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MPEDA-NACA sustainable shrimp village demonstration programme

MPEDA (the Marine Products Export Development Authority of India) and NACA continue to build upon their success with the village based demonstration of shrimp farming and Aquaclub formation. During 2006 the programme has been extended and now involves a total of 29 villages and 29 Aquaclubs in five Indian states (Andhra Pradesh, Tamilnadu, Orissa, Gujarat, and Karnataka). This means that 690 farmers operating 1313 ponds covering 708 hectares now produce shrimp under MPEDA-NACA Better Management Practices (BMPs), and in the first six months of 2006 more than 500 metric tonnes of BMP shrimp were produced. MPEDA and NACA originally conducted village demonstration programmes from 2002 to 2005 as a part of the technical collaboration between the two organizations on shrimp disease control in India. These demonstration programmes involved organizing small-scale farmers into self-help groups known as "Aquaclubs". The clubs provide a structure to help farmers adopt BMPs and improve their capacity to farm shrimp sustainably.

BMP shrimp farming family from Krishna, Andhra Pradesh.

Other highlights of the programme include:

- In Andhra Pradesh, 82% of the Aquaclub farmers reported that their harvests were successful, with the average size of the shrimp ranging from 24 to 35 grams;
- In East Godavari, out of 84 ponds 79 ponds have been successfully harvested, whilst five underwent an emergency harvest due to disease. The average size of the shrimp in the harvested ponds was 30 grams;

BMP shrimp farmer from Thalaynayar, Tamilnadu.

- In Kundapur, Karnataka all 26 ponds covering 18 hectares recorded a successful harvest;
- In Tamilnadu in the newly established Aquaclub, 23 out of 49 ponds have been successfully harvested, with the average size of the shrimp ranging from 30 to 35 grammes

BMP shrimp farmers from Kundapur, Karnataka.

- In Orissa shrimp is being farmed following BMP approaches in Astarang in Puri District in 18 ponds and in Silda in Balasur District in seven ponds.

Meanwhile other villages are taking up better management practices in shrimp farming. In two villages in Machilipatnam, Krishna District an area characterized by thousands of abandoned ponds, farmers are returning to their ponds following demonstrations. Early indications now suggest that 50% of farmers who have taken up the BMP shrimp farming approach will record a profit. It also is expected that even better results will be achieved as farmers learn more about better management practices for shrimp production, which increase productivity by reducing disease losses while improving environmental performance. *See page 4 for a table of the performance of farms operating under the programme.*

Inter-calibration of white spot syndrome virus PCR laboratories in India

White spot syndrome virus in India

The elimination of infected seed prior to stocking is arguably the single most important factor in reducing the risks of diseases in shrimp farming within India and throughout the region. This can be achieved by the proficient PCR testing of broodstock and/or seed. In fact in many countries around the region PCR is now used to screen shrimp seed for white spot syndrome virus or WSSV prior to stocking. However, white spot disease (WSD) continues to seriously impact shrimp production and it is suspected that variations in the reliability of screening results, compounded by on-farm factors, may result in the outbreak of disease even when seed has been properly screened. One of the main reasons for this has been a lack of harmonization or an inter-calibration of the PCR testing capabilities of different service providing laboratories. This variance in the quality of testing and accuracy of results has contributed towards an erosion of the confidence shrimp farmers have in laboratory PCR testing.

Inter-calibration of PCR

Under the framework of the ongoing ACIAR funded regional project *Application of PCR for improved shrimp health management in the Asian region* a voluntary PCR calibration programme was developed and executed. In association with project partners CIBA, CSIRO, MPEDA and NACA a WSSV inter-calibration exercise was implemented. The technique, which is also known as ring testing aimed to provide an overview of the current quality of WSSV PCR testing in participating laboratories in India. The approach would identify which laboratories might require more assistance in improving their testing procedures and offer individual laboratories the opportunity to compare their results with other laboratories undertaking the PCR testing of WSSV. In effect inter-calibration not only provided a step towards accreditation but also gave participants an opportunity to assess their performance.

PCR calibration samples packed and ready in CIBA, Chennai to be couriered to different labs in India.

