

## Workshop on Biosafety Science of Aquatic Genetically Engineered Organisms

**Transgenic fish are probably the first genetically engineered animal to be approved for human consumption, yet scientific data to assess and manage their potential risks to aquatic biodiversity are very inadequate.**

The Department of Aquatic Sciences, Burapha University, Thailand and the Institute for Social, Economic and Ecological Sustainability (ISEES), University of Minnesota, organized a **Workshop on Biosafety Science of Genetically Engineered Organisms (GEOs)** at Burapha University, Chonburi, Thailand during 27-28 October 2003. The Workshop was organized through a Biotechnology-Biodiversity Interface competitive grant from the U.S. Agency for International Development and the Pew Fellows Program in Marine Conservation. The objectives of the Workshop were to: build capacity of different interested parties for conducting locally-relevant and scientifically reliable biosafety assessment and management; stimulate biosafety scientific research on GEOs; and stimulate future networking and information exchange among workshop participants. The participants at the Workshop were from academia, government, business, and public interest organizations. Although the regional focus

of the Workshop was Thailand and neighboring countries, there were several participants from other regions who are involved in developing genetically engineered fish or biosafety assessment and management.

The Workshop emphasized a forward-looking, preventative 'Safety First' approach that differs from the reactive, risk-based approach to biosafety. Through interactive presentations and discussions, the Workshop introduced the participants to scientific and technical principles and methods of the 'Safety First' approach to biosafety of GEOs: planning and managing safety from early-stage design (e.g. gene construct elements and tissue-specific expression) through testing and monitoring; different scientific assessment methods; and risk management strategies.

For additional information, please contact Dr Anne Kapuscinski (kapus001@umm.edu) or Dr Wansuk Senanan (wansuk@buu.ac.th).

## Advanced course on quantitative genetics for developing country scientists

With the objective of strengthening the capacity of developing country scientists in the field of quantitative genetics, especially in the analysis and interpretation of genetic data, the WorldFish Center/INGA, with financial support from the Norwegian Agency for Development Cooperation (NORAD), organized a training course on **Quantitative Genetics and its Application to Aquaculture** during 20-31 October 2003 in Penang, Malaysia. A total of 20 participants from 11 member countries of INGA (Bangladesh, China, Ghana, India, Indonesia, Malawi, Malaysia, and the Philippines), Brazil and the WorldFish Center completed the course. The course program introduced the participants to high caliber lectures and taught them to analyze fish breeding data using the ASREML computer program. The training program comprised lectures and practical exercises with emphasis on hands-on analysis of actual breeding/genetic data sets. The course curriculum covered the following topics: (i) general overview of the design and implementation of genetic improvement programs; (ii) strain choices and comparisons; (iii) estimation of phenotypic and genetic parameters (heritability, phenotypic and genetic correlations); (iv) breeding objectives and selection indices; (v) estimation of breeding values; (vi) incorporation of DNA fingerprinting into selection schemes; (vii) mate allocation strategies in genetic improvement programs; (viii) importance of population size in selection programs; (ix) estimating genetic change; and (x) potential of biomolecular techniques in fish breeding.

## INGA member scientist Dr M.G. Hussain awarded gold medal by Prime Minister of Bangladesh

INGA congratulates Dr M.G. Hussain, Director, Research and Planning, Bangladesh Fisheries Research Institute (BFRI) on being awarded the prestigious **National Fish Fortnight 2003 Gold Medal Award** in recognition of his outstanding contributions to the development of a genetically improved strain of silver barb (*Barbonymus gonionotus*) and further improvement of the GIFT strain Nile tilapia (*Oreochromis niloticus*). The award was presented by the Prime Minister of Bangladesh in an award ceremony for the National Fish Fortnight held on 12 August 2003. Dr Hussain was also awarded the silver medal of the National Fish Fortnight 2000 for his

numerous publications in the field of fisheries and aquaculture.

BFRI is a member of INGA. Dr Hussain has been actively involved in the implementation of fish genetic improvement programs in Bangladesh in collaboration with the WorldFish Center and INGA.

BFRI, as a member of INGA, has undertaken further improvement of the GIFT strain obtained from the WorldFish Center. The improved strains of *B. gonionotus* and GIFT strain are being widely disseminated among farmers in Bangladesh.



