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Expert Workshop on Inland Fisheries Resource Enhancement and Conservation in Asia

Participants in the workshop at Pattaya, Thailand.

Over the past few decades inland fisheries resources have come under increasing pressure from water engineering projects, pollution and overfishing. This has lead to an alarming decline in the natural populations of many important inland fish species in Asian countries, with implications for the economic welfare and nutrition of millions of people that are dependant on these resources, for the environment, and also for the aquaculture industry that depends on the genetic resource base.

Regional collaborative efforts are required to facilitate assessment of current inland fisheries resource enhancement and conservation practices, and there are transboundary coordination issues for countries that share rivers.

FAO and NACA convened an expert workshop to review inland fisheries resource enhancement and conservation practices in Pattaya, Thailand, 8-11 February. Experts from 10 Asian countries attended the meeting to share experiences and lessons learned. The papers and synthesis from the workshop will be published by FAO in due course, but in the meantime high-quality audio recordings of the workshop presentations are available for download from the NACA website in MP3 format. You can also stream them from our server if you prefer to listen to them online.

Country presentations on inland fisheries enhancement and conservation practices are available for Bangladesh, China, India, Indonesia, Republic of Korea, Myanmar, Nepal, Sri Lanka, Thailand and Vietnam. To download / listen to the presentations, please visit:

http://www.enaca.org/modules/news/article.php?storyid=1867

The Secretariat is pleased to announce that NACA will be offering audio recordings of key technical presentations for free download as a matter of course from now on, to increase the accessibility of this material throughout the region. A 'podcasting' feed is also in development.

Reviews in Aquaculture: Special issue on the Use and Exchange of Aquatic Genetic Resources

The new journal 'Reviews in Aquaculture' has published a special issue on the use and exchange of genetic resources of cultured aquatic animals and the articles are available for free download.

The papers in this issue are the result of a consultation NACA facilitated on behalf of the Commission on Genetic Resources for Food and Agriculture (CGRFA) of FAO, which was conducted in April 2009, in Chonburi, Thailand.

The issue also contains a synthesis paper on aquatic genetic resources that was tabled at the twelfth regular session of the CGRFA in October, 2009, Rome.

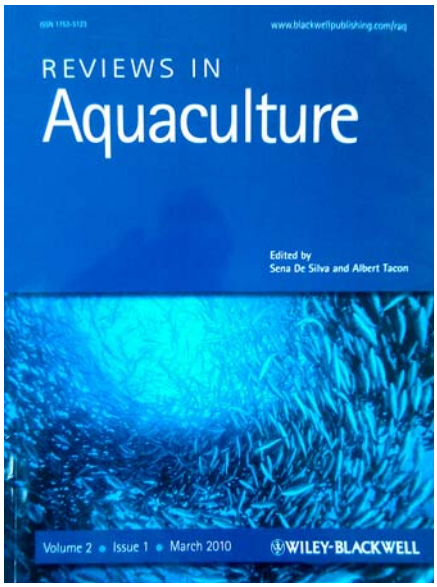
This is the first time that aquatic genetic resources have been included in the portfolio of the Commission, giving recognition of the growing importance of the sector for sustainable food production. Contents of this issue include (PDF articles):

- Editorial - Use and exchange of aquatic genetic resources in aquaculture: information relevant to access and benefit sharing
- Use and exchange of aquatic resources relevant for food and aquaculture: common carp (*Cyprinus carpio* L.)
- Use and exchange of salmonid genetic resources relevant for food and aquaculture
- Use and exchange of genetic resources of Nile tilapia (*Oreochromis niloticus*)
- Use and exchange of aquatic genetic resources for food and aquaculture: *Clarias* catfish
- Patterns of use and exchange of genetic resources of the striped catfish *Pangasianodon hypophthalmus* (Sauvage 1878)
- Use and exchange of genetic resources of penaeid shrimps for food and aquaculture
- Use and exchange of genetic resources in molluscan aquaculture
- Use and exchange of genetic resources of emerging species for aquaculture and other purposes
- Chinese abstracts

The issue may be accessed / downloaded from:

http://www.wiley.com/bw/journal.asp?ref=1753-5123

Other issues of Reviews in Aquaculture are also being made available for free download during the journal's start up phase, so keep an eye out for more to come.



