December 2012

FAN

FAO Aquaculture Newsletter

Celebrating 50th issue of FAN and paying tribute to two great aquaculture colleagues

From 1968 to 1977, the FAO Aquaculture Bulletin was published and served as a useful source of news regarding FAO activities and aquaculture developments in general. The "ADCP Aquaculture Minutes" (renamed Aquaculture Minutes) published from 1988 to 1990, addressed general issues of relevance to decision makers but contained little about FAO work. These were made available during those times when very little information were disseminated through other communication media, e.g. newsletters, scientific journals, etc. While FAO had developed and implemented numerous technical cooperation projects (at that time from 1986 to 1990 worth USD 56 M), the outcomes and accomplishments of these projects were not publicized. Thus, the FAO Aquaculture Newsletter or popularly known as FAN was born in 1992[1].

The main aim of FAN is to disseminate activities and information generated from both normative work (e.g., statutory body sessions, studies, assessments and technical consultations), field project/programmes and relevant capacity building activities implemented by the FAO Department of Fisheries and Aquaculture (FI) and decentralised offices in various aquaculture regions together with partners at national, regional and international levels. Contributed articles highlighted topics ranging from: current state of aquaculture, its contribution to sustainable development, future challenges and prospects, emerging issues, challenges and opportunities facing different aquaculture producing regions and current views on such themes as biosecurity, feed, networking, business aquaculture, aquaculture planning and policy development, genetics, gender issues, aquaculture technologies, CCRF-aquaculture reporting, aquaculture statistics, trade and marketing, food safety, nutrition, etc.. Two regular sections include staff profile (e.g. new appointments of FI new aquaculture officers, interns and volunteers) and new aquaculture and aquaculture related publications by FAO.

Dr Michael New served as the first editor for FAN 1 and FAN 2. The editorship changed during succeeding years, with Dr P. Choudhury and Mr Mario Pedini taking 3 issues each (FAN 3,4,5 and FAN 6,7,8, respectively). Dr Ziad Shehadeh took the longest editorship todate (FAN 9 to 23, or 15 issues) followed by Dr Melba Reantaso, the current editor, who took over from FAN 37 to 50 or 14 issues and Dr Rohana Subasinghe who handled 13 issues of FAN, i.e. FAN 24 to 36.

[1]FAO Aquaculture Newsletter No. 1

Five issues (FAN 35, 38, 40, 43 and 49) were presented as special editions prepared for a particular event. FAN 38 was dedicated to the theme "Role of Aquaculture in Sustainable Development", discussed at the High Level Special Event, in November 2007 during the 37th FAO Conference in Rome, Italy. FAN 35/40, 43 and 49 were dedicated for the third/fourth sessions of the Committee on Fisheries Sub-Committee on Aquaculture (COFI/SCA), the Global Conference on Aquaculture 2010 and the 30th session of COFI, respectively. Two volumes of FAN in CD-ROM were released in 2001 and 2006. From 1993 to 2000, there were 3 issues/year and from 2001 to present, 2 issues/year except for 2008 and 2012 when there were 3 issues.

In this 50th issue of FAN, we pay tribute (pages 48-49) to two great FAO colleagues Dr Ziad H. Shehadeh and Dr André Georges Coche for their significant contributions to the aquaculture sector.

Times have changed; we are now in the era of internet connectivity. FAN has gone a long way since 1992, although a little conservative compared to accessing information via the world wide web. We shall continue, to bring news and updates of FAO's work and views on emerging issues as part of our advocacy to support responsible and sustainable development of the sector through dissemination of past, ongoing and future work and engagements in aquaculture development.

With dedicated contributions from the staff of the FI and decentralized offices and with continuous expressions of appreciation, interest and demand from users and readers, we hope to survive another next decade or so.

FAN can be accessed at http://www.fao.org/fishery/ations/fan/en and distributed free of charge.

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Special thanks to Ms Marika Panzironi for assistance to FAN 50

Farmed fish: a major provider or a major consumer of omega-3 oils?

Fish and other seafood products are getting more and more attention among consumers due to its health benefits. These benefits are in particular linked to the valuable long chained omega-3 fatty acids EPA and DHA[1], almost exclusively found in foods from the aquatic environment. A recent FAO/WHO expert consultation[2] concluded that fish in the diet of women giving birth to children lowers the risk of suboptimal development of the brain and neural system compared to children of women not eating fish. Strong evidence also underlines how consumption of fish, and in particular oily fish, lowers the risk of death (36 percent reduction) caused by coronary heart diseases (CHD) - a particularly growing health problem in developing countries. A daily intake of only 250 mg EPA+DHA per adult gives optimal protection against CHD. For optimal brain development in children, the daily requirement is only 150 mg. Evidence on the role DHA has in preventing mental illnesses is now becoming more and more convincing. This is particularly important as brain disorders are dramatically increasing all over the world, and in the developed nations, the cost related to mental disorders is now greater than the cost related to CHD and cancer combined.

As with humans, most fish need to get EPA and DHA through their diets. This is particularly true for fish from the marine environment where marine algae are the main producers of these valuable fatty acids ending up in our food chain. Freshwater fish seem to be better able to elongate short chained omega-3 fatty acids into EPA and DHA.

Farmed fish, and particularly marine fish, need to be provided the beneficial EPA and DHA fatty acids through their feed. This will secure a final product comparable and as healthy as their wild counterparts. Fish oil is in practice the only economically viable source of these essential fats for feed purposes, and around 80 percent of all fish oil is consumed by the aquaculture sector (Figure 1). However, this amount seems to be going down despite the growing aquaculture production, as the demand for fish oil for direct human consumption is rapidly increasing.

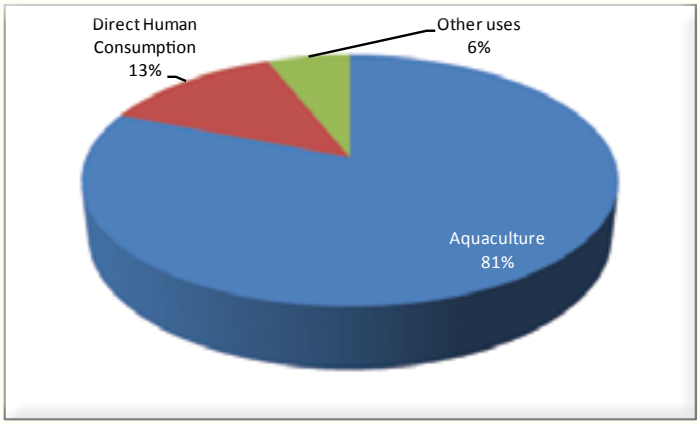

Figure 1. In 2009 81 percent of the fish oil supply was absorbed by the aquaculture industry. Despite the fast growing aquaculture production, the consumption of fish oil and fishmeal by the sector continues to go down (IFFO/FAO, 2010)

Let's take a closer look at the total consumption of these essential omega-3 fats (EPA+DHA) by the aquaculture sector. The global production of fish oil is around 1 million tonnes/yr, and is not expected to increase. Every year roughly 800 000 tonnes of pure fish oil are used for aquaculture feed. The level of EPA+DHA in fish oil is usually between 15 and 25 percent, so with an average content of 20 percent we would expect 160 000 tonnes EPA+DHA from fish oil to fish feed purposes. Additionally, fishmeal provides 50 000 tonnes EPA+DHA for fish feed (based on 3.1m tonnes fish meal containing 8 percent oil). At present, the aquaculture sector therefore consumes an estimated total of 210 000 tonnes of EPA+DHA, all originating from the marine environment. Figure 2 shows how the total amount of EPA+DHA is consumed by the different groups of farmed species.

Salmon and trout (salmonids) farming alone uses 122 000 of the 210 000 tonnes EPA+DHA provided annually. In 2010, production of salmonids was 2.4 million tonnes; 1.6 million tonnes salmon and 0.8 million tonnes trout. Based on recent nutrient composition data for Atlantic salmon and Rainbow trout, which represent about 90 percent of all farmed salmonids, the EPA+DHA content in salmon and trout is estimated at an average 22 g/kg fish, providing 53 000 tonnes of EPA+DHA. This estimate shows that 43 percent of the essential EPA+DHA fats from feed are retained in the fish.

This is in line with commercial feed producers claiming 50 percent of fish oil is retained, and scientific studies showing retention of EPA+DHA in salmon from 30-75 percent depending on the level of fish oil in feed; lower levels of fish oil give higher retention rates.

Since salmonids consume a major part of fish oil in aquaculture, the EPA+DHA retention rate of 43 percent is used for calculating the contribution of these essential fatty acids for other species consuming fish oil, although one would expect better retention in fish having a diet with lower levels of fish oil. Cyprinids do not get fish oil in their diets, but some fishmeal adds some limited amount of EPA+DHA to their feed (Figure 2). However, with an annual production of 24 million tonnes carps, they contribute around 108000 tonnes of EPA+DHA, assuming a level of EPA+DHA of 4.5 g/kg of fish (calculation based on literature values for common carp, Silver carp, Catla, and Crucian carp). Mollusks are not consumers of feed, but are net providers of EPA+DHA with an estimated contribution of 6 000 tonnes.

Based on the assumptions above, the aquaculture sector as a whole provides 206 000 tonne of EPA+DHA, but at the same time consumes a total of 210 000 tonnes; i.e., in practice providing the same amount as it consumes. Figure 3 shows the major farmed species providing long-chained omega-3 to our diets. At present the aquaculture sector provides enough EPA+DHA to cover the need of more than two billion people. All carps combined consume less than 1 percent of all EPA+DHA provided by fish oil and fishmeal, but contributes more than 50 percent of all the EPA and DHA coming from aquaculture products.

Alternatives such as EPA and DHA production based on microalgae is too costly, and from an economic point of view not a viable alternative. Researchers have reported that plant based oils can have a 15 percent DHA content from genetically modified plant seed oil. However, ingredients based on genetic modified plants are not yet widely accepted as feed ingredients. Despite this, with the increasing focus on reducing levels of fish oil and fish meal in diets for aquaculture, the sector is soon a net provider of these valuable and essential fatty acids to our diets.

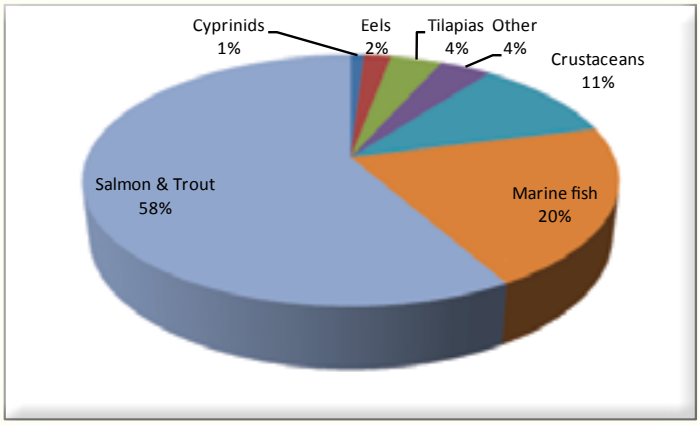

Figure 2. The pie chart above shows the relative usage of fish oil by major groups of farmed species. Carps consume only about 1 percent the total EPA+DHA, all contributed through fishmeal. Fishmeal accounts for about 25 percent of the 210,000 tons EPA+DHA annually used in aquaculture feeds

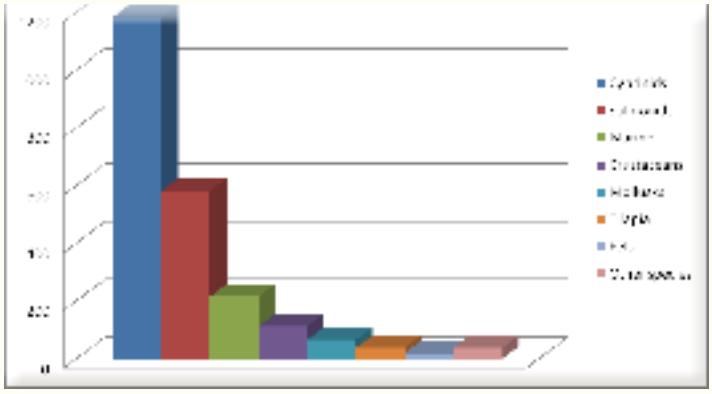

Figure 3. Farmed fish provides enough Omega-3 (EPA+DHA) to cover the yearly need of more than 2 billion people. The figure above shows the estimated contribution of essential Omega-3 oils, by group of species and per million people. Estimates are based on live weight equivalents[3]

More information can be obtained by writing to:

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[1]Eicosapentaenoic (EPA) and docosahexaenoic acid (DHA)
[2]Joint FAO/WHO Expert Consultation on the Risks and Benefits of Fish Consumption (2011). Available at:
www.fao.org/docrep/014/ba0136e/ba0136e00.pdf
[3]Based on FAO production data from 2010. EPA+DHA content taken from published nutrient data bases; USDA National Nutrient Database 2012, New Zealand Food composition database 2010, NIFES Seafood Nutrient Database 2012.

Towards the State of the World Aquatic Genetic Resources for Food and Agriculture

Introduction

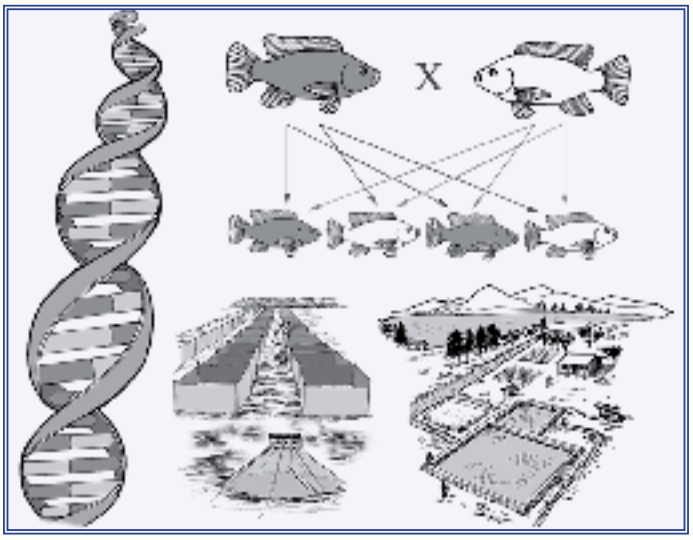
Aquatic genetic resources (AqGR) provide the raw materials that enable breeders to improve aquatic animals and ensure the existence and evolution of natural populations.

AqGR includes DNA, genes, gametes, individual organisms, wild, and farmed and research populations, as well as species and organisms that have been genetically altered.

Despite the crucial role of AqGR in contributing to global food security and sustainable livelihoods, information available on AqGR tends to be scattered, is generally incomplete, and the lack of standardization results in poorly accessible data and information.Thus, policies and awareness of the potential use of AgGR in responsible fisheries and aquaculture are often lacking. Some of the most important AqGR for aquaculture and capture fisheries are under threat and many populations are declining, resulting in loss of genetic diversity.

At its thirteenth Regular Session, the FAO Commission on Genetic Resources for Food and Agriculture (the Commission) requested the FAO Fisheries and Aquaculture Department (FI) to continue its work towards the preparation of a first report on *The State of the World's Aquatic Genetic Resources for Food and Agriculture* (*SoWAqGR*), initially by focusing on cultured aquatic species. Aquatic genetic resources for the development of sustainable and responsible aquaculture and capture fisheries are included within the Multi-year Programme of Work (MYPOW) of the Commission. The Commission would provide guidance on further work on aquatic genetic resources at its next session in April 2013.

Also the Sub-Committee on Aquaculture, at its sixth Session in Cape Town, South Africa, affirmed that emphasis needs to be placed on the assessment and responsible use of aquatic genetic resources for aquaculture. To this effect, it proposed to establish an Advisory Working Group on Genetic Resources and Technologies under FAO's coordination.[1] The Committee on



Cover artwork from FAO CCRF Technical Guidelines on Aquaculture Development 3. Genetic resource management, designed by Emanuela D'Antoni

Fisheries (COFI), at its thirtieth Session in July 2012, endorsed and supported this proposal for an Advisory Group that "would advise FAO on matters concerning aquatic genetic resources and technologies, to enhance international cooperation on aquatic genetic resource management".[2]
The Commission's MYPOW foresees to have the *SoWAqGR* presented at the Commission's sixteenth Session in 2017. Furthermore, related elements of the FAO *Code of Conduct of Responsible Fisheries* (CCRF) and associated tools for assessing their implementation are to be developed for the Commission's seventeenth Session in 2019. A review of implementation of relevant elements of the FAO CCRF should be reported back to the Commission's eighteenth Session in 2021.

Preparatory activities

A number of regular programme activities undertaken by FAO recently will facilitate efforts to prepare the *SoWAqGR*, including: preparation of the *State of World Fisheries and Aquaculture*[3], preparation of the *Review of the State of World Marine Fishery Resources*[4], collection and analysis of country level data and information on fisheries and aquaculture production and value e.g. as reported in FAO FishStat Plus[5], and establishment and updating of information systems and databases

on the fisheries and aquaculture sectors (e.g. Aquatic Species Fact Sheets, Cultured Aquatic Species Fact Sheets, The National Fisheries Sector Overview, The National Aquaculture Sector Overview, The National Aquaculture Legislation Overview, The Fisheries Resources Monitoring System, and the Database on Introduced Aquatic Species).

FAO has undertaken several other initiatives since the last Regular Session of the Commission that directly or indirectly will assist efforts to prepare the *SoWAqGR*, including:

- distribution of a Circular State Letter inviting Members to nominate National Focal Points responsible for the preparation of national reports on aquatic genetic resources for food and agriculture; 33 nominations have been received;
- preparation of a background study paper *Scoping policy analysis for aquatic genetic resources* and preparation of a related working document on *Policy gaps and opportunities* for the fourteenth Session of the Commission in April 2013;
- presentation on *Improving the knowledge base on aquatic genetic resources for sustainable aquaculture development – an international approach* at the OECD – Government of Republic of Korea Green Growth and Aquaculture Workshop in December 2012;
- planning of an FAO Expert Meeting to develop draft Terms of Reference, composition, operating procedures, and plan of work for the Advisory Working Group on Genetic Resources and Technologies as recommended by COFI, by end January 2013;
- preparation of Guidelines for Country Reports and review of these guidelines during an FAO Expert Meeting (above); and
- preparation of a working document regarding the potential establishment of an Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture for consideration of the Commission at its fourteenth Session.