Participants of the training course on Quantitative Genetics and its Application to Aquaculture

## Training on brood stock management and sex reversal of tilapia

Training government and private hatchery personnel on the management of brood stock and production of good quality fry is essential, particularly for those who are rearing and managing the improved fish stocks. As part of INGA's strategy to assist member countries in effective dissemination of improved fish, the WorldFish Center, in collaboration with GIFT Foundation International, organized two separate training programs in Bangladesh and Malaysia on **Brood stock Management and Sex Reversal of Tilapia Using Genetic Improvement of Farmed Tilapia (GIFT) Protocols**.



*Participants of the training on brood stock management and sex reversal using GIFT protocols in Bangladesh*



*Participants of the training on brood stock management and sex reversal using GIFT protocols in Malaysia*

In cooperation with the Department of Fisheries in Malaysia, the training program was held during 29 September – 2 October 2003 at Jitra Aquaculture Station, Kedah. Thirty-three participants from the government and private sectors completed the course. In Bangladesh, the training program was conducted in collaboration with the Bangladesh Fisheries Research Institute (BFRI) and was held during 6-9 October 2003 at BFRI, Mymensingh. The program was

attended by 19 participants from private hatcheries and NGOs.

The course comprised lectures and hands-on/practical sessions. It focused on practical applications of tilapia breeding and fry/fingerling production using GIFT protocols; rearing and management of brood stocks including techniques on how to avoid inbreeding; and production of all male tilapia using the sex reversal technique.

## Manual on Strain Comparison Trials

Comparison and evaluation of fish strains is important for policy makers, government agencies, breeders and farmers for making well informed decisions on breeding. In aquaculture, strain comparison and evaluation are mainly utilized to design breeding experiments, e.g. selective breeding or cross breeding, etc.

A number of strain evaluation experiments have been carried out for various fish

species in the past. A majority of them failed to answer the desired questions with the required degree of accuracy. A manual on 'Strain Comparison Methods' is being developed for member countries of INGA to help fish geneticists design and carry out more useful and accurate strain comparison experiments. Dr Shrinivas Jahageerda, a Senior Scientist from the Central Institute of Fisheries Education, Mumbai, India spent seven weeks at the

WorldFish Center, Malaysia to help develop the manual. The manual will provide: a review of breed and strain comparisons (with emphasis on methodology used); theoretical and practical aspects of strain comparisons; and recommendations, ranging from situations in which full pedigrees are available to those in which no parentage information is available.

## ADB Approves Funding for Second Phase of Carp Genetics Project

The Asian Development Bank (ADB) has approved funding for the second phase (2004-2006) of the project for genetic improvement of carps in Asia. The new project called **Achieving Greater Food Security and Eliminating Poverty by Dissemination of Genetically Improved Carp to Fish Farmers** will be undertaken by the WorldFish Center in collaboration with national institutions in six carp producing countries in Asia

(Bangladesh, China, India, Indonesia, Thailand and Vietnam).

Unlike the first phase of the project, which focused on determining research priorities and initiating research leading to development of high yielding carp strains, the second phase will concentrate on: continued development of improved strains; dissemination and evaluation of the improved carp strains; and

establishment of national carp breeding programs. The project is expected to result in improving the nutritional status and economic conditions of fish farmers in Bangladesh, China, India, Indonesia, Thailand and Vietnam through the culture of genetically superior carp strains that better utilize feed resources in common production systems.

### EIFAC Symposium on Aquaculture Development - Partnership between Science and Producer Associations

Producers are recognized as key players in the development of sustainable aquaculture, being the direct users of resources for the production of food. However, more interaction and better communication and coordination between producers, scientists and other stakeholders in aquaculture are required. There is a continuing trend towards creating partnerships and collaboration between aquaculture producers and scientists, government officials and other stakeholders. The European Inland Fisheries Advisory Commission (EIFAC) will hold a **Symposium on Aquaculture Development – Partnership between Science and Producer Associations** in Weirzba, Mazurian Lakeland, Poland during 26-29 May 2004 as part of its 23<sup>rd</sup> Session. The

main objective of the Symposium is to define the complementary roles of science and production in the development of the aquaculture sector in the EIFAC region. The participants are expected to be from aquaculture producer's associations, government agencies, research and education institutions, environmental and social non-governmental organizations, including consumer protection groups, private sector and scientists.

