

## Recent Asian Initiatives Under the NACA Regional Programme on Aquatic Animal Health Management

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### ABSTRACT

The activities of NACA in support of improving aquatic animal health management within Asia dates back since 1986 when it was first involved in the UNDP/FAO/ODA (and subsequently DFID) sponsored program on Epizootic Ulcerative Syndrome (EUS). Consequently, in cooperation with relevant governments and institutions, NACA implemented a Regional Research Program on Ulcerative Syndrome in Fish and the Environment, from 1986 to 1989, which produced most of the scientific data on environmental parameters associated with EUS outbreaks in the Asia-Pacific region. Between 1989-1990, NACA and ADB implemented the Regional Study and Workshop on Fish Disease and Fish Health Management which revealed a scenario of environment-linked disease problems, product contamination, and environmental impacts on aquaculture, and for the first time losses suffered by Asian aquaculture from fish diseases were quantified. The study provided the first broad guidelines to regional and national strategies for developing capacities in fish health management. In 1991, OIE Tokyo approached NACA to initiate cooperation with respect to aquatic animal disease reporting which eventually led to an Expert Consultation on Aquatic Animal Disease Reporting in 1996. Between 1992 to 1996, NACA was involved in the following regional activities: (a) collaborating with IDRC and UPM in a Tropical Fish Health Management course, that ran for two intakes of students at UPM; (b) participating in the FAO 1994 Expert Consultation on Health Management held at UPM in Malaysia; and (c) the 1996 Consultation on Quarantine and Health Certification of FAO and AAHRI through the ODA-funded SEAADCP project. In 1998, a joint publication - 'EUS Technical Handbook' with ACIAR, DFID, NSW Fisheries, AAHRI through SEAADCP and NACA - was completed.

The major recommendations of the various regional meetings/consultations became the basis for the development of a strong multi-disciplinary Asia-Pacific regional programme on aquatic animal health management. At the request of Asian governments, NACA and FAO developed a Regional Technical Cooperation Programme on "Assistance for the Responsible Movement of Live Aquatic Animals" (FAO RTCP/RAS 6714 and 9605). The project was implemented from 1998 to 2001 in cooperation with 21 governments/territories in Asia-Pacific region, OIE FDC, OIE Tokyo, AFFA, AusAID/APEC and AAHRI.

The programme and its outputs were developed through three years (1998 to 2001) of awareness raising and consensus building through various national and regional level activities (e.g. workshops, training courses, expert consultation, health assessments, etc.). This multi-disciplinary Regional Aquatic Animal Health Management Programme has now been adopted by

Asian governments (including NACA members and participating governments within ASEAN) as an important element of NACA's Third Five Year Work Programme (2001-2005). The current thrust of the programme is to assist countries in implementing the 'Technical Guidelines', giving special emphasis to the concept of "*phased implementation based on national needs*", including monitoring and evaluation of its implementation. One of the mechanisms to support Asian governments in the implementation of the 'Technical Guidelines' is through regional cooperation where effective partnership with relevant organizations will be continuously established and strengthened. Designated National Coordinators will continue to be the focal points for its implementation.

A Regional Advisory Group on Aquatic Animal Health has been established which will function as an official regional expert group that will ensure the provision of expert advice to Asian governments in the implementation of the 'Technical Guidelines', with NACA providing institutional support and FAO and OIE providing technical guidance. The main elements for regional cooperation include: (a) Promoting effective cooperation through regional resource centers on aquatic animal health; (b) Harmonization of procedures for health certification, quarantine and diagnostics; (c) Support to capacity building; (d) Awareness raising, communication and information exchange on aquatic animal health; (e) Regional disease reporting; (f) Emergency response; and (g) Joint activities for risk reduction in shared watersheds.

The paper also briefly include other health related projects jointly being developed and/ or currently carried out by NACA with other organizations (*e.g.* ACIAR, APEC, ASEAN, CSIRO, DANIDA, IDRC, MPEDA, MRC and SEAFDEC-AQD).

## INTRODUCTION

The Network of Aquaculture Centres in Asia-Pacific (NACA) is an inter-governmental organization of 15 member governments (*i.e.*, Australia, Bangladesh, Cambodia, China PR, Hong Kong China, India, Korea DPR, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand and Vietnam), including a number of actively participating countries such as Indonesia, Iran, Korea RO, Lao PDR and Singapore. NACA's vision is to assist member and participating governments to improve opportunities for sustainable aquaculture development and aquatic resources management in order to contribute to social and economic development in the Asia-Pacific region. Aquatic animal health management and disease control is a priority element of NACA's Third Five Year Work Programme (2001-2005). NACA's activities on aquatic animal health, however, dates back as far back as two decades ago.

This paper provides chronological information about NACA's aquatic animal health management program - a brief history, recently concluded projects particularly the FAO TCP/RAS 6714 and 9605 "Assistance for the Responsible Movement of Live Aquatic Animals" and current and forthcoming projects.