100 sets of ten samples (1,000 samples) were prepared and coded by scientists of CSIRO and CIBA. These included 100 sets of five DNA samples and 100 sets of five tissue samples. This preparation and coding of samples took considerable planning and required two weeks of meticulous work by scientists from CSIRO, Australia and CIBA, Chennai. The DNA samples were derived from WSSV experimental infection in adult *Fenneropenaeus indicus*, using infected material from a hatchery near Chennai. Batches were sent to forty-nine laboratories throughout India with five batches sent to CSIRO in Australia and six batches in CIBA, India.

Confidentiality is key

Participation in the inter-calibration exercise was voluntary and the results of all testing remained strictly confidential, a fact that was key to the success of the exercise. Participating laboratories were identified by a code number. Throughout the trials the code numbers remained private with participating laboratories only informed of their own identification number. Once completed the laboratories returned their results which were collated into a summary table, individual laboratories could then view their own results and compare these with results from other facilities; however the confidential nature of the test results meant that the names of the laboratories would never be identified.

Lab performance

Early findings reveal that some laboratories encountered problems

Continued page 4...

Shrimp health management training course

The annual Shrimp Health Management Training Course has just finished, in Bangkok, with 30 participants attending from India, Indonesia, Malaysia, Brunei Darrussalam, the Philippines and Thailand. A five-day practical course aimed at producers, training is provided in all aspects of health management with a strong emphasis on prevention of disease through good farm management practices and husbandry, from pond preparation and selection of seed through to harvest. The course is taught by recognized experts in the field and includes visits to hatcheries and farms. This year's course was organized under a collaborative arrangement between ALLTECH and NACA. The course was initiated in 1998 by the Aquatic Animal Health Research Institute (AAHRI) of Thailand's Department of Fisheries, DFID/Stirling University and NACA.

ALLTECH's Dan Fegan (recent President of the World Aquaculture Society) giving the initial lecture on opening day on 24 July.

Rotary International/NACA meeting facility set up at Koh Yao Noi

Under the Special Programme in Response to the Tsunami (SPIRIT), NACA has been working in partnership with other concerned organizations to provide assistance to several affected communities in Southern Thailand. In particular, NACA has supported the restoration and improvement of marine finfish cage aquaculture on the island of Koh Yao Noi in Phang Nga Province. Rotary International, working in partnership with NACA, has also provided handheld two-way radios for fishers to enable easy communication of urgent matters including impending disasters.


The meeting house with a fine view of the bay where the fish cages are moored.

With the cages back in the water and producing fish and lobster again, the residents of Koh Yao Noi have turned their attention to other business opportunities including the development of home stay tourism and other initiatives to attract business to the island. Recently, one community has constructed through their own labour a conference centre (which they have kindly named the Rotary International/NACA Conference Centre), a charming structure by the water's edge. The centre serves as an office of the Koh Yao Noi Ecotourism Association whose members are also fishers and fishfarmers and a conference facility. During our visit, they were preparing to host a conference of medical doctors from various provinces in the south. Rental of the facility will generate income for

the association; meals are prepared for the participants and nominal charges are placed on the services.

In late August, the Chiba (Japan) Conference on Environment Education and Protection, a civic group, will make a second visit to continue with the practical seminars on environmental issues that they had initiated in January at the Koh Yao Noi district school, which has a student population of 400.

Mangrove and seedlings for reforestation of tsunami-damaged areas.

Mud crabs caught in the Krabi mangroves by local artisanal fishers.

Intercalibration...from page 2.

with test contamination and test sensitivity, a general failure of PCR testing capability and errors in sample handling. The project is now offering these laboratories the option to improve their techniques; these will be addressed on a case by case basis via assistance with resourcing, technical advice and training. Despite such problems the overall performance of the participating laboratories was rated as good with over half of the participating laboratories returning either excellent or acceptable results. It is hoped that this should help to boost the confidence of the farmers and hatcheries in the seed testing process implemented in India.

Future directions

A second PCR training workshop under the regional ACIAR funded shrimp health project is scheduled to be held in Central Institute of Brackishwater Aquaculture (CIBA) from 23-26 October 2006. This will be attended by the 25 national participants who participated in the first PCR training workshop. Three participants, one each from Sri Lanka, Myanmar and Bangladesh will also attend the event. It is hoped that the workshop will provide an opportunity to discuss the results of the PCR inter-calibration exercise and decide upon the way forward in developing a PCR laboratory accreditation programme in India. A two day ACIAR project coordination meeting is then scheduled to be held at the College of Fisheries, Mangalore on 28-29 October.