The way forward

Although there is tremendous opportunity to have the first *SoWAqGR* to be comprehensive and include all aquatic genetic resources for food and agriculture from capture fisheries as well as aquaculture, the Commission in April 2013 will ultimately decide on its scope. This process will support the work of the Regular Programme of FI, the United Nations General Assembly, the Convention on Biological Diversity and other international instruments, and is not meant to supplant or duplicate their work. Importantly, country reports will be the most important source of information in the preparation of the *SoWAqGR* which will help Members develop policies and practices that promote responsible use of aquatic genetic resources for food and agriculture.

[1]FAO. 2012. Report of the sixth session of the Sub-Committee on Aquaculture. Cape Town, South Africa, 26-30 March 2012. FAO Fisheries and Aquaculture Report. No. 1006. Rome, FAO. 59p.

[2]FAO. 2012. Report of the thirtieth session of the Committee on Fisheries. Rome, 9–13 July 2012. FAO Fisheries and Aquaculture Report. No. 1012. Rome, FAO. 59 pp.

[3]FAO. 2012. The State of World Fisheries and Aquaculture. Rome, FAO. 209p.

[4]FAO. 2011. Review of the State of World Marine Fishery Resources. FAO Fisheries and Aquaculture Technical Paper No. 569. Rome, FAO. 334p.

[5]http://www.fao.org/fishery/statistics/software/fishstat/en

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Fish farming in Malta

Offshore mariculture has been an emerging area of marine culture development in the past few years, is getting increased attention and will be of importance for future aquaculture growth. The Mediterranean region, particularly Malta, is an important site for bluefin tuna offshore cage culture.

Characteristics, structure and resources

Aquaculture in Malta is marine-based. It consists of capture-based aquaculture of the Atlantic bluefin tuna (*Thunnus thynnus thynnus*), exported mainly to Japan, as well as the culture of European seabass (*Dicentrarchus labrax*) and gilthead seabream (*Sparus aurata*), both exported mainly to Italy, and a small production of meagre (*Argyrosomus regius*).

Malta is also at the forefront of amberjack (*Seriola dumerili*) and bluefin tuna aquaculture research. The production of amberjack juveniles has been overcome and the commercial production of juveniles is expected to be mastered. Apart from the highly priced bluefin tuna, there are a few other species that may be considered as aquaculture candidates. Amberjack is at the top of the list as it is a fast grower.

In 2010, there were six European seabass and gilthead seabream farms. Total production of European seabass and gilthead seabream was 1 857 tonnes; gilthead seabream production was 1 755 tonnes; European seabass production was 102 tonnes; Atlantic bluefin tuna production was 4 955 tonnes – and giving a total value of all species produced in 2010 at EUR 93.8 million.

All farming systems used around Malta are made of floating cages. Two of the six operational farms have inshore nursery sites for juvenile seabream, seabass, meagre and amberjacks. All tuna farms are offshore, approximately 1–2 km off the coast towards the north or on the southeast side of the main island in approximately 50 m deep sea, while another two farms occupy a concession that is 6 km offshore in the south east in around 90 m deep waters. Cages (50 m diameter) and depth of 30 m are usually used, although few cages (90 m diameter) have also been used since 2003.

The tuna farming technology used in Malta is similar to that of other Mediterranean countries, such as Spain, Croatia, Turkey and Italy. Generally, fish are caught in international waters by purse seines during the months of June and July. They are then transferred to the cages where they are fed on raw fish, depending on farm management and requirements. Fish are kept in the cages until harvest and then exported between October and January as fresh or frozen products to Japan. The size of the exported fish depends on the size of fish caught from the wild and generally ranges between 80 and 250 kg. As all farmed tuna are caught from the wild, the sustainability of fish stocks and its impact on coastal ecosystems are issues of concern to various bodies.

P. Suuronen, FAO

Tuna cages in Malta

Promotion and management

The Ministry for Resources and Rural Affairs (MRRA) regulates and administers aquaculture industries in the country and is responsible for issuing aquaculture permits, while aquaculture research is handled by the Malta Aquaculture Research Centre (MAR) under MRRA. MAR has a pilot marine hatchery that focuses on research on species diversification in collaboration with a private company Malta Fishfarming Ltd. (MFF). The Amberjack Project, a joint venture agreement, is concerned with the study of amberjack spawning and juvenile rearing methods. MAR also participated in the Self-sustained Aquaculture and Domestication of Bluefin Tuna Thunnus or SELFDOTT Project, an EU-funded project under the 7th Framework Programme for the domestication of bluefin tuna. Although the basic culture techniques for the production of bluefin tuna juveniles is now known, more time will be required for the techniques to be refined and to produce large quantities of juveniles for farming or culture-based fisheries. These developments may reduce pressure on wild stocks in the future. Apart from encouraging research into species diversification, MAR also provides technical advice and assistance to local companies and carries out research and development in aquaculture.

Trends, issues and development

Various issues have lead to conflict between tourism and aquaculture operations due to the severe lack of space around the Maltese islands. Aquaculture developments require an environmental impact assess-ment, including benthic surveys, and the collection of data regarding environmental parameters such as water quality and sediment analysis. There is a trend to move mariculture further offshore, to reduce environmental impacts and conflicts with tourism. The carrying capacity of fish cages will have to be determined on the basis of monitoring and based on agreed environmental quality standards. Important factors affecting the ecological carrying capacity are water currents and depth.

Fish farming in Malta has a positive effect on employment of both unskilled and skilled labour, earns the country hard currency from exports and provides a net cash inflow from high local value added product.

A draft aquaculture strategy for a sustainable aquaculture industry in Malta is available online. At present, this draft strategy is undergoing a strategic environmental assessment (www.mrra.gov.mt/page.aspx?id=80) and will address many of the current issues for aquaculture development in Malta.

More information can be obtained by writing to:

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P. Suuronen , FAO

Group photo: A study tour was organized on 26–28 September 2012 with assistance of the Malta Aquaculture Research Centre (MAR) to a cage culture site to get first-hand experience. Ten staff members from the FAO Aquaculture Service (FIRA) and two from the FAO Fishing Operations and Technology Service (FIRO) participated in the study tour which provided technical and practical exposure on capture-based cage mariculture and its complexities as well information related to the operation of vessels in support of offshore mariculture activities.

Mainstreaming Gender in Fisheries and Aquaculture: a Stock-taking and Planning Exercise

A gender mainstreaming in fisheries and aquaculture stock-taking and planning exercise was undertaken between December 2011 and June 2012 by the FAO Department of Fisheries and Aquaculture (FI) focusing on three services, i.e. the Aquaculture Service (FIRA), the Fishing Operations and Technology Service (FIRO) and the Policy, Economics and Institutions Service (FIPI) with involvement of other services, e.g. Products, Trade and Marketing Service (FIPM) and the Statistics and Information Service (FIPS) to a lesser extent. The main objective of the exercise was to assess the extent to which the fisheries and aquaculture policies, researches and action projects are oriented towards gender equality and women's empowerment. This gender mainstreaming exercise became part of an assessment and learning endeavor of FAO/FI to review its progress in advancing gender equality in fisheries and aquaculture development.

The first part of the exercise involved the work of a gender consultant, Ms Esther Velasco[1], who developed and designed a methodology aimed at: (1) generating an understanding of the extent to which gender equality and women's empowerment have been internalised and acted upon by management and technical staff; (2) assessing the extent of gender mainstreaming in terms of the development and delivery of programmes/projects; (3) identifying mechanisms, practices and attitudes that have made positive contribution in mainstreaming gender in fisheries and aquaculture; and (4) assessing the level of resources allocated and spent on gender mainstreaming and gender activities. The methodology used considered the broad framework of the rights-based gender equality and women's empowerment framework, which recognises the realisation of the equitable and sustainable development of fisheries and aquaculture is inextricably intertwined with reduction of gender inequalities as an integral element.

The key question used in the exercise was: To what extent are gender equality and women's empowerment principles taken into account in fisheries and aquaculture development research, projects and policy support?

Three complementing tools were used, i.e. (i) documents review; (ii) staff consultation and interview; and (iii) a feedback and planning workshop. A process-oriented, organisational and self-learning approach used provided opportunities to identify and clarify priorities through participatory means and thus created an openness in exploring opinions and insights as well as issues and opportunities on mainstreaming gender in the work areas of the FI Department.
In order to determine the status of gender

M. B. Reantaso, FAO

Men and women work together in a field processing plant in Paramaribo, Suriname

understanding and knowledge of staff as well as gender-responsiveness of fisheries and aquaculture policies and programmes, the following nine specific areas, guided by key questions, were used during the staff interviews.

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. Fisheries and aquaculture gender mainstreaming strategy: its objectives, programme and budget.
3. Mainstreaming 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 knowledge and management.
6. Gender analysis, monitoring and evaluation systems and tools.
7. Planning and decision-making on gender mainstreaming.
8. Organisational culture (including policies and procedures).
9. Perceptions and attitudes on the achievement of gender equality.

Based on document review and staff consultations, the consultant generated 7 main conclusions:

1. *Increasing shift of focus from simply a women's issue to the more strategic gender equality may have potentially contributed to improving approaches on gender in policy and projects but still needs substantive clarification and levelling of understanding.*
2. *Mixed views and understanding about gender among staff and senior management, but there is a strong recognition of its importance.*
3. *Increased attention to gender in global and regional discussions and fora in fisheries and aquaculture.*
4. *Despite progress in documentation, policy development, and practice, gender-responsiveness of programmes and policies remains weak. There seems to be a disconnect between policy and practice.*
5. *There is substantive lack of gender information, knowledge generation and management.*
6. *Persistently inadequate human and financial resources for gender mainstreaming activities should be mitigated.*
7. *Lack of active leadership in support of an enabling environment for pursuing gender equality and gender mainstreaming.*

A two-day feedback and planning workshop followed in June 2012 and the outcomes of this workshop suggested that FI should address the gender mainstreaming gap through the following ten gender mainstreaming goals:

(1) develop a Fisheries and Aquaculture Gender Mainstreaming Strategy;
(2) improve gender awareness and gender mainstreaming capacity gap of senior managers and staff through a capacity development programme;
(3) pay more attention to the persistent data and knowledge gap on gender in fisheries and aquaculture;
(4) bridge the gap between relatively strong attention on gender in policy responses, on the one hand, and the much weaker integration of gender analysis and perspectives, on the other;
(5) create opportunities for regular sharing of experiences and lessons on gender activities;
(6) strengthen focus on gender equality and move beyond women's issues;
(7) improve the gender dimension, and promote coherence in the gender equality framework;
(8) strengthen the social science and gender expertise of FI at all levels of operations;
(9) strengthen management accountability for and leadership in promoting gender equality and gender mainstreaming; and
(10) pursue compliance and tracking on FI's contribution to achieving the FAO gender equality objectives.

This gender mainstreaming stock-taking exercise and planning initiative is a big leap forward and provides FI management with guidance by which actions and gender mainstreaming strategy maybe based upon.

The full report will be available in February 2013. More information can be obtained by writing to: Melba.Reantaso@fao.org

[1]Ms Esther Velasco is a sociologist-gender specialist with over a decade of international work experience, including projects of the United Nations and the European Commission, on gender equality and gender mainstreaming in diverse contexts and sectors.

Legislating for sustainable aquaculture in Eastern Europe, Central Asia and the Caucasus: some lessons from the field

The FAO Development Law Service (LEGN) has over the past two years been involved in three fisheries and aquaculture legislative projects in Eastern Europe, Central Asia and the Caucasus (EECAC) Region. During the implementation of these projects in Ukraine, Azerbaijan and Tajikistan respectively, LEGN noted a number of similarities in the legal and institutional frameworks of these countries and witnessed similar outcomes in comparable cases. The selected issues discussed below may be of relevance when working with countries with legal systems that are similar to, based on or evolved from the former USSR legal system.

Aquaculture versus agriculture

Aquaculture has more in common with agriculture in terms of business operations than with capture fisheries or other sectors which involve the capture of wild animals. However, it is treated differently and is not classified as an agriculture activity in Ukraine, Azerbaijan and Tajikistan. This is not unique in the region, and many aquaculturists perceive this as a problem, especially if agricultural concessions or incentives do not apply to them. The option to treat aquaculture as an agro-industry is particularly important when aquaculture is in its infancy or an increase in production is desired or if the cost of starting an aquaculture business is prohibitive. In Ukraine and in Tajikistan, aquaculture operators are obliged to pay higher taxes than the typical agriculture farmers. In Ukraine, during the drafting of the aquaculture legislation, the review team opted to describe in the preambular clauses, that aquaculture is a form of agri-business. This implies that aquaculture should benefit from the same incentives as are made available to agriculture farmers. In Tajikistan, this issue was taken up at ministerial level with the tax committee.

Central management of aquaculture

No competent authority for aquaculture exist in the three countries and none of them opted for establishing such an authority. Instead, the management of aquaculture is placed under the direction of the national fisheries authority. In addition, aquaculture is for the most part centrally driven by mandated institutions, in contrast to being managed by farming associations and cooperatives. The laws of these countries list obligations of the aquaculturists or 'fish producers' including the *obligation* to produce. This obligation relates to a period when aquaculture was carried out in state farms (kolkhoz) with prescribed production targets. In contrast, modern aquaculture facilities set their own targets as production is determined by their investment and production capacity and market demand. The need to set production targets may, however, continue to be relevant and is probably in line with the current perspective on aquaculture in the region, being an emerging and developing sector. It is uncertain whether this will change as countries gain more experience and make adjustments for effective management of the sector. Useful guidance might have to be provided by the sector itself to these governments as it becomes more established.

M. Galushchak, FAO

The FAO/Ukraine review team for aquaculture legislation

Regulating aquaculture activities: leases versus licenses

In the absence of a specific law concerning the development and management of aquaculture, the sector will continue to be unregulated. In the current Fisheries Law of Azerbaijan, private commercial aquaculture is not addressed and is therefore *de facto* a non-regulated activity causing concerns on the part of private commercial operators about legal uncertainties. While operators can and must obtain permission to use land and water for aquaculture, no permit is granted by the authority for carrying out the aquaculture activity. The lease security is another issue. In Azerbaijan, certain land leases can be terminated by local government with minimal prior notice. LEGN supported the development of a draft law in Azerbaijan in which aquaculture licenses are given for medium-term duration to reinforce the legal security of the acquaculturist.

In Ukraine, up to June 2012 there was no clear legal mandate given to an existing authority for regulating the aquaculture sector.

Leasing (rather than licensing) is the most common way of operating aquaculture facilities in the region. Awareness raising and training are essential when recommending alternative forms of authorization, e.g. licensing, in order to enable better understanding of the concept and its application. In Ukraine, introducing licensing seemed to be attractive but the use of the term "licence" had to be avoided because any licensing regime would be regulated and subjected to a fee imposed by the Ukrainian law on licensing.

Separate leasing of the water body from subjacent lands

In these countries, the water body used for aquaculture is considered as a separate leasable item from the land beneath the water body. An aquaculture authorization therefore only gives rights to the water body but not to the subjacent land. In Azerbaijan and in Tajikistan, an aquaculturist has to obtain a water lease and a land lease separately in order to gain user rights. In Ukraine, leasing of the water body and subjacent land separately was considered to be a hindrance to aquaculture development but the issue could not be immediately addressed. It is advisable that, for aquaculture purposes, both the water body and subjacent lands be subjected to a single permitting regime under the same legislation for better regulation and management of the aquaculture sector.

The regulation of "objects" and "subjects"

Another observation is that the management of aquaculture is based on regulating "objects" (being innate or living "things" e.g. the water bodies or aquaculture animals or products such as fish or gametes) and "subjects" (being persons or entities that conduct aquaculture). While the use of 'subjects' and 'objects' should not be problematic *per se*, it can be limiting or may lead to confusion unless a well-defined definition of the terms are provided early in the texts and the definitions are broad enough to cover every conceivable "object" or "subject". In other jurisdictions, the simpler approach is to focus on regulating the behavior or actions of the aquaculture operator whether they be individuals or legal persons. In Tajikistan, the draft law no longer contains such provisions but it indicates a general scope of application and objectives.

There appears to be a preference in the region for having one legal framework that addresses both capture fisheries and aquaculture. Having one common legal framework is not necessarily a disadvantage: what matters is ultimately the quality of and detail provided in the legislation to govern both fisheries and aquaculture. In the three countries of the region, LEGN observed that emphasis was placed on capture fisheries.

B. Kuemlangan, FAO LEGN

Produce from trout farm 'Forel', Vahdat, Tajikistan

The draft legislation developed by LEGN in Azerbaijan and Tajikistan was designed to be suitable and balanced for both capture fisheries and aquaculture. In Ukraine, LEGN worked with the relevant authorities, consistent with the expressed government aspiration, to develop a separate draft aquaculture legislation which has been enacted into law by the Verkhovna Rada (Parliament).

Conclusion

The issues discussed do not represent all the opportunities and challenges that are presented in the individual countries of the region. It is also risky to assume that all countries share identical characteristics which would in turn suggest the adoption or use of identical approaches, styles and templates in revising their aquaculture legal framework. Each country is unique and a tailor made law for any given country is the optimal outcome for better development and management of aquaculture. Nevertheless, being in the same region, these countries share similar history, and their legal systems and laws have many of the same characteristics at least in terms of objectives, processes and structures. While there is more to learn about the region, the LEGN experience shows that parallels can be drawn and best practices can be shared with respect to the broader institutional, technical and legal aspects of the review and drafting of aquaculture legislation between the EECAC region and other regions.

