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International Symposium on Small-scale Freshwater Aquaculture Extension, 2-5 December, Bangkok

The Japan International Cooperation Agency (JICA), NACA and the Thai Department of Fisheries convened an International Symposium on Small-scale Freshwater Aquaculture Extension in Bangkok, from 2-5 December 2013 at the Centara Grand Hotel Ladprao.

The objective of the symposium was to bring together stakeholders from JICA-assisted projects to share experiences and lessons learned, and particularly to evaluate the effectiveness of "farmer-to-farmer" extension approaches in rural aquaculture. The symposium brought together 81 stakeholders from 12 countries working on development projects in Cambodia, Lao PDR, Myanmar, Benin and Madagascar as well as key development partners including the FAO Regional Office for Asia and the Pacific, SEAFDEC, the Asian Institute of Technology and the Thailand International Development Cooperation Agency.

Small-scale freshwater aquaculture has a long history in the region and has provided diverse benefits to rural farmers including income generation and nutritional improvement, while integrated farming systems have also offered improved sustainability. However, improvements to practices and technology are still required and in many cases have not yet reached or been disseminated to many small-scale farmers. The lack of access by many small-scale farmers to simple, existing technologies on seed production and grow out practices has hindered aquaculture development and the benefits therefrom.

The symposium found that JICA's "farmer-to-farmer" approach to extension has been an effective way to transfer technologies and improved management practices to small-scale farmers. The advantage of this approach is the exposure and training is conducted by experienced "core" farmers, who have practical knowledge in the application of these technologies, which they have tested themselves. The technology extension, moreover, is conducted in the farmers own dialect and based totally on local resources which can be easily accessed by the farmers.

The farmer-to-farmer approach can be initiated by proper training of selected core farmers, who apply the technology to increase their own aquaculture production and augment family income. This system not only provides economic benefit to the core farmers but also enhances their social role as local leaders and extension workers, although it should be noted that careful selection of core farmers is critical to success. Once the core farmers are trained and established, they share their experience with other selected farmers who are willing to try it for themselves. This process will continue

Participants in the symposium.

from one farmer to another, thus benefiting many rural farmers and helping them to at least improve their production or profitability from their small-scale holdings.

Farmers that had voluntarily participated in or experienced the JICA projects from the above-mentioned countries shared their experiences at the symposium. From initially having a few tanks or ponds for their culture operations, most had managed to gradually expand their facilities and production, often going on to supply fingerlings to other local farmers (usually to the ones they trained through farmer-to-farmer approach) and sell part of their harvest for additional income. Their willingness to train other farmers in their community and to share their experiences with others was also a contributing factor in the overall improvement of the local fish production within the local area or even at neighbouring villages or communes.

In some cases, local farmers that were trained by core farmers became core farmers themselves, going on to train and extend assistance to others. Despite some problems that have been encountered in the implementation of this approach (e.g. criteria for initial selection of core farmers; willingness of voluntary farmers to join the program), results obtained from the implemented JICA projects in some countries in the region indicate the effectiveness of the approach in ensuring continuity of technology extension from one farmer to another.

By and large, results of the farmer-to-farmer approaches of technology extension in small-scale freshwater aquaculture can be potentially be applied to other small-scale aquaculture systems (e.g. brackishwater and marine). The symposium recommended that a Guidebook on Farmer-to Farmer Extension Approaches on basic aquaculture technologies be developed, based on the outcomes of the JICA projects. This guidebook will then be used to develop a Regional Training Course module, to train prospective core farmers involved in small-scale aquaculture (freshwater or marine) who are willing to extend assistance to other local farmers using this approach.

Audio and video recordings of the technical presentations from the workshop, including discussion group conclusions, plus the workshop programme are available for download or online viewing from the NACA website at the link below. The report of the workshop will also be made available for download shortly:

http://www.enaca.org/modules/podcast/programme.php?programme_id=13

12th Meeting of the Asia Regional Advisory Group on Aquatic Animal Health

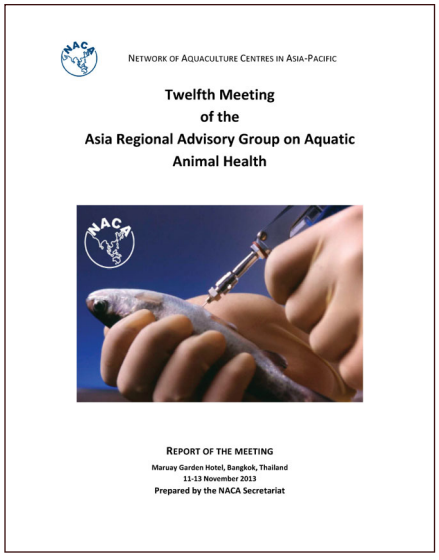
The 12th meeting of the Asia Regional Advisory Group on Aquatic Animal Health was held at the Maruay Garden Hotel, Bangkok, Thailand from 11-13 November 2013.