MPEDA-NACA sustainable shrimp village demonstration programme...from page 1.

Table of BMP shrimp farming performance under the NACA-MPEDA programme by state.

State	Villages	Total ponds	Total area (ha)	Farmers	% planned harvest achieved
Andhra Pradesh	19	957	461	550	82
Tamilnadu	2	89	82	52	94
Orissa	2	25	15	19	-*
Gujarat	2	210	127	45	93
Karnataka	4	32	23	24	84
Total	29	1313	708	690	

Tsunami-affected farmers train in marine cage aquaculture

The Food and Agriculture Organization of the United Nations (FAO) has generously provided funding to train 200 tsunami-affected farmers in small-scale marine finfish cage aquaculture. FAO had previously assisted the farmers through provision of materials to re-establish their fish cages and the training is a follow on to ensure that they also have a solid grounding in the fundamentals of cage aquaculture. The training is entirely practical, emphasizing better management practices that enable farmers to reduce their costs through (for example) more efficient use of feed and reduce losses through improved health management. This helps farmers achieve greater production efficiency, yield and profitability. The training, organized in a series of ten courses over a three-month period, is being provided by the Department of Fisheries Krabi Coastal Fisheries Research and Development Centre, with cooperation from NACA. The course is directed by Mr Paiboon Bunliptanone, Director of the Krabi centre and internationally recognized for his expertise in marine finfish aquaculture, particularly in breeding groupers such as *Epinephelus coioides* and *E. fuscoguttatus*, among others. The centre has also been active in the breeding of marine clownfish, with a numbr of species of these popular aquarium pets in production. Most of the juveniles are sold to aquarium dealers, while some are released into the Andaman Sea for resource enhancement.

Participants in a marine cage aquaculture course.

The Krabi centre is undergoing an extensive renovation to upgrade its

Farmers at Koh Yao Noi currently farm Asian seabass (Lates calcarifer) and fatten tropical lobsters. They wish to diversify into grouper culture.

research facilities and improve local ecotourism services, which has recently been integrated into the centre's development program. A pilot mesocosm hatchery, provided under the NORADAQVAPLAN-NIVA gift to NACA and FAO as part of the tsunami rehabilitation efforts will also be set up in the Krabi centre. It is expected to be scaled up and provide hatchery-reared grouper and other marine finfish seed to the small cage farmers in the area.

Second training course in website management

NACA's second training course on website management was run from 3-7 April for two participants from Vietnam's Can Tho University and one from the Coastal Habitat and Resource Management project (CHARM) project, a joint initiative of the Thai Department of Fisheries and the European Union. The purpose of the training course is to teach participants to plan, construct and maintain their own website using the free, open source XOOPS Content Management System (www.xoops.org), which is the same software used to maintain the NACA website. The course covers both the technical issues and and often more difficult project management aspects of getting institutional ownership and staff involvement in contributing to a website. The Can Tho University participants, Ms Tran Thi Hong Hanh and Ms Su Kim Anh (below) are constructing a new website for the College of Aquaculture and Fisheries. Mr Ton is working on a new website for the CHARM project.

Above: Mr Paiboon Bunliptanone (right), Director of the Krabi Coastal Fisheries Research and Development Station leads the training course. Below: Asian seabass produced by Koh Yao Noi farmers.

Marine Finfish Aquaculture Network at the APAN Meeting in Singapore

The Asia Pacific Advanced Network (APAN) met at the Singapore National University on 17-21 July. The meeting presented and discussed advanced network technology and applications, many of which were relevant to fisheries, agriculture and natural resource management.

In the Agriculture Working Group, Mr. Koji Yamamoto of NACA gave a presentation on the "Asia-Pacific Marine Finfish Aquaculture Network and Grouper Aquaculture in the region". This presentation described the networking mechanism and strategies used by the marine finfish aquaculture network - which NACA anchors.

Also from NACA - which became a member of APAN in 1998 following the first APAN meeting in Tsukuba, Japan (attended by then Information Specialist Pedro Bueno), was a presentation on using the Content Management System for creating a Digital Library, by Mr. Yoothana Suansook, NACA's ICT specialist.

Dr. Pisuth Paiboonrat from Hydro Agro Informatics Institute (HAII) in Thailand presented an interesting

Continued page 8...