## **BRIEF HISTORY OF NACA BEGINNINGS ON AQUATIC ANIMAL HEALTH MANAGEMENT**

NACA implemented a Regional Research Program on Ulcerative Syndrome in Fish and the Environment, from 1986 to 1989, under the cooperative framework of UNDP/FAO/ODA. The program produced most of the scientific data on environmental parameters associated with the outbreak of Epizootic Ulcerative Syndrome (EUS) in the Asia-Pacific region (Roberts *et al.*, 1986; Phillips, 1989; Phillips and Keddie, 1990). In 1992, the Aquatic Animal Health Research Institute (AAHRI) of Thailand's Department of Fisheries and NACA jointly published a review of the EUS which contained much of the literature on the subject from both national and international articles, reports and conference proceedings (Lilley *et al.*, 1992). Subsequently, a joint publication - 'EUS Technical Handbook' with the Australian Centre for International Agricultural Research (ACIAR), the Department of International Development (DFID) of the United Kingdom, the New South Wales Fisheries (NSW Fisheries) of Australia, AAHRI through the Southeast Asia Aquatic Animal Disease Control Project (SEAADCP) and NACA - was completed. This handbook contains additional practical applications to assist in the diagnosis and control of EUS (Lilley *et al.* 1998). NACA was also involved in a study visit to investigate the occurrence of EUS in Pakistan. This was undertaken with AAHRI, ACIAR and Institute of Aquaculture of Stirling University.

Between 1989-1990, NACA implemented an ADB-funded Regional Study and Workshop on Fish Disease and Fish Health Management which revealed a scenario of environment-linked disease problems, product contamination, and environmental impacts on aquaculture, and for the first time losses suffered by Asian aquaculture from fish diseases were quantified. The study provided the first broad guidelines to regional and national strategies for developing capacities in fish health management (ADB/NACA, 1991).

In 1991, the Office International des Epizooties (OIE) Regional Representation for the Asia-Pacific based in Tokyo, Japan (OIE Tokyo) approached NACA to initiate cooperation on aquatic animal disease reporting. The same year a representative of OIE Tokyo participated at the NACA's Governing Council Meeting (GCM). This eventually led to an Expert Consultation on Aquatic Animal Disease Reporting in 1996 with representatives from OIE Tokyo, OIE Fish Disease Commission (OIE FDC) and a number of selected aquatic animal health experts in the region.

The period between 1992-1996 saw NACA involved in more regional activities. These were (a) collaboration with the International Development Research Centre (IDRC) of Canada and the Universiti Pertanian Malaysia (UPM) in a Tropical Fish Health Management course, and supported two batches of Asian students; (b) participation in the FAO 1994 Expert Consultation on Health Management held at UPM; and (c) co-organization of the 1996 Consultation on Quarantine and Health Certification of FAO and AAHRI through the ODA-funded SEAADCP project (Humphrey *et al.* 1997).

The major recommendations of the various regional meetings/consultations and activities mentioned above became the basis for the development of a strong multi-disciplinary Asia-Pacific regional programme on aquatic animal health management. The 1996 FAO Consultation on Quarantine and Health Certification, particularly catalyzed the development of an FAO Regional Technical Cooperation Programme described in the following section.

**FAO REGIONAL TECHNICAL COOPERATION PROGRAM  
(TCP/RAS 6714 AND 9605) PROJECT “ASSISTANCE FOR THE  
RESPONSIBLE MOVEMENT OF LIVE AQUATIC ANIMALS”**

At the request of 15 Asian governments, NACA and FAO developed a Regional Technical Cooperation Programme on “Assistance for the Responsible Movement of Live Aquatic Animals” (FAO RTCP/RAS 6714 and 9605). The project was participated by 21 governments/territories in Asia-Pacific region (*i.e.*, Australia, Bangladesh, Cambodia, China PR, Hong Kong China, India, Indonesia, Iran, Japan, Korea DPR, Korea RO, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam), and supported by a number of regional and international organizations and agencies such as OIE Tokyo, OIE FDC, Australia’s Agriculture, Fisheries and Forestry (AFFA), the Australian Agency for International Development - Asia Pacific Economic Cooperation (AusAID/APEC) and AAHRI.

The objective of the program was to develop technical guidelines on health management and responsible movement (introductions and transfers) of live aquatic animals, through appropriate strategies that minimize potential health risks associated with live aquatic animal movements; and that which are in concordance with other international agreements and treaties (WTO’s Sanitary and Phytosanitary Agreement or SPS Agreements and OIE’s health standards - the Code and the Diagnostic Manual), in support of FAO’s Code of Conduct for Responsible Fisheries (CCRF), and that which is practically applicable to the Asian region.

Program implementation and further development took three years (1998 to 2001) of awareness raising and consensus building through various national and regional level activities (*e.g.* workshops, training courses, expert consultation, health assessments, etc.). National Coordinators of each of the 21 participating governments were designated and they became the focal persons of the participating countries on aquatic animal health. A Regional Working Group (RWG) and Technical Support Services (TSS) composed of aquatic animal health experts, within the region and outside were formed to assist in the over-all implementation of the program (Anonymous, 1998).