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FAO-Government of Uganda Capacity Building Workshop on Conducting Aquaculture as a Business under the SMARTFISH Project

Background

Responding to African countries' desire and in order to contribute to their effort to transform aquaculture from a public-funding driven, subsistence-oriented and non-viable sector to an economically vibrant, private-sector led and sustainable enterprise, the "FAO-Government of Uganda Capacity Building Workshop on Conducting Aquaculture as a Business" was held from 30 July to 03 August 2012 in Mukono, Kampala, Uganda. This workshop was organized under an EU-funded project "Implementation of a Regional Strategy for East and South Africa & Indian Ocean", a.k.a. SMARTFISH. The SMARTFISH Programme aims at contributing to an increased level of social, economic and environmental development and deeper regional integration in the Eastern and Southern African and Indian Ocean regions through improved capacities for the sustainable exploitation of fisheries resources.

Content

Conducted by two FAO aquaculture economists and attended by over 20 local participants, including fish farmers, private aquaculture service providers, extension personnel and policymakers, participants to this 5-day workshop shared their understanding, experiences, insights and expectations on development of aquaculture as a business in Uganda. Using a user-friendly investment tool developed by FAO's Fisheries and Aquaculture Department, participants engaged in brainstorming exercises on profitability analysis as one of the core elements of business planning. The tool was used by participants to evaluate the economic profitability and viability of their own businesses under different scenarios. The results were presented and discussed in plenary. The heated but inspiring debates in the discussions allowed participants to appreciate the complexity of business planning and enhanced their intuitive understanding of the subject.

Workshop participants preparing for the group exercise J. Cai , FAO

Impact

It has been increasingly recognized that fish farmers in Africa need help not only on good aquaculture practices, but also more urgently on knowledge and understanding of and skills to conduct aquaculture as a business endeavour. The workshop directly contributed to enhancing such capacity of participating fish farmers. Indirectly, other farmers will benefit when the knowledge and skills acquired in the workshop are passed on through various channels. Uganda fish farmers appreciated the necessity of treating aquaculture as a business and have been trying to do so. With proper training and an enabling environment, they have great potential to become successful aquaculture entrepreneurs. Experiences elsewhere have indicated that the presence of a group of entrepreneurs who are willing and adept to taking risks in aquaculture business is a crucial factor driving and sustaining aquaculture development in the long run.

The workshop also helped enhance the understanding of major constraints over aquaculture development in Uganda. In addition to well-recognized issues such as poor quality and high prices of feed and seed, which have been

J. Cai, FAO

Workshop participants sharing fish farming experience during a field visit to a commercial tilapia farm near Kampala

hindering aquaculture development in the entire Sub-Saharan African region, the brainstorming exercises and discussions have shed light on other factors constraining the bottom line of aquaculture business in Uganda. These include lack of economies of scale in fish farming and marketing, inadequate basic infrastructures (e.g. roads and stable power supplies), under-utilization by aquaculture of fish processing and marketing facilities (e.g. processing plants and marketing channels for Nile perch from capture fisheries), competition of capture fisheries products in local markets, inadequate and/or inaccurate information on market conditions, etc. Improved awareness of such less apparent but sometimes more fundamental factors would help motivate policymakers in Uganda to take necessary actions to create an enabling environment for the growth of aquaculture business in the country.

The workshop also helped identify several key areas that need further assistance in order to promote aquaculture business in Uganda, including: 1) compilation and dissemination of reliable baseline data and information on fish farming and marketing; 2) strengthening institutional support to business-oriented aquaculture (e.g., by updating the aquaculture provisions in the National Fisheries Policy); 3) forming or strengthening farmers associations and cooperatives; and 4) modify the user-friendly investment tool to accommodate the special characteristics of aquaculture in Uganda and facilitating its applications through more training courses or capacity-building workshops.

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FAO/FI and OIE strengthen cooperation on aquatic animal health

The FAO Department of Fisheries and Aquaculture (FAO/FI) and the World Organisation for Animal Health (OIE) has a long history of cooperation on AAH which now spans almost 20 years including 18 years of FAO/FI's participation as an Observer in the OIE Aquatic Animal Health Standards Commission and especially addressing the issue of national and regional capacity building for implementing OIE aquatic animal health standards, in particular those relevant for the movement of live aquatic animals and animal products.

The OIE supported FAO's Technical Cooperation Programme (TCP) on several projects and activities, for example in Asia (since 1999), Africa (since 2007), Western Balkan (since 2009) as well as normative work on prudent and responsible use of veterinary medicines (2009) and aquaculture certification guidelines (2012). The FAO/FI participated in OIE's *Ad-hoc* group meetings (food safety and Epizootic ulcerative syndrome or EUS), international conferences on AAH (Norway in 2007 and Panama in 2011) and training of OIE focal points on AAH. Under the Crisis Management Center-Food Chain programme, the most recent cooperation was during the emergency investigation of a serious unknown shrimp disease in Viet Nam and white spot disease of shrimp in Mozambique. The OIE now participates in sessions of the FAO Committee on Fisheries (COFI) and COFI Sub-Committee on Aquaculture. The OIE also participated in the Expert Consultation on FAO Guidelines on Aquaculture Certification, held in December 2012 in Rome, Italy. On March 2013, FAO will participate in the OIE Global Conference on the Responsible and Prudent Use of Antimicrobial Agents for Animals to be held in France with a presentation on 'Aquaculture sector initiatives' during Session 5 on Existing initiatives to implement responsible and prudent use: need for a harmonised multisectorial approach.

Occasional meetings between the OIE Director General Dr Bernard Vallat and FAO/FI Assistant Director General (with previous ADG Mr Ichiro Nomura, and recently with the current ADG, Dr Árni Mathiesen) were held during the last few years. In July 2012, Dr Vallat met with the FAO Director General Jose Graziano da Silva and Dr Mathiesen. Recognizing the increasing demand and production of aquatic animals worldwide, the growing contribution of aquatic food production sector to food security, and considering that the mandates of OIE and FAO converge in the field of AAH, both DGs agreed that regular meetings of relevant personnel from FAO/FI and OIE be held to enhance cooperation between the two

M. B. Reantaso, FAO

Informal meeting in 2007 in Rome, Italy between OIE (Dr B. Vallat, 3rd from left) and FAO (ADG Mr I. Nomura, Dr R. Subasinghe and Dr L. Ababouch, 2nd, 4th and 6th from left, respectively)

organizations on AAH. As an outcome of these meetings, a group tentatively called Joint FAO/OIE Aquatic Animal Health Coordination Group was formed and held its first meeting from 10-11 January 2013 in Rome, Italy. The objective of this Coordinating Group is to jointly address mutual issues on AAH within the framework of the Chart on FAO and OIE competencies and complementarities in the field of animal health and the companion Vade Mecum, signed in 2008 and recommended to be revised to include aquatic animals. The outcomes of the Coordination Group Meeting will be reported to the FAO/OIE/WHO Tripartite Coordination Meeting Mechanism (February 2013, Rome, Italy). More details of the outcomes of this meeting will be featured in future issues of FAN.

M. B. Reantaso, FAO

Meeting of the OIE Ad hoc Group on the OIE List of Aquatic Animal Diseases (Finfish Team), held in Paris, France in September 2012

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http://www.fao.org/docrep/015/i2281e/i2281e00.htm

http://www.fao.org/docrep/016/i2765t/i2765t00.htm

Fourth Regional Consultative Forum Meeting of the Asia-Pacific Fishery Commission

The Fourth Regional Consultative Forum Meeting (RCFM) of the Asia-Pacific Fishery Commission (APFIC), with the theme *Improving management and governance of fisheries and aquaculture in the Asia-Pacific region* was convened at the Sandy Beach Hotel in Da Nang, Viet Nam, 17–19 September 2012. The Meeting was attended by 73 participants from 16 APFIC member countries and representatives from 12 regional partner organizations and projects. The Meeting was hosted by the Ministry of Agriculture and Rural Development (MARD), Government of Viet Nam.

M. Weimin, FAORAP

Vice Minister, Ministry of Agriculture and Rural Development of Viet Nam addressing at the Opening Ceremony

The APFIC RCFM was chaired by Mr Nguyen Viet Manh, APFIC Chairman and Director General, Department of Science and International Cooperation of MARD. Mr Simon FungeSmith, APFIC Secretary delivered a welcome address on behalf of Mr Hiroyuki Konuma, FAO Assistant Director General and Regional Representative for Asia and the Pacific. Mr Vu Van Tam, the Vice-Minister of MARD formally opened the RCFM with his remark.

This Fourth RCFM was held to precede the 32nd Session of APFIC and served as a regional forum to brief on the activities of the Commission and member countries. It also provided an opportunity to get an update on the work of various regional partner organizations that are relevant to the programme of work of the Commission. The RCFM developed and agreed on ways of implementing policies and action plans developed to address major issues of importance to the region. The meeting was organized around six thematic sessions, namely: (i) regional overview of fisheries and aquaculture; (ii) regional initiatives promoting improved assessments for strengthening management; (iii) country experiences on improving fisheries management and implementation of FAO's Code of Conduct for Responsible Fisheries (CCRF); (iv) adaptation to and mitigation of climate change, livelihoods and support to small-scale fisheries; (v) country experiences improving aquaculture management and the CCRF; and (vi) priorities and capacity building for implementation of the CCRF.

Based on reviews of regional fisheries and aquaculture, presentations by member countries and regional organizations, reports of action plans of APFIC regional consultative workshops, a final session was dedicated to developing RCFM summary recommendations for presentation to the APFIC 32nd Session. The summary recommendations identified a set of challenges facing regional fisheries and aquaculture and the anticipated outcomes of APFIC work programme in the coming years. The major aquaculture challenges in the region identified by the RCFM include the following:

- socio-economic issues, such as low economic return to aquaculture farmers; urbanization and other socio-cultural changes significantly changing the structure and performance of the subsectors;
- supply of low-value fish/trash fish for feeds in (marine/coastal) aquaculture and certification requirement of fishmeal and feeds from sustainable fisheries for export markets;

- technological bottlenecks including limited availability of quality formulated feed at reasonable cost and high quality and healthy seed;
- environmental impacts and health problems, including concerns regarding residues and contaminants resulted from aquaculture intensification;
- aquaculture development in sustainable and socially acceptable manner with strong consideration for more affordable fish as well as export opportunity;
- impacts of changing market demands resulting from economic downturn and changing requirements for food safety;
- adapting aquaculture to and mitigating the impacts of climate change, climate variability and natural disasters.

Regional Study/Workshop on Adoption of Aquaculture Assessment Tools in Asia and the Pacific

M. Weimin, FAORAP

Participants to the workshop on Adoption of Aquaculture Assessment Tools

The aquaculture industry has developed rapidly in Asia and the Pacific Region in the past 3 decades, and significantly contributed to food and nutritional security and rural livelihood in the region as well as the global seafood trade. The importance of promoting responsible and sustainable aquaculture practices at national and local levels is increasingly recognized. In order to promote responsible and sustainable aquaculture, planners, policy makers and managers are expected to consider environmental, social, animal health and welfare and food safety issues among others while developing and managing aquaculture programmes and activities at different levels. Various aquaculture assessment tools (AATs), developed for achieving such objectives, include broadly methods, guidelines and processes that are used for planning, development, management and decision making. Countries in the Asia and the Pacific region are increasingly adopting these tools in their practices of planning and management aquaculture program and activities. However, effectiveness and extensiveness of current adoption of these tools in the region vary across the countries due to various factors, such as lack of legal support, weak human capacity and financial constraints etc. As a follow up to the recommendations of the APFIC regional consultative workshop on "Strengthening Assessments of Fisheries and Aquaculture in the Asia-Pacific Region for Policy Development and Management" (4-6 October 2011, Yangon, Myanmar), FAO, NACA and APFIC jointly conduced a regional study/workshop on adoption of AAT in Asia and the Pacific.

The FAO/NACA Regional study/workshop on application of aquaculture assessment tools in Asia and the Pacific (i) evaluated the status of adoption of AAT in selected Asian and Pacific countries; (ii) identified the major issues and constraints in scaling up the effective adoption of various tools at different levels; and (iii) put forward the strategy and recommended actions for supporting wider and more effective adoption of AAT for planning and managing aquaculture in the region.

In this regional initiative, national experts were invited to conduct national review study in 10 countries (Australia, Bangladesh, China, India, Indonesia, Malaysia, the Philippines, Republic of Korea, Thailand and Viet Nam) following a uniform guideline jointly developed by FAO and NACA. The country review study covered brief sectoral background, key aspect summary and narrative description of adoption of over a dozen of identified AATs related to aquaculture planning and management, and lessons learnt, issues and constraints and recommended actions to promote the adoption of the tools in the region. Based on nine completed country review papers, a draft regional synthesis report was jointly developed by FAO and NACA, and covered issues of regional importance, commonality of issues and concerns across countries, extent of adoption of tools in the region, constraints to adoption, capacity building and awareness raising needs, suggested actions and recommendations.

A regional expert workshop was jointly convened by FAO and NACA from 3-5 July 2012 in Pattaya, Thailand. Experts from 9 countries (Australia, China, India, Indonesia, Malaysia, the Philippines, Republic of Korea, Thailand and Viet Nam), representatives from Southeast Asia Fisheries Development Centre-Aquaculture Department, World Organisation for Animal Health-Tokyo, Sustaining Ethical Aquaculture Trade project, and the private sector participated in this 3-day workshop. Country study papers and draft regional synthesis were presented and discussed. The workshop participants agreed on final structure for the regional synthesis document and the major findings and develop a regional strategy and action plan for promoting wider adoption of AATs in Asia and the Pacific.

The regional workshop found that AATs have been increasingly adopted in aquaculture planning and management in all countries which participated in the study. The major identified constraints to effective adoption of AATs included: (i) limited incentives and awareness and long-term benefits not immediately apparent to industry/producers; (ii) lack of adequate supporting legislation and institutional mainstreaming; (iii) financial constraints and no clear cost recovery mechanisms; (iii) lack of capacity and technical skill to apply tools; (iv) lack of basic methodology or regional minimum requirements (e.g. carrying capacity, genetic risk analysis); (v) limited access to technical information (e.g. language barrier); (vi) ineffective integration between different agencies with responsibilities linked to planning and management; and (vii) lack of buy-in by producers due to lack of regulatory controls and potential increased costs.

The regional workshop recommended the following actions to promote more effective and wider adoption of AATs, such as: (i) develop an aquaculture planning and management toolbox for the region; (ii) develop a comprehensive series of course modules on the tools for aquaculture planning/assessment/management to be used for regional and in-country training courses; (iii) promote/encourage networking for sharing information (success stories/best practices and specific review studies) on adoption of AATs across the countries in the region; and (iv) international and regional bodies to develop a regional programme supporting adoption of AATs in the region. An FAO/NACA joint publication on the regional study/workshop will be released in January 2013.

Regional Consultation on Sustainable Intensification of Aquaculture in Asia and the Pacific

Being the fastest growing food production sector, aquaculture has achieved average annual production growth of 10 percent throughout the last 3 decades. Aquaculture sector currently supplies nearly 50 percent (47 percent in 2010[1]) of the fish and aquatic products for direct human consumption. The rapid growth of aquaculture in the past decades resulted from both expansion of culture area and intensification of culture operation based on technological development

Participants to the Regional Consultation

and increasing input levels. While contributing to global food and nutritional security and rural poverty alleviation through improved production efficiency, aquaculture intensification has been associated with issues such as environmental impacts, more fish disease outbreaks and food safety problems related to irresponsible use of antibiotics and other chemicals.

Population growth and diet habit change will create greater demand pressure on fisheries and aquaculture products in the coming decades. It has been estimated that, to maintain the current level of per-capita consumption, by 2030 the world will require at least another 23 million tonnes of aquatic animal food – which aquaculture will have o provide[1]. The Asia and the Pacific region contributed the major part of the aquaculture growth in the past three decades, with 90 percent contribution to the world aquaculture production. Due to various reasons such as lack of needed public support, dyamic market and traditional importance of fish in people's diet and nutirition, aquaculture development is much slower in other regions with the average annual growth of 6 percent compared with the growth of 10 percent in Asia and the Pacific. Therefore, it is foreseeable that the Asia and the Pacific region would play a major and outstanding role in meeting the future global fish demands.

Aquaculture intensification is considered inevitable in the region in meeting the growing demand of the people for fish in the coming decades with increasingly scarcity of land and water resources. On the other hand, there is also concern about its long-term sustainability. In addition, the aquaculture sector is facing new challenges such as climate change, and impacts from social, economic and cultural change, particularly urbanization and globalization. The Zero Draft Outcome Document of Rio+20 called upon all States to prioritize sustainable intensification of food production. The 32nd Session[2] and 4th Regional Consultation Forum Meeting of the Asia Pacific Fishery Commission identified "Advice for sustainable intensification of aquaculture developed and communicated" as one of the regional priority outcomes.

In order to assess the status of aquaculture intensification, identify the major issues related to its sustainability and develop a regional strategic policy framework to guide national governments and regional organizations in promoting sustainable intensification of aquaculture in the Asia-Pacific region, FAO and NACA jointly convened the Regional Consultation on Sustainable Intensification of Aquaculture in Asia and the Pacific from 9-11 October 2012 in Bangkok, Thailand. Some 50 participants from 17 governments, four universities, six international organizations, two national agriculture policy development institutes, two major private corporations associated with aquaculture (Charoen Pokphand Group and Cargill) and one national aquaculture farmer association attended the regional consultation. The consultation was jointly opened by Mr Hiroyuki Konuma, FAO Assistant Director General/ Regional Representative for Asia and the Pacific, Dr Chirdsak Vongkamolchoon, Deputy Director General of Fisheries Department of Royal Thai government and Dr Ambekar Eknath, Director General of NACA. Dr Rohana Subasinghe, Senior Aquaculture Officer, Aquaculture Service, made a keynote presentation on "Aquaculture Sustainability Towards 2030".

The Regional Consultation included three major activities:

(1) presentations by invited resource persons on key thematic areas related to sustainable intensification of aquaculture, particularly science and technology (genetics and

aquaculture seed, nutrition and feed, aquatic animal health, aquaculture and environment), aquaculture systems, market and trade and governance and policy;

(2) presentations by country representatives on current status of aquaculture intensification and successful stories of sustainable aquaculture intensification; and

(3) three working group sessions focussed on identification of priority issues and options for sustainable intensification of aquaculture in Asia and the Pacific, development of strategies and action plans for promoting the sustainable intensification of aquaculture at the national level and development of a regional strategic framework and action plan to support sustainable intensification of aquaculture in the region.