The Advisory Group was established by the Governing Council of the Network of Aquaculture Centres in Asia-Pacific (NACA) to provide advice to NACA members in the Asia-Pacific region on aquatic animal health management, through the following activities: (a) evaluate disease trends and emerging threats in the region; (b) identify developments with global aquatic animal disease issues and standards of importance to the region; (c) review and evaluate the Quarterly Aquatic Animal Disease reporting programme and assess the list of diseases of regional concern; (d) provide guidance and leadership on regional strategies to improving management of aquatic animal health including those under the framework of the Asia Regional Technical Guidelines; (e) monitor and evaluate progress on Technical Guidelines implementation; (f) facilitate coordination and communication of progress on regional aquatic animal health programmes; (g) advise in identification and designation of regional aquatic animal health resources, as Regional Resource Experts (RRE), Regional Resource Centres (RRC) and Regional Reference Laboratories (RRL); and (h) identify issues of relevance to the region that require depth review and propose appropriate actions needed. Members of the Advisory Group include invited aquatic animal disease experts, World Animal Health Organization (OIE), Food and Agricultural Organization of the United Nations (FAO) and collaborating regional organisations.

The report of the meeting includes details of discussions concerning OIE standards and global issues; a review of the regional disease status, reports on aquatic animal health programmes from partner agencies; discussion of disease reporting; and implementation of the FAO/NACA Technical Guidelines on Responsible Movement of Live Aquatic Animals.

The report is available for download from the NACA website at the link below.

http://www.enaca.org/modules/library/publication.php?publication_id=1132



National Workshop on EMS/AHPND of Cultured Shrimp held in India

A national workshop on acute hepatopancreatic necrosis disease (AHPND) of shrimp, also commonly referred to as EMS, was convened in Chennai, India from 20-21 January 2014. The meeting was opened with messages from Dr Yadava (Bay of Bengal Programme IGO), Dr Raja Sekhar Vundru (Joint Secretary of Fisheries), Dr P. Ravichandran and Dr Eduardo Leano (NACA Aquatic Animal Health Programme Coordinator).

The workshop commenced with an overiew of AHPND, followed by a presentation on the status of this disease in Thailand. Dr Siripong Thitamadee presented the progress of AHPND research in Mahidol University with emphasis on the PCR kit that they have developed in collaboration with researchers from Taiwan Province of China. Dr Loc Tran presented on diagnostics and status in Vietnam.

Dr Oliver Decamp of Inve gave a keynote presentation on Prevention and Management of EMS/AHPND from Other Asian Countries, and Dr Indrani Karunasagar of the Magalore College of Fisheries gave a keynote presentation on *Vibrio parahaemolyticus* and *harveyi* clade – so common, so complex. A discussion group session was held with the theme "contingency planning for emerging diseases".

The workshop was attended by around 70 people representing key government organisations and research institutions in India and the private sector including the Society of Aquaculture Professionals, Marine Technologies, All India Shrimp Hatchery Association, Waterbase Ltd., Growel Feeds Ltd. And the Prawn Farmers Federation of India. The proceedings of the workshop will be released in due course.

Participants in the national EMS/AHPND workshop.

www.enaca.org

Report on early mortality syndrome / acute hepatopancreatic necrosis syndrome of shrimp

A new FAO Fisheries and Aquaculture Report, Early Mortality Syndrome (EMS) or Acute Hepatopancreatic Necrosis Syndrome (AHPNS) of Cultured Shrimp, focuses on this emerging disease that has devastated the shrimp industry of China, Malaysia, Thailand and Viet Nam over the last three years.

FAO project TCP/VIE/3304 "Emergency assistance to control the spread of an unknown disease affecting shrimps in Viet Nam", implemented by Viet Nam's Ministry of Agriculture and Rural Development, organised an FAO/MARD Technical Workshop on EMS/AHPNS last June.