The major outputs of the program are:

*(a) Regional Strategy on Responsible Movement of Live Aquatic Animals*

The Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing Consensus and Implementation Strategy” or ‘Technical Guidelines’ (FAO/NACA, 2000) contains the guiding principles that will assist countries in undertaking responsible movement of live aquatic animals in a way that minimizes the risks of trans-boundary pathogens/diseases being introduced and spread with the movement (introduction and transfers) of their hosts. The ‘Technical Guidelines’ contains the following elements: guiding principles, pathogens, disease diagnosis, health certification and quarantine measures, disease zoning, disease surveillance and reporting, contingency planning, import risk analysis, national strategies and regulatory frameworks, capacity building and an implementation strategy.

The 'Technical Guidelines' is accompanied by an Implementation Strategy - the Beijing Consensus and Implementation Strategy - which gives special emphasis to the concept of "*phased implementation based on national needs*" and two other supporting technical documents: (i) the Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals (FAO/NACA, 2001) and (ii) the Asia Diagnostic Guide to Aquatic Animal Diseases (Bondad-Reantaso *et al.*, 2001). These key publications which contain the regional strategy are in accordance with the WTO's SPS Agreement and the OIE aquatic animal health standards and the first of a regional technical guidelines supporting the implementation of FAO's CCRF.

Adopted in principle by the 21 participating governments/territories during a final workshop in Beijing, China PR in June 2000, the 'Technical Guidelines', also received strong support from the Association of South East Asian Nations (ASEAN) which endorsed the 'Technical Guidelines' as an ASEAN policy document during the 9<sup>th</sup> Meeting of the ASEAN Working Group on Fisheries held in September 2001 in Bali, Indonesia. Consequently, the 'Technical Guidelines' will be discussed at the next Senior Officials Meeting of ASEAN and subsequently in the Ministerial Meeting of ASEAN in 2002.

The ASEAN-SEAFDEC Fisheries Consultative Group (FCG) during the development of the 'Regional Guidelines for Responsible Fisheries in Southeast Asia - Responsible Aquaculture' held in Iloilo, Philippines in July 2001 endorsed the provision of support for the implementation of the 'Technical Guidelines.' The major references are:

(a) Article 9.3.2 "States should cooperate in the elaboration, adoption, and implementation of international codes of practice and procedures for introductions and transfers of aquatic organisms." The two relevant statements are:

4) "*States should support the implementation of the 'Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing Consensus and Implementation Strategy' with emphasis on phased implementation based on national needs*"; and

5) "*The National Strategies on Aquatic Animal Health Management in the 'Technical Guidelines' should be integrated into the national aquaculture development plans of States in the region. States should provide funds for its implementation.*"

Support to the implementation of the 'Technical Guidelines' was again re-emphasized during the ASEAN-SEAFDEC Millennium Conference "Fish for the People" held in Bangkok, Thailand on 19-24 November 2001, and was included as one of the major recommendations and action plans under Session 3.4 - Healthy and Wholesome Aquaculture (Anonymous, 2002).

The Asia Pacific Economic Cooperation (APEC) Marine Resources Conservation Working Group (APEC MRCWG) during a meeting held in Hobart, Australia, in November 2001, recommended closer consideration of instruments, guidelines and processes (including the 'Technical Guidelines') relevant to introduction of marine pests.

The 'Technical Guidelines' also provided the technical basis for the approval and/or development of a number of other regional projects on aquatic animal health. Examples include the following: (a) APEC Fisheries Working Group (APEC FWG) 02/2000 "Development of a Regional Research Programme on Grouper Virus Transmission and Vaccine Development" (APEC/AAHRI/FHS-AFS/NACA, 2001); (b) APEC FWG 03/2000 "Joint APEC/FAO/NACA/SEMARNAP Workshop on "Trans-boundary Aquatic Animal Pathogen Transfer and the Development of Harmonized Standards on Aquaculture Health Management" (APEC/FAO/NACA/SEMARNAP, 2001); (c) APEC FWG 2002 "Capacity and Awareness Building on Import Risk Analysis (IRA) for Aquatic Animals" - for implementation in 2002; and (d) Mekong River Commission's (MRC) Mekong Basin Aquatic Animal Health Management Programme which is still under development phase.

*(b) Asia-Pacific Quarterly Aquatic Animal Disease (QAAD) Reporting System*

The reporting system for aquatic animal diseases was developed following the recommendations of the NACA/OIE Expert Consultation in 1996 and was eventually integrated into the Regional Programme. It commenced in 1998, jointly implemented with OIE Tokyo and OIE FDC, and involves a list of diseases of finfish, molluscs and crustaceans identified to be important to the region together with the OIE list of notifiable and other significant diseases. To-date, 13 quarterly issues have been published and the reporting system is continuing with long-term financial assistance granted by the NACA Member Governments and technical assistance by NACA staff (NACA/FAO, 1999).

Through this quarterly reporting system, there is now emerging a clearer, up-to-date health profile for these diseases within the Asian region which can be used for initiating control and eradication as well as early warning, contingency plans and emergency-preparedness programs. Although still at its very early stages of development, surveillance and reporting systems will in the long run become a 'value added' label to aquaculture and fisheries products because they reflect a country's commitment and ability to collect and provide documented information on the health, origin and quality of each commodity. Countries with a sound aquatic animal health infrastructure and a demonstrated record of surveillance, containment and disease control programs provide them a significant trade advantage.