A final plenary session was convened to discuss the draft regional strategic framework supporting sustainable intensification of aquaculture in the region. Key actions recommended in the regional strategy and action plan include: (i) promotion of regional sharing of aquatic genetic resources; (ii) development of capacity for improvement of seed varieties and seed quality; (iii) strengthening aquaculture biosecurity and health management; (iv) promotion of more the efficient utilization of feeds and feed ingredients, sourcing of cheaper aquaculture feed ingredients and review and reform feed standards; (v) expanding aquaculture into under-utilized areas with appropriate environmental impact assessment and improving access to water resources for sustainable intensification; (vi) improving management of aquaculture effluent discharge through innovative technology; (vii) promotion of aquaculture as an attractive livelihood in the changing socio-economic context, particularly urbanization; (viii) reducing vulnerability of farmers to risks and increasing their coping capacity to climate change impacts and improving the energy efficiency of aquaculture systems and its contribution to mitigation of greenhouse gas (GHG) emissions; and (ix) improving access of small scale farmers to mainstream market and promote equity in risk and benefit sharing along the aquaculture value chain.

[1]FAO. 2012. The State of World Fisheries and Aquaculture. FAO. 2012.
[2]FAORAP. 2012. Report of the Thirty-second Session of the Asia-Pacific Fishery Commission (APFIC), Da Nang, Viet Nam, 20–22 September 2012. FAO RAP Publication 2012/24, Bangkok, 2012, p21.

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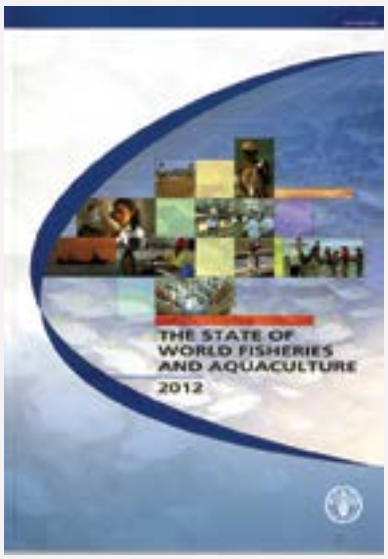

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FAO/SPC Regional Workshop on Aquatic Biosecurity and Aquaculture Data & Statistics

The Regional Workshop on Aquatic Biosecurity and Aquaculture Data & Statistics was planned as a follow-up of the FAO/SPC Regional Scoping Workshop - Development of a Pacific Aquaculture Regional Cooperative Programme[1] (Nadi, Fiji, 11-14 October 2011), and was successfully conducted at the Tanoa International Hotel (Nadi, Fiji, 1-6 October 2012), in cooperation with the Secretariat of the Pacific Community (SPC). The workshop, participated by representatives of both national fisheries/aquaculture and quarantine authorities from 20 Pacific Island Countries and Territories (PICTs) (American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Wallis & Futuna) (see photo), had a total of 52 participants (including staff of FAO and SPC). The workshop was supported by the FAO Regular Programme budget, FAO's Japanese Trust Fund (GCP/INT/069/JPN) and SPC's AusAID Fisheries for Food Security Programme.

Aquatic biosecurity in the Pacific Island region, in recent years, has become one of the main agenda in aquaculture development. Several opportunities in the past highlighted and discussed aquatic animal movements (e.g. introduction and transfer of exotic marine species such as giant clams, trochus and other molluscs) and aquatic quarantine capabilities and regulations. Despite discussions concerning aquatic animal movements at the regional level, appropriate national policies on aquatic animal movements have not been in place in the PICTs. In addition, to support sustainable aquaculture, it is deemed important to further strengthen national capacities on aquaculture data and statistics.

The overall objective of the workshop was to evaluate regional needs and enhance the capacities of PICTs on key priority programme areas, namely: (i) aquatic animal health, (ii) aquatic species introductions, and (iii) aquaculture statistics and data. The specific thematic objectives were to:

- develop capacity of PICTs on aquaculture biosecurity governance through a regional framework and programme on aquatic animal health that will enable PICTs to manage biosecurity threats derived from and affecting fisheries and aquaculture industries;
- promote the responsible use and control of aquatic species introductions and translocations in aquaculture and fisheries in the PICTs; and
- agree on a process for the implementation of Strategy-STA (Status and Trends of Aquaculture) in PICTs for improving aquaculture data collection, compilation, analysis and reporting, including methodologies, standards and institutional arrangements.

M. B. Reantaso, FAO

Participants to the FAO/SPC Regional Workshop on Aquatic Biosecurity and Aquaculture Data and Statistics, 1-6 October 2012, Nadi, Fiji

The workshop objectives were successfully achieved. The following are the main outcomes of regional workshop:

- A draft regional strategy on aquatic animal health was developed, finalized by the end of January 2013 and presented during the SPC Heads of Fisheries Meeting in March 2013.
- Recommendations for actions to be taken (e.g. national legislation review/update, national capacity development, stakeholder consultations, guidelines development, research) were recommended regarding species introduction.
- Recommendations for appropriate data (i.e. hatchery/seeds, grow-out, broodstock, animal health, economic, contribution) to be collected at national level to improve the aquaculture information and statistics in the region and provided to FAO for its further analysis and report.

[1]FAO. 2011. FAO/SPC Regional Scoping Workshop: Development of a Pacific Aquaculture Regional Cooperative Programme, FAO Aquaculture Newsletter, no.47, June 2011, pp.31.

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National Workshop on Risk Assessment in Aquaculture Development in Tonga

M. B. Reantaso, FAO

Participants to the National Workshop on Risk Assessment in Aquaculture Development, 9-12 October 2012, Tonga

The project TCP/TON/3401: Risk assessment in aquaculture development in Tonga approved in 12 February 2012 was aimed at strengthening national capacities to assess the risks in aquaculture development in the Kingdom of Tonga. This project assessed the current status of national aquaculture development, particularly with regard to species introductions and transfers and the movement of aquatic species in Tonga and conducted a national workshop on risk assessment.

The National Workshop on Risk Assessment in Aquaculture Development, organized by the FAO Sub-Regional Office for the Pacific Islands (SAP) and the Aquaculture Service (FIRA) of the Department of Fisheries and Aquaculture in cooperation with the Fisheries Division, Ministry of Agriculture & Food, Forests and Fisheries of the Government of Tonga, was held in Nuku'alofa, Tonga from 9 to 12 October 2012. The project followed similar activities already carried out in the other countries in the Pacific, i.e. in Marshall

Islands (2008)[1], in Palau (2006 and 2009)[2] and in the Federated State of Micronesia (2010)[3].

The main objectives of the national workshop were:

- to assist in raising awareness and understanding on the application of risk analysis to aquaculture production;
- to provide basic introductory training on the application of risk analysis; and
- to present the highlights of two risk analysis case studies.

Nineteen participants from concerned government authorities, representatives from the private sector and members of the FAO Project Team (SAP Fishery Officer, FIRA Aquaculture Officer, International Consultant and National Consultant) attended the national workshop.

- basic knowledge necessary to support any future actions concerning aquaculture development particularly with respect to assessing the risks related to movement of live aquatic animals. They are now able to do the following: design and set up a national risk analysis team,
- prepare commodity descriptions,
- contribute to decisions on the need for risk analyses,
- contribute to scoping a risk analysis,
- plan, oversee and monitor risk analyses,
- communicate risk analysis philosophy and issues to senior politicians and other decision-makers, and
- know when and where to get help.

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M. B. Reantaso, FAO

Risk analysis is learned by doing. A lady participant presenting the outcomes of the pathway analysis during the introductory training course on risk analysis in aquaculture held in Tonga in October 2012

The participants were well-mixed with their professional backgrounds in fisheries, aquaculture, environment, conservation and agriculture quarantine. During the workshop sessions, a manual entitled "an Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals (Arthur and Reantaso, 2012)"[4] was fully utilized. The training provided the participants with a better understanding and appreciation of risk analysis as a decision-making tool; and equipped Tongan nationals with the following:

[1]CP/MAS/3101: Risk Assessment in Aquaculture Development in Marshall Islands (refer to the pages 18-19 of FAN no. 40).

[2]TCP/RAS/3101-3208: Sustainable Aquaculture Development in Pacific Micronesia (refer to the pages 28-29 of FAN no. 43)

[3]TCP/MIC/3201: Risk Assessment in Aquaculture Development in FSM (refer to the pages 16-17 of FAN no. 45).

[4]Arthur, J.R. and Bondad-Reantaso, M.G. 2012. *Introductory Training Course on Risk Analysis for Movements of Live Aquatic Animals*, FAO SAP, Samoa, 167pp. http://www.fao.org/docrep/015/i2571e/i2571e.pdf (refer to the pages 25 of FAN no. 48).


P. Bueno, FAO

Participants of the FAO Scoping Workshop on Regional Cooperation Programme for Responsible Aquaculture and Fisheries Development in the Central Asian and the Caucasian Countries, Urumqi, China, 4 – 8 June 2012

Strategy for Aquaculture and Fisheries Development Cooperation in Central Asia and Caucasus Region

A strategy framework on Aquaculture and Fisheries Development Cooperation among countries in Central Asia and Caucasus Regions and China, Iran, Mongolia, Pakistan and Turkey has been formulated. This was carried out by the FAO Scoping Workshop on Regional Cooperation Programme for Responsible Aquaculture and Fisheries Development in the Central Asian and the Caucasian Countries held in China's western city of Urumqi, China's gateway to the Central Asia during 4-8 June 2012. The strategy is to be carried out primarily through technical cooperation, which relies on harnessing the capacities found in the participating countries to strengthen each other. It is envisioned to be facilitated by FAO's South-South Cooperation Programme.

The workshop was a response to the need, expressed by the 29th session of the FAO Committee on Fisheries (29 January – 4 February 2011, Rome, Italy) and the 5th session of the COFI Sub-Committee on Aquaculture that followed (27 September - 1 October 2011, Phuket, Thailand), to provide more assistance to aquaculture development in various regions and areas of the world including the central Asian and Caucasian countries.

Forty-five participants representing 12 countries (5 Central Asian countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, 2 Caucasian countries: Azerbaijan and Georgia, 3 countries from other Asia: Pakistan, Mongolia and Iran, and Turkey and China) and five regional institutions/Technical Support and Advisory Agencies (CACFish[1], NACA[2], NACEE[3], FFRC Wuxi[4] and FRI Xinjiang[5]), two donor agencies (Ministry of Agriculture, China and FAO South South Cooperation), Fishery Bureau of Xinjiang Uygur Autonomous Region and FAO staff took part in the workshop.

They agreed on a vision, the strategic goals and specific objectives of the Strategy and recommended seven major priority programmes: aquaculture production and technology, research and technology development, capacity building, information sharing, management of the aquaculture and fishery sectors, and market access and trade.

They urged the early implementation of these high priority activities: a) capacity development in feed production and management including provision of technologies and equipment for feed development, b) training to improve project development skill, c) formulation of an action plan to upgrade national laboratories, d) harmonization of institutional management structure and legislation in fisheries and aquaculture, e) development of an action plan for sharing and providing broodstock and seed material, f) development of a

programme for increasing and conserving endemic fish stock in inland water reservoirs, and g) establishment of a working group linked to the Technical Advisory Committee of CACFish, which would work on follow-up actions to the workshop recommendations and carry out immediate action plans.

The workshop, conducted in Chinese, English and Russian, was organized by FAO Fisheries and Aquaculture Department (Aquaculture Service FIRA, Marine and Inland Fisheries Service FIRF and Statistics and Information Service FIPS), FAO Technical Cooperation Department (Integrated Food Security Support Service TCSF), FAO Sub-Regional Office for Central Asia (FAOSEC), and FAO Regional Office for Europe (FAOREU) in collaboration with Freshwater Fisheries Research Centre located in Wuxi, China and Fisheries Research Institute of Xinjiang Autonomous Region located in Urumqi, China. It was hosted by Ministry of Agriculture, the People's Republic of China through Bureau of Fisheries and Department of International Cooperation of the Ministry of Agriculture. Full workshop report with strategy framework will be available by February 2013.

[1]Central Asia and Caucasus Fisheries Commission
[2]Network of Aquaculture Centres in Asia-Pacific
[3]Network of Aquaculture Centres in Central and Eastern Europe
[4]Freshwater Fisheries Research Centre in Wuxi, China
[5]Fisheries Research Institute in Xinjiang, China

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Regional Training on Aquaculture Production Systems Including Cage Culture

Inland fisheries and aquaculture in the Central Asian (CA) countries, i.e. Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan has dramatically decreased since the independence of these countries due to limited management of the resources and the capital investments, lack of policies, outdated technical know-how and low institutional capacity. These negative factors decreased the total aquaculture based production in the CA countries up to 9.000 metric tonnes and its value up to USD 5 Million.

On the other hand, it is expected that water resources will be at a premium and with such a pressure on this vital resource for aquaculture, the requirements for sustainable aquaculture development will include both technological and people-based approaches. The design and selection of appropriate culture systems can be made, which most effectively meets their needs and best, fits the opportunities and constraints of the local environment.

In order to strengthen the existing capacity of governments to design and select appropriate culture systems, the FAO Sub-regional Office for Central Asia (SEC) organized a "Regional Training on Aquaculture Production Systems Including Cage Culture" funded under its Regular Programme, from 2th October to 5th October 2012. The training consisted of one day theoretical and three days practical work through field visits, at the International Agricultural Research and Training Center, in Izmir, Turkey. It was attended by 18 participants from Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan.

Activities undertaken during the 4-day training course are described below:

Day 1: Lectures through Powerpoint presentations were conducted by

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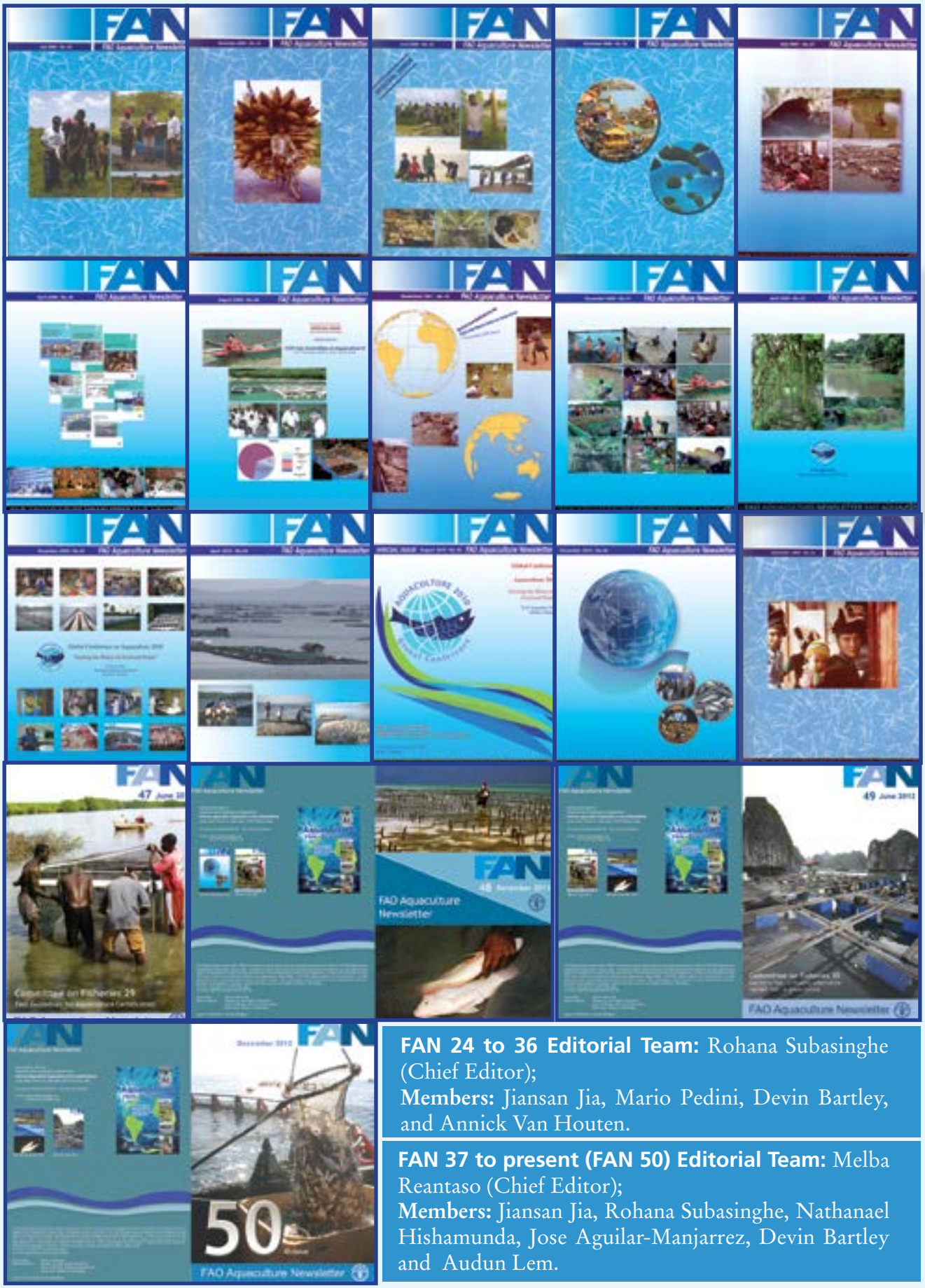
Movers behind FAN

Michael New (Chief Editor, FAN 1 and 2)
P.C. Choudhury (Chief Editor, FAN 3 to 5)
Mario Pedini (Chief Editor, FAN 6 to 8)
Ziad Shehadeh (Chief Editor, FAN 9 to 19)
Sylviane Borghesi: Lay-out artist for all FAN issues

FAN 20 Editorial Team: Ziad Shehadeh (Chief Editor); Members: Jiansan Jia, Mario Pedini, Rohana Subasinghe and Devin Bartley and Izzat Feidi (former Director of FIPM).