Aquatic animal health policy workshops build consensus in ASEAN nations

As a part of the the two AusAid (AADCP-RPS) funded aquatic animal health projects *Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN* and *Operationalise Guidelines on Responsible Movement of Live Food Finfish in ASEAN* - two policy workshops were held in Bangkok in April 2006, coordinated by NACA and AusVet Animal Health Services, in partnership with the ASEAN Secretariat, the Thai Aquatic Animal Health Research Institute (AAHRI) and the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF).

The first workshop, Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN, was conducted from 3-6 April 2006 and the second Operationalise Guidelines on Responsible Movement of Live Food Finfish in ASEAN followed from 10-12 April 2006. Both were attended by around 40 delegates including both health experts and policy makers from the ASEAN region. In addition, both the workshops were attended by resource experts from partner organizations and regional institutions.

The workshops gave ASEAN nations a regional platform to address aquatic animal health and biosecurity issues and are expected to assist members to build consensus and support preparation of harmonized national strategies for aquatic animal health management and for the movement of live food finfish. The workshops are also expected to contribute significantly towards implementation of FAO/NACA *Asia Regional Technical Guidelines for responsible movement of live aquatic animals* in ASEAN member countries.

NACA's Dr C.V. Mohan (left) facilitating a working group.

The report of the workshop will be made available on the NACA website in due course. The 'Technical Guidelines', as they have come be be known, may be downloaded from the publications area of the NACA website.

Aquaculture compendium released

www.cabi-publishing.org/ac

The long-awaited Aquaculture Compendium has been released by CABI after two years of development with contributions from the world's leading experts in Aquaculture and Aquatic Resource Management. The aim of the compendium is to integrate existing respected sources of material and databases with newly commissioned structured texts and 'datasheets'; to build a single resource that presents users with information on Aquaculture in the broader context. The compendium is designed primarily for problem solving and as a reference tool for practical use. It is relevant for

use in both developed and developing countries and features extensive as well as intensive production methods.

The Aquaculture Compendium focuses on all aspects of aquaculture in the broader context and provides information on the sustainable use of freshwater and saltwater aquatic resources worldwide. The compendium includes coverage of several hundred topics in aquaculture production and technology. Features include:

- Detailed analysis of issues that affect aquaculture in the broader context, including environmental matters: regulations, waste management, toxicology, biodiversity, introductions and translocations, ecotourism, coastal zone and watershed management, environmental impact assessment, environmental remediation and restoration.
- Comprehensive, illustrated datasheets on aquatic diseases, each covering epidemiology, geographic and host range, economic impact, pathology, signs, diagnosis, prevention, treatment, zoonoses and food safety issues.
- Illustrated datasheets on all the major cultivated species of finfish, crustaceans, molluscs and seaweeds, providing worldwide coverage, each covering taxonomy, life cycle, reproduction, nutrition and feeding, environmental requirements, health, genetics, behaviour, native and cultured distribution.
- Context-rich case studies, including examples that cover the major aquaculture issues in extension, research and industry.
- Feed information detailing feed composition and nutrition requirements.
- International veterinary drugs and products database, including vaccines: a compilation of databases from diverse sources.
- Geographic Information System to display global and regional maps from underlying geographic databases, especially useful in international trade and quarantine.
- Images allowing easy identification and useful for teaching, extension, public awareness, and many other purposes.
- Bibliographic database, many with abstracts, all linked from citations within the text.
- Background information on thousands of cultured species and their diseases, providing a complete archive.

The compendium is available by subscription on CD-ROM or via internet, with special discounted rates for developing countries, and a free trial period is available. To obtain more information about the compendium, visit it online at http://www.cabi.org/compendia/ac/index.asp.

The initial development of the Aquaculture Consortium was sponsored by an international consortium including the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF), Australian Centre for International Agricultural Research (ACIAR), Bangladesh Agricultural University, CAB International, Canadian Food Inspection Agency (CFIA), Canadian International Development Agency (CIDA), Department for International Development (DFID), UK, Intervet International BV, Netherlands, New Zealand Agency for International Development (NZAID), Nha Trang University of Fisheries, Vietnam, Norwegian Agency for Development Cooperation (NORAD), United States Agency for International Development (USAID), and the United States Department of Agriculture: Animal and Plant Health Inspection Service (USDA-APHIS).

