. No. 567. Rome, FAO. 78pp.

There are four species of mud crab, *Scylla serrata*, *S. tranquebarica*, *S. paramamosain* and *S. olivacea* that are the focus of both commercial fisheries and aquaculture production throughout their distribution. They are among the most valuable crab species in the world, with the bulk of their commercial production sent live to market. This is the first FAO aquaculture manual on this genus, covering everything from its basic biology and aquaculture production, through to stock packaging and being ready to go to market. Information on mud crab biology, hatchery and nursery technology, grow-out systems, disease control, processing and packaging has been collated in this manual to provide a holistic approach to mud crab aquaculture production. Compared with other types of aquaculture, mud crab culture still has a large number of variants, including: the use of seedstock collected from the wild, as well as produced from a hatchery; farming systems that range from very extensive to intensive, monoculture to polyculture; and farm sites that vary from mangrove forests to well-constructed aquaculture ponds or fattening cages. As such, there is no one way to farm mud crabs, but techniques, technologies and principles have been developed that can be adapted to meet the specific needs of farmers and governments wishing to develop mud crab aquaculture businesses. Each of the four species of *Scylla* has subtly different biology, which equates to variations in optimal aquaculture production techniques. Where known and documented, variants have been identified, where not, farmers, researchers and extension officers alike may have to adapt results from other species to their mud crab species of choice and local climatic variables. Compared with many other species that are the subject of industrial scale aquaculture, mud crabs can still be considered to be at an early stage of development, as the use of formulated feeds for them is still in its infancy and little work has yet been undertaken to improve stock performance.

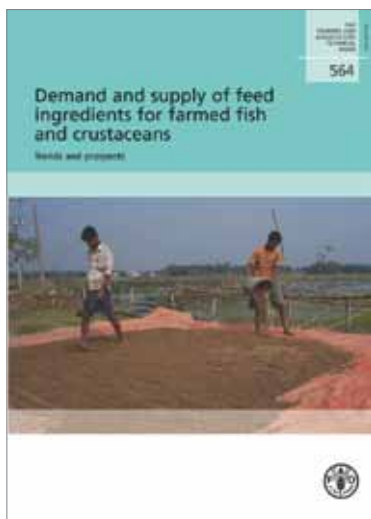
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FAO. 2010. Putting into practice an ecosystem approach to managing sea cucumber fisheries. Rome, FAO. 2010. 81p (REPRINT).

Following the recent organization of the joint FAO, Australian Centre for International Agricultural Research (ACIAR) and Secretariat of the Pacific Community (SPC) regional workshop on “Sea Cucumber Fisheries: an Ecosystem Approach to Management in the Pacific” this practical publication has been reprinted due to its high demand. Pandemic overfishing to critical levels currently threatens the persistence of sea cucumber fisheries and the important role they play in the livelihoods of coastal fishers. Resource managers must embrace an ecosystem approach to fisheries, in which biodiversity conservation, ecosystem services and the concerns of stakeholders are taken into account together with the economic gains from fishing. This document is an abridged version of FAO Fisheries and Aquaculture Technical Paper No. 520 “Managing Sea Cucumber Fisheries With An Ecosystem Approach” (see FAO Aquaculture Newsletter No. 44). This document provides a “road map” for developing and implementing better management of sea cucumber fisheries. Also summarized here are the merits and limitations of potential management regulations and actions by the resource manager, and steps required for their implementation.

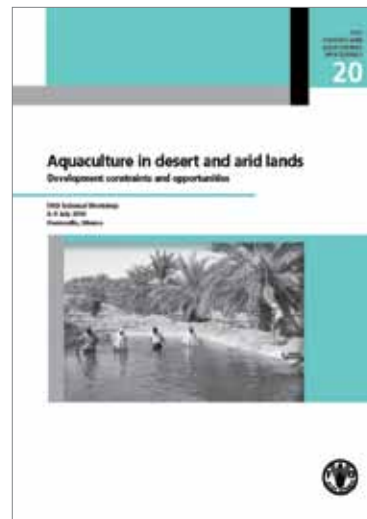
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Tacon, A.G.J; Hasan, M.R. and Metian, M. 2011. Demand and supply of feed ingredients for farmed fish and crustaceans - Trends and prospects. *FAO Fisheries and Aquaculture Technical Paper*, No. 564. FAO. 87pp.