FAN 24 to 36 Editorial Team: Rohana Subasinghe (Chief Editor);
Members: Jiansan Jia, Mario Pedini, Devin Bartley, and Annick Van Houten.

FAN 37 to present (FAN 50) Editorial Team: Melba Reantaso (Chief Editor);
Members: Jiansan Jia, Rohana Subasinghe, Nathanael Hishamunda, Jose Aguilar-Manjarrez, Devin Bartley and Audun Lem.

O. Altan, FAOSEC

Group Picture of the Training

Continued from page 27

Ozgur Altan including fisheries and aquaculture experts from the Faculty of Fisheries, Ege University and a cage culture and mooring systems expert from the private sector. All the experts shared their best management experiences to the participants.

Day 2: Practical work through field visits to a trout and carp farms located in Manisa. The first farm had a capacity to produce about 500 tonnes/ year of trout and 100 tonnes of carp. Participants obtained information about trout and carp culture such as mooring systems, stocking density, feeding applications (from hatchery to net cage) as one of the most important sample of intensive fish farming method. The second farm has been producing trout in concrete ponds since 1985. The participants thus had the opportunity to compare two intensive production systems (cage and pond) and observed the differences between two farms.

Day 3: Field visits continued to a lagoon ornamental fish farm and a marine fish hatchery. The Homa lagoon, the most active and productive lagoon in Turkey, operated by Ege University Faculty of Fisheries, gives an example of an extensive production system. The second field visit was to Ordas Ornamental Fish Farm located in Bergama. The owner of the company provided detailed information about production methods for different species. The last visit was to Akvatek Marine Fish Hatchery located in Denizkoy. A newly rennoated facility, this hatchery has became a high technology production centre for seabass, seabream and other Mediterranean fish species.

Day 4: The practical part of the training course, conducted by Mr Onur Hasaltuntas, Junior Technical Officer for Fisheries at SEC, consisted of a field visit, in close cooperation with the Izmir Directorate of the Ministry of Food, Agriculture and Livestock (MINFAL) to Izmir Fish Hall and two fish processing plants, considered very important for aquaculture production. The fish hall system is a place where fisheries products are traded officially and the processing plants showed various ways how fish can be presented to customers. This part of the practical training provided some perspective and understanding among participants regarding the different aspects of the production chain from production to market. The practical part of the training proved very interesting on the part private fish farmers since this was their first experience cooperating with FAO.

One of the most important messages was that cooperation possibilities with the private sector should be explored more intensively and their active participation should be included into the FAO activities. The practical work of this training was a good example where private fish farms opened their facilities to FAO delegation although they have not been open to any technical visit for years. This positive development showed that FAO can be instrumental in creating good synergy with the private industry and FAO should keep continuous contact with them.

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Regional Training Workshop on Development of a Code of Good Management Practices for Central Asian Aquaculture

The Regional Training Workshop on Development of a Code of Good Management Practices for Central Asian Aquaculture was held at Bishkek, Kyrgyz Republic between 8 and 9 May 2012, was jointly organized and financed by FAO's Central Asia Regional Programme for Fisheries and Aquaculture Development. This is a regional programme being conducted under the FAO-Turkey Partnership Framework and the FAO Project Support to Fishery and Aquaculture Management of the Kyrgyz Republic Project (GCP/KYR/003/FIN) sponsored by the Government of Finland.

Thirty participants from Azerbaijan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan and Turkey, included fisheries and aquaculture senior officials, and representatives of fishers' and farmers' groups and associations, technical staff of the Department of Fisheries, and researchers, scientists, planners and policy makers involved in fisheries and aquaculture management and development in the Kyrgyz Republic.

The primary goal of the workshop was to develop regional principles for responsible Central Asian Aquaculture to be used in the development of more locally applicable and site specific Code of Good Management Practices (GMPs) or other management approaches for aquaculture, suitable for adoption by farmers in consideration of social, environmental and economic contexts.

The specific goals were to raise awareness on FAO's Code of Conduct for Responsible Fisheries (CCRF), the development of responsible aquaculture in Central Asian region, and the importance and applicability of the CCRF on aquaculture GMPs.

Background materials and workshop technical presentations on various aspects of responsible aquaculture facilitated the development of the principles.

The main output of the workshop was a set of eight principles ranging from aquaculture farm siting to social responsibility proposed as Regional Principles for Responsible Aquaculture in Central Asia with justification for each principle and implementation guidance.

The regional principles were sent for consideration to the First Session of the Technical Advisory Committee (TAC) of the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission (CACFish), a Regional Fisheries Management Organization established in 2010 under Article XIV of the FAO Constitution.

It is expected that the principles will provide public and private sectors with the basis for developing, planning and operational management of responsible aquaculture in Central Asian countries. The principles and implementation guidance consider technical, environmental, social and economic issues associated with the aquaculture practices and provide a basis for industry and government management to improve the overall aquaculture practices at national and regional levels. These can be used by public sector stakeholders as for collaboration towards a more sustainable development of aquaculture. For governments, they provide the basis for policy, administration and legal frameworks that can be renewed, adjusted, funded and implemented to address the specific characteristics and needs of the sector in order to protect and enhance the industry, the environment, other resource users and consumers.

In most of Central Asian countries, existing legislation and guidelines have been modified from those suitable for other industries and are not always applicable to aquaculture. Strengthening of institutional arrangements, capacity and partnerships is also important to ensure the cooperation and coordination of all relevant institutions with jurisdiction over natural resources, animal and public health. The principles and guidance in the GMPs will also provide the basis for development of standards and certification systems in aquaculture.

The GMPs are generally non-binding management tools that set suggested operational principles and

recognized standards for more sustainable and responsible practices. One of main goals of the development and implementation of the GMPs in aquaculture and fisheries is to create frameworks for guidance in development of an economically viable fish production that mitigates or minimizes its impact on environment and human health.

Lessons learned suggest that the GMPs should be formulated, among others, on the basis of the best available scientific data and information; comply with the respective national legislation, regulations, and rules; follow a participatory or bottom-up approach; incorporate well the environmental considerations; be flexible; include alternative practices and methods; and be subject to regular review.

A Code of GMPs generally includes the following components: facility siting and infrastructure; design of farm and production systems; safety and biosecurity; feed management, waste management, storage; predator management; production techniques; fish health management and welfare; product quality and safety; management of escapees; recording and reporting, and monitoring. The workshop acknowledged that management and conservation compliance framework drawn by FAO's CCRF provides valuable guidance that can be used in the development of GMPs in aquaculture.

The workshop underlined that due consideration should be given to consumer health and safety as well as environmental protection at each step of the farm process.

It is expected that more sectoral, sub-sectoral or species-specific GMPs would be formulated and developed for the Central Asian aquaculture based on these regional principles. The workshop also highlighted the importance of the development of technical manuals in support of observing more sectoral, sub-sectoral or species-specific GMPs and urged the participated countries to take initiative to develop the same.

H. Fersoy, FAOSEC

Participants from Azerbaijan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan Uzbekistan and Turkey joined the regional workshop

H. Fersoy, FAOSEC

The regional workshop included working group sessions

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Regional Training Workshop on Aquatic Animal Health Management

Background

Despite the available potential, fisheries and aquaculture in the Central Asian countries (i.e. Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) have not evolved to a level that contributes significantly to food security and rural development. Although fish production in these countries has slightly increased over the last decade, total production remains negligible. The limited institutional, technical and financial capacities in these countries are hampering the growth of the fisheries sector.

Disease can pose a great threat to aquaculture, and infectious diseases have become one of the primary limiting factors for the success and profitability of fish farming. Fish health problems and diseases

commonly occur in intensive and semi-intensive culture production systems. Parasites and diseases can also spread from fish farms to wild fish populations and vice-versa. Infectious disease outbreaks cause significant economic losses in the farming of various commercial fish species at the local, national, regional and global levels. Few examples include infectious salmon anemia (ISA), bacterial kidney disease (BKD) of salmon, cold water vibriosis of salmon, spring viremia of carp (SVC), and white spot disease (WSD) of shrimp.

It is well documented that successful fisheries and aquaculture depends on careful planning, management and monitoring. However, operational risk-based fish health management plans and strategies and monitoring are not yet in place yet in the Central Asia and Caucasus (CAC) region. The CAC region often lacks capacity, data and documentation on the occurrence and spatial distribution of disease outbreaks. Therefore, greater efforts should be made on building capacity in order to prevent, control and eradicate the fish diseases through proper management, taking into consideration international standards, guidelines and best practices. Fish health management in the region should begin to move towards a proactive preventive approach rather than reactive disease treatment. The keys to successful fish health management are elimination of fish stress, proper husbandry, good biosecurity and sanitary conditions, proper water and waste management, and prudent use of veterinary chemotherapeutics and fish vaccines.

Fish health management, prevention of fish diseases and control and monitoring of trade of live and processed fish and fish products are great challenges of regional importance. Therefore, more effective and operational rules and regulations need to be developed within the context of trade-related fisheries management. Gradual development of national and regional systems for the collection and dissemination of data and information on disease outbreaks, notification of diseases, monitoring of trade in live and processed fish and fish products, awareness raising on fish health and prevention of fish diseases, updating of national legislation for strengthened compliance and enforcement, technical capacity and capability building, and improved institutional cooperation are expected to overcome the general limitations which exist in terms of fish health management in the CAC region.

Introductory Training Workshop on Aquatic Animal Health Management and Risk Analysis

This training workshop, held in Antalya, Turkey from 3-7 December 2012, was aimed at raising awareness on aquatic animal health (AAH), AAH country status (Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Uzbekistan) and risk analysis as a decision- making tool for movements of aquatic species and the use of these knowledge as basis for discussing regional issues pertaining to AAH management as it relates to aquaculture development. Financial support for the workshop was received from the regular programme funds for fisheries of the Fisheries and Aquaculture Development-FishDev Central Asia, under the FAO Turkey Partnership Programme (FTPP).

The workshop had a total of 27 participants from Azerbaijan (4), Kazakhstan (3), Kyrgyz Republic (8), Tajikistan (2), Turkey (6), and Uzbekistan (4), composed of ministry officials, researchers, and fish farm managers.

The training covered a range of topics (see Box 1) under four main headings: (i) Status, challenges,

M.B. Reantaso, FAO

Participants to the Regional Introductory Training Workshop on Aquatic Animal Health Management
Antalya, Turkey, 3-7 December 2012

and regulatory frameworks; (ii) Introduction to common freshwater fish diseases (infectious and non-infectious diseases); (iii) Diagnostic techniques and control measures; (iv) Aquatic animal health management and risk analysis. Lectures were delivered by experts/scientists from Turkey (Dr A. Kubilay, Dr O. Diler, Dr S. Metin, Dr Y. Emre, Dr S. Colak and Dr G. Koyluoglu), CEFAS (Dr R. Paley) and FAO (H. Fersoy, Dr JR. Arthur and Dr M. Reantaso). The training was conducted using simultaneous translation.

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Box 1 : Topics covered during the introductory training course:

Status, challenges, and regulatory frameworks

- Overview of fisheries in Central Asia and Caucasus region
- Overview of global aquaculture: present situation, constraints and perspectives
- Aquaculture, biosecurity and aquatic animal health challenges
- International agreements, voluntary guidelines, and standard/ best practices on aquatic animal health
- Country presentations

Introduction to common freshwater fish diseases (infectious and non-infectious diseases)

- Bacterial fish diseases
- Viral fish diseases
- Parasitic fish diseases
- Fungal fish diseases
- Stress in fish: physiological response to stress
- Non-infectious diseases

Diagnostic techniques and control measures

- Diagnosis, treatment, control and prevention of bacterial fish diseases
- Diagnosis, treatment, control and prevention of viral fish diseases
- Diagnosis, treatment, control and prevention of parasitic fish diseases
- Diagnosis, treatment, control and prevention of fungal fish diseases
- Therapeutics and use of veterinary drugs in aquaculture
- Fish immunology and fish vaccines

Aquatic animal health management and risk analysis

- Presentation of Aquatic Animal Health Management (AAH) performance and capacity survey and discussion
- Introduction to risk analysis in aquaculture
- Conducting risk analysis – Part 1: preliminary activities, risk communication, hazard identification
- Conducting risk analysis – Part 2: risk assessment and risk management
- Conducting risk analysis – Part 3: risk management: option evaluation, implementation, monitoring and review
- Implementing risk analysis – identification of needs and recommendations

First Session of the Technical Advisory Committee of the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission (CACFish)

The Technical Advisory Committee (TAC) is currently the only subsidiary body of the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission (CACFish), a Regional Fisheries Management Organization that was established in 2010 as an FAO body.

The TAC, has, amongst others, the following key roles in: (i) generating technical and scientific advice in support of the development, enforcement and monitoring of management and conservation recommendations by the Commission; (ii) supporting effective implementation of the work programme of the Commission; (iii) providing technical oversight, monitoring and evaluation of projects and programme of work activities; and (iv) providing information on fisheries and aquaculture production and other data relevant to the functions of the Commission.

A participatory decision-making processes based on scientific advice has not been appropriately incorporated into national fisheries management systems of the Central Asian and Caucasus (CAC) states. The TAC therefore aims to produce objective, transparent and practical scientific and technical advice and guidance to the Commission, considering the framework set forth by international fisheries instruments, including FAO's Code of Conduct for Responsible Fisheries, and key approaches, i.e. the precautionary approach; the Ecosystem Approach to Fisheries; and the Ecosystem Approach to Aquaculture. In this connection, the outputs of TAC are expected to contribute to the management of fisheries and aquaculture within the competence of CACFish.

The establishment and maintenance of collaborative relationships with respective governmental institutions and other key stakeholders (i.e. fishers, farmers and their associations; NGOs, research institutions) are seen as useful collaboration tools for the formulation of scientific and technical advice by TAC.

The first session of the TAC was convened in Kiev, Ukraine from 20 to 22 November 2012 and attended by 4 Member States - Armenia, Kyrgyzstan, Tajikistan, and Turkey. Representatives from 6 non-CACFish Member States (Azerbaijan, Georgia, Kazakhstan, Turkmenistan, Ukraine, and Uzbekistan) also participated in this first session.

Scientific advice on the following issues was produced by the first session and these will be submitted to the Second Session of the CACFish, to be held in 2013, for discussion, and, as appropriate, enforcement consideration:

- Environmental impact assessment in aquaculture (EIA),
- Regional principles for responsible aquaculture in Central Asia,
- Responsible introductions and transfers of fish in Central Asia and the Caucasus, and
- Improvement of collection, analysis, and dissemination of fisheries data and information.

The TAC underlined the importance of implementing EIA for mitigation of the possible negative impacts that fisheries and aquaculture development may cause while recognizing the institutional, technical and legislative limitations in terms of development and implementation of EIA in CACFish Area.

State Agency of Fisheries of Ukraine

The First Session of TAC was attended by four CACFish Member States and six Observer States

The TAC agreed that "one size fits all" approach is not appropriate for the entire region particularly in the implementation of Best Management Practices (BMPs) for responsible Central Asian aquaculture considering the varying types of aquaculture operations and management systems.

In relation to fisheries data and information, it was highlighted that the national data collection methods and the data collected by states from the CAC region, to a great extent, falls short of addressing national and regional needs as well as meeting the requirements emerging from international commitments (i.e. submission of completed annual FAO questionnaires and submission of national fisheries statistics to FAO).

The TAC stressed the key importance of development and implementation of science-based prevention and management measures in the context of integrated management of aquatic invasive species, including fish introductions and transfers. It noted that efficient management of invasive aquatic species needs a systematic regional collaboration and networking. A need for more research on, among others, biological and ecological impacts of invasive species; interactions between invasive and native species; and carrying capacity of water resources within the context of re-stocking were identified.

The Session also included briefing on the status of fisheries and aquaculture in the CAC region. In addition, representatives of states provided brief information on the research or development programmes and projects of relevance to the mandate of TAC. The session regarded the FAO regional projects as a functional instrument for enhanced scientific technical cooperation in CAC region, taking the successful example of the

H. Fersoy, FAOSEC

TAC discussed and formulated scientific advice on the management and conservation of fisheries resources in Central Asian and Caucasus Region

FishDev-Central Asia Programme. In this context, a demand for promotion of such projects was expressed.

The 5-year Regional Work Programme of the Commission (2011-2015) foresees dynamic collaboration with the TAC in terms of implementation and monitoring of the work programme in addition to other regional technical cooperation projects and activities. In this context, the TAC identified priority areas of the work programme and associated activities for implementation in 2013. Additionally, the TAC discussed and identified general key priority areas for its work. These included, amongst others, technical fishing regulations, intensive aquaculture techniques and methodologies, fish health management, fish breeding and broodstock management, trade-related management measures and environmental security.

The TAC stressed the importance of the attendance of the CAC states at the sessions of the Committee on Fisheries (COFI) as well as at the session and technical meetings of its Sub-committees, namely the Sub-committee on Aquaculture and Sub-committee on Trade.

Establishment of sub-bodies (i.e. Sub-Committee, Working Group, Expert Group, etc.) under TAC was suggested earlier. However, the TAC agreed to handle the issue as a medium –term strategy when the Commission is expected to have more members and a more dynamic work programmes. Devoted technical contribution from the Member States to TAC was found essential for effective functioning of the TAC in line with its mandate. In this respect, the Members were encouraged to submit the required data and information, ensure participation of scientists, researchers and experts to the scheduled activities of the TAC work programme.

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Subregional days on aquaculture in the North African countries

English Summary

This article presents the results of a Subregional Workshop on Aquaculture in the North African Countries (Libya Tunisia, Algeria, Morocco and Mauritania) organized and funded by FAO's Subregional Office for North Africa (SNE).

The workshop, held in Monastir, Tunisia from 8-11 October 2012, and attended by a total of 45 people, was aimed at understanding the status of aquaculture development in the subregion, highlighting the technical, institutional, legal and financial strengths and weaknesses that characterize the sector and initiating cooperation among member countries of the subregion, through identification of mechanisms for exchange of expertise and development of appropriate regional policies to be used for the promotion of sustainable aquaculture development. The workshop stimulated active discussions on aquaculture development in this region with strong considerations on mariculture, aquatic animal health and desert aquaculture as important sustainability issues.