Technical partners included the Asian Institute of Technology (AIT), Food and Agriculture Organization of the United Nations (FAO), Institute of Aquaculture - University of Stirling, Leibniz Institute of Marine Sciences at the University of Kiel (IFM-GEOMAR), NACA, the World Aquaculture Society (WAS) and the World Organization for Animal Health (OIE).

Contributors needed

CABI is now planning updates to the compendium. Can you help contribute to this process? The types of information they are seeking to use include texts, images, databases and problem-solving tools. These may be web resources, lists of links or useful addresses, disease reports, case studies, teaching or extension materials, articles, reviews or protocols. Material is encouraged for submission in any language, but where possible should also exist in English translation. CAB International will offer selected experts a payment for their contribution. For more information, see the compendium website link listed above.

APAN...from page 6.

project called the "Digital Pabsa initiative". The aim of the project is to produce a digital archive of traditional knowledge regarding plants and animals (including fish) and their medicinal and other uses, and related studies into biodiversity. Ancient records, written on traditional 'sa' paper, are being digitally photographed and then translated into modern Thai language to preserve their information content past the lifespan of the paper medium. As much of the information relates to traditional medicinal properties of the native flora and fauna, it is also being used to target bioprospecting research for useful medical compounds, with plants identified from the records sent for pharmaceutical testing, modern knowledge building on the old. The project is also producing a GIS database on the distribution of species identified in the records.

Developments in establishing a conservation plan for the Mekong giant catfish

In the latest developments in NACA's Genetics and Biodiversity programme a third meeting of the Mekong Giant Catfish working group was held from 9-11 August 2006 at the Living Aquatic Resources Research Center (LARReC), Vientiane, Lao PDR. The meeting was part of the project "Development of Conservation Strategies for the Critically Endangered Mekong Giant Catfish, *(Pangasianodon gigas)*" and took the form of a Quantitative Assessment and Strategy Evaluation workshop. The event follows previous Mekong Giant Catfish working groups held in Bangkok, Thailand and Phnom Penh, Cambodia in August and December last year respectively.

This project is a collaborative effort between the Imperial College of London, NACA, FAO, the Department of Fisheries Thailand, and the MRC Fisheries Programme, with funding provided by the Darwin Initiative. Discussion groups also include members of WWF, Kasetsart University, and colleagues from fisheries related institutions from the Mekong riparian countries.

Thailand's success in catfish breeding

Since 2001 the Department of Fisheries (DoF), Thailand has been successful in breeding wild caught Mekong giant catfish, with broodstock caught as part of an annual cultural ceremony, then stripped and spawned. The resulting juveniles have then been cultured for further breeding. Currently up to 20,000 offspring from at least 10 year-classes are cultured in government and private farms and could be a valuable resource in efforts to rehabilitate natural populations of the Mekong giant catfish in the wild.

The need for genetic information & recent developments

In any breeding programme genetic information on how individuals are related to each is required, as such information can be used to prevent inbreeding. For the giant catfish such information will also optimize the genetic resources of the stocks so that their use in rehabilitation efforts will not further deteriorate the wild stocks.

The application of molecular genetics therefore is a vital tool in developing a meaningful and an effective overall conservation strategy for the Mekong giant catfish and in programmes to use of hatchery-bred fish to rehabilitate natural populations.

Recently, in addition to 20 microsatellite markers developed for Pangasiid catfish by Hogan and May (2002), 11 polymorphic microsatellite DNA markers were developed from finclip tissue of the Mekong giant catfish (Ngamsiri *et al*. 2006). It is believed that these markers will be valuable for both population genetic studies as well as pedigree analysis for the Mekong giant catfish and other closely related species, such as *Pangasius bocourti*, *P. conchophilus*, *P. larnaudii* and *P. sanitwongei*.

Another study using sequences of the mitochondrial DNA to compare levels of genetic diversity between the critically endangered Mekong giant catfish and other closely related species has also recently completed. The work is lead by Prof. Uthairat Na-Nakorn of Kasetsart University, and is accepted for publication in *Animal Conservation*. An important finding is that although Mekong giant catfish is highly endangered, its level of genetic variation of the wild population (16 individuals collected over the period of four years from 2002-2005) was very much commensurate to that observed in other related and abundant species. It is believed that this level of genetic variation could be a signature of historically large population of giant catfish, and doesn't reflect its current status.