For additional information, contact: Mr Uwe Barg, Technical Secretary of EIFAC Sub-Commission II – Aquaculture, Fishery Resources Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy. Fax: (39) 0657053020; E-mail: [uwe.barg@fao.org](mailto:uwe.barg@fao.org)  
Source: <http://www.fao.org/fi/meetings/eifac/eifac23/symposm/default.asp>

### International Symposium on Fish Nutrition and Feeding

The **International Symposium on Nutrition and Feeding of Fish** will be held in Phuket, Thailand during 3-7 May 2004. This Symposium will promote scientific discussions on all aspects of fish nutrition, including current knowledge and future perspectives, in plenary sessions, workshops and oral presentations. Emerging issues that relate to food quality and safety will also be addressed. There will be opportunities to organize meetings to discuss issues that may lead to the formation of networking groups for promoting the advancement of aquaculture nutrition science, technological developments and discussions where nutritionists can provide suggestions for policy development.

Source: <http://www.enaca.org/Events.htm>

### New Website for Greater Access to Agriculture Science Data

The United Nations Food and Agriculture Organization (FAO) is developing a new computer-based system to provide students and researchers in some of the world's poorest countries access to scientific literature on agriculture,

nutrition and related biological and environmental sciences. This public-private initiative is expected to provide information on research and data from 400 scientific journals at little or no cost. For more information on this new

website, visit  
<http://www.digitalopportunity.org/link/gotarticle/addhit/70448/1138/525>

Source: Marine Finfish Aquaculture Network e-news.

## AFS news

### AFS Journal Volume 16 Issues 1&2, Off the Press

Copies of the AFS Journal Volume 16 1 and 2 are now being sent out to members and subscribers. Galleyproofs of articles included in Issues 3 and 4 were already sent out to authors for final editing and approval.

### New OIC at the AFS Secretariat in Manila

Miss Elsie Tech is no longer connected with the Asian Fisheries Society effective August 2003. Communications can be addressed to the President, Dr Clarissa Marte or to the Officer-in-Charge, Ms Aida R. Rubiano. [afs@compass.com.ph](mailto:afs@compass.com.ph)

### Membership Updates

For several months now, we have been plugging our call for membership updates in our website as well as in our column in *NAGA*. We would like to reiterate our invitation once again to members to activate and/or upgrade their membership status. Those, for instance, who have been accepted as student or associate members before, may upgrade their status to Full Members upon submission of documents certifying additional or higher educational merits/degrees obtained (in the case of student members) or list of scientific publications (in the

case of associate members). To activate membership, the Society calls on all members to update payment of their annual dues. This invitation also aims to reach out to our inactive members, whose correspondence addresses on our file are no longer current. Please contact us and be counted. Current members who wish to submit their updated information may fill up the standard membership form on the web and send this via e-mail ([afs@compass.com.ph](mailto:afs@compass.com.ph)). The Society looks forward to providing better service and support to its members.

## AFS Council Meeting

The 26th Council Meeting of the Asian Fisheries Society was held in Bangkok on 21 September 2003. Among the important matters discussed was the upcoming 7th Forum, to be hosted by the Universiti Sains Malaysia. Co-hosts of the Forum include Universiti Putra Malaysia (UPM), the Malaysian Ministry of Agriculture, the Malaysian Fisheries Society, the WorldFish Center, the Department of Fisheries and the Fisheries Development Authority of Malaysia.

## AFS - SLAFAR Agreement of Affiliation

The Asian Fisheries Society (AFS) and the Sri Lanka Association for Fisheries and Aquatic Resources (SLAFAR) have signed an Agreement on 27 June 2003 to form an administrative arrangement to enable a cooperative exchange of publications, enhance the benefits available to the members of each Society, and broaden the international exchange of information among fisheries scientists. The signatories to this Agreement are Dr Clarissa Marte, AFS President, and Dr A. Hettiarachchi, SLAFAR President. AFS looks forward to a more fruitful partnership between the two Societies.

## SEAFDEC Hosts AFS Website

In addition to the present website, which is being hosted by the World Fish Centre, the AFS website can now also be accessed thru the SEAFDEC website (<http://www.seafdec.org.ph/afs>). This will allow additional access to members and potential members.