The workshop consisted of lectures, working group discussions and a final round table discussion for adoption of the report and recommendations.

One day was dedicated to a field visit to a mariculture farm, one nautical mile far from the port of Monastir. This farm operates 65 intensive floating cages (3 500 m^3 per cage) using European seabass and gilthead seabream, with an annual production 1 200 tonnes and has its own processing plant. A half day was spent visiting an Agriculture Fair in Tunis.

The workshop concluded that the subregion has a good potential for aquaculture development particularly marine and desert aquaculture. Stagnation of the capture fisheries sector and an increasing demand for animal fish protein, is shared by all the countries of the subregion. Although the contribution of aquaculture sector to the national economies in the region is still low, there is a common feeling that more institutional and financial support should be given to the sector in order for it to grow. Some constraints identified during the workshop among others, include lack of aquaculture expertise; cooperation and information exchange among the countries of the subregion is still weak; lack of well-defined aquaculture financing and development strategies in place in the subregion and private sector involvement remains non-existent.

Regional recommendations generated by the workshop include: establishment of mechanisms for strengthening collaboration and information exchange between sub-regional countries through the support of SNE and the General Fisheries Commission for the Mediterranean (GFCM); setting up of a network of diagnostic laboratories to monitor diseases of aquatic animals; and promoting and facilitating trade between aquaculture producers within the subregion for inputs distribution (e.g. fingerlings, feed and equipment) and commercialization of aquaculture products (organization of exhibitions and fairs at the subregional level).

[1]Libya was not present at this meeting

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Journées sous régionales de l'aquaculture dans les pays de l'Afrique du Nord

Cet article traite des journées sous régionales de l'aquaculture dans les pays de l'Afrique du Nord, tenues du 8 au 11 Octobre 2012 à Monastir, Tunisie. Le bureau sous régional de la FAO à Tunis a organisé ces journées en vue d'établir l'état des lieux du secteur de l'aquaculture dans les pays de la sous-région en mettant en relief les contraintes et les points forts qui caractérisent le secteur dans ses aspects techniques, institutionnels, juridiques et financiers et pour appuyer la coopération sous régionale à travers l'identification de mécanismes d'échanges d'expériences et d'expertises réussies.
Quarante cinq personnes représentant les pays de la sous région (Libye[1], Tunisie, Algérie, Maroc, et Mauritanie) ont participé à l'atelier en plus des fonctionnaires de la FAO et des consultants internationaux.

L'ouverture des journées a été présidée conjointement par Monsieur Mohamed Ben Salem, Ministre de l'Agriculture en Tunisie et Monsieur Benoit Horemans, Représentant de la FAO à Tunis et coordonnateur sous régional du Bureau de la FAO pour l'Afrique du Nord. Le programme des journées comprenait 15 communications réparties en 4 sessions principales : (i) état des lieux du développement de l'aquaculture dans les pays de la sous-région[1], et l'analyse synthétique des politiques de développement de l'aquaculture dans les pays de la sous-région; (ii) les programmes d'appui du bureau de la FAO à Tunis, en matière de développement de l'aquaculture et des réseaux sanitaires des produits aquacoles dans la sous-région; (iii) la mise à niveau technique du secteur aquacole par la maitrise des maladies dans les élevages piscicoles; et (iv) la situation de l'aquaculture en méditerranée et les systèmes d'informations associées ainsi que les techniques d'élevage aquacole envisageables dans la sous-région.

Deux groupes de travail, comprenant plus d'une dizaine de participants chacun, ont été constitués au cours de la 3ième journée. Le 1er groupe a traité les institutions et stratégies de développement du secteur de l'aquaculture alors que le 2éme groupe a traité les aspects liés à la mise à niveau technique du secteur aquacole, y compris les améliorations techniques de la production et la maîtrise des maladies des poissons d'élevage.

Une journée a été consacrée à une visite sur le terrain d'une ferme aquacole en milieu marin, à proximité du port de Monastir. La ferme possède 65 cages flottantes (3 500 m^3 par cage) qui contiennent du bar européen et de la dorade royale (production annuelle de 1 200 tonnes) avec une usine de transformation à terre. Une demi-journée a été consacrée à la visite du Salon de l'Agriculture à Tunis.

L'atelier a conclu que la sous-région a un bon potentiel de développement de l'aquaculture en particulier en milieux marin et désertique. La stagnation des captures de pêches et la demande croissante de protéines animales, des poissons en particulier, est une contrainte partagée par tous les pays de la sous-région. Bien que la contribution du secteur de l'aquaculture à l'économie nationale dans la région est encore faible, il ya le sentiment commun qu'un important soutien institutionnel et financier devrait être apporté pour la croissance du secteur.

Certaines contraintes affectant la croissance du secteur ont été identifiées pendant l'atelier, entre autres, l'absence de politiques nationales appropriées au développement de l'aquaculture ainsi que l'absence de cadre juridique et institutionnel spécifique et adapté au développement du secteur; le manque d'expertise en aquaculture; le faible niveau de coopération et d'échange d'informations entre les pays de la sous-région; les stratégies de financement et de développement de l'aquaculture ainsi que le rôle du secteur privé qui reste très faible. Parmi les recommandations principales issues de l'atelier, les participants ont proposé de mettre en place un mécanisme favorisant la collaboration et l'échange d'informations entre les pays de la sous-région, par le biais d'un réseau fonctionnel et spécifique à l'aquaculture, s'intégrant dans le cadre institutionnel existant, et comprenant les aspects techniques, recherche et développement, zoo sanitaire et environnemental; favoriser et faciliter les échanges commerciaux entre les producteurs

L. Bigarré, FAO

L. Bigarré, FAO

L. Bigarré, FAO

L. Bigarré, FAO

Top left: Harvesting gilthead seabream from a floating cage at sea
Top right: Fish are concentrated to one side of the cage by using a seine net
Bottom left: A scoop net is used to bring on board the fish
Bottom right: Seabream are released in a box containing seawater and ice, Monastir, Tunisia, 2012

des pays de la sous-région relatifs aux intrants (alevins, aliments et équipements) et l'écoulement des produits aquacoles (organisations de salons et de foires à l'échelle sous régionale); et renforcer la coopération sous régionale et régionale avec la FAO (Bureau sous régional de l'Afrique du Nord) et la Commission Générale des Pêches pour la Méditerranée (CGPM) en matière de formation et d'expertise relative aux aspects liés au développement de l'aquaculture et en relation avec le plan de travail de la FAO.

[1]La Libye était absente à cette réunion

Aquaculture on rooftop gardens in Gaza

For most people in the Gaza Strip, obtaining sufficient quantities of good quality food remains a significant challenge. The Socio-Economic and Food Security (SEFSec) survey for 2011 indicated that despite some improvement in the food security status of Gazans (44 percent food insecure in 2011 vs. 52 percent in 2010), the number of food insecure and vulnerable households remains extremely high in all five governorates. The current situation in the country has led to soaring unemployment rates and increase of prices of consumable commodities. Food insecure households in Gaza now spend up to 48 percent of their income on food, a figure which would be even higher when considering that 65 percent of the population is not receiving food assistance. The military instability in the region has resulted in widespread destruction of assets and infrastructure, most notably in the agriculture sector. Also the imposed buffer/conflict zone and navigation, and hence fishing restrictions off the coast, has further impeded the agricultural efforts to produce enough food for local needs. For example, between the late 1990s and late 2000s, fish catches varied from a maximum of 3 788 tonnes in 1997 to minimum of 1 507 tonnes in 2003, and after the security restriction on navigation within 3 nautical miles, annual catches further decreased. This chronic food security emergency in Gaza is further compounded by the demographic situation. Gaza's population of roughly 1.6 million is growing at a rate of 3.5 percent, which means that it will double in 20 years. Already, this makes Gaza one of the most crowded places on earth at nearly 4 500 people/km^2. Furthermore, 70 percent of the people living in Gaza are refugees, the vast majority of whom still live in crowded refugee camps with no access to land or water resources.

Fish is an important supply of protein in Gaza which has a per capita consumption of 3.3 kg per year. Aquaculture, as an option for the production of food fish in Gaza has increased since 2005 with currently 110 tonnes of fish being produced. Private entrepreneurs and FAO projects have established about 13 intensive farms and 90 irrigation-based fish farms, respectively. A private entrepreneur has established a tilapia hatchery in Northern Gaza.

Urban agriculture through aquaponics as means to food security

In response to the crisis in Gaza, and in particular, the needs of food insecure female-headed households in urban areas, FAO implemented several small-scale urban food production projects in partnership with a number of European donors. Providing food-insecure households with the means and knowledge to grow their own food proved to be an extremely successful way of reducing their vulnerability. FAO's internal evaluations have shown that activities such as backyard and rooftop gardens, small rabbit, chicken and fish units, boost the quality of food consumed by poor households and also provide a modest source of additional income through sales of surplus production.

In 2011, through the generous contribution from the Kingdom of Belgium, a follow-up emergency food production initiative was launched which included the setting-up of small-scale aquaponic units on rooftops and supported by training.

Aquaponics is a sustainable food production system which integrates aquaculture (growing fish) and hydroponics (growing plants without soil) whereby both agricultural practices mutually benefit from each others presence in one production unit. Aquaponics relies on the nitrification process whereby waste from the fish is converted by nitrifying bacteria, which are hosted naturally within the unit, into an organic

C. Somerville, FAO

Reem Seyman showing her tomato harvest during the summer

nutrient solution for the growing vegetables. The vegetables then take up the nutrients from the water which essentially purifies it as it re-circulates back into the fish tank. Under this production technique, two products (fish & vegetables) can be harvested from only one input. Also, due to the re-circulation and recycling of water, aquaponics only requires a fraction of the water needed for ground-grown plant production in the Middle East.

Considering that access to good agricultural land and water will continue to be chronic issues within Gaza, aquaponics can serve as an applicable food production option mainly due to: 1) efficient water utilization, and 2) easy installation of each production unit (fish and plant) on any flat, urban platform using local low-tech materials.

Within the Belgian-supported project, 15 beneficiaries in Gaza City received an aquaponics unit kit including a locally-made 1 m^3 fiberglass fish tank, grow beds filled with volcanic gravel, an electric pump, PVC pipes/fittings and water quality monitoring kits. Other inputs for each unit were given including tilapia fingerlings, fish food and enough vegetable seedlings for one growing season. Once assembled, each beneficiary had a fully fledged "flood and drain" aquaponics unit with m^2 growing space and a maximum fish stocking density of 20 kg. In addition, two demonstration units were also installed at FAO's office and at the office of their implementing partner.

The unit design, tailored to adapt to the unique environmental and logistical realities in Gaza, was actually a marriage of an initial small-scale Integrated Aquaculture Agriculture (IAA) unit locally designed in Gaza with external expertise on aquaponics technology. Although there was initial success when the IAA unit was piloted during the project's first phase, questions were being raised as to whether poor families in Gaza could successfully utilize the new aquaponics units as they demand a higher educational capacity to operate. It was highlighted early on the in project cycle that the training course and materials for each beneficiary needed to be as simple and as accessible as possible to ensure success.

Initial results

The initial 15 rooftop aquaponics units showed some promising results. Most of the beneficiaries exerted considerable effort into the management of their units and most have already harvested a summer crop which was used for household consumption. For example, Mr Abu Ahmed, cited in the photographs above, was able to grow enough tomatoes, peppers and eggplants during 3 summer months to remove the need for him to spend his income on these vegetables from the local markets. Other beneficiaries had varying results. Some paid less attention to reaching the full production potential of their units and concentrated more on growing some of their favorite herbs and vegetables.

C. Somerville, FAO

Abu Ahmed's entire aquaponic rooftop production

C. Somerville, FAO

Abu Ahmed, explaining to all the other beneficiaries on how he tripled the production capacity of his unit

Every beneficiary mentioned that they thoroughly enjoyed managing their units. Some were very thankful that they could now grow nutritious and pesticide-free vegetables for their families while others seemed to really appreciate a quiet green space of their own, inside the busy city of Gaza. Often beneficiaries would mention how they would happily spend hours during the day tending to their fish and vegetables and seek rest from the difficult realities facing them on a daily basis.

C. Somerville, FAO

Iman Nofal growing a host of summer vegetables such as tomatoes, peppers and cucumbers

Although success stories have been recorded, the initial pilot work suffered some problems and setbacks, mostly due to the unique challenges presented in Gaza. Power cuts along the entire strip are a daily hassle for households which can easily last up to 8 hours or more. This has unfortunately led to fish mortality particularly during the hot summer months when the capacity for water to hold dissolved oxygen reduces as the water temperature increases above thirty degrees.

Information received from various project monitoring trips highlighted the existence of some cultural barriers. The idea of growing vegetables without the use of soil has been quite a paradigm shift for some of the beneficiaries with some still relatively skeptical of the total added value to which soilless culture units can provide. One major lesson learnt in light of this was to implement complementary public awareness campaign on any new technology, particularly that of aquaponics which is a substantial diversion from traditional agricultural practices. Such campaigns can overcome initial cultural barriers and prevent a potential 'false start' syndrome within participating communities.

Future plans

Seeing the potential of urban agriculture activities in Gaza, and in particular the development of soilless culture units such as aquaponics and hydroponics, the Belgium Government is kindly willing to fund another similar project with FAO in the new year. This project will expand on the initial number of urban aquaponics farmers while developing the capacity of existing ones. There will also be scope to reward some of the more successful farmers in the pilot phase by incorporating training and monitoring support to reap the benefits of their experience this year.

New techniques will also be investigated in order to remove some of the problems experienced in the pilot phase. Solar power will be explored along with battery-powered air pumps in order to reduce fish mortality due to low oxygen levels in the fish tanks during summer. The project will continue to have large focus on female producers offering the means for them to secure fresh, nutritious food and potentially generate a supplemental income for their family.

Further information can be obtained by writing to:

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Foreground: Concrete ponds for tilapia. Background: Earthen ponds used for white leg shrimp

Strengthening Aquatic Animal Health Protection System in Suriname (TCP/SUR/3401)

Suriname, located in Northern South America, bordering the North Atlantic Ocean, between French Guiana and Guyana with a population of 560 157 (July 2012 est and ranked 170 in the world, is a small, open, middle-income economy dominated by the mining sector, a history of dependent economic relationships with Netherlands (Holland) and Europe.

The agriculture sector is important to the economy in terms of employment, food security, income generation and poverty reduction. About USD 81 million (96 percent of export earnings in agriculture) is generated by four commodities: rice, banana, fish and shrimp. The Government's 2010 policy statement "gives high priority to a series of programmes aimed at food production for about 85 percent of the Suriname food demand and at least 40 percent [total production] intended for export"[i] . According the government policy, primary responsibility for production and productivity rests with the private sector, while leading corporations, farm cooperatives, support firms develop sub-sector strategies through sectoral organization, and involving contractual systems of small producers. The government, on the other hand, takes responsibility for improving the macroeconomic, legal and business environments to stimulate private sector investments and enhance access for small-scale entrepreneurs.

Background to the project

A request for technical assistance on 'Fish disease monitoring system' through a Technical Cooperation Programme (TCP) project was received on 31 August 201. Ms M Reantaso of the Aquaculture Service (FIRA) was assigned as technical focal point. Discussions between FIRA, FAOTT, FAOSLC and LEGN[1] developed and finalized the TCP document which was approved ion 28 May 2012; Mr B Clarke (FAOTT) was designated with operational and budget responsibilities[2]. The implementing agency is the Ministry of Agriculture, Animal Husbandry and Fisheries.

The project, with a duration of 18 months, has the development goal of ensuring food security and securing livelihoods and foreign exchange earnings through sustainable aquaculture development that supports effective biosecurity governance. The expected outcome of the project is to strengthen the competence of national authorities in Suriname in implementing effective aquatic animal health protection systems to minimise the risks from aquatic animal diseases affecting aquaculture production.

Outputs. Five major outputs are expected through a number of activities whose implementation will follow the principles of team effort, wide stakeholder consultation and participation,

M. B. Reantaso, FAO

White-leg shrimp *Litopenaeus vannamei* and vacuum-packed frozen shrimp product

M. B. Reantaso, FAO

transparency and wide dissemination of information, human capacity development and gender considerations.

Personnel services. The project provides the following personnel services: 4 National Consultants (Ms Alexis Persaud on aquaculture development and promotion, legislation, Dr Anand Chotkan on aquatic animal health, Dr (Ms) Astrid van Sauers on disease surveillance and reporting), 2 International Consultants (Dr (Ms) K de Braak on disease surveillance, monitoring and reporting and aquatic animal health information system; Dr J Richard Arthur on aquaculture and aquatic animal health strategy development and promotion) and 4 FAO Technical Support Staff [Dr (Ms) M Reantaso and Dr R Subasinghe (FIRA), Dr R Van Anrooy (FAOSLC), Mr P Deupmann (LEGN)].

Progress so far. Since start of implementation on October 2012, achievements so far with respect to different Outputs are listed below:

Output 1: Updated Aquaculture Development Strategy and Action Plan finalised and approved by the Competent Authority

1. First Aquaculture Action Planning (AAP1) Workshop was held on August 2012 and drew a number of recommendations (e.g. (i) explore possibility of Suriname membership to the Aquaculture Network of the Americas (RAA) and participation in RAA meetings in Dominican Republic (April 2013) and Chile (June 2013); (ii) review of the aquaculture sector since 2000 and document lessons learned; (iii) develop small-scale aquaculture training programme; (iv) organize a risk analysis training workshop; (v) conduct a capacity building needs assessment as basis for developing a mid-term training and research programme for the aquaculture sector)

2. Project Team completed the following: draft National Aquaculture Policy Document; draft "Strategy for Aquaculture Development and Management in Suriname (2013 - 2025)"; and draft Logical Framework for the Strategic Plan

3. AAP2 Workshop will be held from 7-8 February 2013 which will build consensus and agree on the: (i) National Aquaculture Policy (ii) the National Aquaculture Development Strategy and the (iii) Action Plan for implementation of the Strategy.