Ongoing work is underway to genotype individuals of hatchery-produced giant catfish using both microsatellite and mitochondrial DNA markers. Results of this work are expected to be useful in designing a breeding programme that ensure genetic diversity of the species is maintained, hence minimising the genetic impacts upon wild populations.

Third meeting of the project working group

The third project meeting group aimed to provide an opportunity for project partners to review research activities since December 2005 and provide updates on the biotelemetry study and the genetic inventory of the captive giant catfish population. It is hoped that workshop discussions will result in revisions to the quantitative assessment reports and the first draft of a long-term conservation strategy for the species.

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ROUNDTABLE: Exploring south-south cooperation opportunities in sustainable shrimp farming in West Africa, Conakry (Guinea)

The first steps towards cooperation between NACA and West African countries were taken with the Roundtable organised by the Sahel and West Africa Club of the OECD on "Exploring South-South Cooperation Opportunities in Sustainable Shrimp Farming in West Africa", held in Conakry, Guinea 6-8 June 2006.

The Roundable was a unique opportunity to discuss and debate within a small group of targeted West African and Asian experts and partners about the region's shrimp farming potential through South-South Cooperation opportunities. The event successfully contributed to increasing the level of shared information on shrimp farming among key stakeholders involved, and developed short-term as well as medium-term actions on investment and technical partnerships in shrimp farming, and in aquaculture in general, in the region.

The participants included staff from the NACA secretariat and government and private sector participants from Thailand and India. The discussions during the Roundtable and conclusions identified considerable opportunities for strengthening of cooperation in sustainable shrimp farming between West Africa and Asia, including development national and regional policy frameworks needed to encourage shrimp farm investment and sustainability (financial, environmental and social), capacity building and institutional linkages and exchanges of people from both regions to strengthen South-South cooperation. The report of the Roundtable will be available during 2006, providing a wealth of valuable insights for NACA members into West Africa, the region's potential for aquaculture and opportunities for cooperation.

Sorting wild shrimp from a fishery in southern Senegal: Wild stocks are dwindling leading to increasing interest in farming.

Technical missions to Cambodia and Lao PDR

In the latest activities under the AusAid funded project *Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN* (370-021) two of the four planned technical missions to four ASEAN countries (Lao PDR, Cambodia, Vietnam and Myanmar) have recently been completed. These missions follow on from project policy workshops and training programmes held earlier this year

Projects 370-021 together with a partner project "Operationalise Guidelines on Responsible Movement of Live Food Finfish in ASEAN (370-018)" comprise the ASEAN-Australia Development Cooperation Program Regional Partnership Scheme (AADCP-RPS). Both projects are being implemented by NACA and AusVet Animal Health in partnership with the ASEAN Secretariat; ASEAN Sectoral Working Group on Fisheries; NACA National Coordinators; Australian Department of Agriculture, Fisheries and Forestry (DAFF); Aquatic Animal Health Research Institute (AAHRI) Department of Fisheries, Thailand; and the ASEAN governments.

Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN

Cambodia and Lao PDR along with other ASEAN countries currently face significant challenges in the practical implementation of health management strategies, specifically in the areas of:

- Disease diagnosis;
- Surveillance and reporting;
- Quarantine and certification;
- Emergency preparedness;
- Risk analysis; and
- Resources (trained manpower, infrastructure).

Developing simple and practical national aquatic animal health management strategies that suit the needs of the country and at the same time utilize the existing resources (e.g. department of livestock) effectively, should be the way forward. Such an approach should focus on:

- Awareness and capacity building;
- Networking;
- Sharing of resources;
- Promoting cooperation; and
- Giving ownership to all stakeholders concerned.

Technical missions

The technical missions took place in Cambodia from 2-9 July and Lao PDR from 11-18 July 2006. Conducted by a small team of experts, these missions aimed to support the development and implementation of national strategies on aquatic animal health, provide assistance to the project policy workshop and training participants, and follow up on the identified country specific action plans.

Objectives of the technical missions

The objectives of the technical missions were to work closely with national authorities in both countries, project participants and other relevant stakeholders to support the development of a framework for national strategies on aquatic animal health management and to identify gaps and develop short and long term plans.