## Dr I Chiu Liao Represents Asian Fisheries Society in World Aquaculture 2003 Meeting

Dr I Chiu Liao, together with two Asian Fisheries Society (AFS) – Taiwan Branch members (Dr Nai-Hsien Chao and Dr Shi-Yen Shiau), attended the recently held World Aquaculture 2003 meeting in Salvador, Brazil held during 19-23 May 2003. Dr Yang Yi, AFS councilor from Thailand, also attended the meeting. It was a huge success with more than 4 000 participants from all over the world. The exhibition also attracted 300 exhibitors, and 900 technical papers and 38 special lectures were presented. Dr Liao presented a paper titled Cobia Culture in Taiwan: Current Status and Problems. He also took this opportunity to announce the forthcoming 7<sup>th</sup> Asian Fisheries Forum in Penang to be held during 29 November - 3 December 2004. He posted and distributed posters on a preliminary announcement



*A souvenir photo (from left to right: Dr N.H. Chao, Dr I.C. Liao, current WAS President Dr Geoff Allan, and the only elected WAS Honorary Life Member Dr P. Sorgeloos)*

for the forum and also distributed complimentary copies of AFS Special Publication No. 12 (Post Retirement Careers in Fisheries and Aquaculture).

## The 7th Asian Fisheries Forum



The 7th Asian Fisheries Forum, to be held in November 2004, will be hosted by Universiti Sains Malaysia and will be organized by the School of Biological Sciences. The Universiti Putra Malaysia (UPM), the Malaysian Ministry of Agriculture, the Malaysian Fisheries Society, the Malaysian Department of Fisheries, the WorldFish Center and the Fisheries Development Authority of Malaysia are co-hosts of the Forum. A carefully selected panel of world-renowned experts in fisheries will address the Forum in a series of plenary and concurrent sessions. Comprehensive aspects of fisheries, both in the Asian and global contexts, will be discussed. Associated activities and events will include: workshops, discussions, special symposia, trade exhibitions, related tours and field trips. Announcements regarding submission of Abstracts/Papers and preliminary registration details have been published in the AFS Journal since December 2002. Brochures have been distributed since October 2003 and important details can be accessed from the AFS websites.

## Whose values count? Whose decisions matter? Researching governance of wetlands in the Mekong region

Why do government statistics systematically overlook information about the uses of wetlands resources essential to poor people's livelihoods? Why are the ecosystem services of wetlands consistently undervalued when decisions are made to develop roads, dams, irrigation and other infrastructure? What strategies are most promising for improving inter-agency coordination for wetlands management? How can the interests of poor farming and fishing communities be more effectively represented in policy decisions?

These and other such questions provided a focus for a lively dialogue at a panel discussion held at the WorldFish Center's Penang headquarters on 6 November 2003. The panel discussion was the culminating event of a three-day

writing workshop that brought together partners from Thailand, Cambodia, the Lao PDR, and Vietnam, who have been working together under the project, Legal-Institutional Analysis and Economic Valuation of Resources and Environment in the Mekong River Region: A Wetlands Approach. The project was financed by the Swedish International Development Cooperation Agency (Sida).

Dr Blake Ratner, the project leader for the above project, was joined in the panel discussion by four colleagues who are cooperating in producing a regional synthesis report on the themes of economic valuation and legal-institutional analysis of wetlands management: Dr Dang Thanh Ha (Nong Lam University, Vietnam), Mam Kosal (Wetlands International, Cambodia), Somphanh Chanphengxay (Dept. of

Livestock and Fisheries, Lao PDR), and Dr Ayut Nissapa (CORIN, Thailand).

This writing workshop activity builds directly on the results of a Regional Synthesis Workshop held during 19-21 August 2003 near the Nam Ngum reservoir in Vientiane province, Lao PDR. That Workshop was attended by 30 participants from partner institutions in the four countries as well as representatives from regional partners, the Mekong River Commission, Asian Institute of Technology – Aqua Outreach Program, and IUCN (World Conservation Union).