The rise into global prominence and rapid growth of finfish and crustacean aquaculture had been due, in part, to the availability and on-farm provision of feed inputs within the major producing countries. More than 46 percent of the total global aquaculture production in 2008 was dependent upon the supply of external feed inputs. For the aquaculture sector maintain its current average growth rate of 8 to 10 percent per year to 2025, the supply of nutrient and feed inputs will have to grow at a similar rate. This had been readily attainable when the industry was young. It may not be the case anymore as the sector has grown into a major consumer of and competitor for feed resources. This paper reviews the dietary feeding practices employed for the production of the major cultured fed species, the total global production and market availability of the major feed ingredient sources used, the major constraints to feed ingredient usage, and recommends approaches to feed ingredient selection and usage for the major species of cultivated fish and crustacean. Emphasis is placed on the need for major producing countries to maximize the use of locally available feed-grade ingredient sources, and, in particular, to select and use those nutritionally sound and safe feed ingredient sources whose production and growth can keep pace with the 8 to 10 percent annual average annual growth of the fed finfish and crustacean aquaculture sector.

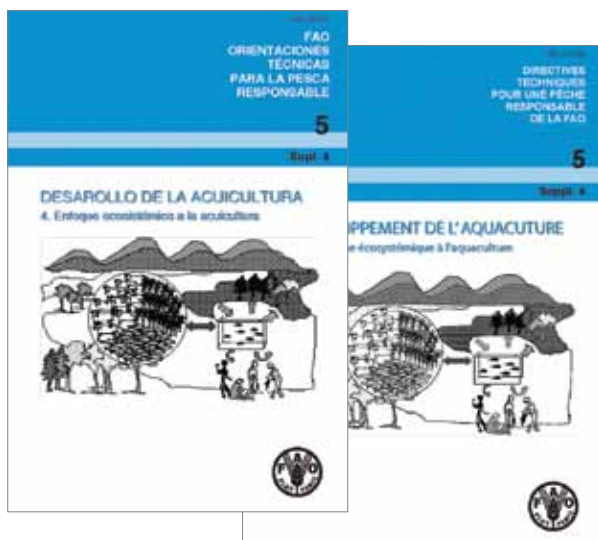
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Crespi, V. and Lovatelli, A. 2011. Aquaculture in desert and arid lands: development constraints and opportunities. *FAO Technical Workshop*. 6–9 July 2010, Hermosillo, Mexico. *FAO Fisheries and Aquaculture Proceedings* No. 20. Rome, FAO. 198pp.

Modern technologies and alternative energy sources have allowed the expansion of aquaculture in deserts and arid regions over the last decade. The current status of desert aquaculture, developmental constraints and opportunities, were discussed at the FAO technical workshop held in Hermosillo, Mexico, in July 2010. The organization of this workshop resulted from the growing interest of numerous countries with vast desert areas to develop this food production sector and the desire to make better use of the limited water resources available in these harsh environments. This publication presents the recent experiences of desert and arid land aquaculture in seven countries and regions across the globe (Australia, Egypt, Israel, Mexico, Southern Africa, the United States of America, and Central Asia) describing the achievements of a number of farming operations, and the potential of using geothermal, surface and underground fresh and brackish waters. Furthermore, the global overview on desert aquaculture illustrates, with the use of maps and tables, those countries with vast extensions of arid territories that have the potential of further develop this industry. The document also provides recommendations on how to promote and expand this aquaculture subsector. Limited water supply remains the single largest developmental constraint, however, where the resource is available, the development of integrated aqua-agriculture systems may provide economic output opportunities from such resource-limited regions.