Dr Ayyappan becomes the Director General of ICAR

Dr S. Ayyappan has been appointed to the post of Director General of the Indian Council of Agricultural Research (ICAR), with effect from 1 January 2010. With this appointment. Dr Ayyappan also becomes the Secretary of the Department of Agriculture Research and Education (DARE).

ICAR, one of the largest R&D institutions dedicated to agricultural research has 5,000 scientists working in 45 institutes, 17 National Research Centres, 4 Deemed Universities, 6 National Bureaus, 25 Directorates and Project Directorates, 569 Krishi Vigyan Kendras, 44 state agricultural universities across the country and one Central Agricultural University at Manipur.

Dr Ayyappan obtained his B.F.Sc and M.F.Sc degrees from College of Fisheries, Mangalore and PhD from Bangalore University. In his distinguished career of over 30 years, he has headed two ICAR institutions namely CIFA and CIFE, before becoming the Deputy Director General of Fisheries in ICAR in 2002. He is a well known scientist and has contributed immensely to the development of fisheries and aquaculture in India.

Dr Ayyappan is well known to the NACA family of 18 governments in Asia Pacific. He has served NACA as its TAC and GC member for several years. NACA is very pleased and proud that a fisheries scientist has reached the highest position in the ICAR system in a big country like India. On behalf of member countries, NACA Secretariat wishes Dr Ayyappan all the best in his future endeavours.

CIBA training course - capacity building on entrepreneurship development in coastal aquaculture

Coastal Aquaculture inter-alia offers scope for a variety of entrepreneurial activities that can generate value or contribute to the economy, such as identifying and exploiting new species, processes or markets. Identifying potential entrepreneurs and giving them an enabling environment is the role of government and other development departments that seek to support entrepreneurship in coastal aquaculture. To take initiative in this direction, the Central Institute of Brackishwater Aquaculture (CIBA) of the Indian Council of Agricultural Research (ICAR) conducted a national level training course on 'Entrepreneurship Development in Coastal Aquaculture' from 26-31 October 2009 at its campus in Chennai, with funding support from the National Fisheries Development Board. Twenty five participants comprised of three main groups (i) officials from the Departments of Fisheries of various maritime states, (ii) personnel from non-governmental organisations and (iii) potential entrepreneurs participated in the training course.

Training at a crab hatchery.

Entrepreneurial avenues in seven areas of coastal aquaculture sector were identified and included in the training module. The seven areas were: Seed production of shrimp, crab and finfish; farming of shrimp/ prawn and finfish; ornamental fish farming; shrimp and finfish feed production; disease diagnostics & analytical services; domestic fish marketing and ICT aided technical and marketing consultancy.

Training at a fish hatchery.

Identifying and developing new products, processes and markets were given emphasis in the training course. The training adopted a tripartite learning approach. The first technical part of the module dealt with the technical aspects of the entrepreneurial activity providing scientific aspects of the enterprise, the second economic part dealt with project preparation for credit support with economics principles and bankers' perspective and the final enabling part provided the institutional support available in the form of capacity building and technical consultancy, promotional schemes, regulatory guidelines, success stories and interactive sessions with bankers, promotional agencies and entrepreneurs and field visit to various entrepreneurial units/enterprises. The trainees indicated in their feedback that the approach taken was very useful in combining technical, economic and institutional aspects of learning and expressed that the course was an exciting experience. The government officials and the NGOs felt that the training had helped them to play a 'enabling role' in identifying and facilitating potential entrepreneurs. The potential entrepreneurs indicated that the training would help them to develop their own business enterprises in aquaculture.

Training at a shrimp farm.

Those who wish to participate in the training course dealing with entrepreneurship development in coastal brackishwater aquaculture may contact the Director, Central Institute of Brackishwater Aquaculture (ICAR), 75, Santhome High Road, R.A. Puram, Chennai-600028, India through e-mail to: director@ciba.res.in.