For further information contact:  
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Program, WorldFish Center.  
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## Announcements

### Marine Ornamentals '04

Marine Ornamentals '04 (MO'04), the third in a series of conferences for the marine ornamental fish community, will be held at the Hawaii Convention Center, Honolulu, Hawaii during 1-4 March 2004. This is a special session of Aquaculture '04 (AQ'04), the Triennial Meeting of the National Shellfisheries Association (the Fish Culture Section of the American Fisheries Society) and the World Aquaculture Society. The entire event is scheduled during 1-5 March

2004. Those who attend MO'04 will have the opportunity to participate in the AQ'04 sessions, as the MO'04 sessions will run concurrently with AQ'04 for three days (2-4 March 2004). The registration also includes entry to the Trade Show and Exposition. More information regarding the conference and program developments may be found on the website: <http://www.hawaiiacquaculture.org/marineornamentals04.html>

Current updates are also available from:  
Marine Ornamentals '04  
Conference Manager  
2423 Fallbrook Place  
Escondido, CA 92027  
USA  
Tel: +1-760-432-4240  
Fax: +1-760-432-4275  
E-mail: [worldaqua@aol.com](mailto:worldaqua@aol.com)

### Towards participatory fisheries management

The International Agricultural Centre (IAC, Wageningen, Netherlands) is organizing a training program in co-operation with Wageningen University. The title of the program is "Towards participatory fisheries management" and it consists of two modules. The first module on "Fisheries management: perspectives, information and co-

management" will be held during 4-22 October 2004. The second module on "Tools for fisheries co-management" will be held during 25 October-19 November 2004. Interested applicants may apply for either one or both modules. Further information and application forms may be obtained from:

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Tel: +31-317 495 495  
Fax: +31-317 495 395  
E-mail: [training@iac.agro.nl](mailto:training@iac.agro.nl)  
URL: [www.iac.wageningen-ur.nl](http://www.iac.wageningen-ur.nl)



## SEA OF CHANGE IN FISHERIES



Fish exports from developing countries to developed ones are expected to decline by 2020, despite the fact that people in developing countries will produce, consume and trade a greater share of the world's fish.

Developing countries will produce 79 per cent and consume 77 per cent of the world's total production of fish by the year 2020.

These projections are made in "Outlook for Fish to 2020: Meeting Global Demand", a report released on 3 October 2003, simultaneously in Washington DC, Hamburg and Penang, by the International Food Policy Research Institute (IFPRI) and the WorldFish Center.

The study uses state-of-the-art computer modeling to provide a comprehensive economic analysis of conditions facing the fisheries sector in the rapidly changing business and social environment up to the year 2020.

The report projects that fish consumption in developing countries will increase by 57 per cent, from 62.7 million t in 1997 to 98.6 million in 2020. By comparison, fish consumption in developed countries will increase by only about 4 per cent, from 28.1 million t in 1997 to 29.2 million t in 2020.

We can expect major shifts in supply and demand for animal protein from livestock and fish as a result of rapid population growth, increasing affluence and urbanization in developing countries on one hand, and stagnant population combined with a saturated market for fish in the developed countries on the other.

Fish farming or aquaculture, an already booming industry, will continue to expand to meet this growing demand for fish in developing countries, especially as most of the world's existing wild fisheries are already, or will soon be, over-fished. It is projected that by 2020, aquaculture will account for 48 per cent of the total production of fish as compared to 31 per cent in 1997.

The study also notes that more than 40 per cent of fish consumed in 2020 will come from fish farms. World aquaculture production is expected to nearly double, from 28.6 million t in 1997 to 53.6 t in 2020.

The inevitable expansion of fish farming in the developing countries could cause increased pollution, greater damage to already vulnerable wild fisheries, and competition for water and land use. This poses a potential threat to the environment as well as the livelihoods and food security of poor people in developing countries.

According to the report, trade among the developing countries will intensify. To ensure a greater market share, there will be heightened urgency for governments to put in place prudent policies and measures to ensure that fish products meet new hygiene and food safety requirements and environmental needs. Technologies and management practices adopted will have to be efficient and cost-effective for developing countries to remain competitive.

Speaking at the launch of the report, Dr Mark W. Rosegrant, Director of the Environment and Production Technology Division, International Food Policy Research Institute (IFPRI), said:

"It is possible to avoid trade-offs to the environment and the poor, while meeting growing global demand for fish over the next two decades. Environmental impacts of aquaculture can be minimized through environmentally friendly technologies and by increasing the efficiency with which fish meal and fish oil are used to feed farmed fish."

