REPORT OF THE SIXTH MEETING OF THE ASIA REGIONAL ADVISORY GROUP ON AQUATIC ANIMAL HEALTH

Network of Aquaculture Centres in Asia-Pacific

Bangkok, Thailand

12-14 December 2007

Preparation of this document:
This report was prepared by the 6th Asia Regional Advisory Group (AG) on Aquatic Animal Health (AGM-6) that met at NACA Secretariat, Bangkok, Thailand, on the 12th-14th December 2007.

The Advisory Group was established by the Governing Council of the Network of Aquaculture Centres (NACA) to provide advice to NACA members in the Asia-Pacific region on aquatic animal health management, through the following activities: (a) Review and evaluation of quarterly regional aquatic animal disease reporting; (b) Review and evaluation of implementation of the *Technical Guidelines*; (c) Revision of the *Technical Guidelines*[1], *Manual of Procedures*[2] and *Asia Diagnostic Guide for Aquatic Animal Diseases*[3] as required; (d) Development of procedures for advising on Technical Guideline implementation; and (e) Advise on identification and designation of regional aquatic animal health resources, including specialist advisers, Regional Reference Laboratories and Resource Centres. Members of the Advisory Group include invited aquatic animal disease experts, World Animal Health Organization (OIE), Food and Agricultural Organization of the United Nations (FAO) and collaborating regional organizations.

Reference: NACA 2008. Report of the Sixth Meeting of the Asia Regional Advisory Group on Aquatic Animal Health. Published by the Network of Aquaculture Centres in Asia-Pacific, Bangkok, Thailand.

[1] Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing consensus and Implementation strategy, 2000. FAO/NACA. Fisheries Technical Paper No 402
[2] FAO/NACA. 2001. Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals. *FAO Fisheries Technical Paper*, No. 402, Suppl. 1. FAO, Rome. 2001. 106 p.
[3] Bondad-Reantaso, MG, McGladdery SE, East, I and Subasinghe, RP. (Eds.). Asia Diagnostic Guide to Aquatic Animal Diseases. *FAO Fisheries Technical Paper*, No. 402, Suppl. 2. FAO, Rome. 2001. 236 p.

Abbreviations and Acronyms

AADCP-RPS	ASEAN Australia Development Cooperation Program – Regional Partnership Scheme
AAHRI	Aquatic Animal Health Research Institute (Thailand)
AAHSC	Aquatic Animal Health Standards Commission of the OIE
AAPQIS	Aquatic Animal Pathogen and Quarantine Information System (FAO)
ACIAR	Australian Centre for International Agricultural Research
ADG	Asia Diagnostic Guide
AG	Advisory Group
AGM	Advisory Group Meeting
AIT	Asian Institute of Technology
ANAAHC	ASEAN Network of Aquatic Animal Health Centres
ASDD	Abdominal segment deformity disease (in *P.vannamei*)
ASEAN	Association of South East Asian Nations
ASEC	Asean Secretariat
AusAID	Australian Agency for International Development
AVG	Abalone viral ganglioneuritis
AVM	Abalone viral mortality
AVN	Acute viral necrosis (in scallops); also referred to as acute viral necrobiotic disease of scallops
AVNV	Acute viral necrosis virus
BFAR	Bureau of Fisheries and Aquatic Resources (Philippines)
BKD	Bacterial kidney disease
BMGN	Baculoviral midgut gland necrosis
BMP	Better management practices
CAA	Coastal Aquaculture Authority (India)
CCRF	Code of Conduct for Responsible Fisheries (FAO)
CCV	Channel catfish virus
CCVD	Channel catfish virus disease
CIBA	Central Institute of Brackishwater Aquaculture (India)
CLM	Cambodia, Lao PDR and Myanmar
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
CVO	Chief Veterinary Officer
DAFF	Australian Government Department of Agriculture, Fisheries and Forestry
DOF	Department of Fisheries (Thailand)
ESC	Enteric septicaemia of catfish
EU	European Union
EUS	Epizootic ulcerative syndrome
FAO	Food and Agricultural Organization of the United Nations
FHS	Fish Health Section of the Asian Fisheries Society
FIGIS	Fisheries Global Information System (FAO)
GAV	Gill associated virus
GC	Governing Council of NACA
GCHV	Grass carp haemorrhagic virus
GID	Grouper iridoviral disease
HPV	Hepatopancreatic parvo-like virus
HPVD	Hepatopancreatic parvo-like virus disease
ICAR	Indian Council of Agricultural Research
IHHNV	Infectious hypodermal and haematopoietic necrosis virus
IMN	Infectious myonecrosis
IMNV	Infectious myonecrosis virus
IPN	Infectious pancreatic necrosis

ISKNV	Infectious spleen and kidney necrosis virus
KHV	Koi herpesvirus
KHVD	Koi herpesvirus disease
LFF	Live food finfish
LSNV	Laem Singh necrosis virus (in *P. monodon*)
MBV	Monodon baculovirus
MLD	Milky lobster disease
MoVD	Mourilyan virus disease
MPEDA	Marine Products Export Development Authority (India)
*Mr*NV	*Macrobrachium rosenbergii* nodavirus
MSGS	Monodon slow growth syndrome
NACA	Network of Aquaculture Centres in Asia-Pacific
NaCSA	National Center for Sustainable Aquaculture (India)
NC	National Coordinator
NHP	Necrotising hepatopancreatitis
OIE	World Organisation for Animal Health
OOD	Oyster oedema disease
PANDA	Permanent Advisory Network for Diseases in Aquaculture (of the EU)
PCR	Polymerase chain reaction
PL	Postlarvae
*Pv*NV	*Penaeus vannamei* nodavirus
PVS	Performance of Veterinary Services
QAAD	Quarterly Aquatic Animal Disease
RRC	Regional resource centre
RRE	Regional resource expert
RRL	Regional reference laboratory
RSID	Red seabream iridoviral disease
RT-PCR	Reverse transcriptase PCR
SAARC	South Asian Association for Regional Cooperation
SEAFDEC	Southeast Asian Fisheries Development Center
SEAFDEC-AQD	Southeast Asian Fisheries Development Center Aquaculture Department
SOP	Standard operating procedure
SPF	Specific pathogen free
SVC	Spring viraemia of carp
SVCV	Spring viraemia of carp virus
TG	Technical Guidelines (Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals)
TS	Taura syndrome
TSV	Taura syndrome virus
VER	Viral encephalopathy and retinopathy
VNN	Viral nervous necrosis
VNNV	Viral nervous necrosis virus
WAHIS	World Animal Health Information System
WAHID	World Animal Health Information Database
WSD	White spot disease
WSSV	White spot syndrome virus
WTD	White tail disease
WTO	World Trade Organization
XSV	Extra small virus
YHV	Yellowhead virus

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Opening session

The sixth meeting of the Asia Regional Advisory Group on Aquatic Animal Health (AGM-6) was held at the NACA Secretariat, Bangkok, Thailand on 12th-14th December 2007.

Professor Sena De Silva, Director General of NACA, formally opened the meeting. He welcomed the Advisory Group (AG) members and the co-opted members to Bangkok and thanked them for their active involvement in the regional aquatic animal health programme. Professor De Silva highlighted the significant role played by the AG in supporting the implementation of a strong aquatic animal health programme in the Asia Pacific region.

Election of Chair and Vice Chair

The meeting was called to order by Dr Supranee Chinabut, the outgoing Chair of AG. Nominations for Chair and Vice-Chair for the 6th AGM were invited. Dr Eva-Maria Bernoth was elected as the Chair of the AG, nominated by Dr Supranee Chinabut and seconded by Dr Celia Pitogo. Dr Celia Pitogo was elected as the Vice-Chair, nominated by Dr Eva-Maria Bernoth and seconded by Dr Huang Jie. The outgoing Chair thanked the members for their support and cooperation. The incoming Chair thanked members for selecting her and assured members that she would make her best efforts to ensure successful conduct of 6th AGM.

Following the welcome remarks, Dr Eva-Maria Bernoth took over as Chairperson of the Meeting and requested the AG members to review the agenda. The participants reviewed and adopted the AG Meeting agenda (Annex A) with the addition of one more item (item 1.4. Comments on commodity standards in the OIE *Aquatic Animal Health Code*). The list of participants is given as Annex B.

Session 1: Progress since AGM-5 and expected outputs from AGM-6

1.1 Progress report from NACA on progress since AGM-5 and expected outputs from AGM-6

The AG was informed of the progress made since AGM-5. The report dealt in detail about the major regional activities that have contributed to strengthening aquatic animal health management in the region and identified issues for discussions during the meeting. A full progress report is provided as Annex C. The presentation provided details about the following key regional activities to the AG:

- Highlights of AGM-5
- Outcomes of the 18th NACA Governing (GC) meeting
- Quarterly Aquatic Animal Disease (QAAD) reports and regional disease status
- Progress on implementation of Technical Guidelines (TG)
- Progress on implementation of various regional projects in support of aquatic animal health management in the Asia Pacific region
    - Australian Centre for International Agricultural Research (ACIAR) regional shrimp health project – Application of Polymerase chain reaction (PCR) for improved shrimp health management in Asia
    - ACIAR regional better management practices (BMP) communication project-Strengthening regional mechanisms to maximize benefits to small-holder shrimp farmer groups adopting better management practices
    - ASEAN Australia Development Cooperation Program – Regional Partnership Scheme (AADCP-RPS) project 370-021-Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN (Association of South East Asian Nations)

    - AADCP-RPS project 370-018-Operationalize Guidelines on Responsible Movement of Live Food Finfish (LFF) in ASEAN
    - PCR training, calibration and harmonization in India and Indonesia
    - Australian Government Department of Agriculture, Fisheries and Forestry (DAFF)/NACA collaboration on publication of Aquatic Animal Diseases Significant to Asia-Pacific: Identification Field Guide
    - Marine Products Export Development Authority (MPEDA, India)/NACA shrimp BMP project in India – Promoting widespread adoption of BMPs in shrimp farming in India
    - Asian Institute of Technology (AIT)/NACA/Department of Fisheries (DOF) shrimp BMP project in Thailand – Capacity building of small-scale shrimp farmers on adaptation of BMPs to promote Thai shrimp export to the European Union (EU)
- Details of various capacity building and training activities conducted
    - Master class in fish pathology
    - Indian Council of Agricultural Research (ICAR)/NACA national training workshop on aquatic epidemiology, surveillance and emergency preparedness
    - FAO/NACA/Aquatic Animal Health Research Institute (AAHRI) Molluscan Health Phase III Regional Training Workshop
    - FAO/NACA Workshop on Information Requirements for Maintaining Aquatic Animal Biosecurity
    - FAO/NACA workshop: Understanding and applying risk analysis in aquaculture
- Details of NACA's participation and provision of technical assistance and collaboration to other related regional activities
- Details of ongoing regional and international collaborations and new project proposals being developed.

Following the presentation, the report was opened for questions and comments.

Observations and Recommendations:

- The AG congratulated NACA for the excellent progress made and adopted the progress report.
- Considering the direct and indirect impacts of various ongoing NACA regional aquatic animal health activities (e.g. projects, training programmes, technical missions, harmonization exercise) towards progressing the implementation of TG in several countries in 2006-2007, the AG strongly felt that such an holistic approach is more appropriate and practical than undertaking a compartmentalized approach of addressing individual TG elements. The AG recommended that such approach should be continued and further strengthened.
- The AG also recognized that building capacity on aquatic animal health still represents a major requirement for the region and efforts should be continued.
- The AG was concerned that nominations received from countries to participate in capacity building activities facilitated by regional organizations (e.g. NACA, Southeast Asian Fisheries Development Center [SEAFDEC]) are not always appropriate. The AG suggested that governments should consider the long term benefits and make an effort to nominate the right participants, keeping in mind the long term interest of the country.
- The AG recommended that attempts be made by regional organizations to set up a database of capacity building activities organized in the region and details of participants.
- The development of standard operating procedures (SOPs) for responsible movement of LFF within ASEAN under the AADCP-RPS project was seen as a good regional initiative towards harmonization. The AG suggested that such focussed approaches for specific commodities tend to have better impact and application compared to generic guidelines, which are hard to implement.

- The AG recognized the long term benefits of governments seconding their aquatic animal health officers to NACA and suggested that more countries in the region should be encouraged to second officers.

1.2 Outcomes from the OIE General Session (May 2007) and the Aquatic Animal Health Standards Commission meeting (October 2007)

Dr Eva-Maria Bernoth (President of the OIE Aquatic Animal Health Standards Commission - AAHSC) first reported on outcomes from the 75th General Session of the OIE with relevance to aquatic animal health.

The OIE International Committee adopted the listing of two additional crustacean diseases, Infectious myonecrosis (IMN) and White tail disease (WTD). For these two diseases, specific reporting obligations will come into force on 1 January 2008. Necrotising hepatopancreatitis (NHP) will retain the footnote "Listing of this disease is under study", and Hepatopancreatic parvovirus disease (HPVD) and Mourilyan virus disease (MoVD) will now receive this label. There are therefore no specific reporting obligations for these three diseases (but general reporting obligations apply, for example, when there are findings of epidemiological significance to other countries). There were no changes to the list of fish diseases and the list of mollusc diseases, respectively.

The OIE International Committee adopted a new chapter on koi herpesvirus disease (KHVD) for the *Aquatic Animal Health Code* (*Aquatic Code*) and revised chapters for six mollusc diseases and six crustacean diseases, respectively. Almost all of the disease chapters in the *Aquatic Code* are now in the new format. Dr Bernoth recapitulated that this format has articles in four large sections: (1) a contextual definition of the disease and the scope of the chapter, the latter being susceptible species that are internationally traded, (2) a list of commodities that are safe, i.e. for which there should be no restrictions for the disease under consideration, commodities for which certain measures are recommended, and commodities that require a risk analysis, (3) provisions for achieving, maintaining and regaining freedom for countries, zones and compartments, respectively, and following the different pathways of absence of susceptible species, historical freedom, or targeted surveillance, and (4) disease-specific recommendations for the importation of live animals and dead products, taking into consideration the purpose of the importation (e.g. aquaculture, human consumption, animal feed) as well as the origin of the consignment (whether or not declared free from the disease under consideration). Dr Bernoth explained each of these sections in some detail.

The OIE International Committee adopted a new disease chapter for KHVD for the *Manual of Diagnostic Tests for Aquatic Animals* (*Aquatic Manual*). The International Committee also agreed to the AAHSC's recommendation to accept the applications of two laboratories be recognised as OIE Reference Laboratories for KHVD, i.e. the Fisheries Research Agency, Research Promotion & Development Department, Yokohama, Japan, with Dr Motohiko Sano as the expert, and the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Weymouth, UK, with Dr Keith Way as the expert.

Sixty-five OIE Members had replied to a questionnaire on amphibian diseases in December 2006, and of these replies, 46 (over 70%) supported the inclusion of amphibian diseases in the remit of the OIE. In view of this supportive majority, the OIE International Committee agreed to this expansion.

Dr Bernoth then provided a brief summary of draft new or revised standards following the meeting of the AAHSC in October 2007. Each of these drafts is currently with OIE Member Countries and Territories for comment. Depending on the extent and nature of comments received, some of these draft new or revised standards may be progressed at the Commission's next meeting

in March 2008 with a view to proposing them for adoption at the 76th General Session of the OIE in May 2008.

The *Ad hoc* Group on Amphibian Diseases had assessed two diseases of amphibians against the OIE aquatic animal disease listing criteria: infection with *Batrachochytrium dendrobatidis* and infection with ranavirus. The AAHSC supported the *ad hoc* group's conclusion that those diseases meet the listing criteria. A new *Ad hoc* Group on Abalone Diseases will assess the Australian condition abalone viral ganglioneuritis (AVG) against the listing criteria and – provided it meets them – also suggest whether AVG should be listed as part of the already listed abalone viral mortality (AVM) complex, or separately. Three crustacean diseases still under study (NHP, HPVD and MoVD) will be referred for re-consideration to the *Ad hoc* Group for the Listing of Crustacean Diseases. This *ad hoc* group will also review the currently listed diseases spherical baculovirosis and tetrahedral baculovirosis as to whether they still meet the criteria for listing, which had previously been questioned by Thailand.

The Commission has circulated for comment *Aquatic Code* chapter drafts for the two crustacean diseases listed in May (IMN and WTD), drafts for the two amphibian diseases proposed for listing (see above), a revised draft for the fish disease gyrodactylosis (*Gyrodactylus salaris*) and the mollusc disease Infection with *Mikrocytos mackini*. As yet, there is no revised draft for crayfish plague.

Other draft text currently with OIE Members for comment includes (1) Guidelines for aquatic animal health surveillance (to replace Chapter 1.1.4 in the *Aquatic Manual*), (2) Guidelines on the control of aquatic animal health hazards in aquatic animal feed, (3) Guidelines on the handling and disposal of carcasses and wastes of aquatic animals, and (4) an Introduction to the OIE Guidelines for the welfare of live aquatic animals. Discrete revised draft guidelines for aquatic animal welfare are not yet available.

Dr Bernoth reported on progress with further important initiatives. The next edition of the *Aquatic Manual* is scheduled to be published in June/July 2009. The AAHSC reviewed the revised template for *Aquatic Manual* disease chapters which will now be sent to all the authors, including authors of chapters that were not updated in the 2006 edition, with the request that they use it to update their chapters. The OIE *Ad hoc* Group on the Evaluation of Veterinary Services, which has been responsible for the development of the Performance of Veterinary Services (PVS) procedures, met in July 2007 and considered how to accommodate the use the tool to assess aquatic animal health services. The OIE Central Bureau will revise the introduction to the OIE PVS Tool to provide scope for aquatic animals to be included in an evaluation and to identify the legal basis of such evaluation. Dr Bar-Yaacov, CVO of Norway, who has assisted the Commission in this process, indicated that she would develop a short text on general principles to guide assessors on the use of the OIE PVS Tool in the context of evaluating an aquatic animal health system. Both drafts are to be ready for the AAHSC to consider at its next meeting in March 2008. Finally, Dr Bernoth reported that publication of the proceedings of the First OIE Global Conference for Aquatic Animal Health – defining roles and responsibilities, which had taken place in October 2006 in Bergen, Norway, is imminent. Publication of a special issue in the *OIE Scientific and Technical Review* series on "Changing trends in managing aquatic animal disease emergencies" is planned for April 2008; all manuscripts have been received and reviewed and are now in the process of copy-editing by OIE.

Observations and Recommendations:

- The AG thanked the President of the AAHSC for providing very clear and useful information and commended the AAHSC for their continuous collaboration with the NACA and the AG.
- The AG was pleased to note that the *Ad hoc* Group for the Listing of Crustacean Diseases will also review the currently listed diseases spherical baculovirosis and tetrahedral

baculovirosis as to whether they still meet the criteria for listing, which had previously been questioned by Thailand, as a result of previous AG deliberations.

- The AG felt that the recent developments within the OIE are of significant relevance to international trade and implementation of national aquatic animal health strategies. In view of this, the AG requested NACA to disseminate the information to National Coordinators (NCs)/aquatic national focal points as appropriate.
- The AG suggested that member countries should explore options to make use of the OIE PVS tool and seek assistance from OIE to assess the performance of their Veterinary Services, where possible.