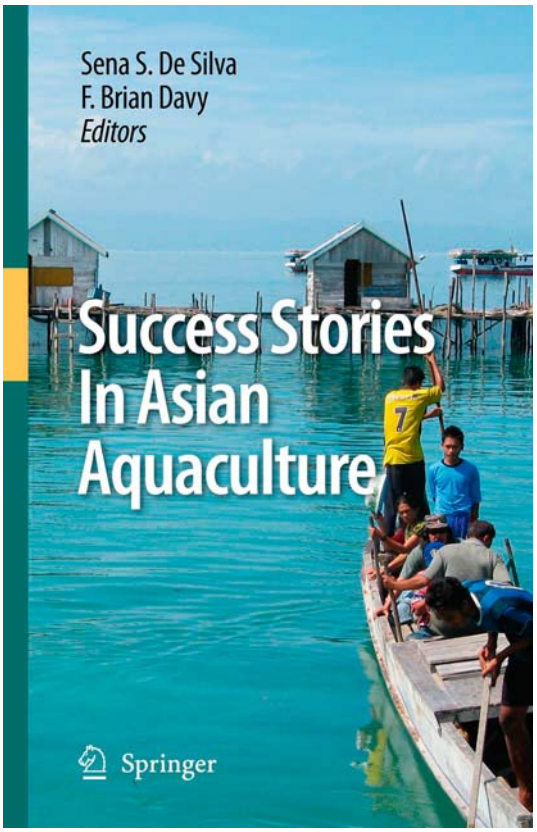
Success Stories in Asian Aquaculture – now available for free download!

We are pleased to announce that NACA's new flagship publication Success Stories in Asian Aquaculture is now available for free download from the NACA website, as foreshadowed in previous newsletters.

The stories in this book reflect the unique nature of Asian aquaculture, providing first-time insight into how and why it has become so successful. Overall, the book demonstrates how the resiliency, adaptability, and innovation of small-scale aquaculture farmers have been crucial to this success. It also places aquaculture development in Asia into a wider global context, and describes its relationship to natural systems, social conditions, and economics. The book is unique in its in-depth presentation of primary research on Asian aquaculture, and in demonstrating how aquaculture can have a lasting positive impact on livelihoods, food security, and sustainable development.

This book will appeal to a wide range of readers. The introduction and conclusion give an excellent general overview of Asian aquaculture, and the individual case studies provide a wealth of new information for specialist readers. Researchers, development workers, and decision-makers, in particular, will be interested in how the Asian experience might be used to strengthen aquaculture development more generally and in other parts of the developing tropics of Latin America and Africa.

Success stories in Asian Aquaculture is edited by by Sena S. De Silva, Director General of the Network of Aquaculture Centres in Asia-Pacific, and F. Brian Davy, Senior Fellow at the International Institute for Sustainable Development in Canada.



Download your free copy from:

http://www.enaca.org/modules/wfdownloads/singlefile.php?cid=209&lid=999

If you prefer a hard copy, you can buy them online from the Springer website at:

http://www.springer.com/environment/aquatic+sciences/book/978-90-481-3085-6

Giant Prawn 2011

Giant Prawn 2011 will be held as a component of next year's Asian-Pacific Aquaculture 2011 conference, 17-20 January, in Kochi, India. Giant Prawn 2011 will be a landmark opportunity to review the status of freshwater prawn farming worldwide and discuss the future of this $2 billion industry. The meeting will include field trips to freshwater prawn farming sites on 21-22 January.

The scientific programme for Giant Prawn 2011 consists of a three-day invited paper session (18-20 January), plus a one-day parallel session for contributed papers on freshwater prawn farming (date to be announced later). Speakers include Nesar Ahmed (Bangladesh), Janet Brown (UK), Michael Frinsko (USA), Ilan Karplus (Israel), Spencer Malecha (Hawai'i), Peter Mather (Australia), C. Mohanakumuran Nair (India), M.C. Nandeesha (India), Uthairat Na-Nakorn (Thailand), Michael New (UK), Nguyen Thanh Phuong (Vietnam), K.R. Salin (India), Amir Sagi (Israel), James Tidwell (USA), Wagner Valenti (Brazil), Patricia Moraes-Valenti (Brazil), Md. Abdul Wahab (Bangladesh) and Miao Weimin (China).

Discussions about the contributions of several further invited speakers are on-going. The topics to be presented in the invited session of GP2011 include biology, genetics, grow-out and hatchery rearing technology, health management, and post-harvest handling, marketing and economics.

Selected GP2011 papers will be considered for a special issue of the journal Aquaculture Research after the conference. The parent Asian-Pacific Aquaculture 2011 meeting will also provide the usual rainbow of conference topics and social events, together with an important exhibition. Those who attended the last event organised by this chapter in Kuala Lumpur will already know how successful it was.

GP2011 will be a very important event for all those involved in freshwater prawn farming, research and marketing. Mark your calendars and make your travel plans for January 2011 now!