The QAAD was revised and updated in November 2001 and beginning the first quarter reporting period for 2002, an updated list of diseases based on the 4<sup>th</sup> edition of OIE International Code for Aquatic Animals (see <http://www.oie.int>) will be reported, with an additional column to reflect the levels of diagnosis (*i.e.*, Level I, II or III - see Table 1 for explanatory notes) for the disease reports as agreed upon during the Provisional Meeting of the Regional Advisory Group on Aquatic Animal Health. The deadline for submission of reports has also been extended (2.5 months from end of each reporting period).

**Table 1.** Diagnostic levels, associated requirements and responsibilities

Level-Activities	Work Requirements	Responsibility	Technical requirements to support activities
Level I Activities	Knowledge of normal (feeding, behaviour, growth of stock, etc.); Frequent/regular observation of stock	Farm worker/manager Fishery extension officers	Field keys Farm record keeping formats
Observation of animal and the environment	Regular, consistent record-keeping and maintenance of records - including fundamental environmental information	On-site veterinary support Local fishery biologists	Equipment list Model clinical observation sheets
Clinical examination	Knowledge contacts for health diagnostic assistance Ability to submit and/or preserve representative specimens for optimal diagnosis (Levels II, III)		Pond-side check list Preservation/transportation guidelines for Levels II/III diagnoses Model job descriptions/skill requirements Asia Diagnostic Guide to Aquatic Animal Diseases
Level II Activities	Laboratories with basic equipment and personnel trained/experienced in aquatic animal pathology	Fish biologists/Technicians Aquatic veterinarians	Model laboratory record-keeping system
Parasitology	Keep and maintain accurate diagnostic records	Parasitologists/Technicians	Protocols for preservation/transport of samples to Level III
Bacteriology	Preserve and store specimens	Bacteriologists/Technicians	Model laboratory requirements/equipment/consumables lists
Mycology		Mycologists/Technicians	
Histopathology	Knowledge of/contact with different areas of specialization within Level II; Knowledge of who to contact for Level III diagnostic assistance	Histopathologists/Technicians	Model job descriptions/skills list Contact information for accessing Level II and Level III specialist expertise Asia Diagnostic Guide to Aquatic Animal Diseases OIE Diagnostic Manual for Aquatic Animal Diseases Regional General Diagnostic Manuals Model laboratory requirements, equipment, consumables lists
Level III Activities	Highly equipped laboratory with highly specialized and trained personnel		
Virology	Keep and maintain accurate diagnostic records	Virologist/Technician	Model job descriptions/skills requirements
Electron microscopy	Preserve and store specimens	Ultrastructural histopathologist/Technicians	Contact information for reference laboratories
Molecular biology	Maintenance of contact with people responsible for sample submission	Molecular biology scientists/technicians	Protocols for preservation of samples for consultation/validation ODE Diagnostic Manual for Aquatic Animal Diseases General molecular and microbiology diagnostic references Asia Diagnostic Guide to Aquatic Animal Diseases
Immunology			

The reporting system paved the way for a more strengthened co-operation and collaboration among FAO, NACA and OIE whereby functional linkages and co-operation between fisheries and veterinary authorities of participating countries are now being established. An 'In-session Paper' was presented during the meeting of the OIE Regional Commission for Asia, Far East and Oceania, held in Kathmandu, Nepal in November 2001. The paper raised important issues regarding QAAD. As a result, the Meeting made the following recommendations: (a) quarterly reports submitted to the OIE Regional Office in Tokyo should be consistent with annual submissions to OIE Central Bureau; (b) OIE reporting should be done accurately; (c) and that OIE National delegates should cooperate and consult more closely with their national fisheries authorities especially in those countries where jurisdictional responsibility for aquatic animals does not, or not exclusively, lie with veterinary authorities.

Current efforts are now geared towards improving the quality of the reports, and establishing surveillance and monitoring programs for the list of diseases being reported.

*(c) Aquatic Animal Pathogen and Quarantine Information System (AAPQIS-Asia)*

AAPQIS, an internet-based information systems which enables comprehensive tracking and reporting of parasites and diseases on a regional basis, can serve as an important science-based instrument in making risk assessments for the movement of live aquatic animals. AAPQIS-Asia is based at NACA and is accessible at <http://www.enaca.org>. AAPQIS-Asia currently contains about 2000 bibliographic data and information on about 50 pathogens, mainly of trans-boundary importance, pathogen records for 22 countries, 100 hosts and 50 color images. More information, pathogens, records, images and drawings will be added, as they become available and shall be updated on a regular basis.

FAO is continuing the further development of AAPQIS to extend to other aquaculture regions of the world, with the development of AAPQIS-Africa, AAPQIS-Latin America and AAPQIS-Mediterranean. In addition, the further development of AAPQIS is being considered under a proposal being developed by the World Fish Center (ICLARM - International Center for Living Aquatic Resources Management) on Aquatic Animal Diseases, Food Safety and Trade for inclusion in the CGIAR Challenge Program on Animal Diseases, Food Safety and Trade.