1.3 Global issues of relevance to aquatic animal health management in the region

The FAO representative made a brief presentation on various activities FAO is undertaking globally to assist Members in improving national aquatic animal health management activities. FAO recognized the importance of aquatic animal health management in the region. The report dealt in detail about ongoing activities of FAO in different parts of the world (Asia, Africa, Eastern Europe, Gulf Region, Pacific Islands) in support of aquatic animal health management. The detailed report from FAO is provided as Annex D.

Since the recent outbreak of Epizootic ulcerative syndrome (EUS) in Africa, there is an interest and a need for improving biosecurity in that region and FAO has been requested to assist in developing a biosecurity framework, encompassing aquatic animal health management and reducing the risks of aquatic pathogen incursions and resulting diseases. The meeting was told that FAO is currently working in this direction and is planning to have a regional workshop, in collaboration with OIE, during early 2008 to develop such a framework and build consensus on its implementation. The countries sharing the Zambezi river system, where EUS has been detected, have requested FAO for a programme to improve aquatic animal health capacities in those countries. FAO is working with these countries through an emergency regional project assisting capacity building, developing national emergency preparedness and response strategies and initiating active surveillance programme to better understand the EUS situation in the counties.

The meeting was informed that on climate change issues, FAO will convene a high level conference on World Food Security and the Challenges of Climate Change and Bioenergy in Rome in June 2008. FAO is also planning more work on aquatic biosecurity, specifically on "Prudent use of chemicals in aquaculture". The meeting was also informed that FAO is collaborating with NACA in preparing guidelines for aquaculture certification for international agreement. These guidelines encompass aquatic animal health management aspects of aquaculture and refer to regional and global scenarios and the OIE *Aquatic Code* and FAO Code of Conduct for Responsible Fisheries.

The AG was informed that FAO will soon publish two documents ("Health management for Responsible movement of live aquatic animals", and "Procedures for the quarantine of live aquatic animals: a manual") in support of the aquatic animal health programme.

Observations and Recommendations:

- The AG thanked FAO for its contribution to the development of aquatic animal health management in the Asia-Pacific region and globally.
- The AG observed that FAO publications (a) Health management for Responsible movement of live aquatic animals, and (b) Procedures for the quarantine of live aquatic animals: a manual, will be very relevant and useful to the region and suggested that NACA work closely with FAO in widely disseminating the publications in the region and take up regional programmes to assist member countries in implementing these guidelines.

- The AG thanked FAO for involving NACA and Regional expertise (AAHRI) in its emergency technical assistance mission to Africa in the wake of EUS outbreaks.
- The AG suggested that NACA collaborate closely with FAO in providing regional expertise to the proposed FAO regional programme in Africa. The lessons learned in the Asia Pacific region over the last ten years in the development and implementation of the aquatic animal health programme could be effectively used in developing simple and sound regional programme for Africa and NACA could play an important role in fostering the south-south cooperation.

1.4 Comments on commodity standards in the OIE *Aquatic Animal Health Code*

Prof Timothy Flegel presented a position paper titled "Lack of uniformity in commodity guidelines for fish, molluscs and shrimp in the Aquatic Animal Health Code of the World Organisation for Animal Health (OIE)". He suggested that the commodity standards in the *Aquatic Code* are somewhat similar for fresh chilled and fresh frozen fish and molluscs but highly restrictive for fresh chilled or fresh frozen shrimp. No explanation is given for the discrepancy. Therefore, OIE Member Countries could apply import restrictions for shrimp products that would not be applied to similar fish and mollusc products.

Observations and Recommendations

- The AG thanked Prof Timothy Flegel for putting the paper together for the consideration of the AG.
- On the subject of lack of harmonization between chapters in the *Aquatic Animal Health Code,* Dr Eva-Maria Bernoth clarified on behalf of the AAHSC that different chapters are produced at different times. When revised chapters for some diseases are adopted, changes are subsequently made to other chapters (where appropriate) to achieve consistency.
- On the issue of not listing frozen shrimp as a safe commodity, Dr Bernoth clarified that no country had objected to this and hence those chapters were adopted in May 2007. However, she strongly encouraged that scientific evidence supporting the listing of such commodities as safe should be brought to the attention of the OIE for consideration through the formal channel (i.e. country delegate).

Session 2: Review of regional disease status

2.1 Emerging crustacean diseases in the region

Prof Timothy Flegel provided a detailed presentation to the AG of emerging crustacean diseases in the region. He highlighted the following points in his presentation:

- The cryptic nature of crustacean viruses and their ability to cause multiple infections raises important issues to be addressed when considering the transboundary movement of live crustaceans.
- Yellowhead virus (YHV) and Whitespot syndrome virus (WSSV) are lethal to all cultivated shrimp in the region. WSSV still remains an important problem in the region. Six geographical types of YHV have been identified. YHV-1 found in Thailand is considered to be highly virulent followed by YHV-II (Gill associated virus - GAV) found in Australia. All other types of YHV were considered to be non virulent and therefore not significant.
- Taura syndrome virus (TSV) is still an important problem of *P.vannamei.* Even though TSV is known to infect local species such as *P.monodon*, *M.rosenbergii* and *P.japonicus*, its effects were considered to be not significant. There has been no reported effect on cultivated Asian shrimp reported since 1998 (almost ten years). Most domesticated stocks of *P.vannamei* are highly tolerant.

- TSV outbreaks would appear to originate from postlarvae (PLs) that are not specific pathogen free (SPF), although carriers such as wild crabs, which have been shown to be susceptible to long-term infection, may play an important role.
- IMN was recognized as the most recent threat. IMN was first reported in Brazil in 2002 and it was associated with gradual mortality reaching up to 70%. IMN was reported for the first time in the region (Indonesia) in June 2006 and, for its close similarity (99.6%) with the Brazilian strain it would appear to have been associated with the movement of crustaceans from Brazil to the region. It is now reported from *P. vannamei* farms on both Java and Sumatra islands. PCR kits are now available in the region for screening PL for IMNV.
- Muscle cramp syndrome, similar in pathology and clinical appearance to IMN, has been reported from many countries. This condition, for some unknown reason, is common in *P.vannamei*, but these shrimp test negative for IMNV infection
- Infection with *P.vannamei* nodavirus (*Pv*NV), first reported from Belize (2004) is indistinguishable from IMN in gross signs and histopathology has not yet been reported from Asia.
- Abdominal segment deformity disease (ASDD) was reported from Thailand and Indonesia in *P.vannamei*. The appearance of affected shrimp is similar to some infections with Infectious hypodermal and haematopoietic necrosis virus (IHHNV) except there is no retarded growth and no bent rostra. PCR tests for IHHNV are negative as are PCR and Reverse transcriptase PCR (RT-PCR) tests for other viruses including IMNV, *Pv*NV and Laem Singh necrosis virus (LSNV). Many viral-like particles are found in the muscle and ventral nerve cord and it appears to be caused by a new pathogen originating from natural Asian carrier species. Although not affecting survival, the occurrence of ASDD in *P.vannamei* farms in Thailand and Indonesia is associated with deformities that lead to a reduction in market prices of about 10 baht/kg, therefore leading to significant financial losses.
- IHHNV was considered an emerging problem for *P.vannamei* in Philippines.
- For *P.monodon*, WSSV and YHV are still considered most serious pathogens. The next most serious problem in *P.monodon* is Monodon slow growth syndrome (MSGS). This is followed by HPV and Monodon baculovirus (MBV) that do not appear to cause mortality but retarded growth.
- MSGS is the most significant problem of shrimp in Thailand, and possibly in some other *P. monodon* culturing countries like India. Recent results have shown that small shrimp from MSGS ponds show retinopathy. They are positive by RT-PCR for LSNV and also show strong *in situ* hybridization reactions in necrotic retinas. Large shrimp from the same ponds are also positive for LSNV by RT-PCR but show no retinopathy. Shrimp from normal growth ponds may also be positive by RT-PCR but show no retinopathy. Therefore, LSNV appears to be associated with MSGS but the possibility of involvement of other factors (including pathogen(s)) is being studied. Further work in this direction is underway. LSNV has also been reported from some other countries in the region.
- Non-pathogenic YHV "type-4" and an unknown, icosahedral, viral-like particle associated with tegumental glands (tentatively called tegumental gland associated virus) are being investigated for their role as potential partners of LSNV in causing MSGS.
- A new *Macrobrachium baculovirus* and HPV have been detected. They cannot be detected with MBV or HPV methods
- Milky lobster disease (MLD) has been reported recently from caged lobsters in Vietnam (10 million USD losses). It appears to be caused by a new rickettsial type bacterium. An intensive research programme is underway in Vietnam
- NHP is still exotic to the region and is considered a potential threat to shrimp farming in the region.

- *Macrobrachium rosenbergii* nodavirus (*Mr*NV) was considered to be a serious problem in freshwater prawn farming in some countries of the region. *Mr*NV is capable of infecting *P.monodon*, but to date, there is no evidence of any disease.

The AG was informed of the new isothermal PCR detection methods for TSV, WSSV and HPV. The total time required for the test is less than 2h including extraction. The basic equipment is very cheap, and neither a PCR machine nor electrophoresis are required. This LAMP-PCR is seen as a very good development for rapid and cheap diagnosis. The AG was also informed of a breakthrough in cultivation of shrimp viruses in insect cell lines, which will greatly facilitate work with shrimp viruses.

Observations and Recommendations:

- The AG appreciated the report given by the crustacean disease expert and considered it to be very useful to the region.
- Realizing the scientific and health management value of the information provided, it was suggested, that NACA make the summary information available to all member countries at the earliest.
- The AG recommended that some of these diseases be assessed against the listing criteria for possible inclusion in the QAAD regional list.

2.2 Status of emerging finfish diseases in the region

Status of emerging finfish diseases in the region was informed to the AG by Dr Lauke Labrie. The following points were highlighted:

- Epidemiological data on finfish disease is needed.
- A large number of health problems in finfish are still detected in several countries in the region.
- *Edwardsiella tarda* was identified as a problem in several countries and associated with outbreaks in red seabream, Japanese flounder, turbot, catfish and eel.
- "BB" or big belly is associated probably with a new *Vibrio* sp. causing high mortality in seabass fry. The syndrome can be easily diagnosed based on the occurrence of clinical signs (blacking of fish, thin tail musculature and swollen abdomen filled with granulomatous connective tissue). Mortality is high (up to 80% in one week) and so far is found to affect only Asian seabass.
- *Streptococcus dysgalactiae* is an emerging disease of yellowtail in Japan, affecting primarily larger fish and detected also in China. No further cases have been found
- *Francisella* sp. is an emerging problem of cod and salmon in Norway and Chile, respectively. It is now causing emerging problems in tilapia in Indonesia. This is the first *Francisella* sp described in fish. The homogeneity of the isolates form different locations is still unclear and requires further investigation.
- Visceral toxicosis in catfish is a major problem in the US and similar clinical disease signs were seen in catfish in China. No agent has been identified with the disease and no further information has been reported.
- Loss of mucus and septicaemia syndrome is a major problem of European eel in China. No agent has been identified with the disease although it would appear to be associated with a virus. Further investigations are ongoing in China to evaluate the causes of the disease.
- *Streptococcus iniae* remains a major problem in the marine environment and is found also in freshwater environments.
- *Tenacibaculum maritimum* is a global problem affecting most aquaculture marine species with mortalities up to 90% in fingerlings. Its isolation is difficult, leading most likely to an underestimation of the problem

- *Nocardia seriolae* is a problem of increasing importance, being associated with higher mortality and showing an increasing geographical spread. It seems that some fish species are more susceptible than others. Isolation is difficult and is successful in only approximately 50% of all cases.
- *Streptococcus agalactiae* is still a major problem in freshwater environments and especially in tilapia culture
- *Edwardsiella ictaluri* is a major problem in catfish in the US. A vaccine is registered in the US.
- *Flavobacterium columnare* is a global problem in the freshwater environment and particularly important in tilapia culture.
- Other important pathogen/diseases include:
    - *Lactococcus garvieae*
    - *Vibrio anguillarum O1*
    - *Aeromonas salmonicida* subsp. *salmonicida*
    - *Photobacterium damsela* subsp. *piscicida*
    - Red sea bream iridovirus and other iridoviruses
    - Viral nervous necrosis (VNN)
    - KHV
    - Spring viraemia of carp (SVC)
    - Grass carp reovirus
    - Channel catfish virus (CCV)

Observations and Recommendations

- The AG appreciated the report given by the finfish disease expert.
- In view of the fact that health problems in finfish are often underestimated, the AG recommended conducting surveys to identify the impact of finfish diseases and the development of extension material (i.e. disease cards) to build capacity on the diagnosis of these problems.
- The AG also recognized the need for risk factor epidemiological studies to identify management strategies associated with a reduced occurrence of finfish diseases.
- Because of the difficulties in isolating some of the pathogens associated with the occurrence of important diseases of finfish, the AG recommended the development of surveillance systems based on the occurrence of abnormal clinical signs (syndromic surveillance).
- NACA should communicate to the NCs the importance of reporting also diseases that are not listed in the QAAD regional list but appear to be important health problems.

2.3 Emerging mollusc diseases in the region

Emerging mollusc diseases in the region and the status of mollusc diseases in some of the countries was presented by Dr Temdoung Somsiri.

- Of the seven OIE-listed mollusc diseases, only three are known to be present in the region (Infection with *Bonamia exitiosa*, Infection with *Perkinsus olseni* and AVM)
- The status of mollusc diseases based on OIE reports, published literature and collated from various other sources for Australia, China, Indonesia, Japan, South Korea, Malaysia, Philippines, Thailand and Vietnam was presented.
- The AG was also informed of the constraints for mollusc disease study in the region. Among others, these include:
    - Lack of scientists working on mollusc diseases in the region
    - There is no method for diseases control in the natural environment. However, mortality can be minimized by avoiding stress conditions such as high densities, harvesting stress or overcrowding in depuration plants during the warmer months
    - Less funding support for mollusc disease research programmes.

- It was noted that molluscs are generally of low export value and hence receive less research attention. In recent years, there has been more focus on oyster and abalone, probably not because they are more prone to disease but because of their higher export value.
- The AG was also informed about the completion of the III Phase of the FAO/NACA Mollusk health programme through the conduct of training workshop in June 2007 at AAHRI.

Observations and Recommendations:

- The AG appreciated the report given by the mollusk disease expert and recommended that input from Regional Resource Experts (RREs) should be sought before a decision on the inclusion of the above and potentially other diseases in the QAAD regional list is taken.
- The AG recognized that the FAO/NACA Mollusk health programme, through three training workshops over the last eight years, has helped to initiate some work on mollusc disease surveillance in the region.
- Considering the present level of capacity for mollusc disease diagnosis and surveillance in the region, the AG suggested that NACA take up further work on capacity building for mollusc diseases in the region.

2.4 Results of a targeted surveillance programme implemented by SEAFDEC-AQD

Dr Celia Pitogo provided a detailed account of the results of a targeted surveillance programme implemented by the SEAFDEC Aquaculture Department (AQD). The Fish Disease Trust Fund Program of the SEAFDEC-AQD is based on the outcome of the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security that was held in Bangkok in November 2001. The first Trust Fund project on the Development of Fish Disease Inspection Methodologies for Artificially-bred Seeds was implemented from 2000-2004. The present programme is on the Development of a Fish Disease Surveillance System (2005-2009). Just before the programme was implemented, a meeting on "Current Status of Transboundary Fish Diseases in Southeast Asia: Occurrence, Surveillance, Research and Training" was convened in Manila to gather information on its status in SEAFDEC member countries.

The surveillance and research projects are:

- Monitoring and surveillance of transboundary pathogens in cultured shrimps and prawn. Diseases/agents covered are WSD, TS, IMN, IHHNV, YHV/GAV and WTD.

This study covers Myanmar, Cambodia and the Philippines. Except for the significant increase in shrimp samples that tested positive for IHHNV for 2006 and 2007, and the continuing problem with WSSV, no positive results were obtained for TSV, IMNV, YHV and WTD.

- Surveillance of emerging fish viral pathogens in Southeast Asia. This study involves sampling for detection of emerging viral pathogens in Cambodia, Laos PDR, Myanmar, Philippines and Vietnam for the following pathogens: KHV, SVCV and Grass carp haemorrhagic virus (GCHV) among koi carp, common carp, grass carp and silver carp.

No positive samples were detected during the surveillance programme.

Others research and surveillance studies that are implemented under the project by researchers from various institutions in the region are:

- Screening of important viral diseases of marine fish
- Survey of viral diseases in freshwater aquaculture of Pacific white shrimp, *P. vannamei*, and giant freshwater prawn, *Macrobrachium rosenbergii,* in Thailand
- Surveys of giant freshwater prawn viral diseases, *Mr*NV and Extra small virus (XSV) in Thailand
- Survey of viral diseases of Pacific white shrimp, *P. vannamei*, in Indonesia
- Screening of parasites of molluscs – Parasitic fauna of green mussels cultured in Thailand

- Screening and monitoring of parasites of fish – Diseases of Nile tilapia (*Oreochromis niloticus*)
- Haemorrhagic Disease of Cultured Freshwater Catfish (*Pangasianodon hypothalmus*) in Mekong Delta (Vietnam)

On-site trainings have been conducted in Myanmar (February 2007) and Vietnam (August 2007) instead of the hands-on training at SEAFDEC, to allow for more participants from the departments of fisheries and farmers. The presence of translators and interpreters during the training helped in making the training delivery more efficient.

Observations and Recommendations:

- The AG noted the results of the targeted surveillance implemented by SEAFDEC-AQD and appreciated the contributions towards improving surveillance and reporting in the region.
- The AG recommended that NACA and SEAFDEC-AQD further strengthen their collaboration to support surveillance and disease reporting in the region.

2.5 Key aquatic animal health issues facing the aquaculture sector in China

Dr Huang Jie provided a detailed presentation on key aquatic animal health issues facing the aquaculture sector in China. The presentation mainly focused on the reedited "Animal Epidemic Prevention Law of the People's Republic of China" and how the new law will assist in disease management and compliance with regional and international agreements. The reedited law will come into effect on Jan 1st, 2008. The requirements and purpose of the modification are to support the establishment and improvement of necessary systems for animal disease control, to better match international rules, to enhance prosecution for the violation of the law, to improve the operability of the articles, and to rebalance responsibilities. Promulgation of the reedited law will greatly improve the governmental mechanism on animal disease control.

A three-class system is now used to categorise the importance of an animal disease, based on its hazards for animal culture and human health. Class I diseases are those that cause severe hazards to human and animal health, and exigent, rigorous, and forcible measures need to be adopted for their prevention, control, and extermination. Class II diseases are those that may cause grave economic losses, and strict control or extermination measures needs to be taken to prevent spread. Class III diseases are those that occur regularly and frequently, may cause significant loss, and need to be controlled through appropriate management measures and treatment strategies. The list of different classes should be finalized and published by the MOA (Ministry of Agriculture) soon.

The reedited law states that MOA should provide notification about the occurrence and control of an important animal epidemic to relevant international organizations and trading partners on time, in line with entered treaties, pacts or agreements. MOA is responsible for the timely release of information on the countrywide animal epidemic situation. MOA can authorize the provincial veterinary administrative department to release information on the local animal epidemic situation. Release of such information by any other organization or person is illegal. Any organization or person must not hide, falsify, delay, or omit information on the animal epidemic situation and must not impede the reporting by others.