Dr Mahfuzuddin Ahmed, Principal Social Scientist, WorldFish Center, and co-author of the report said:

"Countries must take drastic measures to improve the management of wild fisheries. By-catch and wastage must be minimized. Innovative product development and marketing strategies must be encouraged to enhance the value of processed fish food products."

The report presents several possible scenarios. If wild fish stocks in the world are allowed to be fished to depletion, by 2020 the price of low value food fish will increase by 35 per cent. This will effectively remove fish from the food bowls of the poor. If the current annual aquaculture growth of 10 per cent is maintained, fish prices will increase in real terms by about 6 per cent. However, if this growth rate were to face any setbacks (such as disease outbreaks) the price of low value fish will go up by 25 per cent.

According to Dr Ahmed, "aquaculture must grow faster than the current rate in order to supply up to 48 per cent of the total food fish production, so as to maintain a stable or lower price affordable by the poor and the lower income groups."

*The International Food Policy Research Institute (IFPRI) seeks sustainable solutions for ending hunger and poverty. The WorldFish Center contributes to food security and poverty eradication through research, partnership, capacity building, and policy support on living aquatic resources. IFPRI and the WorldFish Center are two of 15 Future Harvest Centers and receive their principal funding from 62 governments, private foundations, and international and regional organizations known as the Consultative Group on International Agricultural Research. Please visit the websites at [www.ifpri.org](http://www.ifpri.org) and [www.worldfishcenter.org](http://www.worldfishcenter.org)*

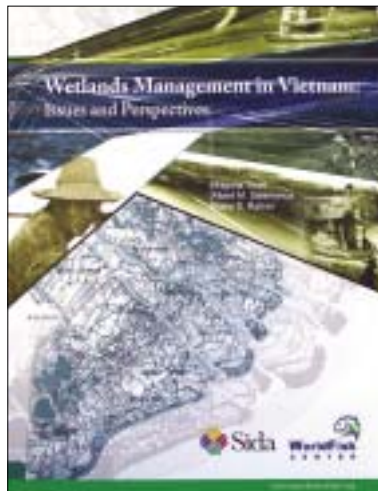
## Wetlands Management in Vietnam: Issues and Perspectives

Wetlands Management in Vietnam: Issues and Perspectives

Edited by M. Torell, A.M. Salamanca and B.D. Ratner. 2003. WorldFish Center Technical Report 61, 89 p.

In Vietnam, wetlands directly provide a source of livelihood for millions of people, yet the health of these fragile ecosystems is under threat. In this new publication of WorldFish, several experts, mostly Vietnamese, identify the pressures and trends driving the transformation of wetlands ecosystems. They point to a number of strategies for responding to these pressures by addressing policy, institutional reform, and information management challenges.

Wetlands in Vietnam are much more than places of aesthetic beauty or sites for the conservation of wildlife habitats. The wetlands are the lifeline of the rural economy – essential to the livelihoods of millions of Vietnamese, particularly in the Mekong Delta. Wetlands include not only mangrove forests on the coast and inland marshes and swamps, but also the country's rivers and lakes as well as the areas that they flood seasonally. Thus, many different groups of stakeholders influence the way that wetlands are managed. These range from local fishers and farmers to private businesses and government agencies with diverse mandates, including those related to fisheries, agriculture, tourism, the environment, rural development, and public works, along with a host of national and international development organizations. Rarely, however, does such a range of actors



perceive themselves as linked together, let alone share the responsibility for stewardship of a vital national resource.

Making progress towards the sustainable management of wetlands demands a systematic, holistic perspective, precisely because wetlands defy boundaries. They do not lie within the domain of any one agency's management authority; they are both publicly and privately owned; and their extent fluctuates seasonally, especially during the rainy season. Moreover, resource use decisions in one part of the system directly impact upon other parts, sometimes in complex ways. By presenting the range of perspectives on a number of key facets of the overall challenge of wetlands management in one volume, this collection of papers aims to broaden the platform for dialogue and debate about the importance of wetlands, trends affecting

their health and productivity, and priority actions required in response to these.