*(d) National Strategy on Aquatic Animal Health Management*

Countries who have participated in the regional program are at different stages of development of the 'National Strategy' that contains the action plans of governments and which form the basis for the national level implementation of the 'Technical Guidelines'. The 'National Strategy' has the following components: legislation/policy, national coordination, list of pathogens, institutional resources, diagnostics, disease zoning, surveillance/reporting, contingency planning, import risk analysis, capacity building, and private sector consultation. These strategies are expected to be incorporated into the aquaculture development programs of participating countries. Box 1 shows some brief highlights with respect to 'National Strategy' development of some of the participating governments.



**Box 1:** Brief highlights of national strategies on aquatic animal health

**Australia:** Australia has a National Strategic Plan for Aquatic Animal Health 1998-2003 - AQUAPLAN - in place since April 1999. The Fish Health Management Committee (FHMC) ministerially appointed, is the body which oversees the development and implementation of AQUAPLAN. AQUAPLAN, which served as a model for other participating countries, is a broad, comprehensive strategy that outlines objectives and projects to develop a national approach to emergency preparedness and response and to the overall management of aquatic animal health in Australia. It comprises eight key programs under which Australia's government and private sectors have identified priority projects to achieve the program objectives. These are: (a) international linkages, (b) quarantine, (c) surveillance, monitoring and reporting, (d) preparedness and response, (e) awareness, (f) research and development, (g) legislation, policies and jurisdiction, and (h) resources and funding. Under the program, the following documents have been released: (a) Australian Aquatic Animal Disease Identification Field Guide (March 2000); (b) AQUAPLAN Zoning Policy Guidelines (August 2000, January 2001); (c) AQUAVETPLAN Enterprise Manual (December 2000); and (d) AQUAVETPLAN Furunculosis Disease Strategy Manual (June 2001).

**India:** India completed two consultative meetings (May and November 2001) to develop India's National Strategic Plan for Aquatic Exotics and Quarantine. The consultation was coordinated by the National Bureau of Fish Genetics and Resources and attended by all national ICAR Directors, fish health experts, policy makers, and other relevant organizations and institutes. The strategic plan comprise of 3 documents: (a) a strategic plan; (b) quarantine guidelines, and (c) handbook on exotics and quarantine. The strategic plan is ready for submission to the Ministry of Agriculture for implementation at the national level.

**Indonesia:** With the ministry level reorganization completed and a Directorate on Fish Health Management and Environment created, a national workshop will be convened in year 2002 to update the National Strategy that was developed in April 2000 with a new set of organizational responsibilities.

**Myanmar:** A national workshop will be convened in April 2002 to further develop the National Strategy and develop a proposal to source out funding for its implementation.

**Nepal:** A national workshop was convened from December 12-14, 2001 in Kathmandu, Nepal, to update the National Strategy and develop a proposal to source out funding for its implementation.

**Philippines:** A national workshop was convened in January 2002 involving key personnel of the Philippine Bureau of Fisheries and Aquatic Resources to further develop the 'National Strategy.' In this workshop, the different elements were prioritized and follow-up action plans with clear time-frame were identified and will be subject to further consultation with all relevant stakeholders before approval by the highest authority.

**Singapore:** Singapore's National Strategy is currently looking at import risk assessment and plans to monitor disease occurrence in newly introduced species for a period of three months is being considered. The Agri-food and Veterinary Authority of Singapore (AVA) continues to review and update the national list of diseases in order to prioritize health management actions for important marine foodfish pathogens identified. The AVA continues to hold dialogues with stakeholders and to bring awareness of the 'Technical Guidelines' and other health related issues.

**Thailand:** Thailand's National Strategies for Fish Disease Research and Development for 2001-2005 is in the process of being finalized. It's mission is to develop roles in controlling disease epizootics, technology for disease prevention and control and information exchange. The plan has 7 elements: (a) law and regulation; (b) organization; (c) cooperation; (d) research development; (e) academic development; (f) scientific services development; and (g) information technology.

**Vietnam:** A National Workshop on the Development of Vietnam's National Strategy for Aquatic Animal Quarantine was held in Hanoi, Vietnam on October 10-11, 2000. The workshop focused on 5 major areas: (a) quarantine and health certification, (b) diagnostics and health management, (c) aquatic animal health information systems, (d) policy and legislation, and (e) proposal for the implementation of the National Strategy. The National Strategy will be finalized in January 2002 for submission to the Ministry of Fisheries.

*(e) National and Regional Capacity Building on Aquatic Animal Health*

National capacity building activities through in-country training/workshops on various aspects of aquatic animal health management were undertaken during the three-year project implementation period. More details of national and regional level capacity building exercises are described in Box 2.

Briefly, national workshops concerning 'National Strategy' development including national disease reporting and information systems were held in Bangladesh, China PR, India, Indonesia, Philippines, Thailand and Vietnam. Training on Import Risk Analysis (IRA) was also undertaken in the Philippines and participated by officers from Hong Kong China, Malaysia and Thailand. Health assessment was also implemented in Lao PDR and Vietnam. A Basic Training Course on Health Management was held in Vietnam and attended also by officers from Cambodia and Lao PDR.

At the regional level, the three major workshops were conducted to build consensus and awareness to participating governments. A molluscan health management course, the first of its kind in the region, was initiated and participated by aquatic animal health specialists from Indonesia, Japan, Korea RO, Malaysia, Philippines, Thailand and Vietnam. Two expert technical consultations were held, one looking at the issues relating to research needs for standardization and validation of DNA-based molecular diagnostic techniques for the detection of aquatic animal pathogens and diseases (Walker and Subasinghe, 2000); and another on primary aquatic animal health care in small-scale rural aquaculture development (FAO/NACA/DFID/GOB, 2000).