Peer reviewed publications

For a complete list of peer reviewed publications, visit http://www.enaca.org/content.php?page=peer_reviewed_publications.

Microsatellite DNA markers revealed genetic population structure among captive stocks and wild populations of mrigal, *Cirrhinus cirrhosus* in Myanmar

Aung, O., Nguyen, T.T.T., Poompuang, S. And Kamonrat, W. (2010), Aquaculture 299(1-4): 37-43

We investigated genetic diversity and population structure of mrigal in Myanmar using microsatellite DNA markers. A total of 211 individuals from five wild populations and 216 individuals from five hatcheries were analysed for six microsatellite loci (*Bgon22*, *Lr3*, *Lr12*, *Lr21*, MFW1 and *MFW17*) which were developed for other cyprinids. For comparison, 43 individuals from a hatchery in northern Vietnam, of Indian origin and introduced in 1984, also were analysed. Tests for all loci revealed H–W equilibrium in only two hatchery samples. Allele richness ranged from 2.3 to 8.5. Overall, observed heterozygosity was high in all Myanmar samples (ranging from 0.654 to 0.756) but relatively low in the Vietnam hatchery sample (0.303). Pairwise FST values among the Myanmar samples ranged from 0.000 to 0.096, and those between the Myanmar and the Vietnam samples from 0.353 to 0.506. Results of multidimensional scaling analysis (MDS) of pairwise FST and Bayesian method revealed that one wild and two hatchery samples from Myanmar were differentiated from others, which appeared highly admixed. The study has important implications for genetic management of mrigal stocks in Myanmar, and possibly elsewhere in the region. For baseline stock for selective breeding, it would be best to include representation of samples from all groups we have identified to ensure a broad genetic base for genetic improvement programs. As for stock enhancement, seed produced from several hatcheries examined here should not be used for restocking in certain locations to avoid genetic contamination.

Available online at: http://dx.doi.org/10.1016/j.aquaculture.2009.12.010

Responsible aquaculture and trophic level implications to global fish supply

Tacon, A.G.J., Metian, M., Turchini, G.M. and De Silva, S.S. (2010). Reviews in Fisheries Science 18(1): 94 - 105.

Hunger and malnutrition remain among the most devastating problems facing the world's poor and needy, and continue to dominate the health and well-being of the world's poorest nations. Moreover, there are growing doubts as to the long-term sustainability of many existing food production systems, including capture fisheries and aquaculture, to meet the future increasing global demands. Of the different agricultural food production systems, aquaculture (the farming of aquatic animals and plants) is widely viewed as an important weapon in the global fight against malnutrition and poverty, particularly within developing countries where over 93% of global production is currently produced, providing in most instances an affordable and a much needed source of high quality animal protein, lipids, and other essential nutrients. The current article compares for the first time the development and growth of the aquaculture sector and capture fisheries by analyzing production by mean trophic level. Whereas marine capture fisheries have been feeding the world on high trophic level carnivorous fish species since mankind has been fishing the oceans, aquaculture production within developing countries has focused, by and large, on the production of lower trophic level species. However, like capture fisheries, aquaculture focus within economically developed countries has been essentially on the culture of high value-, high trophic level-carnivorous species. The long term sustainability of these production systems is questionable unless the industry can reduce its dependence upon capture fisheries for sourcing raw materials for feed formulation and seed inputs. In line with above, the article calls for the urgent need for all countries to adopt and adhere to the principles and guidelines for responsible aquaculture of the FAO Code of Conduct for Responsible Fisheries.

http://dx.doi.org/10.1080/10641260903325680

Observations on metal concentrations in commercial landings of two species of tilapia (*Oreochromis mossambicus* and *Oreochromis niloticus*) from reservoirs in six river basins in Sri Lanka

Allinson, G., Salzman, S.A., Ruoczy, N., Nishikawa, M., Amarasinghe, U.S., Nirbadha, K.G.S. De Silva, S.S. (2010). Toxicological & Environmental Chemistry 92 (4): 749 - 763

Samples of the muscle of two species of tilapia (*Oreochromis mossambicus* and *O. niloticus*; 17-20 cm length) were obtained from at least one reservoir in each of the six river basins (Aruvi Aru, Kala Oya, Kirindi Oya, Ma Oya, Mahaweli, and Walawe Ganga catchments) in Sri Lanka. The metals Ca, Cu, Fe, K, Mg, Mn, Na, and Zn were consistently detected in the muscle tissue. Overall, there were few differences in the concentration of metals between the two species of fish, although there were also some statistically significant differences ($p < 0.05$) in the concentrations of some metals in fish obtained from some of the reservoirs. Aruvi Aru stands out as a river basin in which the two fish species have significantly lower concentration of metals when compared to other river basins. The concentration of the metals studied were below WHO and FSANZ guideline values for fish, suggesting that the consumption of the metals found in tilapia from these reservoirs poses little risk to human health.