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FAO. 2011. Desarrollo de la acuicultura. 4. Enfoque ecosistémico a la acuicultura. *FAO Orientaciones Técnicas para la Pesca Responsable*. No. 5, Supl. 4. Roma, FAO. 60pp. (Available also in French now)

Las dimensiones sociales y biofísicas de los ecosistemas están íntimamente relacionadas, de manera que es muy probable que un cambio en una dimensión genere un cambio en la otra. Aunque el cambio es una consecuencia natural de las interacciones complejas, éste debe ser controlado e incluso manejado si el ritmo y la dirección del cambio amenazan con afectar la resistencia del sistema. «*Un enfoque ecosistémico de la acuicultura (EEA) es una estrategia para la integración de la actividad en el ecosistema más amplio, que promueva el desarrollo sostenible, la equidad y la capacidad de recuperación de los sistemas socio-ecológicos interconectados.*» Siendo una estrategia, el enfoque ecosistémico de la acuicultura (EEA) no es **lo que se hace** sino **cómo se hace**. La base de la estrategia está en la participación de los interesados. La EEA exige un marco político adecuado en virtud del cual la estrategia se desarrolla a través de varios pasos: (i) el alcance y la definición de los límites del ecosistema y la identificación de los interesados; (ii) la identificación de los problemas principales; (iii) la priorización de los temas; (iv) la definición de objetivos operativos; (v) la elaboración de un plan de ejecución; (vi) el proceso de aplicación correspondiente, que incluye refuerzo, seguimiento y evaluación; y (vii) una revisión de la política a largo plazo. Todos estos son pasos informados por los mejores conocimientos disponibles. La aplicación de la EEA requiere fortalecer las instituciones y los sistemas de gestión para que se pueda implementar un enfoque integrado de desarrollo de la acuicultura considerando plenamente las necesidades e impactos de otros sectores. La clave será el desarrollo de instituciones capaces de integración, especialmente en términos de objetivos y normas acordadas. La adopción generalizada de un EEA exigirá un acoplamiento mucho más estricto de la ciencia, política y gestión. También será necesario que los gobiernos incluyan el EEA en sus políticas, estrategias y planes de desarrollo de la acuicultura.



FAO. 2011. Aquaculture development. 6. Use of wild fishery resources for capture-based aquaculture. *FAO Technical Guidelines for Responsible Fisheries*. No. 5, Supl. 6. Rome, FAO. 81pp.

These technical guidelines have been produced to supplement the FAO Code of Conduct for Responsible Fisheries (the Code). The Code and many international agreements and conferences highlight the benefits of and need for adopting an ecosystem approach to fisheries and an ecosystem approach to aquaculture through the principles and concepts elaborated therein. The objective of the guidelines is to assist countries to develop aquaculture, in particular that involving significant use of natural resources, in a sustainable way that produces the greatest social and economic benefits without compromising the underlying resource base for future generations. The heavy dependence of capture-based aquaculture (CBA) on wild resources and its implications for wild populations have been increasingly recognized in the last decade. These guidelines address the actual and potential impacts of wild-seed harvest on target and non-target (bycatch) species (including threatened species), on biodiversity, and on the environment and marine ecosystem. The guidelines also consider harvest and post-collection practices, grow-out, feed and broodstock, social and economic factors, and governance considerations. They also identify CBA principles and guidelines for good practices, and provide numerous illustrative case studies from a diverse range of species and fisheries.

The PDF publication can be found at the following <http://www.fao.org/docrep/014/ba0059e/ba0059e.pdf>

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And third, the FAO/SPC Regional Aquaculture Scoping Workshop (Nadi, Fiji, October 2011) which developed a Pacific Aquaculture Regional Cooperative Programme containing a vision for a sustainable aquaculture sector that meets food security and livelihood requirements based on economically viable enterprises supported by enabling governance arrangements through a focus on six major priority programmes (biosecurity, capacity building, feasibility assessment, statistics and data, market and trade and technology transfer and improvement).

The biennium also witnessed the recognition and success of the good work done on aquaculture. For the first time, the Edouard Saouma Award 2010-2011 was given to an aquaculture project – TCP/BIH/3101 Strengthening capacity on aquaculture health management – for an efficient project implementation by the recipient State Veterinary Office (SVO) of Bosnia and Herzegovina. The project assisted in acquiring a license to export fish and fish products to the EU market, a tough feat for a country that, although with a long history of aquaculture, is still in transition, recovering from the destruction brought about by the 1992-1995 war. Also for the first time, the FAO Margarita Lizarraga Medal was awarded to NACA, another aquaculture IGO whose noteworthy achievements - in the areas of networking, environment and aquatic animal health, support to small-scale producers, promotion of better management practices (BMPs) and aquaculture certification - serve as a good model and now being emulated in other regions. The FAO Department of Fisheries and Aquaculture also received the Gold Medal Award from the Asian Fisheries Society (AFS) in recognition of its role in the development of aquaculture and fisheries in the Asia-Pacific region and its active support to the AFS.