**Box 2. National and regional capacity building activities (1998-2001)**

## 1. In-Country Training/Workshops:

## Bangladesh

- \* National Workshop on Disease Reporting and Development of National Disease Reporting System, November 24-28, 1998, Dhaka, Bangladesh
- \* Workshop on the Development of National Strategy Framework for Quarantine and Health Certification, April 13-15, 1999, Dhaka, Bangladesh

## Cambodia

- \* Participation of two Cambodians to the Training Course on Disease Diagnosis and Surveillance in Cultured Aquatic Animals, June 7-11, 1999, RIA-1, Hanoi, Vietnam

## China PR

- \* National Workshop on Quarantine, Health Certification, Information and Disease Reporting Systems, July 26-30, 1999, Beijing, China PR

## Hong Kong SAR China

- \* Two health officers attended the Philippine National Training Workshop on Import Risk Analysis (IRA) and Aquatic Animal Disease Surveillance, Reporting and Contingency Planning, November 15-20, 1999, Cebu City, Philippines

## India

- \* Development of Practical Guidelines and Strategy for Aquatic Animal Health Certification and Quarantine for India, May 28-29, 1998, Bhubaneswar, India
- \* Workshop on the Development of a Reporting System for Aquatic animal Diseases, May 30-31, 1998, Bhubaneswar

## Indonesia

- \* National Workshop on the Development of Indonesia's National Strategy on Aquatic Animal Health, May 22-25, 2000, Jakarta

## Lao PDR

- \* Three participants from Lao PDR participated in the Training Course on Disease Diagnosis and Surveillance in Cultured Aquatic Animals, June 7-11, 1999, RIA-1, Hanoi, Vietnam
- \* Aquatic Animal Health Assessment Survey in Southern Lao PDR, August 2-13, 1999, Savannakhet, Lao PDR

## Malaysia

- \* Two health officers attended the Philippine National Training Workshop on Import Risk Analysis (IRA) and Aquatic Animal Disease Surveillance, Reporting and Contingency Planning, November 15-20, 1999, Cebu City, Philippines

## Philippines

- \* National Training Workshop on Import Risk Analysis, November 15-17, 1999, Cebu City, Philippines
- \* National Training Workshop on Aquatic Animal Disease Surveillance, Reporting and Contingency Planning, November 18-20, 1999, Cebu City, Philippines

## Thailand

- \* National Training Workshop on Aquatic Animal Disease Surveillance and Reporting, September 2-4, 1999, Bangkok
- \* One fish health officer attended the Philippine National Training Workshop on Import Risk Analysis (IRA) and Aquatic Animal Disease Surveillance, Reporting and Contingency Planning, November 15-20, 1999, Cebu City, Philippines

## Vietnam

- \* Training Course on Disease Diagnosis and Surveillance in Cultured Aquatic Animals, June 7-11, 1999, RIA 1, Hanoi
- \* Inter-Institutional Meeting on Quarantine, Health Certification and Information Systems for the Responsible Movement of Live Aquatic Animals, June 14-16, 1999, RIA 1, Hanoi, Vietnam
- \* Training/workshop on aquatic animal health assessment and management of Tam Giang Lagoon. Hue, Vietnam, 19-23 August 1999 and 15-22 April 2000
- \* Vietnam National Strategy Development Workshop, October 2000, RIA 1, Hanoi

## 2. Regional Workshops

- \* First Training Workshop of the Regional TCP, January 16-20, 1998, Bangkok, Thailand
- \* Second Training Workshop of the Regional TCP, February 1-5, 1999, Bangkok, Thailand
- \* Final Workshop of the Regional TCP, 26-30 June, 2000, Beijing

## 3. Expert Consultations/Regional Workshops/Training Courses

- \* Expert Consultation on the Research Needs for the Standardization and Validation of DNA-based Molecular Diagnostic Techniques for the Detection of Aquatic Animal Pathogens and Diseases, February 7-9, 1999, Bangkok (jointly organized with ACIAR, CSIRO and DFID)
- \* Scoping Workshop on Primary Aquatic Animal Health Care in Small-Scale Rural Aquaculture Development, September 27-30, 1999, Dhaka (jointly organized with DFID)
- \* Asia-Pacific Regional Programme on Molluscan Health Management, Phase I: Training Course on Basic Molluscan Health Management, 29 November to 3 December 1999, Tigbauan, Iloilo (jointly organized with SEAFDEC-AQD, OIE, IFREMER, DFO-Canada and NIWA-New Zealand)
- \* Joint APEC/FAO/NACA/SEMARNAP Workshop on Trans-boundary Aquatic Animal Pathogen Transfer and the Development of Harmonized Standards on Aquaculture Health Management, Puerto Vallarta, Mexico, 24-28 July 2000
- \* Workshop of APEC FWG 02/2000 "Development of a Regional Research Framework on Grouper Virus Transmission and Vaccine Development", 18-20 October 2000, Bangkok, Thailand (jointly organized with APEC, FHS/AFS and AAHRI)
- \* Provisional Meeting of the Asia Regional Advisory Group on Aquatic Animal Health (AG), 7-9 November 2001, Bangkok, Thailand