4. Preliminary work on legal aspect of the Aquaculture Strategy commenced.

Output 2: a National Strategy for Aquatic Animal Health (AAH) Management in Suriname approved

1. Suriname's Aquatic Animal Health Performance and Capacity Survey Questionnaires have been completed. Summary and analysis will be presented during the Aquaculture Task Force

(ATF) Meeting on 14-15 February 2013. The information collected here will also feed into Output 4.

2. Specific elements of the National AAH Management Strategy have been developed, e.g. Vision, Guiding Principles and National List of Pathogens; these will be finalized and decided during two ATF meetings (30 January and 14-15 February) which will also discuss the other elements of the national strategy and potential projects to support its implementation.

3. Preliminary work on legal aspect of the AAH National Strategy commenced

Output 3: Surveillance systems for aquatic animal pathogens/diseases and an aquatic animal health information system established and functional

1. Preparation of a surveillance design for selected aquatic pathogens is in progress and will be finalized and presented to the above-mentioned ATF meeting. The field mission of the International Consultant from 30 January to 13 February 2013 will validate, refine and revise the surveillance design based on local conditions and develop plans for pilot testing

2. Outcomes of the surveillance desk top work to be presented during AAP2 Workshop and during the Aquaculture Task Force Meetings (30 January and 14-15 February 2012) meetings.

Output 4: Human capacity of aquaculture and aquatic animal health professionals both in public and private service strengthened through trainings and workshops

1. A introductory training course on risk analysis will be held from 11-13 February 2013 (refer to Output 1 (1.iv) above)

2. Other specific capacity building activities will be decided during the Project Team Meeting (see below).

A Project Team Meeting will be held 9-10 February 2013 in Paramaribo that will serve as an interim project implementation meeting to discuss progress of project implementation and problems encountered, decide on actions to be taken pertaining to recommendations generated from different workshops/meetings and prepare details of remaining activities to achieve all outputs until end of project (December 2013).

[i]Bouterse, D.D, October 2010, "Crossroads: Together towards better times. Statement of Government policy , 2010-2015

[1]FIRA: Aquaculture Service; FAOTT: FAO Regional Office in Trinidad and Tobago; FAO SLC: Sub-regional Office for the Carribean; LEGN: Legal Office

[2]Personnel from FAOTT supporting the TCP include Ms M Alleyne, Ms Lisa Martinez and Ms Geeta Ramkissoon

Further information can be obtained by writing to: Melba.Reantaso@fao.org and/or

M. B. Reantaso, FAO

An art contest, participated by elementary school children was held as part of the World Food Day celebration in October 2012

Raymon.Vananrooy@fao.org

M.B. Reantaso, FAO

Freshwater trout raceways in the village of Ravni, Serbia

Assistance to Western Balkan Countries for Improving Compliance to International Standards on Aquatic Animal Health (TCP/RER/3402)

The seven countries comprising the West Balkans (Albania and the newly independent nations of the former Yugoslavia – Bosnia and Herzegovina, Croatia, Montenegro, Serbia, Slovenia and The Former Yugoslav Republic of Macedonia) are in the process of developing modern aquaculture production systems as a means of providing healthy low-cost protein to their citizens and generating export earnings. With large areas of high-quality fresh waters, skilled and relatively inexpensive labour and proximity to large markets in the European Union, this region has an advantageous situation with regard to aquaculture development[1].

The Western Balkan countries are thus, attempting to develop the capacity to meet international standards for trade in live aquatic animals and their products in order to reach these potentials. Such standards include that of the World Organisation for Animal Health (OIE) as expressed in the OIE *Aquatic Animal Health Code* and *the Manual for Diagnosis of Aquatic Animal Diseases*, the Agreement on the Application of Sanitary and Phyto-Sanitary Measures (SPS Agreement) of the World Trade Organization (WTO), and the standards for market access as required by the European Union (EU), as expressed in various EU Directives. In order to achieve these goals, responsible and efficient aquaculture production, including good capacity to address issues related to the control and prevention of aquatic animal diseases, are neede[2]. This regional TCP addresses the concerns expressed by the ministries of five participating FAO member countries (i.e. Ministry of Foreign Trade and Economic Relations of BiH, Ministry of Agriculture, Fisheries and Rural Development of Croatia, Ministry of Agriculture, Forestry and Water Economy of FYR Macedonia, Veterinary Administration of Montenegro, Ministry of Agriculture, Trade, Forestry and Water Management of the Republic of Serbia) on the need to improve national and regional capacity for aquatic animal biosecurity. This regional project was an outcome of an assessment of the status of national planning, policy and capacity for aquatic animal health in these five countries conducted in 2009 and a regional proposal development workshop[3] which identified constraints to achieving national goals on sustainable aquaculture supported by effective biosecurity governance.

The project is aimed at strengthening regional and national aquatic biosecurity governance and capacities for dealing with transboundary aquatic animal diseases (TAADs), and in the process improve compliance with international health standards for aquatic animals so that countries are better able to maintain and improve national aquatic animal health status, harmonize standards regionally, and better comply with the health standard requirements of regional and international trading partners. It will: (i) build regional aquatic animal health capacity (via workshops and training) on specific themes (legislation, risk analysis, surveillance, diagnostics, emergency preparedness, aquaculture development and promotion); (ii) provide a regional review and assessment of national legislation to harmonize with respect to compliance with international aquatic animal health standards; (iii) design and implement a regional surveillance programme for aquatic

animal diseases; and (iv) promote national, regional and international communication mechanisms and networking systems for aquaculture development.

Sustainability will be assured by promoting appropriate regional and national level planning and actions. Associated training activities will be conducted for technical professionals from national diagnostics laboratories and senior biosecurity/aquatic animal health policy-makers. All these actions will ensure the sustainability of the project outcomes and will help to improve long-term policy and planning and the technical capacity to implement aquatic animal health and biosecurity measures in participating countries.

The project, which will be implemented for 24 months beginning January 2013, has provisions for:

(i) 5 national training/workshops on specific themes, hosted by each participating country as below:

1. Serbia: disease surveillance, monitoring and reporting
2. Bosnia and Herzegovina: diagnosis of diseases of fish and molluscs
3. Croatia: risk analysis for movement of live aquatic animals and harmonizing legislation with international standards
4. Macedonia: contingency planning and emergency preparedness
5. Montenegro: aquaculture development and promotion

(ii) 5 regional training workshops, hosted by each of the five participating countries and

(iii) a final Project Terminal Workshop.

Project implementation will be supported by:

- 6 National Consultants (legislation; disease surveillance, monitoring and reporting; diagnostics; risk analysis and aquaculture development and promotion),
- 4 TCCT Consultants (aquatic animal health management; diagnostics; aquatic epidemiology: surveillance and aquatic animal health information system; emergency response and contingency plan),
- 2 International Consultants (disease surveillance, monitoring and reporting, contingency planning and emergency preparedness; risk analysis and aquaculture development and promotion) and
- 4 FAO technical backstopping officers (from the Aquaculture Service, Legal Office and regional office).

More information about the project can be obtained by writing to: Melba.Reantaso@fao.org

M.B. Reantaso, FAO

At a trout fish farm and processing facility "Gacka-Sinac", Croatia

[1]Arthur, J.R., Bondad-Reantaso, M.G., Tanković, S. and Fejić, N. 2011. Western Balkans regional aquatic animal health capacity and performance survey: Summary of survey results and analysis. In FAO. 2011. Report of the Regional Proposal Development Workshop "Assistance to Western Balkan Countries for Improving Compliance with International Standards for Aquatic Animal Health". FAO Fisheries and Aquaculture Report. No. 969. Rome, FAO. pp.16-124.

[2]Op.cit.

[3]"Assistance to Western Balkan Countries for Improving Compliance with International Standards for Aquatic Animal Health". Zagreb, Croatia, 7–9 September 2009. FAO Fisheries and Aquaculture Report. No. 969. Rome, FAO. 2011. 147p.

Tribute to two great

Dr Ziad H. Shehadeh

(20 January 1938-18 December 2012)

With deep sorrow we lament the passing away in Washington D.C. of our dear friend and colleague, Dr Ziad Halim Shehadeh, who for several years was Editor of this FAO Aquaculture Newsletter (FAN) and retired from FAO as Senior Fisheries Resources Officer (Aquaculture) at the Fisheries Department (FI) in 2000.

Ziad's life long and fruitful career in aquaculture started in the late sixties after obtaining a Ph.D. in Zoology at the University of California. He joined a pioneer research group on induced breeding of mullet at the Oceanic Institute in Hawaii in 1969 and moved to the FAO Fisheries Department in 1972 to strengthen the aquaculture group of the Fisheries Resources Division. In the following four years, he participated in the organization of the regional meetings in Africa and Europe that led to the final Kyoto Conference setting the frame for the establishment of the FAO/UNDP Aquaculture Development and Coordination Programme (ADCP). In 1976, he was recruited by the newly created International Centre for Living Aquatic Resources Management (ICLARM) first as Deputy Director General in Hawaii and then as Director General in 1979 when this organization moved its headquarters to Manila, Philippines. One could easily say that he was crucial in providing the initial impetus to launch ICLARM as a full-fledged international fisheries centre.

In 1982, he accepted an offer to work as Manager of the Mariculture and Fisheries Department of the Kuwait Institute for Scientific Research in Kuwait (KISR). At KISR, research on marine finfish (groupers and sparids) and tilapia culture in seawater, as well as local shrimp species was advanced and progressed substantially under his leadership although KISR policy was that the results obtained should remain largely confidential. The first Gulf War in 1990 ended abruptly this fruitful period and after the war, he worked from the US first as freelance consultant for FAO and later in Ottawa as Secretary of the Strategy for International Fisheries Research (SIFR), a multidonor initiative leading to the establishment of the World Fish Center under the CGIAR.

In 1994, Ziad rejoined the FAO and supervised the FAO Regular Programme activities in aquaculture. During this period, in addition to the planning aspects of aquaculture development and trend analysis, he was also editor of FAN amongst other duties. After retirement, he worked as consultant for the FAO Investment Centre, FAO FI, NOAA and for the World Bank.

Ziad 's career in aquaculture was full of important contributions in research, institutional development, projects, development planning and meetings, too many to list them here, but after his initial international experience with FAO in the early seventies, he made a quantum leap in his move to ICLARM showing that he had the ability to work as a real leader and top level organizer. In the years he spent at KISR he had to ability, the vision and the leadership to organize centres of excellence.

But Ziad was not only the serious, demanding and conscientious leader that many may remember, concerned with producing the best possible results and sometimes driving people mad. He was above all a good friend of many, helping junior staff to develop skills and vision, correcting and leading them to improve their performance. His excellent writing skills made him a valuable editor always ready to assist in improving articles or major fisheries and aquaculture publications. For those who had the privilege to work with him during his years in FAO, he was a friend ready to assist but also ready to listen and to accept your points of view if they were correct, and at the same time learning also from those junior to him - a rare quality in those that have occupied high positions in organizations. Although he was definitely overqualified for the position he had in the last years he spent in FAO, he was one among the group who never imposed his superior experience.

Born in Lebanon, he was above all a Mediterranean person. He loved the Mediterranean, Italy, its light and its cities, and Rome in particular. He enjoyed the art, the story, the food and the warm character of the people. He was also a classical music lover, particularly of baroque and neoclassical composers, perhaps because of their rationale and orderly way of composing, similar in a way to his approach to work. We remember the many good memories left behind, moments of fun and joy, and the sorrow of having lost a good friend and an excellent colleague.

He leaves his wife Maha, and daughter Serene and son Nadim, with the pain of having lost him, that we, his friends, also share. He will still live in our memories and hearts. May he rest in peace.

Arrivederci Ziad.

aquaculture colleagues

Dr André Georges Coche
(15 April 1931 - 25 December 2012)

The Fisheries and Aquaculture Department of FAO is deeply saddened by the passing away last 25 December 2012 of a dear friend and colleague, Dr André Georges Coche who retired as Senior Fisheries Resources Officer (Aquaculture) in 1990.

After graduating in Belgium at the Faculty of Agricultural Sciences in Gembloux, André continued his academic studies in the USA where he obtained a PhD at the Oregon State University in Corvallis with a thesis on farming steelhead trout in freshwater impoundments.

He then joined the FAO field programme in Africa in the early 1960s serving initially as Fishery Limnologist working in Zimbabwe at the Lake Kariba Fisheries Research Institute. After this initial assignment he was posted in Zambia at the Central Fisheries Research Institute in Chilanga and then moved in Côte d'Ivoire heading the FAO/UNDP team of the Lake Kossou Fishery Development Project. His final field posting was in Cameroon as Principal Technical Adviser on the FAO/UNDP fish farming development project.

In 1976 André moved to FAO Headquarters in Rome as a Fishery Resources Officer in the Inland Fisheries and Aquaculture Service bringing along and sharing with his colleagues a wealth of technical and field project experience. Soon thereafter was designated as Senior Fishery Resources Officer (Aquaculture). During this period he continued his work mainly in Africa and Europe but also in other continents formulating new projects and providing technical supervision, coinciding with the period of maximum expansion of the FAO field programme in aquaculture. He also served as the Technical Secretary (Aquaculture) of the Committee of Inland Fisheries and Aquaculture for Africa (CIFAA) and the European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC) organizing symposia, working groups and international training courses in Africa, Europe and also in the Middle East.

André's has contributed a substantial amount of technical work to the Organization, as the impressive record of documents he has produced shows, to increase awareness within and outside FAO on the importance of aquaculture as a food production sector and as a sector offering business and employment opportunities particularly to rural communities. During his period at Headquarter he certainly was the undisputed authority in the Regular Programme for what concerns knowledge of African aquaculture.

After his retirement in 1990 he continued assisting the Inland Fisheries and Aquaculture Service (FIRI) (currently the Aquaculture Service – FIRA) of the FAO Fisheries and Aquaculture Department as consultant for several years including leading the team for the study on Aquaculture Research Needs in Africa that was carried out by the organization in support of the multi-donor Study on International Fisheries Research in the early 1990s.

Andre was particularly keen in producing material for training for both farmers and extension services in Africa and among the numerous publications he produced throughout his career, he will certainly be remembered, among others, for the very popular, informative and highly visual FAO aquaculture training manuals of the Better Farming Series ("Simple methods for aquaculture") which have been also digitized and all available on an interactive CD-ROM and for his important contribution in the preparation and finalization of the FAO Glossary of Aquaculture. These training manuals are still today highly demanded.

André was a calm hard working person, highly respected by his colleagues, both professionals and general service also for his kindness and for the assistance and guidance given to the younger staff joining the aquaculture group in the years he was in FAO Headquarters. Those that had the privilege to work with him in the years he served in Rome still remember with admiration the respect shown to him by the numerous visitors coming from the projects and field in general, a proof of the high esteem and consideration he had gained through his work.

Andre is survived by his wife, Rita, his son Thierry and daughter Brigitte. The whole FAO Fisheries and Aquaculture Department and the aquaculture community from around the world join his family in sharing in their loss.

Kwaheri André.

Dr Indroyono Soesilo (Indonesia)
Director, FIR

Dr Indroyono Soesilo, an Indonesian national, was appointed as the new Director of the FAO Fisheries and Aquaculture Resources Use and Conservation Division (FIR), Department of Fisheries and Aquaculture effective December 17, 2012. Dr Soesilo has a Ph.D degree on Geologic Remote Sensing, University of Iowa, USA (1987), M.Sc degree on Remote Sensing for Natural Resources, University of Michigan (1981), and an Engineering degree from Institut Teknologi Bandung, Bandung, Indonesia (1979).

Prior to taking this post, Dr Soesilo was the Secretary/Deputy Senior Minister of the Coordinating Ministry for People's Welfare of the Republic of Indonesia for which he was responsible for ensuring sound and effective coordination among 17 Ministries and Agencies that manage issues related to sustainable development, education and poverty, housing, food and nutrition, women and children, and the environment. Within the Indonesian Government, Dr Soesilo was former Director General for the Agency for Marine and Fisheries Research, Ministry of Marine Affairs and Fisheries (2000-2008); Director General for Sea Research and Exploration, Ministry of Sea Exploration and Fisheries (1999-2000); and Deputy Chairman of the Agency for the Assessment and Application of Technology (BPPT) for Natural Resources Development (1997-1999). Relevant work on fisheries include: as coordinator of the FAO Project on the Study of Combating IUU Fishing Practices in the Arafura Sea 2008, UNEP-UN FAO Blue Carbon Fund Initiative, Executive Secretary for the World Ocean Conference 2009 which resulted in The Manado Ocean Declaration; he was the prime-mover for the establishment of the Coral Triangle Initiative, started in 2007. At regional and international levels, Dr. Soesilo served as Co-chair of 2005 APEC Senior Official Meeting on Ocean-Related Issues, as initiator of the establishment of Regional Plan of Action on Responsible Fishing Practices involving 10 countries in Southeast Asia – Australia Region 2007, Lead Shepherd of APEC Marine Resource Conservation Working Group in 2006-2008, as well as Head of the Indonesian Delegation to various regional and international conferences and meetings. As a remote-sensing technology scientist, Dr Soesilo developed applications for geographic information system (GIS) for disaster planning and mitigation, land use planning, rice yield prediction, marine resource inventory, combating IUU fishing practices and forest management during the period 1988-1998. Professional academic contributions include studies, analyses, and writings on issues ranging from development planning, natural resource management, marine and fisheries, through to practical applications of science and technology.

Dr Soesilo was a recipient, in 2009, of the prestigious Medals of Honor in Indonesia - Bintang Mahaputra Pratama Medal (2009) and the Bintang Jasa Utama Medal (1997) - for his dedication and service for the people of Indonesia. He was also a Fulbright Distinguished Scholar Award Recipient of 2012.

The Aquaculture Group warmly welcomes to Rome Dr Indroyono Soesilo, his wife and children and wishes him and his family a pleasant stay and a fruitful and productive tenure as Director of FIR.