Sixty-three participating international experts and local stakeholders from the shrimp farming sector discussed the outcomes of the work carried out under the TCP project and the current state of knowledge on EMS/AHPNS in the affected countries. The Workshop agreed on a list of specific and generic actions and measures that may help reduce and manage the risks of EMS/AHPNS, directed to various shrimp stakeholders (public and private sectors).

The report is available for free download from FAO website at:

http://www.fao.org/docrep/018/i3422e/i3422e.pdf

Sustaining Ethical Aquaculture Trade Newsletter

The November Newsletter of the Sustaining Ethical Aquaculture Trade Project (SEAT) is available! This issue covers the debate over aquaculture certification, how non-filltet fish products are used and valued in Europe and Asia, the benefits of transdisciplinary research and how management measures have reduced parasite risks in Thailand and China. To access the newsletter, please visit:

http://seatglobal.eu/news-november2013/

India and the AFSPAN Project

Vishnu Baht, Department of Animal Husbandry, Dairying and Fisheries

To provide food to a world population expected to surpass 9 billion in 2050, it has been estimated that agricultural output, originating primarily from crops, livestock and fisheries, including aquaculture, must increase by 70%. Meeting this target is a formidable challenge for the international community considering that an alarming number of people, currently around one billion, or one-seventh of humanity, presently suffer from hunger and poverty. Finding opportunities to alleviate poverty and increase food security through agriculture is vital and timely.

The contribution of aquaculture to food security, nutrition, employment creation, income generation and women's empowerment is significant, globally, and must be enhanced. However, it is recognised that the current knowledge and understanding of aquaculture's contribution to human development is inadequate and that better tools, and more systematic and quantitative assessments are needed to improve the current knowledge and information base. Better understanding of this contribution is expected to assist low-income food-deficit countries and development partners to develop and implement sustainable policies, strategies and plans for improving the livelihoods of millions of poor people.

The AFSPAN Project is an initiative to better understand the current status of the contribution of aquaculture to food and nutrition security and poverty alleviation. In particular, the project will:

- Review the current knowledge on the contribution of aquaculture to food and nutrition security and poverty alleviation.
- Develop methodologies for better assessment of this contribution.
- Disseminate widely among countries, governments and civil society, the knowledge gained.
- Elaborate strategies for improving the contribution of aquaculture to food security, nutrition and poverty alleviation.

India is the second largest global fish producer after China in terms of aquaculture production. The present annual production from freshwater and brackish water aquaculture in India is estimated to be around 4.18 million tonnes and 0.25 million tonnes, respectively. Indian aquaculture has come a long way from being a traditional subsistence-level activity to a predominantly commercial enterprise in recent years, and plays a significant role as a source of food and nutritional security, poverty alleviation and overall rural development.

With diverse resources ranging from deep seas to lakes in the mountains and more than 10% of the global biodiversity in terms of fish and shellfish species, India has shown continuous and sustained increments in aquaculture production in recent years. The present scenario is that freshwater aquaculture, notably carp culture, is witnessing considerable growth with minor contributions from catfish and freshwater prawns. Similarly, the export-oriented shrimp aquaculture in coastal areas has also been growing in a rapid way.

Freshwater aquaculture, which represents about 84% of India's total production by volume, is the mainstay of Indian fisheries and aquaculture. Much of this contribution is from Indian major carps farmed through pond culture or raised in freshwater tanks and other water bodies. In fact, in India, the aquaculture sector started as a subsistence fishery amongst small and marginal farmers, subsequently, owing to export demand and other commercial gains, coastal aquaculture developed on a commercial scale with the involvement of enterprising entrepreneurs. Nevertheless, the aquaculture sector is dominated by small and marginal farmers who represent more than 90% of the industry, considering the farm holding and the number of farmers involved. Most of them are resource poor in terms of skills, financial capacity and other technical aspects.

About 40% of the available pond and tank resource of 2.36 million hectares is underutilised and the mean national pond productivity has remained at about 2.9 tonnes per hectare per year, despite production levels of 6-8 tonnes being realised by farmers in some parts of the country. This indicates vast scope for enhancement both by horizontal and vertical expansion of freshwater aquaculture. Shrimp aquaculture in coastal areas witnessed substantial growth during the early nineties with production levels reaching 140,000 metric tonnes during the beginning of this decade. However, on account of disease, the production level during 2008-09 declined to about 88,000 tonnes. Coastal brackishwater aquaculture is now on path to revival with the introduction of exotic SPF shrimp L. vannamei.