Much work needs to be done to adopt the administration of this new law regarding aquatic animal health. Recently, diseases of aquatic animals have been relisted and categorised. Classification of diseases is based on the importance of their host species in China, the impact of the disease on aquaculture and human health, and the listing by international organizations including the OIE and NACA, and risk analysis. To intensify control measures for diseases of aquatic animals, the new list of aquatic animal diseases will include more diseases. Some diseases will be moved to Class I and Class II, while in the 2005 all 22 listed aquatic animal diseases were in Class III.

Another important task is to set up the system of recognition and certification of the official veterinarian. The new law states that the examination requires the person to have a university or postgraduate background in veterinary medicine. The certificate of competency for the veterinarian for aquatic animals should be issued by MOA.

The AG was also informed of the following pathogens on which most research efforts have been focused in China. These include:

- Pathogens of freshwater aquatic animals
  - Fish pathogens
    - Infectious spleen and kidney necrosis virus (ISKNV) GCHV, *Aeromonas hydrophila*, *Edwardsiella tarda*, *Ichthyophthirius multifilliis*
  - Crustacean pathogens
    - *Mr*NV
- Pathogens of marine animals
  - Fish pathogens
    - Lymphocystis, iridoviruses similar to ISKNV, VNNV, *Vibrio anguillarum* and *V. alginolyticus, Edwardsiella tarda*
  - Crustacean pathogens
    - WSSV, TSV, IHHNV
  - Mollusk pathogens
    - Acute viral necrosis virus (in scallops) AVNV, AVM
  - Sea cucumber pathogens
    - *Vibrio* sp.

Observations and Recommendations:

- The AG thanked the expert from China and noted that the new law was very comprehensive and will go a long way in supporting aquatic animal health management in China and also provide the necessary mechanism for national authorities to comply with regional and international disease reporting obligations.
- The AG hoped that under the new law, MOA of China will resume reporting to the regional QAAD at the earliest.

Session 3: Disease Reporting

3.1 New OIE Disease list and status of global reporting on aquatic animal health

Dr Eva-Maria Bernoth (President of the OIE AAHSC) reported on the list of diseases in the 2007 edition of the *Aquatic Code*. Following the addition of IMN and WTD to the list of diseases in May 2007, there are now nine diseases of fish, seven diseases of molluscs and nine diseases of crustaceans listed in Chapter 1.2.3 of the OIE *Aquatic Code*:

Diseases of fish (no changes since 2006 edition of the *Aquatic Code*)

1. Epizootic haematopoietic necrosis
2. Infectious haematopoietic necrosis
3. Spring viraemia of carp
4. Viral haemorrhagic septicaemia
5. Infectious salmon anaemia
6. Epizootic ulcerative syndrome
7. Gyrodactylosis (*Gyrodactylus salaris*)
8. Red sea bream iridoviral disease
9. Koi herpesvirus disease

Diseases of molluscs (no changes since 2006 edition of the *Aquatic Code*)
1. Infection with *Bonamia ostreae*
2. Infection with *Bonamia exitiosa*
3. Infection with *Marteilia refringens*
4. Infection with *Perkinsus marinus*
5. Infection with *Perkinsus olseni*
6. Infection with *Xenohaliotis californiensis*
7. Abalone viral mortality

Diseases of crustaceans
1. Taura syndrome
2. White spot disease
3. Yellowhead disease
4. Tetrahedral baculovirosis (*Baculovirus penaei*)
5. Spherical baculovirosis (*Penaeus monodon*-type baculovirus)
6. Infectious hypodermal and haematopoietic necrosis
7. Crayfish plague (*Aphanomyces astaci*)
8. Infectious myonecrosis
9. White tail disease

For IMN and WTD, specific reporting obligations will come into force on 1 January 2008.

Dr Bernoth then summarised the status of diseases that are currently "under study" or otherwise under review for listing:

Three crustacean diseases (NHP, HPVD and MoVD) are currently listed as "under study", which means there are no specific reporting obligations for these three diseases (but general reporting obligations apply, for example, when there are findings of epidemiological significance to other countries). The next step is a meeting of the *Ad hoc* Group for the Listing of Crustacean Diseases, scheduled to take place back-to-back with the Diseases in Asian Aquaculture Symposium in June 2008 in Chinese Taipei. The *ad hoc* group will reconsider whether these three diseases meet the listing criteria. They will also review the currently listed diseases spherical baculovirosis and tetrahedral baculovirosis as to whether they still meet the criteria for listing, which had previously been questioned by Thailand. Because this *ad hoc* group meets after the 2008 General Session, there will be no changes to the list of crustacean diseases in 2008.

A new *Ad hoc* Group on Abalone Diseases will assess the Australian condition AVG against the listing criteria and – provided it meets them – also suggest whether AVG should be listed as part of the already listed AVM complex, or separately. This group will also review the preliminary assessment for listing of the sabellid worm (*Terebrasabella heterouncinata*). A meeting is planned, but at this stage not confirmed, for early 2008, and therefore it is not possible to say whether the AAHSC will be able to consider this *ad hoc* group's report prior to its own meeting in March 2008 and the OIE General Session in May 2008.

Depending on comments made by Members on its October 2007 meeting report, the AAHSC plans to propose for adoption in May 2008 the listing of two amphibian diseases, namely Infection with *Batrachochytrium dendrobatidis* and Infection with *ranavirus*. If adopted, there will be implications for OIE Member Countries and Territories to make those amphibian diseases notifiable.

Finally, Dr Bernoth provided a snapshot on the status of global reporting on aquatic animal health. She explained that the OIE's World Animal Health Information Database (WAHID) is an interface that provides access to all data held within OIE's new World Animal Health Information System (WAHIS). A comprehensive range of information is available from (1) immediate notifications and

follow-up reports submitted by Member Countries and Territories in response to exceptional disease events occurring in these countries as well as follow-up reports about these events, (2) six-monthly reports describing the OIE-listed disease situations in each country, and (3) annual reports providing further background information on animal health, on laboratory and vaccine production facilities, etc. Available information can be explored by country (or group of countries), by disease, focusing on control measures, or comparing the animal health situation between two countries.

Dr Bernoth reported that she had explored immediate notifications and follow-up reports for the years 2005, 2006 and 2007 (the latter until 21 November 2007) for diseases of fish, molluscs and crustaceans, respectively. She summarised that there appears to be conscientious and accurate reporting on events that require such emergency notifications.

She had also looked at the six-monthly WAHID reports from the region, for selected diseases (WSD, TS), and compared them to the QAAD reports available from the OIE Regional Representation for Asia and the Pacific. She deplored that from some Member Countries and Territories, there are no reports at all, neither in WAHID nor in the QAAD system, including on diseases that are known to occur in that country or territory. Some Member Countries and Territories are late with their reports (which should be received within two months after the end of the semester). Also, for some Member Countries and Territories in this region, the information provided through WAHIS is in conflict with the information provided to OIE Asia Pacific through the QAAD system. This includes submitting "not reported this period" to WAHIS while reporting "clinical cases confirmed" to OIE Asia Pacific. Obviously, such discrepancies occur because two sets of data are produced, one for OIE WAHIS, and for QAAD reporting; this should not happen.

Finally, Dr Bernoth noted that to date only half (16/32) of the OIE Member Countries and Territories in the region have nominated an aquatic national focal point, and she stressed the need for OIE as well as NACA to "keep pushing" from both the veterinary and the fisheries side, respectively, for this situation to improve.

Observations and Recommendations:

- On the listing of NHP as "under study" the crustacean regional expert was of the opinion that NHP describes only a pathological condition, in this case caused by a specific pathogen. Necrotizing hepatopancreatitis (a pathological condition in the hepatopancreas) could also be caused by other pathogens (e.g. vibriosis) in shrimp. In view of these observations, the AG felt that listing it as NHP might lead to future complications and confusions in reporting of this disease. In view of this it was suggested that it may be necessary to specify the pathogen responsible for this particular condition.
- The AG noted that researchers often publish their findings on new diseases and pathogens in scientific journals, without bringing it to the attention of the competent authority at the national level. As a consequence, such new information is often not included in the official submissions made by the OIE delegate. This is largely due to the lack of strong national aquatic animal strategies and the lack of mechanisms for researchers to notify such findings to the competent authority. In view of this, the AG suggested that NCs and aquatic national focal points should encourage building the awareness of researchers for disease reporting obligations of OIE members.
- Concerning discrepancies in reports submitted to OIE WAHIS, and for QAAD reporting, the AG felt that some countries may not yet have streamlined the data collation and reporting mechanisms, therefore, two sets of data are being produced. The AG felt that this is unacceptable. To avoid such discrepancies, the AG suggested that countries should seriously consider nominating one focal point under the competent authority for aquatic animal disease reporting.

3.2 Global online reporting system (WAHIS) of OIE with special reference to aquatic animal health (see also item 4.2)

Dr Karim Ben Jebara, Head of the OIE Animal Health Information Department, informed the AG on WAHIS and the concept of regional cores. His presentation included the OIE mission, obligations of OIE Member Countries and Territories, procedures for notification (both how Veterinary Administrations inform the OIE Central Bureau, and how OIE Central Bureau informs the Veterinary Administrations in OIE Member Countries and Territories), and the different reporting schedules:

- Immediate notification of disease, infection or unusual epidemiological events
    - Weekly reports: follow-up to the immediate notification
    - Final report :
        - whether an outbreak has been eradicated
        - whether the disease has become endemic
- Six-monthly (with monthly breakdown for diseases/infections present in the country)
- Annual report

WAHIS allows online entry of all the different types of reports and uses maps and geographic coordinates of the outbreaks. The OIE Delegate has to nominate persons responsible for the submission of the various reports. Those nominated (focal points) are allowed access to WAHIS. For the six-monthly report, the system will automatically aggregate existing data for the referred period for diseases if they have been notified through immediate notifications & follow-ups.

The AG was informed of the concept of WAHIS regional cores and the three options available for setting them up:

Option 1: For disease control purposes, the OIE offers the possibility for groups of members, and for priority endemic diseases covered by a regional control programme, to provide and share more information than the minimal information required by the OIE for these diseases (e.g. outbreak by outbreak). A regional core enables members to only once enter data that may then be used for different purposes, e.g. to meet the objectives of the regional control programme, while respecting a member's reporting obligations towards the OIE. This approach avoids discrepancies between processed data posted on the OIE website and data used by the regional control programme (and its regional website). Non-confirmed information (suspicions of disease outbreaks) will be shared between participating members only. Only confirmed information will be transferred to the OIE and – through the OIE – to the rest of the world. Such regional databases can be hosted free of charge by the OIE central servers.

Option 2: If the data that OIE collects as part of the six-monthly reporting procedure (including by monthly breakdown) is sufficient for a region, then an agreement could be signed between a regional organisation and the OIE. The OIE will provide data of these priority diseases for members of the region to be displayed on a regional web site or be provided in different types of publications such a bulletin to be published inside the region.

Option 3: This option may be the most appropriate for a WAHIS-NACA Regional Core on Aquatic Animal Diseases. It can be customized for NACA members. The aquatic national focal points will enter data on OIE-listed aquatic animal diseases and other, regional aquatic animal diseases of concern. The database associated with this core will therefore contain information on both groups of diseases. The database can be used to produce outputs on the NACA/OIE Asia Pacific websites to meet the requirement of the region. The data can also be used to produce hard copies of QAAD reports as a single joint publication of NACA/OIE/FAO. Through this option, members would only once process information that can then be used for different purposes, e.g. to meet the

objectives of the regional programme and its needs while respecting members' obligations to notify diseases to the OIE.

Through regional cores, the OIE offers its members and interested regional organisations the possibility to work together on regional disease information and/or control programmes for identified diseases of regional interest, while at the same time a subset of the information is transferred automatically to WAHIS. This would help achieving two objectives at the same time: it improves the quality and quantity of disease information needed for control or eradication of priority identified regional endemic diseases at the regional level, and it improve members' compliance with international reporting obligations

Observations and Recommendations:

- The AG supported option three for setting up of a WAHIS-NACA Regional Core on Aquatic Animal Diseases.
- The AG supported the concept that the regionally collected data will be displayed in the regional websites of both NACA and OIE Asia Pacific, and that one joint (NACA/FAO/OIE) hard copy of the QAAD publication be maintained for a transitional period.
- The AG recommended that NACA initiate discussions with the OIE Central Bureau and the OIE Regional Representation for Asia and the Pacific, to describe the technical specifications of the WAHIS-NACA Regional Core on Aquatic Animal Diseases, and that NACA and OIE agree on a timeframe within which the Regional Core becomes fully operational.
- The AG emphasized that there needs to be a clear mechanism, involving the AG, for identifying the regional, non OIE-listed diseases for inclusion in the WAHIS-NACA Regional Core on Aquatic Animal Diseases.

Session 4: Review of QAAD Regional Reporting System

4.1 Regional disease status and progress in regional reporting

The AG was informed about the progress in regional reporting. The FAO/NACA/OIE regional QAAD reporting came into effect from the 3rd quarter of 1998. By June 2007, a total of 36 reports have been published. Of the 21 participating countries, reports could be obtained from 17 (2006/3), 17 (2006/4), 16 (2007/1) and 15 (2007/2) countries for the respective quarters. The quality of reports and epidemiological comments provided by countries has improved significantly over the years. The advantages of the regional reporting especially in terms of sharing information and supporting countries in the region to address diseases that are significant beyond trade considerations were reported. The AG was informed that the quality of epidemiological comments provided by many of the countries has improved significantly. Improved understanding of the implications of regional reporting by NCs appears to be the underlying reason for the increase in quality of reports. QAAD reports are regularly downloaded from NACA website (2006/3-181; 2006/4-212; 2007/1-164; 2007/2-116).

From disease occurrences published in the last 4 QAAD reports, the following QAAD listed diseases were recognized as important to the region:

- Fish
  - KHVD
  - VNN
  - EUS
  - Grouper iridoviral disease (GID)
- Crustaceans

  - WSD
  - TS
  - IMN
  - WTD
- Molluscs
  - AVM

In addition, the AG was informed about the following emerging diseases in the region:

- Fish
  - Red spot disease (red hemorrhagic disease) in grass carp (4 countries)
  - Red spot in tilapia (2 countries)
  - Infection with *Streptococcus* sp.
- Crustaceans
  - MSGS (LSNV) (3 countries)
  - Loose shell syndrome in *P.monodon* (1 country)
  - Milky syndrome in lobsters (1 country)
- Molluscs
  - AVG (1 country)
  - Oyster oedema disease (OOD) (1 country)
  - Babylonia mortality (1 country)

Observations and Recommendations:

- The AG noted the present status of occurrence of important diseases in the region and appreciated the improvements achieved over the years in the quality of reports submitted.
- The AG noted the history of QAAD reporting (nearing ten years) and agreed that the regional QAAD reporting mechanism has served as a useful mechanism for recognizing emerging diseases in the region.
- The AG agreed that there is a need to further improve the quality of QAAD reports. As per the present reporting requirement, QAAD reports are submitted within 75 days of the end of the reporting quarter. In view of this, it is suggested that in emergency situations regarding all diseases listed in the QAAD as well as non-listed diseases, immediate notification should be conducted in line with the provisions of the OIE *Aquatic Code* for such situations[4].

4.2 Way forward with regional QAAD reporting (see also item 3.2)

The AG was provided with details of outcomes of two meetings held between representatives from OIE (Regional Representation for Asia and the Pacific, Central Bureau's Animal Health Information Department, and South East Asia Foot and Mouth Disease Campaign) and NACA in June 2007, and between OIE Asia Pacific and NACA in December 2007 in Bangkok. Key outcomes included:

- OIE and NACA collaboration to explore the possibility of setting up WAHIS-NACA Regional Core on Aquatic Animal Diseases that would accommodate both OIE-listed diseases and other regional diseases of concern
- OIE and NACA collaboration in organizing training for countries in the region on WAHIS online data entry and reporting
- OIE and NACA collaboration in organizing a workshop early in 2008, tentatively in the last week of March, in Thailand.

While such a Regional Workshop on Aquatic Animal Diseases would primarily address aquatic animal health reporting obligations and mechanisms, it would also cover wider aspects such as

[4] see Chapter 1.2.1 of the *Aquatic Code*

OIE standards and the standard setting process. It would target those senior officers who fulfill the roles of aquatic national focal points (OIE) or NCs, i.e. those involved in surveillance and QAAD reporting in the region. Resource persons would include Dr Bernoth (President of the OIE AAHSC), Dr Karim Ben Jebara, Head of the OIE Animal Health Information Department), experts from FAO, NACA and SEAFDEC, and speakers on economic impacts of aquatic animal diseases, on specific aquatic animal diseases of regional importance.

The OIE and NACA representatives at this AGM agreed to expedite the preparation of the workshop as soon as possible in January 2008 so that advance notifications and subsequent formal letters of invitation can be sent in a timely manner. NACA agreed to assist in coordinating local logistics and to identify RREs to contribute to the workshop, and OIE will support participation of participants and experts for the training workshop.

Observations and Recommendations:

- The AG recalled the recommendations made at the previous AG meetings to consider organizing a regional workshop to bring together all the regional aquatic focal points and NCs.
- The AG welcomed this development, thanked OIE and NACA for progressing this regional workshop proposal further and assured its full support to the conduct of the proposed workshop.
- In addition to the proposed topics, the AG suggested to include topics such as how to use the *Aquatic Code* to develop import measures.
- It was also suggested that more discrete Terms of Reference be developed for aquatic national focal points and NCs and presented at the workshop.
- The AG further suggested that national representatives should present reports at the workshop that include information on the current situation on aquatic animal diseases and prevention and control measures including existing surveillance and reporting systems in their country, aquatic animal disease control and prevention plans (national strategies) and constraints against the plans, and identified needs for international/regional cooperation.
- The AG asked NACA and OIE Asia Pacific to further strengthen their collaboration and cooperation in support of surveillance and disease reporting in the region.

Dr Yumiko Sakurai, the Representative from the OIE Regional Representation for Asia and the Pacific, presented the views of OIE Asia Pacific on the way forward with the regional QAAD reporting:

There exist two kinds of reporting systems in the Asia-Pacific region on aquatic animal diseases: one is the QAAD reporting system which started in 1998 as a joint activity between OIE and NACA. This is a hard-copy-based reporting system using such as e-mail, fax and letter with signatures of the OIE delegates or NACA NCs. The other is OIE WAHIS which was launched in April 2006. This is an on-line reporting system and National Focal Points nominated by the OIE delegates enter data into the system. Since national data reported in QAAD reports and those in OIE WAHIS are sometimes contradictory, OIE proposes to set up a WAHIS-NACA Regional Core on Aquatic Animal Diseases which accepts data of QAAD targeted diseases, i.e. both OIE-listed and non-listed diseases, and which provides regional data to NACA and OIE Regional Representation for Asia and the Pacific. After the launch of the WAHIS-NACA Regional Core on Aquatic Animal Diseases, QAAD reports will no longer be collected at the regional level by OIE Asia Pacific. Dr Sakurai also confirmed OIE Asia Pacific's support for the Regional Workshop on Aquatic Animal Diseases.