Available online at: http://dx.doi.org/10.1080/02772240903049710

Meetings address climate change impacts on small scale milkfish farmers in the Philippines

Milkfish production is the second highest component of aquaculture production in the Philippines by volume (229,111 tonnes in 2007) and the highest of the animal aquaculture products, and also the second highest in terms of value (US$ 317 million in 2007) after giant tiger shrimp. Ilolio province of the Philippines is an area where a large amount of the milkfish production occurs. The province is vulnerable to climate change and thus was selected as a case study area for the impacts and adaptation of small scale aquaculture to climate change project.

Two focus group discussion meetings of milkfish farmers were held in Dumangas and Barotac Viejo towns in Iloilo City on 30 September 2009 close to the farms of participating milkfish farmers. The focus group discussion meetings mapped farmer perceptions of climate change including climate change issues, impacts on production, economic impacts, adaptation solutions, responsible agencies and matched impacts with seasonal and cropping calendars.

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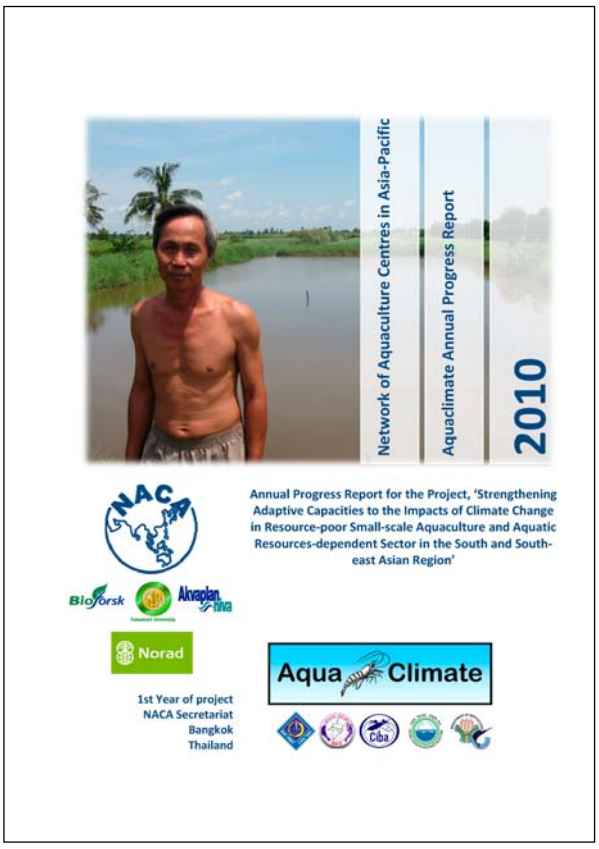
A stakeholder workshop was held in Iloilo City on 1 October 2009 with a range of stakeholders including government representatives, scientists, milkfish farmers and milkfish farming support industry people. After hearing about the status of milkfish farming in Iloilo, climate changes that had occurred and the predicted future effects of climate change, stakeholders identified adaptation solutions in four areas: Operational measures (farmer measures),technical measures (science measures), institutional measures (local government units, provincial, regional and central measures), and financial measures (calamity insurance, etc).

The milkfish farmers identified a number of climate change impacts that they are currently experiencing and described their adaptive practices. Possible future measures to assist milkfish farmers to adapt to climate change were indentified at the research and institutional levels.

The project is now conducting a comprehensive survey of small scale milkfish farmers in Iloilo, the Philippines, which will be used with secondary information to assess their vulnerability and adaptive capacity to climate change.These activities are part of the climate change impacts and adaptation of milkfish farming in the Philippines case study; one of several case studies of the regional project *Strengthening adaptive capacities to the impacts of climate change in resource-poor small-scale aquaculture and aquatic resources-dependent sectors in the south and south east Asian region* funded by NORAD. The first annual report of the project is also now available for download from the project webpage. For information, please visit:

http://www.enaca.org/modules/inlandprojects/index.php?content_id=10



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