In India, fish is a very rich and cheap protein source that can be afforded by the common people. Domestic demand for fish in India is growing rapidly due to increased availability of fish, economic growth, rising population, shift in dietary patterns, tastes and preferences for high protein and nutritional content foods. The increase in supply will make fish more readily available to consumers at a cheaper price, which will in turn likely increase fish consumption. In fact, as per an estimate the domestic demand for fish is likely to grow at an annual rate of 2.5% between 2000 and 2020. The domestic demand for fish is likely to grow to around 8.46 million tonnes in 2020. The annual per capita fish consumption at national level is projected to grow from 5.6 kg in 2011 to 6.3 kg. in 2020. Thus, for meeting the future additional fish demand the aquaculture sector is key, given the stagnation of capture fishery resources. Aquaculture output is likely to grow at about 6-7% per annum and the higher share of aquaculture in total output of fish has been projected to rise from 52% in the year 2000 to 61% in the year 2020. Among aquaculture species, the Indian major carps and shrimp will emerge as great opportunities for the future fish supply scenario in India. The government has also given much emphasis on the creation of an additional supply of protein through the National Mission on Protein Supplements, in which aquaculture has found a prime place.

Aquaculture has long been seen as an important source of food fish for the masses. It has also been contributing substantially to economic growth as well as human welfare, considering its support to livelihood activities for a large section of the underprivileged population of India. Therefore, in the present context, and with the emphasis on sustainability, the objectives put forth in the AFSPAN serve as an impetus to ameliorate the socio-economic status of the small and marginal aqua farmers. The project thereby assists the country in identifying thrust areas for meeting the requirements of small and marginal aqua farmers and for taking forward the overall aquaculture sector.

The AFSPAN Project is considered in the positive thinking of the Government to be giving an edge to country's vision of fisheries development and management programmes, which aim to improve the sustainable production of food fish, contributing to food security and amelioration of the socio-economic conditions of the population.

For more information about AFSPAN visit www.afspan.eu.

Report on AFSPAN Chilean survey

The AFSPAN survey in Chile was conducted by a team of five young research assistants between 11 April to 6 May. They were able to interview 126 aquaculture centre managers and 122 households in three coastal regions (Coquimbo Region, The Lakes Region and Atacama Region) covering 34 localities and approximately 3,500 km of territory by land, plus inter-regional travel by air. Before starting their actual work the survey team underwent a two week training period including trial interviews in the Valparaiso Region, home of the Pontificia Universidad Católica de Valparaíso.

Coquimbo Region

The team began their survey in Tongoy, a typical coastal village in Coquimbo Region, located 375 km north of Valparaiso. Tongoy has a semi-arid climate, with a current population of around 9,000 people, approximately 60% of whom are engaged either in fisheries or aquaculture activities.

Aquaculture in Tongoy is mainly scallop farming (Argopecten purpuratus), raised from seed to market size individuals. Seed collection is a critical activity. Sixteen interviews were conducted in Tongoy covering small, medium and large producers. In addition, sixteen interviews were conducted with households involved inscallop aquaculture. Surveys were conducted in this locality over two and a half days, before returning to Valparaíso by land.

Port of Caldera.

Small-scale scallop producer in Caldera-Bahia Inglesa.

The Lakes Region

On 14 April the team flew down-south to Puerto Montt city in the Lakes Region around 1,100 km south of Valparaiso, in order to survey the most important aquaculture area of Chile, covering territory from south of Puerto Montt city, the capital of the region, to the southern tip of Chiloe Island. Target aquaculture activities for this part of the survey were salmonid aquaculture, including Atlantic salmon (*Salmo salar)*, Rainbow trout (*Oncorhynchus mykiss)* and Pacific salmon (*Oncorhynchus kisutch*); Chilean mussel (*Mytilus chilensis*) and pelillo algae (*Gracilaria chilensis*).

The team deployed first in Chiloe, an island some 180 km long and 50 km wide, which is part of the last portion of the coastal cordillera running north-south almost all along the country, divided into ten municipalities. The island and the entire archipelago are characterised by its maritime and agricultural tradition and it is home to a rich culture combining catholic religion and local knowledge, beliefs andmythology.