## **NACA'S THIRD YEAR WORK PROGRAMME (2001-2005) - COMPONENT ON AQUATIC ANIMAL HEALTH MANAGEMENT AND DISEASE CONTROL**

The various components identified in the 'Technical Guidelines' are now the main elements of the Aquatic Animal Health Management and Disease Control Programme under NACA's Third Five Year Work Programme (2001-2005), approved during NACA GCM-12 held in Brisbane, Australia in December 2000 and the 2.5 year work activities recently planned and endorsed by the Sixth Meeting of the Technical Advisory Committee of NACA (TAC-6) held in Siem Reap in May 2001. As indicated elsewhere in this paper, support for the implementation of the 'Technical Guidelines' was expressed by APEC, ASEAN, MRC and SEAFDEC.

The main elements of the component on Aquatic Animal Health Management and Disease Control include: (a) promoting effective cooperation through regional resource centers on aquatic animal health; (b) harmonization of procedures for health certification, quarantine and diagnostics; (c) support to capacity building; (d) awareness raising, communication and information exchange on aquatic animal health; (e) regional disease reporting; (f) emergency response; and (g) joint activities for risk reduction in shared watersheds.

Assistance to countries in the implementation of the 'Technical Guidelines,' with special emphasis to the concept of "*phased implementation based on national needs,*" including monitoring and evaluation of its implementation, is the current thrust of the health program. Regional cooperation is a key strategy where effective partnerships with relevant organizations will continuously be established and strengthened. The National Coordinators will continue to be the focal points for implementation at the national level.

The first major activity undertaken to move forward the implementation of the 'Technical Guidelines' was the establishment of the Regional Advisory Group on Aquatic Animal Health (AG) during a meeting held at the NACA Headquarters in Bangkok from November 7-9, 2001. The Terms of Reference (TOR) of the AG, composition and follow-up activities for the coming year were finalized. The AG represents an official expert group on aquatic animal health, institutionalized under the NACA inter-governmental organization, with technical assistance from FAO and OIE, who will provide regular expert advice to Asian governments in the implementation of the 'Technical Guidelines.'

### **CURRENT AND FORTHCOMING PROJECTS**

A number of current projects being implemented (and/or under development) by NACA in cooperation with NACA's partners in development are described below:

#### *Shrimp Health Management Training Workshop*

This regular training workshop on shrimp health management carried out with AAHRI, lasts for 6 days and includes lectures, practical case studies, and farm visits. The emphasis is on maintaining healthy stock and preventing disease through management. The course is attended primarily by participants from the private sector.

*APEC FWG 01/2002 “Capacity and Awareness Building on Import Risk Analysis for Aquatic Animals”*

With NACA, as Project Implementor and Thailand's Department of Fisheries as Project Overseer, with Australia, Hong Kong China, Mexico, Philippines and the United States as cooperating economies, this Project consists of two training/workshops (Bangkok, Thailand on 1-6 April 2002; 12-17 August 2002 in Mazatlan, Mexico) whose objectives are to raise capacity among regulatory officers and aquatic animal health scientists, build consensus in conducting import risk analysis for aquatic animal importation, and establish networking. An IRA Manual for Aquatic Animals will also be developed as an outcome of the project. This project is a follow-up of one of the major recommendations from two APEC FWG funded projects where NACA was a collaborator, namely: (a) APEC FWG 03/2000 “Transboundary Aquatic Animal Pathogen Transfer and the Development of Harmonized Standards on Aquaculture Health Management (see APEC/FAO/NACA/SEMARNAP, 2001); and (b) APEC FWG 02/2000 “Development of a Regional Research Programme on Grouper Virus Transmission and Vaccine Development” (APEC/AAHRI/FHS-AFS/NACA, 2001).

*FAO/NACA Molluscan Health Management Programme*

FAO and NACA initiated a programme on molluscan health management in response to the recommendations arising from the Second Workshop of the Regional Programme on Aquatic Animal Health Management regarding the shortage of information and knowledge about molluscan diseases in the region. The workshop considered and recognized the need to establish baseline expertise that will provide the foundation for countries to develop their own national programmes for molluscan health monitoring, disease risk analyses and control of epizootics.

The over-all objectives of the Molluscan Health Management Programme are: (a) train national staff on techniques used in molluscan disease investigation, diagnosis and treatment; (b) build expertise in molluscan disease diagnosis and research in the Asian region; (c) through country-specific mollusc health survey/assessment - identifying molluscan diseases existing in, and of concern, to the Asian region; (d) prepare a Manual on Molluscan Health Management for Asia-Pacific; and (d) establish a network of people with expertise in molluscan diseases.

The programme which is of three phases is expected to: (a) develop baseline data on the health profile of economically significant molluscan species in the region; (b) identify molluscan diseases of concern to the Asian region and assist in updating the list of molluscan diseases included in the Asia-Pacific Quarterly Aquatic Animal Disease Report; (c) develop uniform standards of molluscan disease diagnosis, pathogen detection and pathogen identification comparable to those used by countries with mollusc aquaculture and fisheries; (d) enhance national and regional capability in molluscan health management and good husbandry practices; (e) establish an Asia-Pacific network of people with expertise in molluscan health; (f) prepare a reference Manual on Molluscan Health based on Asian material; (g) establish a reference collection of important molluscan diseases in the Asian region; and (h) identify a regional center for molluscan health.