Because the regional QAAD system includes not only NACA and OIE, but also FAO, the FAO representative provided FAO's views on the way forward with QAAD. Regarding the Quarterly Aquatic Animal Disease Report (QAAD), FAO considers that the QAAD system be continued as a

joint, single NACA/FAO/OIE Report. FAO is happy to explore the possibilities of joint publication (with corresponding logos). If QAAD can be incorporated into WAHIS, still retaining the contributions by FAO, NACA and OIE Asia Pacific, it should be considered as a viable option. FAO encourages continued collaboration with NACA and OIE (Central Bureau and Asia Pacific) on this issue and happy to discuss further on possible options for way forward. FAO is happy to hear the suggestions and recommendations of the AG on this matter.

FAO reminded the meeting that QAAD reports have been compiled since the 3rd quarter of 1998 and now more than 36 reports have been published. Considering the vast amount of regional disease data, it is now timely to store the data in a searchable database (e.g. the Aquatic Animal Pathogen and Quarantine Information System - AAPQIS) and conduct data analysis to determine trends and perhaps even forecasting, current health profiles, patterns of disease spread or reduction, risk factors (depending on other data available), and how the database information can be converted to disease control information. FAO supports the idea of undertaking a systematic data analysis, for e.g., retrospective analysis of the disease data; whether such valuable database can be used for defining freedom of diseases (zoning) of an area, region, country; whether the database on the distribution or occurrence of a disease can be used to better understand or identify risk factors (e.g. climate change, etc.) for such disease/pathogen and be used for making predictions or assessment of likelihood of future occurrence; and whether the disease information (presence/absence, epidemiological data) can be used to assess control or eradication success for selected diseases. Such an analysis should also consider the impact of regional efforts on aquatic animal health management (through various mechanisms - capacity building, research, other relevant projects/activities) *versus* disease status *versus* aquaculture production. The meeting was informed that FAO will be interested to collaborate on this activity.

On the way forward with regional QAAD, NACA made the following observations and requested the AG to make a decision considering the view points expressed by OIE Asia Pacific, FAO and NACA:

The QAAD reporting system in the Asia-Pacific region is being implemented as a joint activity between NACA, FAO and OIE Asia Pacific since the second quarter of 1998. To date, 36 reports have been published and widely disseminated. Twenty-one countries from the region participate in the 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 aquatic animal health programme of NACA. The NACA/FAO/OIE disease list includes all diseases listed by OIE in the latest edition of the OIE *Aquatic Animal Health Code*, plus diseases of concern to the Asia-Pacific region. The information generated through the regional reporting system provides up-to-date information on important diseases in the Asia-Pacific region, serves as an early warning system for emerging diseases (e.g. KHVD, AVM, GID, WTD in *Macrobrachium rosenbergii*, IMN), and is a valuable source of information to support risk analysis. The AG was informed that an excellent regional networking had been established over the years to support regional surveillance and QAAD reporting.

Observations and Recommendations:

- The AG stressed that the effective networking established under the regional QAAD reporting system should be utilized for the WAHIS-NACA Regional Core on Aquatic Animal Diseases.
- The AG recommended to continue the QAAD reporting system for 2008 and explore opportunities to further improve the quality of reports.
- The AG recommended an overlapping time period for both QAAD and WAHIS regional core to operate, before QAAD is abolished.
- The OIE informed the AG that WAHIS is presently running in parallel to regional OIE reporting and that it is yet to be fully used for aquatic animal disease reporting. The AG

therefore felt that continuing the QAAD reporting system would not represent a duplication of effort during the transition period.

- The AG suggested that following this overlapping period, the way forward with QAAD be reconsidered at the coming AG meetings (AGM-7 in 2008 and AGM-8 in 2009).
- Considering the interest of FAO to analyze QAAD data, the AG suggested that NACA collaborate with FAO in identifying a mechanism for carrying out the analysis.

4.3 Finalization of criteria for listing of diseases in QAAD

The AG was reminded that at AGM-5 they had strongly endorsed the need for developing a set of listing criteria for the QAAD system, for those diseases that are not already listed by the OIE in the *Aquatic Code* but are of regional significance. A background paper had been prepared following AGM-5 and circulated to governments and RREs, requesting their input regarding criteria for listing diseases. Inputs were received from 8 RREs. The majority were of the view that OIE listing criteria could be broadly used to identify diseases not just of global but also of regional significance. However, the emphasis is encouraging the collation of epidemiological information on regional, non OIE-listed diseases that have the potential to cause serious economic losses and spread across countries.

Observations and Recommendations:

- The AG thanked the RREs for providing input to the discussions on developing QAAD listing criteria for non OIE-listed diseases of regional concern.
- Concerning the identification of criteria for the regional listing of diseases, the AG agreed that a disease listed in the QAAD regional list must be a disease that can be recognized and that requires a certain degree of management. The fact that a disease is listed does not *per se* provide a justification for sanitary measures. Diseases considered important for the region are listed in QAAD to encourage surveillance and stimulate reporting.
- The AG reviewed all the expert inputs received and, after much deliberations, decided to apply the current OIE listing criteria regionally (Criteria under "consequence" and "diagnosis" could be applied as they are, those under "spread" could be applied from a regional point of view) for the purpose of listing non OIE-listed diseases in the QAAD system.
- In addition, it was suggested that due considerations may be given to the need for collating epidemiological information for an emerging disease while listing a disease.
- The AG also suggested that development of a robust "reporting case" definition will form the basis for considering a disease for listing in the QAAD.
- The AG was of the view that individual diseases recognized as emerging in the region could be assessed against some of the above criteria and a decision made on their listing or otherwise on a case by case basis.
- It was also pointed out that diseases listed by AG in the past for the QAAD reporting system (e.g. KHVD, IMN, WTD and AVM) have all now been listed by OIE in the *Aquatic Code.*
- The AG also noted that they have been changes in the taxonomy of iridoviral diseases in fish that could affect the names currently given (e.g. GID, red seabream iridoviral disease (RSID). The AG decided to wait and see whether OIE will change the name of listed iridoviral diseases such as RSID in the *Aquatic Code*.

4.4 Review of diseases listed in QAAD, revision of reporting form and instructions

The relation between OIE and regional QAAD reporting was noted. To help OIE Member Countries and Territories meet their reporting obligations to the OIE at the same time as reporting through the QAAD systems, it was agreed that all those diseases listed by the OIE in the latest version of the *Aquatic Code* should be included in the regional reporting system. However,

delisting of diseases by the OIE from the *Aquatic Code* should not lead to their automatic delisting from the regional list because a globally delisted disease may still have relevance to the region.

The AG considered the revisions required to the regional QAAD list. Revisions take into account changes in the OIE list plus diseases of regional concern not listed by OIE. The QAAD list will include all diseases listed by the OIE plus diseases of regional concern.

The AG undertook the exercise of assessing all the non OIE -listed diseases included for reporting in the 2007 QAAD version against the OIE listing criteria applied regionally. A similar exercise was also undertaken for assessing emerging diseases against the OIE listing criteria for emerging diseases. The result of the assessments is provided as Annex E. The following revisions to the QAAD list were approved by the AG. The revised list effective for reporting in 2008 is provided in Annex F.

Observations and Recommendations:

- Because IMN and WTD are now listed in the *Aquatic Code,* they should be moved from non OIE-listed diseases to OIE-listed diseases under the diseases prevalent in the region category.
- Epitheliocystis, Bacterial kidney disease (BKD), Infectious pancreatic necrosis (IPN), Infection with *Marteilia sydneyi*, Baculoviral midgut gland necrosis (BMGN), Piscirickettsiosis (*P.salmonis*), Infection with *Mikrocytos mackini* and NHP were recommended for delisting as they did not meet the listing criteria.
- GID , Viral encephalopathy and retinopathy (VER), Enteric septicaemia of catfish (ESC), Infection with *Marteilioides chungmuensis* and Akoya oyster disease were recommended to be retained in the QAAD list for reporting in 2008, as they met the OIE listing criteria applied regionally.
- On emerging crustacean diseases, three emerging diseases (MSGS, MLD and Loose shell syndrome) were assessed and the AG recommended listing of MSGS and MLD. Although the criteria were not fully met, the AG felt that collecting epidemiological information from the region would be useful in combating their spread regionally. The AG recommended that NACA facilitate the development of disease cards and robust "reporting case" definition for these emerging diseases.
- On emerging mollusc diseases, two diseases (OOD and AVN) were assessed and the AG recommended listing of AVN. Though the criteria were not fully met, the AG considered that collating epidemiological information and raising regional awareness would contribute to combating AVN spread in the region. The AG recommended that disease card and a reporting case definition be developed for this disease.
- On finfish diseases, four bacterial diseases (Infection with *Streptococcus iniae, Streptococcus agalactiae, Edwardsiella tarda* and *Nocardia seriolae*, respectively) were assessed. For lack of sufficient information to assess OIE criteria 6 and 7, the AG could not come to any conclusion. In view of this, the AG recommended that NACA in consultation with the finfish disease expert, develop a background paper on the assessment of emerging bacterial diseases in the region for listing in QAAD and seek expert opinion from RREs. To guide the process of assessment, it was suggested that RREs be requested to compare infections with the four emerging pathogens cited above with other bacterial diseases such as vibriosis and motile *Aeromonas* septicaemia (considered ubiquitous) and ESC (retained in the QAAD for 2008). The findings of the RREs will be placed before the 7th AGM for decision. In the meantime, to increase awareness about the serious nature of these four diseases and collate epidemiological information, it was recommended that countries be encouraged to report on these diseases under the category of "any other diseases" in the QAAD. It was also recommended that NACA work with RREs and develop disease cards for these diseases to increase awareness and build capacity.

Session 5: Review and evaluate implementation of the Technical Guidelines (TG)

5.1 Briefing on progress in implementation of the 'Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals'

The AG was informed of the progress in implementation of the various elements in the 'Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals' (TG). Many activities implemented in 2007 (projects, workshops, training programmes, technical missions) have contributed to progress the implementation of the various elements contained in the TG. Core funding from NACA is being used to support and sustain only limited activities (e.g. holding of annual AG meetings, publication of QAAD reports), while all other activities have to be supported through national and regional projects. Since these projects have defined outcomes and target countries, many a times it will not be possible to extend the benefits to all the member governments. Based on the recommendations of AGM-5, the status of TG implementation highlighting the differences was presented to the 18th NACA GC and member governments were requested to identify the contribution given by the fisheries sector to countries' economies and to promote a more balanced allocation of resources for aquatic animal health management. Country-specific strategies for TG implementation were developed for all the ASEAN countries. Risk assessment documents were made available to all the countries and relevant stakeholders. The AG was informed that the "progress matrix" is being used as a tool to assess overall regional progress in the implementation of TG and the same is being presented in all relevant meetings to raise awareness about the need for developing and implementing national strategies for aquatic animal health management.

The AG thanked funding agencies supporting aquatic animal health programme in the region. The AG also appreciated the support (in kind and cash) being provided by some of the countries to the programme.

Observations and Recommendations:

- Considering the differences in TG implementation across countries, the AG recommended that the status of TG implementation highlighting the differences should be presented to the NACA GC on a regular basis.
- A country-specific strategy for TG implementation should be developed to bridge the differences between countries.
- The AG recommended that more responsibilities should be given to the countries to progress implementation of TG.
- The AG recognised the importance of the "progress matrix" as a tool to assess overall regional progress in the implementation of TG and suggested NACA to continue using this tool in its monitoring efforts.

5.2 Role of the ASEAN Network of Aquatic Animal Health Centres (ANAAHC) in supporting health management in the region

Dr Somkiat Kanchanakhan provided a detailed background to the setting up of ASEAN Network of Aquatic Animal Health Centres (ANAAHC) by the ASEAN, its purpose, objectives and plan of work. ANAAHC will serve as focal point for ASEAN and facilitate building up of diagnostic and health certification capabilities in ASEAN Member Countries critical for exporting live aquatic animals. The ANAAHC will provide training for ASEAN scientists on key disease of concern to ASEAN. The AG was informed that the DOF Thailand will provide suitably qualified staff,

existing capacity and necessary infrastructure of the Inland Aquatic Animal Health Research Institute (AAHRI) for the operation of ANAAHC. The objectives of ANAAHC include:

- To function as a focal point of the networking among national aquatic animal health agencies or laboratories in ASEAN Member Countries
- To facilitate building up of diagnostic and certification capabilities in ASEAN Members
- To train ASEAN scientists in the field of aquatic animal diseases; surveillance, import risk analysis, zoning and contingency planning
- To assist in emergency response to new disease outbreaks of unknown aetiology
- To act as contact centre for advice and capacity building in control of aquatic animal diseases in close cooperation other international agencies as FAO, NACA and OIE.

Observations and Recommendations:

- The AG congratulated AAHRI of the DOF Thailand for being recognized as the ANAAHC.
- The AG observed that accomplishing the goal and objectives of ANAAHC would certainly facilitate implementation of the six major components of the TG in ASEAN Member Countries.
- The AG recommended that NACA work closely with ANAAHC and explore opportunities to develop programmes in support of aquatic animal health management in the Asia-Pacific region.

5.3 Implementation of two AADCP-RPS projects in ASEAN to support TG implementation

The AG was informed that two projects supported under the AADCP-RPS frame work have been successfully completed in 2007 and the project outputs have contributed significantly in enhancing the national and regional (ASEAN) implementation of TG.

The first project "Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN" was implemented by NACA and AusVet Animal Health Services, in collaboration with other partners i.e. ASEAN Secretariat, AAHRI (Thailand) and DAFF (Australia). A series of activities was conducted to accomplish the project objectives:

- First policy workshop in Bangkok (April 2006)
- First training programme in Singapore (May 2006)
- Technical missions to Cambodia (July 2006), Laos (July 2006), Myanmar (September 2006) and Vietnam (December 2006)
- Second training programme in Vietnam (Feb 2007)
- Second policy workshop in Philippines (May 2007).

The project enhanced the capability of ASEAN Member Countries to implement ASEAN harmonized national aquatic animal health strategies to manage risks to the biosecurity of fisheries industries particularly those related to trade and impacting on the poor:

- Guidelines prepared for ASEAN Member Countries on harmonized aquatic animal health and biosecurity strategies within ASEAN, including an operational strategy for their implementation
- Technical support provided to four ASEAN Member Countries (Cambodia, Lao PDR, Myanmar, Vietnam) for development of national aquatic animal health and biosecurity strategies
- Training courses implemented. Twenty personnel from ASEAN trained in epidemiology, surveillance, risk analysis and contingency planning
- Training material developed on aquatic animal health and biosecurity for all ASEAN Member Countries and made widely available
- Strong network of forty ASEAN aquatic animal health workers established.

The final report of the project contains two parts: (A) "Recommended Minimum Operational Requirements for Implementing National Aquatic Animal Health Strategies within ASEAN". This section identifies the minimum operational requirements for implementing national aquatic animal health strategies within ASEAN. (B) "ASEAN progress in the implementation of National Aquatic Animal Health Strategies". This section is a compilation of the information on the status of implementation of various elements contained in national aquatic animal health strategies within ASEAN. The purpose of this document is twofold: firstly, it provides guidance for countries in ASEAN to implement key elements of national aquatic animal health strategies. Secondly, the compiled status report can be used as a basis for monitoring the progress of national strategy implementation in ASEAN Member Countries. The reports have been widely disseminated within ASEAN and made available on the NACA website.

The second project "Operationalize Guidelines on Responsible Movement of LFF in ASEAN" contributed to the enhancement of biosecurity of LFF industries in ASEAN Member Countries. The project facilitated the development by ASEAN of harmonized SOPs for health certification and quarantine measures for trans-boundary movement of LFF.

This project was coordinated by ASEAN Secretariat (ASEC), NACA and AusVet for Cardno ACIL who manage the AADCP:RPS programme for ASEC and the Australian Agency for International Development (AusAID). These SOPs are a set of documents for health certification and quarantine measures to be used by CA for the responsible movement of LFF by land, sea and air among ASEAN Member Countries. The SOPs recognise the existing variation in capacity among ASEAN Member Countries but the SOPs have been designed so that they can be adopted and implemented within the specific policy and legal framework of each country. These SOPs have been written to help manage the movement of LFF for immediate consumption as human food. They are proposed to be a model for the subsequent development of SOPs to cover the management of movements of juvenile LFF for rearing and for other fish and some elements of this document will be appropriate for those SOPs. A series of activities was conducted to accomplish the objectives of the project:

- First policy workshop in Bangkok (April 2006)
- First AAPQIS training workshop in Bangkok (April2006)
- Working Group Leaders Meeting in Malaysia for drafting the SOPs (September 2006)
- Second policy workshop to finalize the SOPs in Indonesia (Feb 2007)
- Second AAPQIS training workshop in Indonesia (Feb 2007)
- Implementation workshop in Bangkok (October 2007)
- Technical Missions to Cambodia, Lao PDR and Myanmar (CLM) to support implementation of SOPs (Dec 2007).

Key outputs included:

- Variation in current health certification and quarantine measures for import of LFF for all ASEAN member countries identified and an inventory developed.
- Agreed ASEAN export-import model for import of LFF developed
- ASEAN Standard Operating Procedures for health certification and quarantine measures for international trade in LFF finalized.
- Skills in using AAPQIS within ASEAN Competent Authorities improved
- Technical assistance provided to CLM to support implementation of SOPs
- Strong network of 20 ASEAN policy makers in the area of aquatic animal health established

Observations and Recommendations:

- The AG congratulated NACA and project partners for successful implementation of two key projects in ASEAN and recognized the contribution of the projects in strengthening aquatic animal health management in the ASEAN.

5.4 Outcomes of the SEAFDEC international workshop on emerging fish diseases in Asia

The SEAFDEC International Workshop on Emerging Fish Diseases in Asia was convened in Bangkok, Thailand on December 6-7, 2007, with 73 participants from 18 countries. The objectives of the workshop were to obtain updates on emerging microbial diseases in Asia; to keep abreast on advances in research on the pathogenesis, diagnosis, epidemiology and surveillance of emerging microbial diseases; and to identify study gaps for future research thrusts. The programme had seven plenary lectures delivered by invited experts on KHV, SVCV, GCHV, VNN, viral diseases in Asian shrimp aquaculture and freshwater prawns, and surveillance and epidemiology of crustacean viruses. Contributed oral and poster papers were on various viral, bacterial and parasitic diseases. One paper discussed the mechanisms for recognizing emerging diseases in Asia. Two workshops were held to discuss research gaps and important diseases issues that could possibly feed into the preparation of a new proposal for consideration by the Japan Trust Fund. The detailed outcome of the workshops will be available from SEAFDEC once the report is finalized.

Observations and Recommendations:

- The AG congratulated SEAFDEC for successfully organizing the international workshop on emerging fish diseases in Asia.
- The AG observed that the workshop findings could feed into the health management programmes of regional organizations (e.g. NACA, SEAFDEC AQD, ANAAHC).

5.5 Strengthening communication and promoting cooperation between veterinary and fisheries authorities

The AG was informed of initiatives taken by NACA to promote communication and promoting cooperation between fisheries and veterinary authorities in the region. The attention of the AG was drawn to the Nouméa Recommendations to OIE Member Countries and Territories, which state that "Where primary responsibility for aquatic animal health rests with an authority other than the Veterinary Services, nominate an 'aquatic national focal point' from the other authority, so that the OIE may circulate Aquatic Animals Commission reports to the 'aquatic national focal point' at the same time as when circulating to national Delegates (providing comments back to the OIE must take place through, and with the endorsement of, the national Delegate to the OIE)". As of October 2007, 16 countries out of 32 in the region had nominated an aquatic national focal point. Those focal points will be able to obtain access to WAHIS for online reporting.