Stephen Reichley (USA)
Intern

Stephen Reichley, an American national, and a 4th year veterinary medicine student at the College of Veterinary Medicine, The University of Ohio served as a volunteer intern during the period 25 June to 24 July 2012 at the Aquaculture Service (FIRA). This volunteer internship at FAO is part of the Veterinary Externship Programme of the College of Veterinary Medicine, University of Ohio where FAO/FIRA has been accepted and recognized as provider of an elective course that supports quality learning experiences available to the university's 4th year students. (http://vet.osu.edu/education/aquaculture-service-fisheries-aquaculture-dept-food-agriculture-organization-united-nation)
During the volunteer/internship period, Mr Reichley was involved in the following activities: collected data pertaining to cases of

aquatic animal disease on a global scale from ProMED-mail and the World Animal Health Information Database (WAHID); generated graphs displaying the production associated with selected "Top 10" aquaculture producing countries and the disease outbreaks from 2007-2010 based on the above data; generated maps displaying global distribution of selected OIE-listed aquatic animal diseases for incorporation to presentations given at side events during the 30th Session of the Committee on Fisheries (COFI 30); provided feedback on the Aquatic Animal Pathogen and Quarantine Information System (AAPQIS) and detailed recommendations for updating the website; summarized, reviewed and evaluated FAO's financial investments in aquatic animal health from 2004 to 2011. He also had the opportunity to attend proceedings and side events of the FAO Committee on Fisheries (COFI) 30the session especially the agenda item on Decisions and Recommendations of the COFI Sub-Committee on Aquaculture. He spent time with individual FIRA and other FI officers and gained global aquaculture experience through interaction with FAO experts and specialists. Additional activities included participation in the daily global disease tracking seminar (GLEWS) organized by the Animal Health group of FAO; attendance to the proceedings and side events of the 35th Session of the Codex Alimentarius Commission and met delegates from various countries; active participation in the Volunteer/Intern Organization of FAO (VIFAO), attended a trip to Pompei, various organized meals and social gatherings and cultural discussions and participation in formal and informal meetings with volunteers, interns, and other FAO employees from various countries working in departments throughout the organization. At the end of the volunteer/internship period, he made two presentations to the Fisheries and Aquaculture Department and to the GLEWS group.

In his evaluation of his assignment at FAO, Stephen appreciated his "... exposure to the many different aspects of FAO and its involvement in fisheries, aquaculture, and aquatic animal health. I was very fortunate to attend COFI during my assignment which, along with the rest of my assignment, strengthened my awareness of the global aquaculture industry...

The experience greatly increased my understanding of aquatic animal diseases and the vital importance biosecurity and risk analysis plays in the preventive health of aquatic animals".

The Aquaculture Group wishes Stephen a successful completion of his degree on Veterinary Medicine in May 2013 and sends our support and encouragement for his future plan of continuing his career as an aquatic veterinarian.

Jonathan van Senten (Netherlands)
Intern

Jonathan van Senten, a citizen of the Netherlands, and a recent graduate of the University of Miami Rosenstiel School of Marine and Atmospheric Science Marine Affairs and Policy Aquaculture programme, served as a volunteer intern with the Aquaculture Service (FIRA) under the guidance of Dr Doris Soto from August to November of 2012. During his time at FAO, Jonathan worked and collaborated with FAO officers and staff on several projects. Chiefly, the preparation and finalization of the Code of Conduct for Responsible Fisheries (CCRF) new Aquaculture Questionnaire; a critical tool in assessing progress and compliance of member countries with the Code for reporting to COFI SCA and COFI. As a part of this undertaking Jonathan became very familiar with COFI publications and the history and development of the CCRF.

Jonathan significantly contributed to the improvement of the FAO publications links and the formatting of the final version of the Questionnaire. Next to this task, Jonathan also initiated a table top study on the impact of climate change on bivalve mariculture, after having

identified key production sites and production values from around the globe using both FAO data and other recognized scientific publications. Jonathan has expressed his interest and willingness to continue his collaboration with the FIRA service in the near future.

Jonathan was very pleased with his experience at FIRA, and was very appreciative of the opportunity to work alongside and learn from the policy-makers and officers at FAO. He hopes to apply what he has learned at FAO to his future career, and continue to grow his understanding of global quaculture policy and development while undertaking an active role in the industry.

Ms Shin Bohye (South Korea)
Intern

Ms Shin Bohye, a DVM candidate at the Chungbuk University, South Korea, was a volunteer intern from 6 August to 7 September 2012, at the Aquaculture Service (FIRA) under the overall supervision of Dr Rohana P. Subasinghe, Senior Aquaculture Officer, and under the direct supervision of Dr Melba B. Reantaso (Aquaculture Officer – Aquatic Animal Health). Prior to coming to FAO, Shin was a global officer of the International Veterinary Student's Association and also did a volunteer job as assistance at the National Veterinary Research and Quarantine Service. Her earnest desire to be exposed to the mission and activities of an international organization such as FAO has lead her to this volunteer work. During her one month stay at FAO, she was engaged in the following activities:

- Completing the aquatic animal health performance and capacity survey in Korea survey questionnaires;
- Literature search on diseases reported from Korean scientific literature; and
- Participation in the daily 15 min global disease (including aquatic diseases) tracking seminar (from 08.45-09.00 hrs) organized by the Animal Health group of FAO.

Ms Lisa Mertens (Germany)
Intern

Ms Lisa Mertens, a German national, joined the Aquaculture Service (FIRA) at FAO headquarters in Rome as an intern from January to June 2013. She has earned a Bachelor of Science and a Master of Science in Marine Biology (specialized in aquatic genetics and marine management) from the University of Bremen, Germany.

Lisa has researched independently for five months in Israel on coral physiology performance at the Interstate University Institute in Eilat (2010). Moreover, she worked for seven months in South Africa at the University of Stellenbosch to complete her Master thesis on marine gene flow, population genetics and marine protected area planning (2012).

Her activities for FAO are covered by a Leonardo-Da-Vinci-Scholarship from the European Commission. Lisa published a web-portal and a blog in early 2013 to inspire students from Germany, Austria and Switzerland to pursue a career in the marine sciences:
http://www.meeresbiologie-studieren.de

Lisa will contribute in FIRA to advancements regarding the global Database on Introductions of Aquatic Species (DIAS), and will also assist with preparatory activities concerning farmed aquatic species and the 15th Session of the Commission on Genetic Resources for Food and Agriculture.

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Hasan, M.R. 2012. Transition from low-value fish to compound feeds in marine cage farming in Asia. *FAO Fisheries and Aquaculture Technical Paper* No. 573. Rome, FAO. 198 pp.

This technical paper presents the findings of an FAO Regional Technical Cooperation Project on the use of trash fish/low-value fish and pellets as feed for marine cage farming. Implemented in China, Indonesia, Thailand and Viet Nam, its components included a farmers' participatory on-farm trials and a concurrent survey of farmers' perceptions concerning the use of trash fish/low-value fish and pellet feeds and microcredit, environmental impact assessments of the use of two feed types, and a survey of the potential impacts of a change to pellet feeds on livelihoods of fishers and suppliers of trash fish. There were indications of benefits to farmers and the environment of adopting pellet feeds. Improving feed management can boost technical and economic performance from pellet feeds. The recommendations include providing the opportunities and enabling farmers to translate their positive attitude into sustained adoption of pellet feeds. Enablers include reasonable credit facility, species- and growth-stage-specific feed, farmers being associated and sound technical advice. Farmers requested a standardized better management practice guide in cage mariculture. Losing the cage culture industry as their direct market would have minimal impact on the livelihood of fishers and fish suppliers; they have robust coping mechanisms that policy and technical assistance from government could strengthen.

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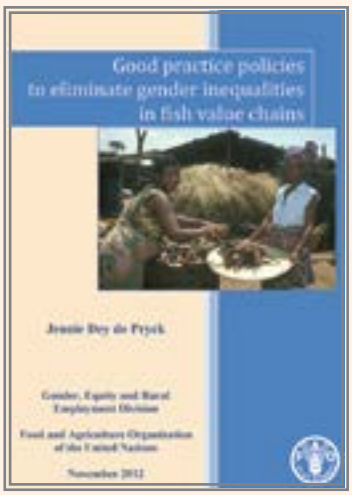


Dey de Pryck, J. 2012. Good practice policies to eliminate gender inequalities in fish value chains. Rome, FAO. 125 pp.

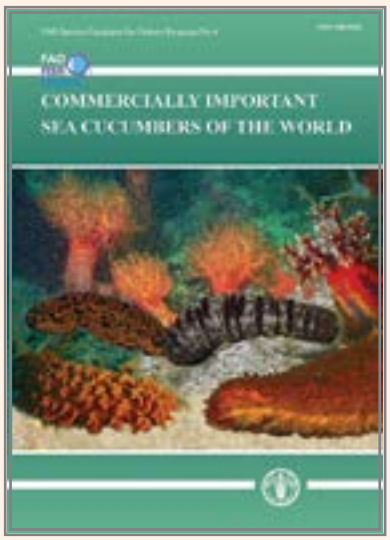
The purpose of this paper is to highlight some key gender inequalities in fisheries and aquaculture value chains and to convince policy makers of the benefits of reducing gender inequalities in the sector.

Based on critical analysis of existing literature with focus on both developing and developed countries the paper echoes the innovative analytical approach taken by FAO's flagship publication *The State of Food and Agriculture 2010-11: Women in Agriculture,* which demonstrated how much food security has to gain from a gender equitable access to productive resources and services.

A major finding of the paper is that fisheries laws, policies, and programmes often reinforce existing gender inequalities. If women and men could equally access to fisheries resources and services their productivity and production would increase to the benefit of their livelihoods but also the fisheries sector at large.

To achieve progress, there is a need for better gender-disaggregated data and actionable indicators to inform future policies and programmes and for more in-depth research on complex gender issues that have varying inter-related socio-cultural dimensions.

This paper was developed by Jennie Dey de Pryck, senior consultant with the Gender, Equity and Rural Employment Division, FAO, Rome, Italy. For further information, please contact libor.stloukal@fao.org or francesca.guarascio@fao.org



Purcell, S.W., Samyn, Y. & Conand, C. 2012. Commercially important sea cucumbers of the world. FAO Species Catalogue for Fishery Purposes. No. 6. Rome, FAO. 150 pp. 30 colour plates.

Sea cucumbers are harvested and traded in more than 70 countries worldwide. They are exploited in industrialized, semi-industrialized and artisanal fisheries in polar regions, temperate zones and throughout the tropics. In some fisheries, more than 20 species can be exploited. The processed animals are exported mostly to Asian markets and need to be distinguished to species level by customs and trade officers. This book is intended as an identification tool for fishery managers, scientists, trade officers and industry workers to distinguish various species exploited and traded worldwide. This book provides identification information on 58 species that are commonly exploited around the world. There are many other species that are exploited either in a small number of localities or in relatively small quantities, which are not presented. Two-page identification sheets provide information to allow readers to distinguish each species from other similar species, both in the live and processed (dried) forms. Where available, the following information for each species has been included: nomenclature together with known common names; scientific illustrations of the body and ossicles; descriptions of ossicles present in different body parts; a colour photograph of live and dried specimens; basic information on size, habitat, biology, fisheries, human consumption, market value and trade; geographic distribution maps.

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Piccolotti, F. & Lovatelli, A. 2012. Assemblage et installation de cages hexagonales en bois pour l'élevage de poissons. Un manuel technique. *FAO Document technique sur les pêches et l'aquaculture* No. 576. Rome, FAO. 78 pp.

Ce document est un guide pratique qui fournit la liste et les détails techniques des matériaux à utiliser pour assembler une cage hexagonale en bois pour l'élevage de poissons, ainsi que son système d'amarrage, dans le cadre d'une aquaculture artisanale. Les instructions pour l'assemblage des différents composants sont illustrées en détail et les directives techniques pour l'installation sur le site d'élevage sont aussi décrites. Ce manuel propose également des indications pour s'orienter dans le choix du modèle de cage et des composants utilisés en fonction des caractéristiques du site (environnementales, logistiques et sociales). Les exigences physiologiques des espèces élevées et leur incidence sur les performances d'élevage ont été également évaluées dans le but de fournir le maximum d'informations nécessaires à la planification et à la mise en place d'une telle activité. Ce guide technique explique également qu'il est possible, à travers le modèle de cage illustré, d'exploiter des milieux plus turbulents que ceux où l'aquaculture artisanale opère traditionnellement. Des renseignements complémentaires sur les thèmes traités dans le texte sont disponibles dans les annexes.

The manual can be downloaded from the following web link: http://www.fao.org/docrep/017/i3091f/i3091f.pdf

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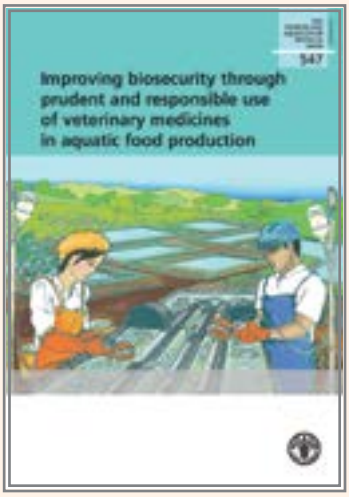

Bondad-Reantaso, M.G., Arthur, J.R. & Subasinghe, R.P., eds. 2012. Improving biosecurity through prudent and responsible use of veterinary medicines in aquatic food production. *FAO Fisheries and Aquaculture Technical Paper.* No. 547. Rome, FAO. 207 pp.

Traditionally, the threats to aquaculture posed by aquatic pathogens have been addressed through the use of antimicrobials, including chemotherapeutants, disinfectants, antibiotics and vaccines. However, the inappropriate use of antimicrobials can lead to problems related to increased frequency of bacterial resistance, with negative impacts on the efficacy of these agents to control infectious diseases in aquaculture and the potential transfer of resistance genes in bacteria from the aquatic environment to other bacteria and the possibility of resistance extending to human pathogens. Injudicious use of antimicrobials has also resulted in the occurrence of their residues in aquaculture products, resulting in commodity bans by importing countries and associated economic impacts. This publication contains the proceedings of and the technical papers contributed to the FAO/AAHRI Expert Workshop on Improving Biosecurity through Prudent and Responsible Use of Veterinary Medicines in Aquatic Food Production was convened in Bangkok, Thailand, from 15 to 18 December 2009. The workshop concluded that safe and effective veterinary medicines need to be available for efficient aquaculture production. Their use should be in line with established principles on prudent use to safeguard public and animal health and should be part of national and on-farm biosecurity plans and in accordance with an overall national policy for sustainable aquaculture.

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FAO. 2012. Report of FAO/SPC Regional Scoping Workshop: Development of a Pacific Aquaculture Regional Cooperative Programme. Nadi, Fiji. 11-14 October 2011. *FAO Fisheries and Aquaculture Report* No. 1023. Rome. 50 pp.

The FAO/SPC Regional Scoping Workshop: Development of a Pacific Aquaculture Regional Cooperative Programme held from 11 to 14 October 2011 in Nadi, Fiji was convened to engage high level discussions between national governments and international development partner organizations on the need to provide more attention to aquaculture development to small island developing states including the Pacific Island Countries and Territories (PICTs).

Fifty five experts representing 17 PICTs, representatives from the private sector, eight international and regional institutions, and SPC and FAO staff participated in this regional scoping workshop whose overall objective was to assess the needs and map out a coordinating strategy and actions for the development of aquaculture in the Pacific region. To this end, a Pacific Regional Aquaculture Strategy was drafted with a vision of a sustainable aquaculture sector that meets food security and livelihood requirements based on economically viable enterprises supported by enabling governance arrangements.

The overall outcomes of the strategy are envisioned to include: (1) successful, competitive and biosecure aquaculture enterprises, using and adapting proven technologies to meet local requirements (technical, social and environmental); (2) recognition of the actual and potential contributions of the aquaculture sector towards regional livelihoods and food security (in response to the pressures of population growth, depleted/overfished inshore fisheries resources and climate change); and (3) framework for aquaculture development that builds cooperation among PICT government aquaculture institutions, national, regional and international agencies, farmer groups/associations, and other stakeholders.

To meet these objectives, the strategy proposes six broad programme elements including biosecurity, capacity building, feasibility assessment, statistics and data, markets and trade and technology transfer and improvement.

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FAO Aquaculture Newsletter

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FAN 48, December 2011

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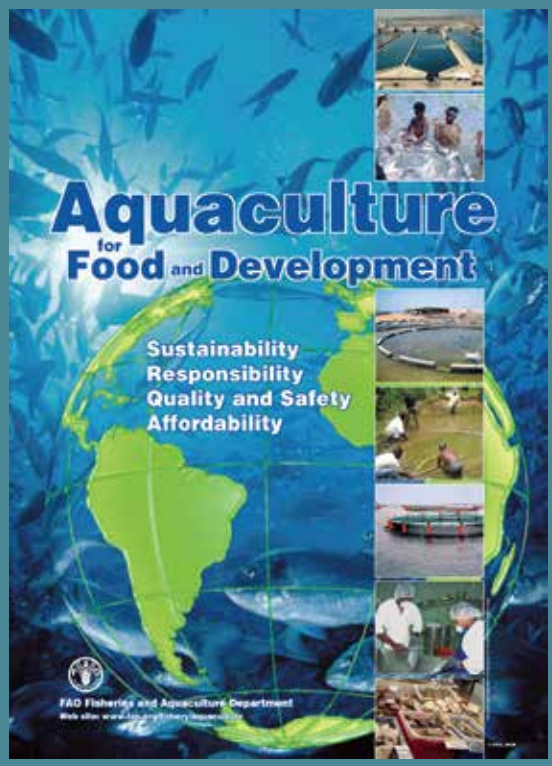

The FAO Aquaculture Newsletter (FAN) is issued two to three times a year by the Aquaculture Service (FIRA) of the FAO Fisheries and Aquaculture Department, Rome, Italy. It presents articles and views from the FAO aquaculture programme and discusses various aspects of aquaculture as seen from the perspective of both headquarters and the field programme. Articles are contributed by FAO staff from within and outside the Fisheries and Aquaculture Department, from FAO regional offices and field projects, by FAO consultants and, occasionally, by invitation from other sources. FAN is distributed free of charge to various institutions, scientists, planners and managers in member countries and has a current circulation of about 1 300 copies.
It is also available on the FAO Web page:
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