Phase I - Basic Molluscan Health Management Training Course was implemented in November 1999 in Tigbauan, Iloilo, Philippines, hosted by SEAFDEC AQD in cooperation with OIE and IFREMER (France), NIWA (New Zealand) and DFO of Canada. Upon completion of the training course, the participants conducted a histological survey of diseases of important molluscan species as agreed during Phase I. Phase II - Training Workshop: Evaluation of Country Specific Survey, Manual Preparation and Follow-Up Training on Levels II/III will be held immediately following the Fish Health Section's (FHS) Fifth Symposium on Diseases in Asian Aquaculture (DAA5) in November 2002 to be hosted by the University of Queensland involving the same participants for an extensive histopathological examination of survey materials collected by participants, drafting an outline of the Molluscan Health Manual and follow-up training on Levels II/III.

Under this program, the preparation of the South Sea Pearl Oyster Health Management Manual is also underway. This particular project received strong support from molluscan pathology scientists from Australia, Canada, France, Japan, New Zealand and the Secretariat of the Pacific Commission who offered to assist in writing the specific chapters that will provide information on diseases and health strategies on pearl oysters in their countries.

#### *Shrimp Disease Control and Coastal Management with India's Marine Products and Export Development Authority (MPEDA)*

This project is on-going, comes in three phases and involves the following studies and activities: (a) horizontal and vertical transmission of diseases in the selected shrimp farming areas, including investigation of hatcheries and broodstock; (b) development of practical measures for containing/preventing shrimp disease outbreaks, which should specifically cover identification of shrimp disease risk factors, diagnosis of problems and management strategies to control disease in farms; (c) conducting training and demonstration of appropriate shrimp disease control measures, which should especially include demonstration of efficient farm management practices for containing viral and other diseases in selected farms; and (d) examining opportunities for co-operation and self-help among shrimp farmers in affected areas to control water quality deterioration and shrimp disease control.

#### *ACIAR's Surveillance Toolbox for Aquatic Animal Diseases*

NACA was involved in a small group of experts organized by ACIAR which met in Bangkok, Thailand in May 2000 to develop this surveillance toolbox for aquatic animal diseases. The document is almost completed and after publication, NACA shall assist in organizing a regional workshop to introduce the concepts contained in the toolbox for pilot testing and adoption.

#### *MRC's Mekong Basin Health Management Program*

The program is currently under development and shall involve the four riparian countries of the Mekong Basin (*i.e.*, Cambodia, Lao PDR, Thailand and Vietnam). A scoping workshop is

being planned in 2002 to develop the proposal which will consider policy issues, capacity building and mechanisms for practical implementation of the 'Technical Guidelines' within the Mekong Basin.

*Capacity Building, Harmonization and Inter-calibration for DNA-based Diagnostic Technologies for Detection of Prawn Viruses in the Asian Region*

This project is still under development and builds on the results of ACIAR Project FIS 96/98 *Diagnostic Tests and Epidemiological Probes for Prawn Viruses in Thailand and Australia* - a cooperative project between CSIRO, Mahidol University, Thai Department of Fisheries and NACA, implemented from 1998 to 2000. The proposal will be submitted to the International Agricultural Cooperation Program of Australia with AFFA, CSIRO, Mahidol University and NACA as collaborators. The project will involve 12 NACA member governments and has four major components: (a) polymerase chain reaction training/workshop, (b) inter-government consultation, (c) inter-laboratory calibration of test sensitivities; and (d) establishment of an Asia-Pacific Prawn Health Network.

*Support to other Regional/International Initiatives on Health*

NACA continues to provide technical assistance to FAO's initiatives. Examples are participation in FAO TCP/RLA/0071 "Assistance to Health Management in Shrimp Aquaculture in Latin America" which is continuing and involvement of NACA to the forthcoming FAO/OIE/DFO-Canada Expert Consultation on Surveillance and Disease Zoning being organized in Rome in October 2002.

NACA also participated in the ASEAN-SEAFDEC Millenium Conference on "Fish for the People" held in Bangkok, Thailand in November 2001 and the SEAFDEC-OIE Seminar/Workshop on Disease Control in Fish and Shrimp Aquaculture in Southeast Asia - Diagnosis and Husbandry Techniques, held in Iloilo, Philippines in December 2001.

## CONCLUSION

NACA will continue to develop projects and seek cooperation from its partners, promote enhanced and strengthened cooperation between organizations in order to provide more assistance to countries, both at national level and regional levels in our quest for resolutions to aquatic animal diseases facing our region.

NACA extends its appreciation to SEAFDEC for the invitation and support to participate at the SEAFDEC-OIE Seminar/Workshop on Disease Control in Fish and Shrimp Aquaculture in Southeast Asia - Diagnosis and Husbandry Techniques, held in Iloilo, Philippines in December 2001, to present NACA's program on aquatic animal health management.

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