Observations and Recommendations:

- The AG observed that the proposed OIE/NACA workshop in March 2008 would provide an opportunity to bring veterinary and fisheries authorities in the region together and promote cooperation.
- The AG appreciated the role played by NACA in working with the fisheries authorities towards helping member countries to send comments to reports of AAHSC and in the nomination of aquatic national focal points. The AG recommended that NACA continues working in this direction and facilitates implementation of OIE's "Nouméa Recommendations" in the region.

5.6 Harmonization in diagnostics: experiences and lessons learned from PCR calibration in India and Indonesia

The AG was informed about the PCR training and calibration work done under the ACIAR supported project in India and Indonesia to promote harmonization. Between 2005 and 2007, two PCR training workshops and two PCR inter-laboratory calibration (ring testing) exercises were conducted in India and Indonesia, primarily targeting laboratories providing PCR services to the

shrimp aquaculture sector. The objective was to improve the effectiveness of PCR-based viral screening in shrimp hatcheries and service laboratories in India and Indonesia. The underlying principles were:

- Provide an assessment of individual lab performances
- Compare the performance with other labs in the country
- Not designed, or in any way intended, to assess the performance of different test kits
- One of the central principles was to allow each lab to use whichever test kit they wish to select
- Prepare the PCR laboratories for participation in a future PCR laboratory accreditation programme.

In India, 37/49 labs in I calibration and 33/51 labs in II calibration returned the results. In Indonesia, 33/34 labs in I calibration and 30/30 in II calibration returned the results. Five categories of results were obtained:

- identified all positives and negatives correctly (Category A)
- failed to identify only one weak positive (Category B)
- reported false negatives (Category C)
- reported false positives (Category D)
- reported false negatives and false positives (Category E).

Some of the positive lessons learned included:

- Increased awareness of issues in PCR testing in India and Indonesia
- An assessment of the reliability of PCR testing
- True private participation in the programme
- Excellent regional and national cooperation
- Government ownership
- Increased demand for reliable testing by farmers and hatcheries
- Recognition of the need for laboratories to form an association and develop their own code of practice
- Recognition of the need for national laboratory registration and accreditation programme in India
- Proactive response from PCR kit manufacturers to test results.

Final recommendations were developed for each category of labs based on performance in two calibrations and sent to all the labs and national policy makers. Following on the success of the project supported PCR calibration programme, national institutions in India (Central Institute of Brackishwater Aquaculture – CIBA, MPEDA and Coastal Aquaculture Authority (CAA) have taken up an initiative to implement a national PCR laboratory registration and accreditation programme. At present, NACA and project partners are providing some technical support. The model developed in India and Indonesia has significant regional implications:

- Model and methodology developed in the project is robust, transparent and worked well in both the countries
- Model and methodology developed in the project can be easily applied in any country
- Model can be easily applied to any type of PCR testing
- Important to involve key national institutions to give ownership and more credibility to the process
- Important to train core group of national PCR experts
- Need outside agency (seen as neutral by national institutions and PCR laboratories) to facilitate the process
- Important to create proper awareness about the principles and implications of calibration exercise.

The AG was also informed that a similar exercise will be implemented in Vietnam with support from ACIAR and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Six key national institutions in Vietnam will be involved in the process. NACA has received requests from other countries in the region to implement such programmes. In the long run it may be necessary to consider establishing regional mechanisms to coordinate laboratory calibration exercises among interested countries to achieve some degree of harmonization (moving away from project mode).

Observations and Recommendations:

- The AG was very pleased to note the excellent work done under the project in support of harmonization. The AG congratulated India for taking up a national accreditation programme following on the success of the project supported PCR calibration in India.
- The AG supported the idea of promoting a regional ring testing initiative to ensure improved quality and promote harmonization amongst PCR service providing laboratories in the region.
- The AG asked NACA to explore funding opportunities to pursue this proposal further.

Session 6: Revision of the Technical Guidelines[5], Manual of Procedures[6] and Asia Diagnostic Guide (ADG) for Aquatic Animal Diseases[7], as required

The need for revision of the TG and Manual of Procedures was discussed. The AG members felt that these two documents are very broad and cover all the aspects required for responsible movement of live fish and saw no need for revision at this time. In addition, the AG also felt that the outputs of the FAO expert consultation held in Sri Lanka in 2005 (FAO. 2007. Aquaculture development. 2. Health management for responsible movement of live aquatic animals; and FAO Technical Guidelines for Responsible Fisheries. No. 5, Suppl. 2. Rome, FAO. 2007. 31pp) would cover many of the issues relevant to the TG. The FAO Technical Guidelines for Responsible Fisheries which were prepared to support sections of FAO's Code of Conduct for Responsible Fisheries (CCRF). They address responsible fisheries management, aquaculture development, international trade and fisheries research. The global guidelines have expanded the perspective and considered strategies at national level and health management at the farm level as parallel measures. The global guidelines have two major components: (1) national strategy and biosecurity and (2) farm-level health management and biosecurity programmes, the elements/components of which are listed below. The National Strategy on Aquatic Animal Health and Biosecurity contains the following elements: policy, legislation and enforcement; risk analysis; pathogen lists; information systems; health certification; quarantine; disease surveillance, monitoring and reporting; zoning; emergency preparedness; research; institutional structure; human resources development; and regional and international cooperation. The Farm-Level Health Management and Biosecurity Programmes contain the following elements: cluster management, better management practices; compliance with national legislation; certification; on-farm disease prevention; surveillance and reporting of disease outbreaks; emergency preparedness and information sharing and farmer education.

6.1 Progress in ADG revision

[5] Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing consensus and Implementation strategy, 2000. FAO/NACA. Fisheries Technical Paper No 402

[6] FAO/NACA. 2001. Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals. *FAO Fisheries Technical Paper*, No. 402, Suppl. 1. FAO, Rome. 2001. 106 p.

[7] Bondad-Reantaso, MG, McGladdery SE, East, I and Subasinghe, RP. (Eds.). Asia Diagnostic Guide to Aquatic Animal Diseases. *FAO Fisheries Technical Paper*, No. 402, Suppl. 2. FAO, Rome. 2001. 236 p.

The need for updating the FAO Fisheries Technical Paper 402/2 Asia Diagnostic Guide to Aquatic Animal Diseases ADG was agreed at AGM-4. The AG was reminded that the ADG revision proposal was approved at AGM-5. FAO informed the AG that the ADG is presently being revised. The work is expected to be completed by March 2008**.** The revised Diagnostic Guide will now have a global scope. Twenty-seven global experts (from Australia, Canada, China, Denmark, France, India, Italy, New Zealand, Norway, Spain, Thailand, UK, USA) have accepted FAO's invitation to participate either as contributing authors, or peer-reviewers, or both. There will be at least fifty diseases/pathogens that will be included and each disease chapter will have the following information: background information, causative agent, host range, geographic distribution, clinical aspects, diagnostic methods, corroborative diagnostics, modes of transmission, control measures and their impacts, and up to ten key references.

Observations and Recommendations

- The AG recognized that ADG has been very useful in the region in supporting disease diagnosis and surveillance.
- The AG noted the progress in ADG revision and appreciated the lead role taken by FAO. The AG requested NACA to work closely with FAO.

6.2 Progress in updating the AAPQIS database

AAPQIS is currently being upgraded and the new version will be available by January 2008. The aim is to expand the range of contents to cover additional aquatic animal health aspects and to increase compatibility with other FAO resources such as FI Homepage, the Fisheries Global Information System (FIGIS), Aquaculture Gateway Page, etc. The available resources will be integrated into all new and existing databases. Possibility of social networking will be explored to increase knowledge of online aquaculture community and a new content to cover broader issues of Governance will be developed

The AG was also informed that the AAPQIS in the present form is exclusively an information database on pathogens and has nearly complete information on about thirty pathogens of relevance to the region. The database at present does not have provision for uploading QAAD information. In addition, the regional and national AAPQIS databases have only home news pages and the central AAPQIS database is not diversified into region or country.

The AG was informed that twenty delegates from ASEAN countries have been trained in the use of AAPQIS database under the AADCP-RPS project 370-018 on LFF.

Observations and Recommendations

- The AG noted the progress being made in updating the AAPQIS database.
- The AG appreciated the role played by FAO to upgrade the AAPQIS and make it compatible with other FAO online resources.
- The AG recommended that NACA work closely with FAO in assisting member countries to utilize the AAPQIS resources.
- The AG asked NACA to provide links to the AAPQIS database from the NACA website.

6.3 Progress made with the DAFF/NACA initiative to improve disease reporting and emergency preparedness in the Asia-Pacific region

The AG was presented a brief progress report on the DAFF/NACA initiative "to enhance regional capability to quickly and effectively respond to aquatic animal disease emergency incidents, through the development of coherent emergency disease plans and by enhancing the emergency management framework within the region". The proposed cooperation consists of different

activities including modification of the *Aquatic Animal Diseases Significant to Australia: Identification Field Guide* to become an Asia-Pacific regional field guide. The meeting was informed that the regional field guide was published recently and widely disseminated in the region. The field guide covers all diseases listed in the 2006 QAAD (OIE + diseases of regional concern). The field guide provides information to support level I field diagnosis of all the diseases listed in the 2006 QAAD. In addition, distribution maps and contact details of national coordinators to be approached in the event of disease emergencies are provided. The meeting was informed that since making it available on NACA website in August 2007, over 1250 downloads have been made. Countries are being encouraged to translate the field guide to local languages.

Observations and Recommendation

- The AG appreciated the publication of the field guide and thanked DAFF for the collaboration to improve aquatic animal health management in the region.
- The AG recommended that NACA continue working closely with DAFF to support aquatic animal health management in the region.
- The AG also recommended that NACA initiate actions to progress the other elements identified in the cooperation including modification of AQUAVETPLAN, the Australian Aquatic Veterinary Emergency Plan, to become a regional resource.

Session 7: Identification and designation of regional aquatic animal health resources

The AG was informed of the progress made in the operation of the three tier regional resource base on aquatic animal health. The AG noted with appreciation the contributions of Regional Reference Laboratories (RRLs), RREs and Regional Resource Centres (RRCs) in developing disease cards, contributing to training programmes, providing special technical assistance to member countries on a case by case basis. The AG highlighted the potential utility of the regional resource base in terms of assisting member countries in dealing with disease diagnosis and responding to disease emergencies. The AG recognized the fact that the regional resource base, specifically, the regional reference laboratory, can be established only for regional diseases not listed by OIE and for the benefit of the region. The AG discussed several approaches to make the best use of three tier regional resource base.

The AG was also informed that AAHRI of Thailand, one of NACA regional resource centre, has been recently recognized as ANAAHC to support capacity building and harmonization efforts within ASEAN.

Observations and Recommendations

- Considering the potential utility of the regional resource base, the AG recommended that the number of RREs and RRCs be expanded.
- Considering the expertise available, it was suggested to utilize RREs to gather additional information on the non OIE-listed diseases in the QAAD.
- The expertise of RREs should be harnessed to assist the AG in developing criteria for listing of diseases in regional QAAD.
- The expertise available with the RREs should be used also to evaluate the list of emerging diseases and suggest their inclusion or otherwise for the consideration of the AG.
- Regularly update the contact details of RRE including their email addresses.

7.1 Discussions to identify practical approaches to make the three tier regional resource base more useful to the region

The meeting was informed of NACA's role in establishing links between stakeholders in different countries with the regional resource experts. RREs and RRCs are willing to offer technical assistance to industry, government, policy makers and research and development organizations. It is for the stakeholders in member countries to make use of the regional expertise.

Observations and Recommendations

- Considering the limited use of regional resources, the AG suggested that NACA publicize the three tier regional resource base mechanism widely amongst the member countries, highlighting the advantages.

7.2 Identifying a RRL for IMN - update

The meeting was informed that no progress has been made in identifying a suitable lab to function as an RRL for IMN. In view of IMN now being listed in the OIE *Aquatic Code*, the AG was informed of the previous decision of AG concerning NACA RRL. At AGM-1 it was decided that NACA RRL would be identified only for non OIE-listed diseases.

Prof Timothy Flegel, AG member and crustacean disease RRE, informed the AG the reasons why his laboratory is not inclined to take up the responsibilities of an RRL. However, he expressed his willingness to provide technical assistance to stakeholders in the region on IMNV and other crustacean diseases and serve as a NACA RRC.

Observations and Recommendation

- Considering the listing of IMN by OIE, it was recommended that NACA need not proceed with the formal process of identifying NACA RRL for IMNV.
- The AG welcomed the suggestion of Prof Timothy Flegel and accepted Centex Shrimp, Chalermprakiat Building, Faculty of Science, Mahidol University, Rama 6 Road, Bangkok 10400, Thailand, as a Regional Resource Centre of NACA.

7.3 Progress on OIE Reference Laboratories for KHVD, WTD and IMN

The AG was informed that two laboratories have been recognised as OIE Reference Laboratories for KHVD, i.e. the Fisheries Research Agency, Research Promotion & Development Department, Yokohama, Japan, with Dr Motohiko Sano as the expert, and the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Weymouth, UK, with Dr Keith Way as the expert.

The meeting was informed that the process for identifying OIE Reference Laboratories for WTD and for IMN has been initiated after those two diseases were adopted for listing by the OIE in May 2007. OIE has circulated calls for expression of interest from eligible laboratories.

Observations and Recommendation

- Considering the identification of OIE Reference Laboratories for KHVD, the AG suggested that the NACA RRL for KHVD could become a NACA RRC. The AG suggested that NACA communicate this proposal to the laboratory and seek its opinion.
- To ensure continuation of diagnostic support in the transition period, the AG decided that the NACA RRL for *Mr*NV will continue to function until an OIE Reference Laboratory for WTD is formally accepted (hopefully in May 2008).
- Although it was decided at AGM-1 that RRL would be identified only for non OIE-listed diseases, the AG decided that RRLs for OIE-listed diseases should continue to function unless at least one OIE Reference Laboratory is identified for the disease under consideration, after which the NACA RRL will cease to be considered a RRL for that disease.

7.4 Evaluation by the AG of applications received (if any) for RREs, RRCs and RRLs

The application received from the Fish Disease Laboratory, Chinese Academy of Fishery Sciences, Zhejiang Institute of Freshwater, Zhejiang, China (Dr Dong Qian) last year for RRL status for *Mr*NV was placed before the AG for consideration.

Considering the listing of WTD by the OIE and the AGM-1 decision that NACA RRL would be identified only for non-OIE listed diseases, the AG agreed that the application could not be taken up for evaluation for NACA RRL. Instead, the AG decided to review the application for consideration as a NACA RRC. The AG welcomed the application received from the Fish Disease Laboratory, Chinese Academy of Fishery Sciences, Zhejiang Institute of Freshwater, Zhejiang, China (Dr Dong Qian) and following a review of the application, found that it met the requirements set for a NACA RRC.

Observations and Recommendation

- The AG recommended that the application of the Fish Disease Laboratory, Chinese Academy of Fishery Sciences, Zhejiang Institute of Freshwater, Zhejiang, China (Dr Dong Qian) be accepted by NACA as an RRC.
- The AG asked NACA to communicate this information to Dr Dong Qian and seek his opinion, before submitting the recommendation to the NACA GC for endorsement and approval.

Session 8: Regional and international cooperation

The AG was briefed on ongoing regional and international cooperation in regional aquatic animal health. The AG was pleased to note the excellent regional and international cooperation that had contributed to the development and implementation of the regional aquatic animal health programme in Asia. It was generally agreed that such cooperation should be further pursued, and the AG took note of various opportunities to further strengthen cooperation with regional and international bodies to support Asia in effective implementation of the regional aquatic animal health programme.

8.1 World Organisation for Animal Health (OIE)

AG thanked the Director General of OIE for contributing to the regional aquatic animal health activities by supporting the participation of the President of OIE-AAHSC at the annual AG meetings. The AG thanked the President of OIE-AAHSC for the excellent contributions made to the meeting. The AG also thanked the DG of OIE for supporting the participation of the Head of the Animal Health Information Department, OIE, Paris, to attend the AG meeting and make a presentation on WAHIS online reporting system. The AG thanked the Head of the Animal Health Information Department for the contributions made to the meeting.

8.2 OIE Regional Representation for Asia and the Pacific

The AG was informed of the ongoing and future planned activities of the OIE Regional Representation for Asia and the Pacific, particularly the proposed joint OIE and NACA training workshop in March 2008 in Thailand. The workshop will train aquatic national focal points/NCs in online reporting and OIE standards, in particular, the *Aquatic Code*. The AG thanked OIE Asia Pacific for its continuing collaboration and cooperation in implementing the regional QAAD reporting system. The AG also appreciated the support and contributions of OIE Asia Pacific through supporting workshops, seminars and networking. OIE Asia Pacific confirmed its support to the countries in the Asia-Pacific region, the AG and NACA to strengthen the aquatic animal health programme.

8.3 Food and Agriculture Organization of the United Nations (FAO)

FAO expressed its support to the AG and the NACA regional aquatic animal health programme and emphasized its importance in coordinating aquatic animal health activities in the region. FAO welcomed the AG report of progress in implementation of the TG.

The AG was informed of the FAO/NACA/AAHRI Molluscan Health Phase III Regional Training Workshop**.** The third and final phase of the Molluscan Health Management Programme (which FAO and NACA initiated in 1999) was completed at AAHRI in Bangkok, Thailand, from 12-17 June 2007. Sixteen participants from seven countries in the region participated in the training workshop. Recognizing the limited capacity for mollusc diseases diagnosis in the region, the AG appreciated the support provided by FAO in the completion of the III phase of the activity.

The AG was informed of the FAO/NACA Workshop on Information Requirements for Maintaining Aquatic Animal Biosecurity (Feb 2007), which was held from 15-17 February 2007, Cebu City, Philippines. The workshop increased awareness and built capacity on general principles of biosecurity and identified key information required for maintaining aquatic animal biosecurity focusing on aspects of risk analysis; diagnostics, health certification and quarantine; and epidemiological surveillance and reporting. The workshop was attended by 14 delegates from seven ASEAN countries, four delegates from the South Asian Association for Regional Cooperation (SAARC), one from China and twelve delegates from the local host institution Bureau of Fisheries and Aquatic Resources (BFAR). Resource persons from FAO, AusVet, NACA and SEAFDEC facilitated the workshop.

The AG was informed of the involvement of NACA in the FAO supported Emergency disease investigation Task force on a serious fish disease outbreak in the Chobe-Zambezi river system (Botswana). There have been some serious fish kills in Zambezi River, since October 2006, affecting several fish species in several countries in Africa (e.g. Namibia, Botswana, Zambia). Following a request from the Government of Botswana to FAO, a joint mission involving scientists FAO, AAHRI and NACA was undertaken during May 2007 to provide emergency technical assistance. The preliminary histopathological investigations of the tissue samples from infected fish collected in Chobe River, Kasane, Botswana confirmed that the disease in question was EUS. EUS is caused by an infection of a primary fungal pathogen, *Aphanomyces invadans (= A. piscicida)*.