The last three issues of FAO Aquaculture Newsletter (FAN 45, 46 and 47) took us to numerous normative and field programme activities on a wide range of issues and themes (e.g. BMPs, biosecurity, certification, climate change, CCRF reporting, ecolabelling, economics, emergencies, feed management, information systems and websites, internal and external cooperation, introduced species, networking, organic aquaculture, site selection and carrying capacity, small-scale aquaculture, spatial

planning, statistics, trade, etc.) reflecting the dynamic and diverse sector that aquaculture is.

### **The biennium that will be**

The 17<sup>th</sup> edition of the OECD-FAO Agriculture Outlook for 2011-2020 which has for the first time included fisheries, reported that the growth of the fisheries sector will be based on aquaculture and that the sector is projected to increase its total production by 1.3 percent annually to 2020. As anticipated by many, aquaculture will continue to grow, an optimism well founded on its performance during the last few decades.

While still in the midst of the FAO reform, the FAO aquaculture group should brace itself for upcoming challenges in anticipation of priority direction and programme structure of the newly-elected FAO Director-General Jose Graziano da Silva. The clear recognition of aquaculture as the fastest food producing sector and its significant contribution to food security, nutrition and economic development still remains as the most valid argument to secure the proper place of aquaculture within corporate FAO and as a priority programme area of the Department as requested by FAO members.

Important forthcoming events include the 6<sup>th</sup> Session of the COFI Sub-Committee on Aquaculture in South Africa (March), 30<sup>th</sup> Session of COFI (July); regional workshops/consultations in Asia, Africa, Central Asian and Caucasian countries; and international meetings (e.g. UN Expert Roundtable on Fisheries and the Right to Food (April in Nairobi); 2012 International Conference on Emerging Infectious Diseases (March in Atlanta) – both events giving a strong focus on fisheries and aquaculture). Newly-approved projects (both internal and externally-funded) will commence implementation at the beginning of the biennium and enhanced efforts to support the FAO regional conferences will raise awareness and properly recognize fisheries and aquaculture in these events.

We intend to reach as many stakeholders as possible through FAN as we continue to report on progress of FAO activities/projects, present short articles on salient issues affecting the sector, and disseminate useful information products.

**Melba Reantaso**  
Chief Editor



# FAO Aquaculture Newsletter

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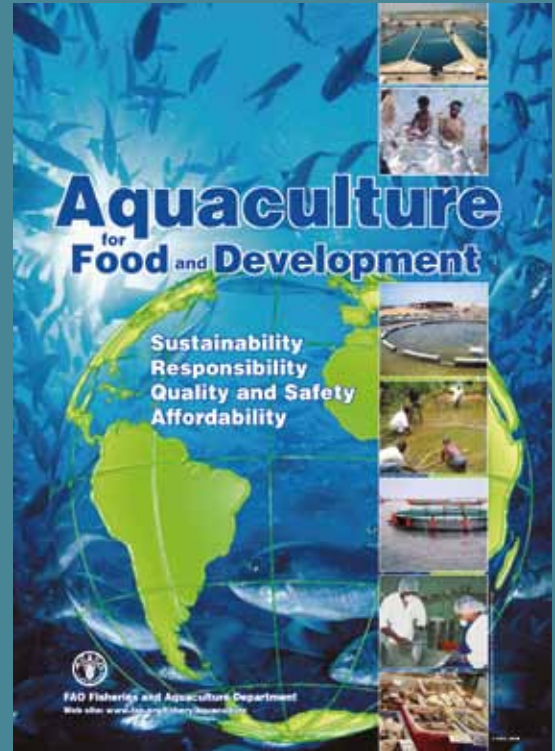
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