The papers in this volume were initially prepared for workshops organized by WorldFish in March 1999 and November 2000. These workshops laid the groundwork for the project called "Legal-Institutional Framework and Economic Valuation of Environment and Resources in the Mekong River Region: A Wetlands Approach." The project, financed by the Swedish International Development Cooperation Agency (Sida) and coordinated by WorldFish, aims to contribute towards environmentally sound development decisions that sustain and improve the livelihoods of those who depend upon wetlands resources. Working in the four countries of the Lower Mekong Basin, the project fosters networks of partners engaged in assessing the value of wetlands and analyzing the legal and institutional challenges of improved governance. The network approach builds domestic capacity for such analysis while at the same time strengthens the ties among professionals in a range of institutions – government agencies, nongovernmental organizations and universities – whose collaboration is essential for institutionalizing new practices over the long term.

Improving the governance of Vietnam's wetlands is an important task. WorldFish hopes that this volume presents a range of perspectives on the challenges ahead for Vietnam, and lays the groundwork for more thorough investigations of its valuable wetlands.



### Angeles Declaration: Public-Private Partnerships for Dissemination of Research Outputs to End-Users

The genetic research programs undertaken by the Philippines national institutions and international organizations have resulted in the development of technologies for and

improved strains of tilapia that are now being disseminated to farmers. As these institutions move towards further development and widespread dissemination of improved tilapia strains, it has become necessary for some of them to establish partnerships with the private sector. Partnerships between public and private agencies in undertaking research on tilapia genetics and in the dissemination of products of such

research are expected to bring benefits to the tilapia industry. However, unlike for crops where the implications of such partnerships have been well studied and established, in the case of fish the subject is still new and knowledge of the changes resulting from evolving partnerships is sparse.

With financial support from the International Development Research Centre of Canada, WorldFish Center and national institutions in the Philippines (Freshwater Aquaculture Center/Central Luzon State University - FAC/CLSU, National Freshwater Fisheries Technology Research Center/Bureau of Fisheries and Aquatic Resources - NFFTC/BFAR, and GIFT Foundation International Inc - GFII) are conducting studies to evaluate evolving public-private partnerships and to determine their impact on research on fish genetics and its development objectives. As part of this initiative, a Workshop for stakeholders was convened in Angeles City, Philippines during 25-27 June 2003.

The Workshop noted that there are issues and concerns relating to the dissemination of research outputs and the development of the Philippines tilapia industry that need to be addressed and given focus. This can best be achieved by providing an environment that promotes stronger partnership between the public and private sectors. The Workshop participants made recommendations that have been published under the title *Angeles Declaration: Public-Private Partnerships for Dissemination of Research Outputs to End-Users*. The objective is to create awareness of the issues among policy-makers. The following is a summary

of the recommendations emerging from the Workshop:

- Public and private sector institutions need to work together for the delivery of improved tilapia breeds and technology to achieve the maximum benefits from genetic research. These linkages and partnerships are needed for effective, efficient and equitable distribution of products and benefits.
- The needs of farmers and how these are being met require evaluation, based on geographical areas, socio-economic conditions and other relevant factors. While the public sector caters to needs of small farmers in general, it is essential that government line agencies place greater emphasis on providing services to the small-scale, poor, and geographically isolated farmers, as well as to those who do not have access to private sector hatcheries, to ensure that they are not marginalized and have access to improved tilapia breeds.
- Public sector policy should recognize and promote greater public awareness of all improved tilapia breeds available in the country and target public sector dissemination efforts on poor and geographically isolated farmers. Effective implementation of such policy should minimize competition between the public and private sectors.
- Breeding nucleus stations (private/public) should be given the responsibility of providing the necessary technical services for effective management and maintenance of seed quality of improved tilapia breeds. Private sector breeding nucleus stations, in partnership with public sector institutions, should also provide the specialized extension services needed by the multipliers and the grow-out farmers. The public sector has to continue providing the traditional type of extension services needed by small-scale hatcheries and the grow-out farmers, especially those not reached by existing distribution systems for genetically improved seed. The private sector breeding nucleus stations can also act as conduits for traditional types of extension information.
- The government should ensure that existing policies for conserving biodiversity and safeguarding the tilapia industry are implemented and, where necessary, develop new policies for effective implementation.
- The government should take the lead in collecting/monitoring/disseminating information on markets, prices, etc., of fingerlings and table fish. An effective mechanism should be established for collecting this information and disseminating it to the producers.
- The Philippines Government should establish a fish seed certification system.

For copies of the Angeles Declaration please contact: The Communications Unit, WorldFish Center, P.O. Box 500 GPO, 10670, Penang, Malaysia