The AG thanked FAO for its continuing support to NACA and involving NACA and regional expertise in furthering south-south cooperation.

8.4 Australian Centre for International Agricultural Research (ACIAR)

The AG was informed of the continuing funding support provided by ACIAR for regional aquatic animal health projects in the region.

ACIAR project on application of PCR for improved shrimp health management in the Asian region was successfully completed in December 2007. This project primarily focused on India, Thailand and Indonesia with three major components. Risk factors for WSD in shrimp farms were identified through the application of PCR-based detection tests and epidemiological probes. The project also provided (a) technical training in PCR-based diagnosis (two training workshops each in India and Indonesia) (b) assisted in PCR test harmonization and laboratory accreditation (two PCR inter-calibration ring testing each in India and Indonesia). In addition, support was provided for setting up a national PCR laboratory registration and accreditation programme in 2007 in India . (CIBA/MPEDA/CAA)

The ACIAR Project "Strengthening regional mechanisms to maximize benefits to small-holder shrimp farmer groups adopting better management practices" was implemented from June 2007. The project focuses on smallholder farmer groups and associated supply chain enterprises. The project will strengthen regional networking mechanisms between stakeholders for exchange of knowledge on BMPs, promote development and dissemination of contextualized BMPs for country/location/farming system/species and explore strategies that maximize market opportunities for BMP-compliant farmer groups. Institutions from Australia, Indonesia, India, Thailand and Vietnam are partners in the project.

The AG thanked the ACIAR for its continuing support.

8.5 AusAid Australia

The AG was informed of the 2 AADCP-RPS projects funded by AusAid. **AADCP-RPS project 370-018** "Operationalize Guidelines on Responsible Movement of LFF in ASEAN" was successfully completed in December 2007. The Project contributed to the enhancement of biosecurity of LFF industries in ASEAN Member Countries. The project facilitated the development by ASEAN of harmonized SOPs for health certification and quarantine measures for trans-boundary movement of LFF. A series of activities were conducted in 2006 and 2007. In 2007, a second policy workshop to finalize the SOPs (Bali, Feb 2007), second AAPQIS training workshop (Bali, Feb 2007), an implementation workshop (Bangkok Oct 2007) and CLM Technical Missions to support implementation of SOPs (Dec 2007) were coordinated from NACA.

AADCP-RPS project 370-021 "Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN" was successfully completed in June 2007. The project enhanced the capability of ASEAN Member Countries to implement ASEAN harmonized national aquatic animal health strategies to manage risks to the biosecurity of fisheries industries. In addition, an operational strategy for implementation of harmonized aquatic animal health and biosecurity plans within ASEAN, was developed Technical support was provided to four ASEAN countries (Cambodia, Lao PDR, Myanmar, Vietnam) for the development of national aquatic animal health and biosecurity strategies. Two training courses were implemented and twenty personnel from ASEAN trained in epidemiology, surveillance, risk analysis and contingency planning. Several activities were conducted in 2006 and 2007. In 2007, a second training programme (Hanoi, Feb 2007) and second policy workshop (Cebu, May 2007) were facilitated.

The AG thanked AusAid for its financial assistance to regional projects in support of strengthening aquatic animal health capacity in the region.

8.6 ASEAN Network of Aquatic Animal Health Centres (ANAAHC):

The Aquatic Animal Health Research Institute (AAHRI) of Department of Fisheries has been recognized as the ANAAHC by the ASEAN Sectoral Working Group on Fisheries and the same has been endorsed. ANAAHC will be working closely with NACA and ASEAN governments in support of aquatic animal health management in the ASEAN region. The AG welcomed this new initiative in ASEAN and advised to NACA to work closely with ANAAHC.

8.7 Permanent Advisory Network for Diseases in Aquaculture (PANDA)

The AG was informed of the invitation from PANDA to NACA to participate in the Final PANDA workshop (March 2007) in Weymouth, UK. PANDA is an EU project supported under the sixth framework (FP6) started in January 2004. The key purpose of the PANDA project is providing a sound scientific foundation for the development of EU policy and legislation for aquatic animal

health management. The AG recognized the value of this collaboration and asked NACA to widely disseminate the PANDA outputs in the region.

8.8 Department of Agriculture, Fisheries and Forestry (DAFF), Australia

The AG recognized the continued contribution of DAFF to the regional aquatic animal health activities and appreciated the progress made in the recent DAFF/NACA initiative on emergency preparedness and response to aquatic animal diseases. The AG was also informed of the recent publication of the "Aquatic Animal Diseases Significant to Asia-Pacific: Identification Field Guide". NACA and DAFF have produced this field guide to support aquatic animal health surveillance, early response and reporting in the region. The AG thanked DAFF for its continuing support to the regional health programme.

8.9 Southeast Asian Fisheries Development Center (SEAFDEC)

The meeting was informed of the various activities carried out by SEAFDEC in the area of aquatic animal health management capacity building in the ASEAN countries, including the recent SEAFDEC International Workshop on Emerging Fish Diseases in Asia (6-7 Dec 2007). The AG recognized the importance and value of collaboration and partnership with SEAFDEC in regional aquatic animal health management activities and thanked SEAFDEC for its support to regional health activities. The AG requested NACA and SEAFDEC to work closely in support of regional aquatic animal disease surveillance and reporting.

8.10 Fish Health Section of the Asian Fisheries Society (FHS)

The AG was informed of the ongoing collaboration of NACA with FHS and the invitation NACA has received to present a key note paper at the next Diseases in Asian Aquaculture Symposium in Chinese Taipei in June 2008. The AG appreciated the role played by NACA in regional aquatic animal health activities.

8.11 Association of South East Asian Nations (ASEAN)

The AG was informed of the progress made under the two AADCP-RPS projects that are being implemented in the ASEAN in close cooperation with the ASEAN Secretariat. The AG recognized the value of strong partnership with ASEAN and advised NACA to further strengthen the cooperation and explore opportunities for securing funding support for regional projects.

8.12 Asian Institute of Technology (AIT)

The AG was informed of the EU supported AIT/NACA/DOF project "Capacity building of small-scale shrimp farmers on adaptation of BMPs to promote Thai shrimp export to the EU" which was successfully completed in December 2007. The overall objective of this project was to improve quality of shrimp produced by small-scale shrimp farmers through adaptation of BMPs to increase their participation in the EU export market. A first stakeholders workshop (Bangkok, May 2007), two training workshops on BMPs for shrimp farmers (November 2007) and a final stakeholder workshop (Bangkok, December 2007) were facilitated and coordinated. The project was implemented by AIT with technical support from NACA. Considering the role of AIT in regional activities in aquaculture, AG appreciated the AIT collaboration and advised NACA to further strengthen the cooperation and explore opportunities to seek funding for new regional projects.

8.13 Crawford Fund (Australia)

The AG was informed of the funding support provided by Crawford Fund to organize a two-week long master class in fish pathology in Bangkok from 12-23 November 2007. The master class was a collaborative activity between Murdoch University in Australia, AAHRI and NACA. Nineteen participants from 14 countries participated in the master class, which trained the participants in histopathology slide reading and interpretation. In addition, DVDs for most of the common pathological conditions in fish were provided to the participants. The AG appreciated the financial support provided by the Crawford Fund and the technical support provided by resource experts from Australia, Japan, Thailand and India. The support provided by AAHRI, Thailand, in the actual running of the theory and practical classes was appreciated by the AG.

8.14 Indian Council of Agricultural Research (ICAR)

The AG was informed of the financial and technical support provided by CIBA of ICAR, India in the conduct of national workshop on aquatic epidemiology, surveillance and contingency planning in Chennai, India in September 2007. The long term objective was to support implementation of National strategies for better aquatic animal health management. Thirty four middle and senior level officers from 19 key national institutions participated in the training workshop. Resource experts from Australia, Thailand, Philippines, Indonesia, Vietnam, India and NACA provided expert inputs to the workshop. AG thanked CIBA for hosting the workshop and Resource experts for their support.

8.15 Marine Products Export Development Authority (MPEDA), India

The AG was informed of the MPEDA/NACA project "Promoting widespread adoption of BMPs in shrimp farming in India" being implemented since 2000, was successfully completed in April 2007. The project has been highly successful in bringing together shrimp farmers (organized into aquaclubs) to collectively implement better management practices to reduce disease-related losses. Adoption of farm level BMPs and cluster farming are promising models for small scale farmers to work together. In order to sustain the BMP extension programme, an institutional framework was conceptualized and National Center for Sustainable Aquaculture (NaCSA) was established as an outreach organization of MPEDA, to carry forward the MPEDA/NACA programme activities. The AG was also informed that some of the lessons learnt from the project are being published in a paper that will as part of the April 2008 issue of the OIE *Scientific and Technical Reviews*. The AG appreciated the outcomes of the project and asked NACA to widely disseminate the project findings in the region.

8.16 Private sector

The Intervet representative and AG member informed the AG of Intervet-NACA collaboration in the conduct of a master class in fish pathology and facilitation of a fish health session during the 8th Asian Fisheries Forum in Cochin, in November 2007. In addition, Intervet offered to assist NACA in its aquatic animal health regional activities as a part of its commitment as a RRC. The AG thanked Intervet for support and collaboration.

Session 9: Any other business

9.1 Any other business

No other matter was raised for discussion. The AG thanked NACA for the organization of the 6th AGM.

9.2 Review of the AG Terms of Reference

Considering the decision of AGM-4 on offering permanent representation to SEAFDEC on the AG, it was decided to revise the table showing the composition of AG Membership. The revised Terms of Reference is provided as Annex G.

9.3 Date of next meeting

The meeting date for AGM-7 was fixed for November 2008. The NACA Secretariat will advise the final date in good time.

Session 10: Presentation of meeting report and closing

The draft report was adopted and the meeting closed.

Annex A: AGM6 Draft Agenda

Wednesday, 12th December 2007: Morning session 0900-1200h

Opening session

- Welcome (Dr Sena De Silva, Director General, NACA)
- Adoption of AGM-6 agenda
- Election of Chair and Vice chair
- Election of Rapporteur

Session 1: Progress since AGM-5 and expected outputs from AGM-6

1.1 Progress report from NACA on progress since AGM-5 and expected outputs from AGM-6 – *presentation by Dr CV Mohan, followed by short discussion session as required.*

1.2 Outcomes from the OIE General Session (May 2007) and the Aquatic Animal Health Standards Commission meeting (October 2007) - *presentation by Dr Eva-Maria Bernoth* followed by discussion

1.3 Global issues of relevance to aquatic animal health management in the region-*short presentation by FAO - Dr Rohana Subasinghe/Simon Funge-Smith*

1.4 Comments on commodity standards in the OIE Aquatic Animal Health Code-*presentation by Porf Tim Flegel*

Session 2: Review of Regional disease status

2.1 Emerging Crustacean diseases in the region-*presentation by Prof Tim Flegel followed by discussion*

2.2 Emerging finfish diseases in the region – *Short presentations by Dr Lauke Labrie followed by discussions*

2.3 Emerging mollusc diseases in the region – *short presentation by Dr Temduong Somsiri followed by discussions*

Wednesday 12th December 2007: Afternoon Session 1330-1730

2.4 Results of targeted surveillance programme implemented by SEAFDEC-AQD – *short presentation by SEAFDEC representative*

2.5 Key aquatic animal health issues facing the aquaculture sector in China-*short presentation by Dr Huang Jie*

Session 3: Disease Reporting

3.1 New OIE Disease list and status of Global reporting on aquatic animal health-*short presentation by Dr Eva-Maria Bernoth followed by discussion*

3.2 Global online reporting system (WAHIS) of OIE with special reference to aquatic animal health-*presentation by Dr Karim followed by discussions*

Thursday 13th December 2007: Morning session 0900-1200h

Session 4: Review of QAAD Regional Reporting System

4.1 Regional disease status and progress in regional reporting – *presentation by CV Mohan*

4.2 Way forward with regional QAAD reporting-Views of the OIE Regional Representation for Asia-Pacific-*short presentation by Dr Sakurai followed by discussions*

4.3 Finalization of criteria for listing of diseases in QAAD-*discussion session*

4.4 Review of diseases listed in QAAD, revision of reporting form and instructions (group to consider changes made to the OIE list, WAHIS online reporting and diseases of regional concern) - *discussion session*

Session 5: Review and evaluate implementation of the Technical Guidelines

5.1 Briefing on progress in implementation of the 'Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals' - *short presentation by Dr CV Mohan followed by discussion*

5.2 Role of ASEAN Network of Aquatic Animal Health Centre (ANAAHC) in supporting health management in the region-*presentation by Dr Somkiat followed by discussion*

5.3 Implementation of two AADCP-RPS projects in ASEAN to support TG implementation-*short presentation by Dr CV Mohan followed by discussions*

5.4 Outcomes of the SEAFDEC International workshop on emerging fish diseases in Asia-*presentation by Dr Ogata/SEAFDEC representative*

5.5 Strengthening National Coordination and Communication and promoting cooperation between veterinary and Fisheries authorities-*discussion session*

5.6 Harmonization in Diagnostics: Experiences and lessons learned from PCR calibration in India and Indonesia-*short presentation by Dr CV Mohan followed by discussions*

Thursday, 13th November: Afternoon session 1330-1730h

Session 6: Revision of the Technical Guidelines[8], Manual of Procedures[9] and Asia Diagnostic Guide for Aquatic Animal Diseases[10] as required;

6.1 Progress in ADG revision-*presentation by Rohana*

6.2 Progress in updating AAPQIS database-*presentation by Rohana*

6.3 Progress made with the DAFF/NACA initiative to improve disease reporting and emergency preparedness in the Asia-Pacific region – *presentation followed by discussion*

Session 7: Identification and designation of regional aquatic animal health resources, including regional resource experts (RRE), Regional Reference Laboratories (RRL) and Regional Resource Centres (RRC)

7.1 Discussions to identify practical approaches to make the three tier regional resource base more useful to the region- *discussion by the AG*

7.2 Identifying RRL for IMNV-updates

7.3 Progress on OIE reference laboratory for KHV, *Mr*NV and IMNV

7.4 Evaluation of applications received (if any) for RRE, RRC and RRL by the AG

Session 8: Regional and International Cooperation

8.1 World Organisation for Animal Health (OIE)
8.2 OIE Regional Representation for Asia and the Pacific
8.3 Food and Agriculture Organization of the United Nations (FAO)

[8] Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing consensus and Implementation strategy, 2000. FAO/NACA. Fisheries Technical Paper No 402
[9] FAO/NACA. 2001. Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals. *FAO Fisheries Technical Paper*, No. 402, Suppl. 1. FAO, Rome. 2001. 106 p.
[10] Bondad-Reantaso, MG, McGladdery SE, East, I and Subasinghe, RP. (Eds.). Asia Diagnostic Guide to Aquatic Animal Diseases. *FAO Fisheries Technical Paper*, No. 402, Suppl. 2. FAO, Rome. 2001. 236 p.

8.4 Australian Centre for International Agricultural Research (ACIAR)
8.5 AusAid Australia
8.6 ASEAN Network of Aquatic Animal Health Centres (ANAAHC)
8.7 Permanent Advisory Network for Diseases in Aquaculture (PANDA)
8.8 Department of Agriculture, Fisheries and Forestry (DAFF), Australia
8.9 Southeast Asian Fisheries Development Center (SEAFDEC)
8.10 Fish Health Section of the Asian Fisheries Society (FHS)
8.11 Association of South East Asian Nations (ASEAN)
8.12 Asian Institute of Technology (AIT)
8.13 Crawford Fund (Australia)
8.14 Indian Council of Agricultural Research (ICAR)
8.15 Marine Products Export Development Authority (MPEDA)
8.16 Private Sector

Session 9: Any other business

9.1 Any other business

9.2 Review of the AG Terms of Reference

9.3 Date of next meeting

Friday, 14th November: Morning session 0900-1200h

Free/Draft report preparation

Friday, 14th November: Afternoon session 1400-1700h

Session 10: Closing Session

Adoption of the report and recommendations

Annex B: List of Participants

I Advisory Group Members	
Aquatic Animal Health Standards Commission (AAHSC) of the OIE	
Dr. Eva-Maria Bernoth President, Aquatic Animal Health Standards Commission of the OIE, Manager, Aquatic Animal Health Office of the Chief Veterinary Officer Australian Government Department of Agriculture, Fisheries and Forestry GPO Box 858, Canberra, ACT 2601 AUSTRALIA Tel: +61 2 6272 4328; Fax: +61 2 6273 5237 E-mail: Eva-Maria.Bernoth@daff.gov.au	
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Annex C: Progress Report

A. Routine Activities

1. Fifth Advisory Group Meeting (AGM-5)

The fifth meeting of the Asia Regional Advisory Group (AG) on Aquatic Animal Health (AGM-5) was held at the NACA Secretariat in Bangkok on 22-24 November 2006. Members are experts from government and the private sector with representatives from FAO, the Aquatic Animal Health Standards Commission of the OIE and the OIE Regional Representation for Asia and the Pacific. The AG constituted by NACA governing council in 2001, in cooperation with OIE and FAO, has been providing advice to Asian governments and NACA on aquatic animal health management matters in the region. The meeting attended by 10 Advisory Group and 2 co-opted members, addressed key aquatic animal health issues in Asia, including regional quarterly aquatic animal disease reporting system, spread of emerging aquatic animal diseases in the region, implementation of the Asia Regional Technical Guidelines (TG) on Health Management and the Responsible Movement of live aquatic animals, functioning of the three tier regional resource base and ways to further strengthen regional and international cooperation in Asian aquatic animal health management. The meeting provided a number of important recommendations on aquatic animal disease control in Asia. The final report with recommendations to Asian governments was circulated to all National Coordinators (NCs), Focal Points (FPs), CVOs, Governing Council Members, AG members, collaborating organizations and made available for download on NACA website

2. Health Work Program Presented to 18th GCM

The work program for 2007-2008, developed, largely based on the AGM-5 recommendations was presented to, and approved by, the 18th Governing Council meeting in Bali, Indonesia (2-5 May 2007).

3. Asia-Pacific Quarterly Aquatic Animal Disease Reporting (QAAD)

Four quarterly reports were published (**QAAD 2006/3, 2006/4, 2007/1, 2007/2**) since the fifth AGM (20-22 November 2006). As recommended by the AGM-5, the QAAD for 2007, was revised. The revised disease list and reporting form were circulated to all the OIE delegates and NCs through a joint OIE/NACA letter. All the QAAD published had forewords/editorials. NCs were encouraged to provide quality reports with epidemiological comments, wherever possible. QAAD reports were sent to NCs, FPs, CVOs, AG members and regional and international organizations (e.g. OIE, FAO) and made available on the NACA website for free download.