The team conducted surveys in the following municipalities and localities: Ancud (Quetalmahue, Puente Quilo, Mar Brava, Caulín, Chacao, Manao, Linao, Doca, Hueldén, Pido and Hueihue), Quemchi (Quelquel, Quiquel, Calen and Rilan), Castro-Chonchi (Nercón, Curahue Puqueldón, Aldachildo),

Dalcahue-Quinchao (Dalcahue, Curaco de Velez, Chuyic, Achao, Castro Tutil, La Estancia) and Quellón (Huildad, Yaldad, Punta Lapa, Candelaria).

After 18 days of work the team was able to complete 31 salmon farm surveys, 30 salmon-related household surveys, 33 surveys for Chilean mussel farms and 31 related households, and 31 farms and 30 housholds involved with pelillo algae.

Atacama Region

On 2 May the team flew directly from Puerto Montt, Lakes Region, to Caldera in Atacama Region, some 850 km north from Valparaíso, the last of the areas to be surveyed. The coastal city of Caldera was founded in 1852 as a maritime hub for the mining activity based from Copiapo city some 100 km inland from the Port of Caldera. Today in addition to the port to export minerals and northern Chilean grapes, Caldera is an important vacation resort and the main centre for the fisheries and aquaculture activities conducted in the region. Caldera is home to northern scallop aquaculture (*Argopecten purpuratus*) as well as to some pelillo algae farming. After nearly four days the team had obtained 15 surveys from scallop farmers and another 15 from households engaged in this activity from Caldera and its surroundings (Calderilla and Bahía Inglesa).

Comments from the respondents

Most of the respondents for both surveys requested to be informed of the results of the survey data analysis and the conclusions reached by the project. The main reason for this was an interest in the solutions or actions that would be proposed which might help to improve their quality of life. The input provided by respondents was generally good, although many farm respondents indicated that information about labour, income and cost information was potentially sensitive.

The team

The survey team was led by Alondra Vega in close collaboration with Allan Gomez, both permanent assistants to this project and also comprised by Andrea Mendez, Carlos Molteni and Nelson Tapia. Felipe Hurtado and Ricardo Norambuena collaborated with contacts and itinerary planning.

Finally, we would like to congratulate and thank our survey team for a work well done!

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NACA is a network composed of 18 member governments in the Asia-Pacific Region.

Feeding and feed management of Indian major carps in Andhra Pradesh

This study reviews the aquaculture of Indian major carps, rohu (*Labeo rohita*), catla (*Catla catla*) and mrigal (*Cirrhinus cirrhosus*) with special reference to current feeding and feed management practices in Andhra Pradesh, India. The study is based on a survey of 106 farmers from four regions in Andhra Pradesh (Kolleru, Krishna, West Godavari, and Nellore). Kolleru and the surrounding districts of Krishna and West Godavari are the primary culture areas. In Nellore district, Indian major carp culture is practiced at a lower intensity to that practiced in Kolleru. In East Godavari district, Indian major carps are primarily cultured in polyculture systems with either black tiger shrimp (*Penaeus monodon*) or giant river prawns (*Macrobrachium rosenbergii*). While the study primarily focused on the feed management practices associated with Indian major carp production, management practices that are used under polyculture conditions with other species-groups were also assessed.

The study revealed that mash feed was the most popular and widely used feed type. De-oiled rice bran was used as the principal feed ingredient, followed by groundnut cake and cottonseed cake. All the farmers reported using de-oiled rice bran, while 56 percent used groundnut cake, 40 percent used cottonseed cake, and 30 percent used raw rice bran and other mash feed ingredients. The poor quality of the mash feed ingredients, especially the de-oiled rice bran, groundnut cake, and cottonseed cake was an important issue of concern to the farmers. Commercially manufactured pelleted feeds were used by 33 percent of the farmers to complement their mash feeds, with the majority choosing to use sinking pellets. Since 2007, there has been a marked increase in the use of commercially manufactured aquafeeds, most notably for the large-scale production of the striped catfish (*Pangasianodon hypophthalmus*).

In the nursery and rearing ponds, the commonly used feed ingredients included groundnut cake, de-oiled rice bran and raw rice bran. The most common feeding practice was broadcast feeding. Rohu broodstock that were collected during the breeding season were fed in a similar manner to the fish in the grow-out production systems. Catla broodstock were segregated from the other culture species, and fed a diet comprising soybean cake, dried fish, and a mineral mixture. Constraints to Indian major carp production were identified, and research and development needs characterised. This publication may be downloaded for free from the FAO website at:

http://www.fao.org/docrep/019/i3146e/i3146e.pdf