The terms of reference of the missions included:

- Identification of key national issues concerning aquatic animal health.
- Identifying national priorities for aquatic animal health management.
- Identifying institutions and their responsibilities.
- Drafting a framework for national aquatic animal health advisory committee.
- Drafting a framework for national strategies on aquatic animal health.
- Developing a national list of diseases.
- Evaluating capacity for national list of diseases.
- Developing a framework for passive surveillance and reporting.
- Developing a framework for contingency planning, and
- Supporting participants of the workshops and training programme to follow up on some of the identified country action plans.

An informal approach

The missions were composed of meetings comprised of a mix of presentations by national delegates and technical mission team members followed by facilitated discussions and the development of outputs. This informal meeting structure was intended to encourage active participation of national delegates and to assist this process throughout the sessions, translations were provided where necessary.

Throughout the mission the need to develop national strategies for aquatic animal health remained the key focus.

The outputs developed took into account existing national frameworks and facilities enabling the national aquatic animal health strategies developed to be both practical and easily implemented within existing resources and structures. All the outputs developed during the mission were based on the inputs received from national delegates and on the last day of the mission, a wrap-up session provided feedback to the participants on the significant outcomes and identified timelines for each of the planned activities.

Development of a framework for a national strategy

In both countries the purpose of a national strategy on aquatic animal health was agreed upon as "to reduce risks of aquatic animal disease impacting on livelihoods of aquaculture farmers, national economy, trade and human health." The essential components of such a strategy were also identified as follows:

- Identification of key issues in relation to aquatic animal health management;
- Identification of national priorities concerning aquatic animal health;
- Identification of key institutions and responsibilities;
- Formation of a national committee on aquatic animal health;
- Developing a national list of aquatic animal diseases;
- Developing disease diagnosis support;
- Capacity building and resources;
- Surveillance and reporting;
- Quarantine and health certification;
- Emergency preparedness and contingency planning; and
- Risk analysis.

The advantages of the development and implementation of national strategies were also identified including:

- It identifies the action plans of a country to implement the various elements contained in the national strategy;
- It will ensure responsible health management; and
- It provides the road map for phased implementation based on national priorities and available resources.

In considering the individual components of this framework the meetings also identified several issues concerning the aquatic animal health management in both countries. For instance in Cambodia over 200 million fish seed are being introduced into the country every year to meet the increasing demands from fish farmers. These introductions are being carried out without proper checks and health certificates and present a significant disease risk. In addition it is widely perceived that importing seed from neighboring countries and nursing them is a much cheaper option compared to sourcing seed from government and private hatcheries operating in Cambodia. In Lao PDR it is estimated that the annual fish-seed requirement is around 500 million. About 300 million (Tilapia, Silver barb, Chinese carp, Common carp, Indian carp, Hybrid catfish, *Pangasius*, frogs) are produced in Lao PDR, with the rest imported from other countries. Despite such large production Lao PDR only has two laboratories dedicated to aquatic animal health related work and there are limited numbers of staff specifically trained in aquatic animal health.

Simple observation and diagnostics

Another important output was the development of a framework for passive surveillance using simple Level I diagnosis or observation. Practical and effective surveillance systems coupled with early warning and early response, are critical to the effective management of disease emergencies. Disease surveillance should be an integral and key component of all national/state aquatic animal health services. This is important in providing early warning of diseases, planning and monitoring of disease control programs, provision of sound aquatic animal health advice to farmers, certification of exports, international reporting and verification of freedom from diseases. It is particularly vital for animal disease emergency preparedness. Implementation of practical surveillance and early response systems will directly and indirectly contribute to improved disease diagnosis, better research collaboration, reliable advice to primary producers, capacity building at the level of extension workers and primary producers and development of an early warning and emergency preparedness system. A good surveillance system was identified as having several benefits:

- Forms the basis for all national disease control programs.
- Helps to meet regional and international reporting requirements.
- Helps to meet trade requirements (e.g. health certificates).
- Helps to initiate development of capacity, infrastructure and resource material.

This simple yet effective surveillance system and the easy to collect data required to monitor any disease event or outbreak will be described in a forthcoming issue of Aquaculture Asia.

Future directions

Building on the success and outputs of these two activities the project plans further missions in Myanmar and Vietnam in the near future. It is hoped that these will contribute to the formulation of individual frameworks for national strategies in aquatic health management.

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