B. Projects and initiatives under the NACA Regional Aquatic Animal Health Programme

1. ACIAR Project-Strengthening regional mechanisms to maximize benefits to small-holder shrimp farmer groups adopting better management practices (June 2007-November 2009)

Better Management Practices (BMPs) in the aquaculture context outline norms for responsible farming of aquatic animals. In aquaculture, better management practices have been developed largely for shrimp and salmon aquaculture, although some efforts are presently being made to develop BMPs for other aquatic commodities (e.g. tilapias, catfish, molluscs, eels). This project intends to build on the ongoing shrimp BMP programs in the Asia-Pacific region (e.g. Australia, Indonesia, India, Vietnam and Thailand) and create a robust regional mechanism for networking and exchange of information, specifically focused to benefit small-scale shrimp farmers in Asia, in reducing disease risks, improve yields, produce quality shrimp, access better markets, address

socio-economic sustainability and comply with international principles. Activities will be built around the ongoing regional activities of project partners to ensure continuity, optimize resources and sustain already established networking in the Asian Region. Network of Aquaculture Centres in Asia-Pacific (NACA) is the Commissioned Organisation for this Category 1 project, the Australian collaborating agency is the University of Sydney. Other regional partners include Directorate General Aquaculture (MMAF) in Indonesia, NAFIQAVED in Vietnam, Department of Fisheries in Thailand and the Marine Products Export Development Authority (MPEDA) and Central Institute of Brackishwater Aquaculture (ICAR) in India. The project focuses on smallholder farmer groups and associated supply chain enterprises. Throughout, the Project partners will pro-actively identify and, as required, facilitate and advocate those activities, linkages, adjustments or enhancements necessary for on-going, independent program implementation.

The project will have 4 objectives:

- *Communications and networking* – To strengthen regional networking mechanisms between stakeholders for exchange of knowledge on BMPs, based on the International principles, to enable adoption to maximize benefits to small holder shrimp farmers
- *Development and dissemination of contextualized BMPs*–To promote development and dissemination of contextualized BMPs for country/location/farming system/species
- *Forward integration* - To explore strategies that maximize market opportunities for BMP-compliant farmer groups
- *Farmer group certification* - To develop a methodology for enabling certification of BMP-compliant small holder farmer groups

First meeting of the above project was held in the MPEDA Meeting room, Cochin, from 9.00-13.00 hours on 21st November 2007. The meeting was attended by project partners from India (MPEDA, CIBA, NaCSA), Vietnam (NAFIQAVED), Indonesia, Malaysia, Australia and Intergovernmental NACA. Representatives from other BMP projects in the region (IFC, WWF, FAO), and Seafood Alliance also participated in the meeting. ACIAR Fisheries Program Manager (Mr Barney Smith) attended the meeting (total 19 participants). Salient outcomes included

- Objectives and expected outcomes of the ACIAR regional BMP communication project was presented and discussed
- Brief overview of all the ongoing BMP projects in the region were presented and discussed
- Draft template of BMP website was presented and discussed. Agreement for BMP webpage on NACA website obtained from project partners
- Draft template for shrimp e-newsletter was presented and discussed. Agreement for shrimp e-newsletter was obtained from project partners
- Project partners and other BMP project implementers in the region were requested to provide information to the BMP website and shrimp e-newsletter
- Possibilities of developing pilot studies in market access and cluster certification methodology were discussed
- Follow up activities to implement the 4 key objectives of the ACIAR BMP communication project was discussed and agreed.

2. Operationalize Guidelines on Responsible Movement of Live Food Finfish in ASEAN (October 2005-December 2007)

The Project contributed to the enhancement of biosecurity of live food finfish industries in ASEAN Member Countries. The project facilitated the development by ASEAN of harmonized standard operating procedures (SOPs) for health certification and quarantine measures for trans-boundary movement of live food finfish.

This project was coordinated by ASEC, NACA and AusVet for Cardno ACIL who manage the AADCP:RPS program for ASEC and AusAID. These SOPs are a set of documents for health

certification and quarantine measures to be used by CA for the responsible movement of LFF by land, sea and air among ASEAN Member Countries. The SOPs recognise the existing variation in capacity among ASEAN Member Countries but the SOPs have been designed so that they can be adopted and implemented within the specific policy and legal framework of each country. These SOPs have been written to help manage the movement of LFF for immediate consumption as human food. They are proposed to be a model for the subsequent development of SOPs to cover the management of movements of juvenile LFF for rearing and for other fish and some elements of this document will be appropriate for those SOPs. Series of activities were conducted to accomplish the objectives of the project:

- First policy workshop in Bangkok (April 2006)
- First AAPQIS training workshop in Bangkok (April2006)
- Working Group Leaders Meeting in Malaysia for drafting the SOPs (September 2006)
- Second policy workshop to finalize the SOPs in Cebu (Feb 2007)
- Second AAPQIS training workshop in Cebu (Feb 2007)
- Implementation workshop in Bangkok (October 2007)
- CLM Technical Missions to support implementation of SOPs (Dec 2007)

Key outputs included:

- Variation in current health certification and quarantine measures for import of live food finfish for all ASEAN member countries identified and an inventory developed.
- Agreed ASEAN export-import model for import of live food finfish developed
- ASEAN Standard Operating Procedures for health certification and quarantine measures for international trade in live food finfish finalized.
- Skills in using AAPQIS within ASEAN Competent Authorities improved
- Technical assistance provided to CLM to support implementation of SOPs

3. Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN (October 2005-June 2007)

As an effort to bridge the development gaps and build capacity, NACA and AusVet Animal Health Services, in collaboration with other partners i.e. ASEAN Secretariat, Aquatic Animal Health Research Institute (AAHRI), Thailand and Department of Agriculture, Fisheries and Forestry (DAFF), Australia, implemented the ASEAN-Australia Development Cooperation Program's Regional Partnership Scheme (AADCP:RPS) project "Strengthening Aquatic Animal Health Capacity and Biosecurity in ASEAN". This project was managed by Cardno-ACIL Australia Pty Ltd on behalf of AusAID and ASEC. Series of activities were conducted to accomplish the project objectives

- First policy workshop in Bangkok (April 2006)
- First training programme in Singapore (May 2006)
- Technical missions to Cambodia (July 2006), Laos (July 2006), Myanmar (September 2006) and Vietnam (December 2006)
- Second training programme in Vietnam (Feb 2007)
- Second policy workshop in Bali (May 2007)

The project enhanced the capability of ASEAN member countries to implement ASEAN harmonized national aquatic animal health strategies to manage risks to the biosecurity of fisheries industries particularly those related to trade and impacting on the poor.

- Guidelines prepared for ASEAN members on harmonized aquatic animal health and biosecurity strategies within ASEAN, including an operational strategy for their implementation.
- Technical support provided to 4 ASEAN countries (Cambodia, Lao PDR, Myanmar, Vietnam) for development of national aquatic animal health and biosecurity strategies.

- Training courses implemented. Twenty personnel from ASEAN trained in epidemiology, surveillance, risk analysis and contingency planning.
- Training material developed on aquatic animal health and biosecurity for all ASEAN countries and made widely available

The final report of the project contains two parts: (A) Recommended Minimum Operational Requirements for Implementing National Aquatic Animal Health Strategies within ASEAN and (B) ASEAN progress in the implementation of National Aquatic Animal Health Strategies. Part A of this document is the result of the working group discussions during the Second Policy Workshop of the project held in Bali-Indonesia from 7-10 May 2007. This section identifies the minimum operational requirements for implementing national aquatic animal health strategies within ASEAN. Part B of this document is a compilation of the information on the status of implementation of various elements contained in national aquatic animal health strategies within ASEAN. As a part of the project activity, information was submitted by project participants and collated by NACA Secretariat. The purpose of this document is twofold. Firstly, it provides guidance for countries in ASEAN to implement key elements of national aquatic animal health strategies. Secondly, the compiled status report can be used as a basis for monitoring the progress of national strategy implementation in ASEAN member countries.

4. ACIAR project on application of PCR for improved shrimp health management in the Asian region (January 2005-December 2007)

This project primarily focused on India, Thailand and Indonesia with three major components and addressed research issues relating to the effective use of PCR for shrimp disease management through the application of population-based and molecular epidemiological methods to determine: (a) the source and cause of white spot disease (WSD) in ponds (b) the relative importance of seed and carriers as sources of infection (c) the role of virulence variation as a disease risk factor and (d) and the contribution of other pathogens to disease. The project also provided (a) technical training in PCR-based diagnosis (b) assisted in PCR test harmonization and laboratory accreditation and (c) and provided farm-level education in the value and limitations of PCR-based screening of seed. Key partners include CSIRO in Australia; MPEDA, CIBA and College of Fisheries, Mangalore in India; Mahidol University, BIOTEC in Thailand, Ministry of Marine Affairs and Fisheries in Indonesia and the intergovernmental NACA. Several activities were conducted under each of the objectives.

1. Reduce risk of WSD in shrimp farms through the application of PCR-based detection tests and epidemiological probes:

- 1st longitudinal epidemiology study completed in 2005 in 491 ponds
- 2nd longitudinal study completed in 2006 in 61 ponds
- 3rd longitudinal study completed in 2007 in 12 ponds
- PCR testing completed, genotype analysis, epidemiological analysis and tracing virus movement in the system is in progress

2. Reduce risk of yellow head and other shrimp diseases in shrimp farms through application of PCR-based detection tests and epidemiological probes:

- Large number of samples from MSGS and Loose shell Syndrome tested in 2006 and 2007
- large number of samples from India tested for YHV and LSV in 2007

3. Improve the effectiveness of PCR-based viral screening in hatcheries and service laboratories in India, Indonesia and other countries in the Asian region:

- first PCR training workshop completed in India (2005) and Indonesia (2005)
- first PCR laboratory inter-calibration completed in India (2006) and Indonesia (2006)
- second PCR training workshop completed in India (2006) and Indonesia (2007)

- second PCR laboratory inter-calibration completed in India (Apr 2007) and Indonesia (Aug 2007)
- support provided for setting up a national PCR laboratory registration and accreditation program in 2007 in India

5. Capacity building of small-scale shrimp farmers on adaptation of better management practices (BMPs) to promote Thai shrimp export to the EU (September 2006-December 2007)

The overall objective of this project was to improve quality of shrimp produced by small-scale shrimp farmers through adaptation of better management practices (BMPs) to increase their participation in the EU export market. The project was a collaborative activity between AIT, NACA and DOF (Thailand). Series of activities were conducted to accomplish the project objectives:

- Farm surveys (Oct-Dec 2006)
- First stakeholders workshop in Bangkok (May 2007)
- Two training workshops on BMPs for shrimp farmers (November 2007)
- Final stakeholder workshop in Bangkok (December 2007)

Existing knowledge gaps of shrimp farmers on BMPs and constraints faced by them were identified. BMPs relevant to the local conditions were formulated and recommended for adoption by small-scale shrimp farmers to produce high quality shrimp. Awareness of shrimp farmers on EU seafood safety standards and market needs increased. Shrimp farmers were trained on BMPs and approaches to comply with EU sea food safety requirements.

6. Promoting widespread adoption of better management practices (BMPs) in shrimp farming in India (January 2000-December 2007)

As a part of the technical collaboration between MPEDA and NACA on shrimp disease control in India, village demonstration programmes were conducted during the years of 2002, 2003, 2004, 2005, 2006 and 2007. These demonstration programme involved organizing small-scale farmers into self-help groups known as "Aquaclubs" for adoption of "Better Management Practices". Some of the key stages of the programme included:

- A baseline study of the major diseases affecting the shrimp aquaculture operations (2000)
- A longitudinal epidemiological study in 365 ponds in Andhra Pradesh, east coast of India, to identify major risk factors associated with WSD and low productivity in *Penaeus monodon* culture ponds (2000-2001)
- Development of farm level contextualized BMPs to address the identified risk factors (2002)
- Pilot testing of BMPs in selected farms (2002)
- Production of a simple and practical shrimp health management manual based on the outcomes of the risk factor study and piloting of BMPs, to support farm and village level extension programmes (2002)
- Development and testing of the concept of cluster farming for effective BMP adoption amongst farmers in a cluster, and expansion of BMP promotion to a large number of clusters (2003-2004)
- Extension of some of the BMPs to downstream activities like hatcheries
- Review and refinement of BMPs, and production of BMP extension leaflets for each stage of the culture operation (2005)
- Expansion of the BMP programme to clusters in five different states in India (2005-2006)
- Conceptualization of an institutional framework for maintaining the BMP and shrimp health extension programme (2006)
- Establishment and inauguration of the National Center for Sustainable Aquaculture (NaCSA) to carry forward the MPEDA/NACA programme activities (2007)

The project has been highly successful in bringing together shrimp farmers (organized into aquaclubs) to collectively implement better management practices to reduce disease-related losses, cost of production, improve yields and produce quality, antibiotic-free and traceable shrimp. Adoption of farm level BMPs and cluster farming are promising models for small scale farmers to work together to reduce disease, food safety, environmental, financial and social risks and earn their livelihood by helping the industry to meet customer demand through adoption of sustainable and environmentally friendly farming practices. However, to expand and maintain the process, there is need for an institutional framework and commitment of resources from the national government and private sector.

Following on from the programme activity, MPEDA formulated a scheme for 'Aquaculture societies' at the primary producer level and extending assistance to them to follow and adopt BMPs. To support the initiative, MPEDA has set up a separate Technical Service Agency called the National Center for Sustainable Aquaculture (NaCSA) under the administrative control of MPEDA. NaCSA has become operational since April 2007 and will function as an outreach organization of MPEDA primarily to cater to the extension needs of aqua farmers. The primary objective of NaCSA is to support development of sustainable aquaculture in India through provision of science based extension and other service to the sector. NaCSA will continue to consolidate and expand the BMP implementation work initiated under the MPEDA-NACA programme across the country through a net work of aquaculture societies. At present, NaCSA is working with forty aquaculture societies and is expected to promote BMPs in one-hundred societies within the next year.

7. Aquatic Animal Diseases Significant to Asia-Pacific: Identification Field Guide

NACA and the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) have recently (August 2007) produced this field guide to support aquatic animal health surveillance, early response and reporting in the region. The result of a collaborative activity among a number of fish health experts from various organizations in the Asia-Pacific region, it is aimed at improving the ability to diagnose diseases of significance to aquaculture and fisheries in the region. The field guide drew extensively from the experiences and previous and ongoing research activities in health management in Australia and other countries in Asia and thus joins the growing body of practical knowledge published for Asia-Pacific aquaculture and fisheries. The regional field guide covers all diseases listed in the Quarterly Aquatic Animal Disease (QAAD) reporting system, which includes all OIE listed diseases plus diseases of regional concern. The field guide is available for free download at NACA website and as of now over 1250 downloads have been recorded. Using other channels, the field guide CD is being wisely distributed in the region.

8. FAO/NACA Workshop on Information Requirements for Maintaining Aquatic Animal Biosecurity (Feb 2007)

This workshop was held from 15-17 February 2007, in Park Lane Hotel, Cebu City, Philippines. FAO and NACA in collaboration with BFAR, organized the workshop. The objective of the workshop was to increase awareness and build capacity on general principles of biosecurity and to deliberate on key information required for maintaining aquatic animal biosecurity focusing on aspects of risk analysis; diagnostics, health certification and quarantine; and epidemiological surveillance and reporting. The workshop was attended by 14 delegates from 7 ASEAN countries, 4 delegates from SAARC, one from China and 12 delegates from local host institution BFAR. Resource persons from FAO, AusVet, NACA and SEAFDEC participated in the workshop. Four resource papers (a) General principles of Biosecurity (b) General principles of diagnostics, health certification and quarantine (c) general principles of risk analysis and (d) Principles of epidemiological surveillance and reporting were presented by experts. Following resource paper presentations and general discussions, the participants worked in 3 working groups and identified

information requirements for 3 key thematic areas (a) Risk analysis (b) Diagnosis, health certification and quarantine (c) Surveillance and reporting

9. FAO/NACA/AAHRI Molluscan Health Phase III Regional Training Workshop (June 2007)

The third and final phase of the Molluscan Health Management Programme which FAO and NACA initiated in 1999 was held at the Aquatic Animal Health Research Institute in Bangkok, Thailand from 12-17 June 2007. Country participants involved in Phases I and II were involved to ensure continuity and achieve sustainability. The participants will continue to act as focal points for molluscan diseases and through their involvement contribute to improved surveillance, reporting and health management. This will further strengthen the ongoing aquatic animal health management initiatives in the Asia-Pacific region. Consolidation of activities (mollusc health network, resource centres and collaborative projects) during the Regional workshop will ensure provision of advice and mentorship to participants from participating countries and help to sustain the regional initiative. The purpose of the regional training workshop was to (a) continue to build the capacity and awareness of participants from 7 countries in Level III molluscan disease diagnostics and (b) finalise the Molluscan Health Programme Report which will include country case studies. Sixteen participants from 7 countries in the region participated in the training workshop. Franck Berthe, Melba Reantaso and CV Mohan contributed to the training workshop as resource experts.

10. FAO/NACA Workshop on Understanding and Applying Risk Analysis in Aquaculture (June 2007)

The above workshop was held from 8-11 June 2007 at Rayong, Bangkok. The workshop was attended by over 40 delegates and the proceedings will be available soon for wider dissemination. The objectives of the workshop were:
(a) to present the desk-top study of the same title focussing on seven major risk sectors:

- pathogen risks,
- food safety and public health risks,
- ecological (pests and invasives) risks,
- genetic risks,
- environmental risks,
- financial risks, and
- social risks.

(b) to discuss the unifying principles for analysis of the various risks and identify:

- the inherent differences in approaches between sectors and
- what risk analysis methodologies/procedures are available for the particular
- hazard/s being addressed; and

(c) to provide a platform for better understanding the hazards, vulnerabilities, uncertainties and risks affecting the aquaculture sector, as well as the connections between the differenrisk events and patterns in order to identify integrated approaches to risk management and reflect on how to share risks and responsibilities.

11. ICAR/NACA national workshop on Aquatic epidemiology, surveillance and emergency preparedness (September 2007)

The 5 day training workshop was held in CIBA, Chennai from 3-7, September 2007. The purpose of the 5 day training workshop was to build capacity and awareness of relevant stakeholders in the areas of aquatic epidemiology, risk analysis, surveillance and emergency preparedness. The long term objective was to support implementation of **National strategies** for better aquatic animal health management with a focus on improved surveillance, reporting, early response, emergency preparedness, risk analysis, certification and quarantine. Thirty four middle and senior level

officers from 19 key national institutions participated in the training workshop. Resource experts from Australia, Thailand, Philippines, Indonesia, Vietnam, India and NACA provided expert inputs to the workshop. The training workshop had three components that were integrated in a logical fashion to ensure continuity and enhance uptake. The **Training component** included lectures on concepts of epidemiology, application of epidemiology (e.g. disease investigations, conduct of surveys, sampling issues), surveillance, qualitative risk analysis and contingency planning. The second component focused on **sharing of experiences** from other countries (e.g. Australia, Thailand, Philippines, Indonesia, Vietnam) that are implementing national aquatic animal health strategies in the Asia Pacific region. This included areas such as national plans, working of national advisory committee, national list of diseases, national surveillance and reporting framework, national contingency plans, national aquatic animal health networks, etc. The third component consisted of **facilitated interaction sessions**. These sessions were used to discuss and agree on simple and practical approaches to implement national aquatic animal health strategies in India with the available resources and expertise. The full report will be soon available at the NACA website.

12. Fish Pathology Master Class (12-23 Nov 2007)

The two week master class in fish pathology, supported by the Crawford fund of the Australian Government, was successfully completed recently. The master class was a collaborative activity between Murdoch University in Australia, AAHRI in Thailand and the Intergovernmental NACA. Nineteen participants from 12 countries in the region attended the master class. The master class focused on training students in reading and interpreting histology slides to understand normal histology, pathological process, tissue pathology, disease case studies and artifacts. Some of the well known and respected fish pathologists from the region taught in the course. Resource experts include Dr Brian Jones, Dr Barbara Nowak and Ms Susan Kueh from Australia; Dr Supranee Chinabut from DOF, Thailand; Prof Miyazaki from Japan; and Dr CV Mohan from NACA. The feed back from the participants was very positive and encouraging. Prof Edwards from Murdoch University attended the closing ceremony on 23rd November and distributed the certificates to the participants. Some of the salient features of the master class:

- Network of project participants developed. NACA will facilitate functioning of the network and ensure expert input from resource experts in support of master class participants in their future work
- Digitized slides of all important pathological conditions provided to the participants (3 DVDs) along with a software to read the digitized slides. Instead of a microscope, computer can be used to read the whole slide. This is altogether a new approach in pathology, slide reading and sharing of information.
- Course brochure (separate attachment) and class notes for all classes provided to participants.

C. Participation in other regional activities

1. China-ASEAN Symposium on import and export aquatic animal safety (March 2007)

This symposium was organized by General Administration of Quality Supervision, Inspection and Quarantine of the P.R. China (AQSIQ) from 1-2 March 2007 at Grand Hotel, Kylin Villa, Shenzen. The Shenzen Entry-Exit Inspection and Quarantine Bureau of the PR China (SZCIQ) co-sponsored the event. The objective of the symposium was to strengthen China-ASEAN cooperation in aquatic animal inspection and quarantine, and facilitate aquatic animal trade between China-ASEAN. The symposium was attended by government nominated representatives from 9 ASEAN countries, representatives from Macao; Hong Kong; representatives from key provinces in China (Yunnan CIQ; Hainan CIQ; Guangxi CIQ; Hubei CIQ; Zhejiang CIQ; Jiangsu CIQ; Beijing CIQ; Shanghai

CIQ; Xiamen CIQ; Fujian CIQ; Liaoning CIQ; Jinan CIQ; Shenzen CIQ; Zhuhai CIQ; Tianjin CIQ; Guangdong CIQ), and representatives from key national institutions (Department of Animal and Plant Supervision and Quarantine,-AQSIQ; Department of International Cooperation-AQSIQ; The National Fishery Technical Extension Center-MOA; Division of Aquaculture, Bureau of Fisheries-MOA; Zhejiang Freshwater Aquaculture Institute).

The key note presentation titled " *Trade in aquatic animals: tools to minimize aquatic animal health risks*" was delivered by CV Mohan of NACA. Representatives from 6 ASEAN countries (Singapore, Thailand, Vietnam, Philippines, Indonesia, Malaysia) provided overviews of Quarantine and disease control systems for import and export of aquatic animals and their products in their respective countries. The symposium provided an excellent opportunity for delegates from China and ASEAN to exchange information, understand each others inspection and quarantine system, discuss issues that affect trade and identify areas that need future collaboration and cooperation. As a symposium outcome, the delegates produced a resolution calling for further strengthening the cooperation between China and ASEAN and identified some key areas for cooperation

2. Final PANDA workshop -Progress report and future perspectives (March 2007)

The final PANDA workshop was organized by Prof Barry Hill, PANDA project Coordinator, CEFAS Weymouth, UK from 20-21 March 2007 at CEFAS Weymouth Laboratory, Weymouth, UK. Permanent Advisory Network for Diseases in Aquaculture (PANDA) is a EU project supported under the sixth framework (FP6) started in January 2004. The key purpose of the PANDA project is providing a sound scientific foundation for the development of EU policy and legislation for aquatic animal health management, through development of a pro-active Community-wide network of experts in fish and shell fish diseases. The long term objective is the establishment of a permanent network of aquatic animal health experts, including researchers, diagnosticians, industry practitioners, etc., to provide a forum for exchange of views on major issues concerning diseases in European aquaculture, and to communicate the results of the discussions to the European Commission. The project is funded by the EU Framework Programme 6 under the theme of Scientific advice in support of policy. The PANDA project consortium has representatives from 8 European institutions. The objective of the workshop was to review the progress made under six work packages of the PANDA project and explore mechanisms to sustain the PANDA network beyond the present project. The workshop also provided opportunities for several regional and international partner/collaborating organizations to present their activities and discuss opportunities for linking up with PANDA. The presentation from NACA "NACA's regional aquatic animal health programme and opportunities to link up with PANDA" provided background information about NACA, history of health programme and some examples of ongoing project activities. As a concluding remark, NACA's desire to strengthen collaboration with PANDA with the intention of building partnerships between Asia and Europe to work together on aquatic animal health issues of common interest and concern to both the regions.

3. ACIAR project development meeting in Jakarta (March 2007)

The ACIAR Joint Project Planning Meeting was held at Hotel Grand Kemang, Jakarta on Saturday, 31 March 2007. The meeting objectives were: (a) Improve mutual understanding of shrimp aquaculture development projects in Indonesia (b) Identify synergies and specific mechanisms for cooperation and (c) Scope potential activities for proposed new shrimp health project. The proposed project titled "Improving delivery of shrimp seed quality management for small-holder shrimp farmers in Indonesia" was presented by Dr Peter Walker and discussed. Full proposal is likely to be submitted by June 2008 for funding consideration.

4. Emergency disease investigation Task force on a serious fish disease outbreak in the Chobe-Zambezi river system (Botswana) from 19-27th May 07

There has been some serious fish kills in Zambezi River, since October 2006, affecting several fish species in several countries in Africa (e.g. Namibia, Botswana, Zambia). Ulcers and focal areas of skin lesions had been noticed in fish caught in the Chobe and Zambezi Rivers in the vicinity of the Chobe Game Reserve, Botswana, and the Caprivi Strip, Namibia, as well as on the Zambian side of the Zambezi, since at least October 2006. Following a request from the Government of Botswana to FAO, a joint mission involving scientists from the Food and Agriculture Organization of the United Nations (FAO), the Inland Aquatic Animal Health Research Institute (AAHRI of Thailand's Department of Fisheries) and the Network of Aquaculture Centres in Asia-Pacific (NACA) was undertaken during May 2007 to provide emergency technical assistance to assess the present situation and advise on future preventative and control measures. The overall objective of the task force was to undertake an emergency assessment of the fish disease outbreak through: (a) field observations (e.g. field visit to affected river system, interviews with local/district officials and local fishermen, collection of epidemiological data), (b) laboratory examination (i.e., parasitology, bacteriology, histopathology, mycology, virology) of available affected fish samples, and (c) examination of available reports and other laboratory findings - to identify as far as possible the causative agent of the outbreak, to provide recommendations to prevent further spread of the disease, recommend control measures if applicable and develop an emergency response and contingency plan for future outbreaks to concerned governments.

The team made field visits to Botswana and specimens and tissue samples were collected from fish in Chobe River, Kasane. The preliminary histopathological investigations of the tissue samples from infected fish collected in Chobe River, Kasane, Botswana confirmed that the disease in question is EUS. EUS is caused by an infection of a primary fungal pathogen, *Aphanomyces invadans (= A. piscicida)*.

Among the key short-term measures recommended by the mission include:

- urgent notification to the World Animal Health Organization (Office International des Epizooties or OIE), of the presence of EUS in the Chobe River in Botswana by the veterinary authority of Botswana. Similarly, the Namibia veterinary authority is also encouraged to make the same notification of the occurrence of the disease in the Caprivi region in Namibia;
- initiation of a public awareness and extension programme to raise understanding of the disease and impact reduction measures;
- conducting short-term training and awareness raising in EUS for key government officers and other key stakeholders (e.g. NGOs working on fisheries or with fishing communities) to raise awareness and implement an extension and monitoring programme;
- establishment of surveillance and monitoring programs along the Chobe-Zambezi river system to monitor spread pattern of the disease outbreak;
- more detailed epidemiological investigation of the present EUS distribution, analysis of risks to the fisheries (people and biodiversity) in all major tributaries and lakes in the Chobe-Zambezi river system, and development of appropriate risk management responses.

5. WAS Asia Pacific Conference in Hanoi, Vietnam (August 07)

Delivered two invited presentations in the Aquatic Animal Health Session-(a) Managing aquatic animal health at the regional level: Experiences from the Asia-Pacific (b) Emerging diseases of mollusks in the Asia-Pacific region

6. NaCSA's Work Plan workshop and NaCSA Governing Council Meeting at Kakinada, India (August 2007)

NaCSA is the outcome of MPEDA-NACA project that has been ongoing in India since 2000. MPEDA has set up NaCSA as an outreach organization primarily to cater to the extension needs of aqua farmers. The primary objective of NaCSA is to support development of sustainable aquaculture in India through provision of science based extension and other service to the sector. NaCSA will continue to expand the BMP implementation work initiated under the MPEDA-NACA project across the country through a net work of aquaculture societies. At present, NaCSA is working with 40 aquaculture societies formerly known as aquaclubs. The aim is to set up nearly 100 aquaculture societies. All the 12 MPEDA-NACA project staff have been absorbed into the NaCSA system and are placed at different levels

7. 8th Asian Fisheries Forum in Cochin, India (November 2007)

Participated in the 8th AFF and interacted with several Indian Fisheries Scientists and Policy makers. The idea of setting up a national disease surveillance project was discussed with senior level officers from Department of Biotechnology and ICAR. Interacted with aquatic animal health scientists from Malaysia, Cambodia, Vietnam, Australia, Bangladesh, Singapore, and China. Co-Chaired the fish health special session on 23rd (9.00-15.30 hours)

D. Other Relevant Activities

1. New project proposal: Improved capability for shrimp virus PCR testing laboratories in Vietnam

This project will apply the successful model established in ACIAR Project FIS02/075 *Application of PCR for improved shrimp health management in the Asian region* to a contextualized program of training and inter-laboratory calibration in Vietnam. In Vietnam, there are 40 PCR laboratories currently servicing the shrimp farming industry in Vietnam of which approximately half (22) are operated by the government and the remainder are operated by universities (10), commercial hatcheries (2) or the private sector. The objectives will be:

- To improve delivery of PCR screening performance and enhance reliability of shrimp production for small-holder farmer groups in Vietnam by:
    - Providing intensive training at the Australian Animal health laboratory for a core group of 3-4 local PCR specialists;
    - Delivering training workshops to private and government sector laboratories in the use of PCR for shrimp screening for the major viral pathogens;
    - Implementing two inter-laboratory calibrations of WSSV PCR testing performance;
    - Providing advice to participating laboratories on an appropriate response to inter-calibration performance; and
    - Assisting the appropriate national authority in the development and implementation of a future PCR laboratory accreditation program.

Proposed partners

- CSIRO Livestock Industries, Australian Animal Health Laboratory (AAHL), Geelong.
- Network of Aquaculture Centers Asia-Pacific (NACA), Bangkok, Thailand.
- Ministry of Fisheries (RIAs 1, 2 and 3), Ha Noi, Vietnam.
- Can Tho University, Can Tho City, Vietnam.
- NAFIQAVED, Ha Noi

2. Secondment of Aquatic Animal Health Specialist from Department of Fisheries, Thailand to NACA

Dr Suppalak Lewis from AAHRI, Thailand has been seconded to NACA for a period of one year. She is working in NACA since August 2007.

3. ASEAN Network of Aquatic Animal Health Centres (ANAAHC)

The Aquatic Animal Health Research Institute (AAHRI) of Department of Fisheries has been recognized as the ANAAHC by the ASEAN Sectoral Working Group on Fisheries and the same has been endorsed. ANAAHC will be working closely with NACA and ASEAN governments in support of aquatic animal health management in the ASEAN region.

4. ASEAN Sub-network for Live Food Finfish SOPs

Under the AADCP-RPS project 370-018 Implementation workshop held in October 2007, ASEAN sub-network for live food finfish SOPs has been formed and TOR for its operation developed. The sub-network will operate through ANAAHC, in close cooperation with NACA.

E. Important Publications and Presentations

1. CV Mohan, Supranee Chinabut & Somkiat Kanchanakhan (In Press). Policy frameworks and guidelines: Perspective in the Asia-Pacific region. In: Changing trends in managing aquatic animal disease emergencies. OIE *Scientific and Technical Review*, Volume 27 (1), April 2008

2. CV Mohan, MJ Phillips, BV Bhat, NR Umesh and PA Padiyar (In Press) Tools for preparedness and response: Farm level plans/ husbandry measures. In: Changing trends in managing aquatic animal disease emergencies. OIE *Scientific and Technical Review*, Volume 27 (1), April 2008

3. R. Subasinghe, C.V. Mohan & M. Reantaso (In Press). FAO/NACA Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals In: Changing trends in managing aquatic animal disease emergencies. OIE *Scientific and Technical Review*, Volume 27 (1), April 2008

4. Bueno, P.B., Mohan, C.V., Phillips, M.J., Yamamoto, K., Corsin, F and Clausen, J. 2007. Better management practices, public health and sustainable farming. Fish for the People, 5: 2-9.

5. CV Mohan, MJ Phillips and F. Corsin. 2007. Communication and networking in a regional organization. In Proceedings: OIE Global Conference on Aquatic Animal Health, Bergen, Norway (9-12 October 2006)

6. F. Corsin, G. Giorgetti, C.V. Mohan. 2007. Contribution of Science to Farm-Level Aquatic Animal Health Management. In Proceedings: OIE Global Conference on Aquatic Animal Health, Bergen, Norway (9-12 October 2006)

1. Workshop on Opportunities and Challenges of Fisheries Globalization, Paris, 16/17th April, 2007; Co-sponsored by OECD/FAO

- *Sena S De Silva, Michael J. Phillips, C.V. Mohan- Meeting the Demands and Challenges of Aquaculture Globalization: the Role of a Regional Inter-Governmental Body*

2. Workshop on Understanding and applying risk analysis in aquaculture production; 7th to 11th June, 2007, Rayong, Thailand

- N.R. Umesh, C.V. Mohan, M.J. Phillips, B.V. Bhat, G. Ravi Babu, A.B. Chandra Mohan and P.A. Padiyar-Risk analysis in aquaculture – experiences from small-scale shrimp farmers of India

3. Workshop on Environment-friendly Aquaculture: Challenges and Potentials: Communities in Sustainable Development), 13th December, 2006 at the East Asia Seas (EAS) Congress 2006
12th – 16th December 2006, Haikou City, Hainan Province, PR China

- Michael Phillips, Pedro Bueno, C.V. Mohan, Rohana Subasinghe, Arun Padiyar and Koji Yamamoto Aquaculture and the Environment: progress and challenges towards sustainable seafood production

4. 8th Asian Fisheries Forum, Cochin Nov 2007

- Peter Walker, Nick and CV Mohan-Shrimp disease and health management
- Koji Yamamoto, C.V. Mohan, Michael J. Phillips- Strengthening regional communication mechanisms for small-holder shrimp farmer groups and adoption of better management practices
- Arun Padiyar, MJ Phillips, CV Mohan, Koji Yamamoto, Vishnu Bhat- Better management practices and cluster management in shrimp farming: Regional developments and experiences

5. ACIAR/ NACA. Development of BMPs for Marine Finfish Aquaculture in the Asia-Pacific region. Lampung, Indonesia, 7-10 November 2007

- *Michael Phillips, C.V. Mohan, Rohana Subasinghe, Arun Padiyar and Koji Yamamoto - Aquaculture and the environment, the challenges of sustainable seafood production and role of better management practices.*

Annex D: FAO global, regional and national level activities on aquatic animal health

1. **Item 1.3. Global Issues:**

 FAO continues to assist Members in improving national aquatic animal health management activities through Technical Cooperation Projects [(TCPs), e.g. Africa, Eastern Europe, Asia, Gulf Region, Pacific Island countries, Asia] or regular programme or extra-budgetary funded thematic projects (e.g. biosecurity, risk analysis, molluscan health, climate change). Brief details are provided below:

AFRICA

- An emergency disease task force organized by FAO in April 2007 (with AAHRI and NACA) confirmed the presence of EUS in the Chobe/Zambesi Rivser system in Botswana. The findings of the task force paved the way for the development of an emergency project TCP/RAF/3111.
- TCP/RAF/3111 (E) Emergency assistance to combat Epizootic ulcerative syndrome (EUS) in the Chobe/Zambesi river system (Angola, Botswana, Malawi, Mozambique, Namibia, Zambia, Zimbabwe). The countries sharing Zambezi river system, where EUS has been detected, have requested FAO for a programme to improve aquatic animal health capacities in those countries. FAO is working with these countries through an emergency regional project assisting capacity building, developing national emergency preparedness and response strategies and initiating active surveillance programme to better understand the EUS situation in the counties.
- Regional Aquatic Biosecurity Framework for Africa. Since the recent outbreak of EUS in Africa, there is an interest and a need for improving biosecurity in the region and FAO has been requested to assist in developing a biosecurity framework for the region, encompassing aquatic animal health management and reducing the risks of aquatic pathogen incursions and resulting diseases. FAO is currently working in this request and is planning to have a regional workshop, in collaboration with OIE during early 2008 to develop such a framework and build consensus on its implementation. The aim of this project is to determine national aquatic animal biosecurity capacities in the African region as basis for developing a regional aquatic biosecurity framework and identifying regional capacity-building needs to support this framework. Preparatory work on going including a regional workshop in 2008.

EASTERN EUROPE

- TCP/BIH/3101 Strengthening Aquaculture Health Management in Bosnia and Herzegovina - this TCP project will culminate in a Project Terminal Workshop and a Regional Seminar on Aquatic Animal Health (May 2008) that will involve West Balkan States (Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro and Servia) and an opportunity to develop a regional project on aquaculture and health management for this region.

ASIA

- Regional Training/Workshop on Information Requirements for Aquatic Animal Biosecurity, February 2007, Cebu, Philippines (with NACA). The objective of the workshop was to increase awareness and build capacity on general principles of bio-security and to deliberate on key information required for maintaining aquatic animal bio-security focussing on aspects of risk analysis; diagnostics, health certification and quarantine and epidemiological surveillance and reporting. A total of 37 delegates attended the workshop. Participants included representatives from Association of Southeast Asian Nations (ASEAN) countries (Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, and Thailand), South Asian countries (Bangladesh, India, Nepal), and China, and representatives from organizing and partner organizations

(FAO, Network of Aquaculture Centres in the Asia-Pacific (NACA), AusVet). The working group findings on key information and capacity building requirements for 3 themes, namely: (i) risk analysis, (ii) diagnostics, health certification and quarantine and (iii) epidemiological surveillance and reporting are the most important output of the workshop. The workshop also contributed towards increased awareness and capacity building of national delegates on aquatic animal biosecurity, WTO-SPS measures and the above thematic areas. In addition, it also created an informal network of national delegates from over 12 countries in the Asia-Pacific region, with interest in aquatic animal health work, paving the way for future collaborative work in the region.

- Molluscan Health Management Programme Phase III Training/Workshop, June 2007, Bangkok, Thailand (with AAHRI and NACA). The regional training/workshop was aimed to: (a) build the capacity and awareness of participants from 7 countries in Level III molluscan disease diagnostics and to close the Molluscan Health Programme which was initiated by FAO and NACA in 1999. A total of 24 consisting of representatives from China (1), Indonesia (2), Philippines (2), Malaysia (2), Sri Lanka (2), Thailand (4), Viet Nam (3), trainers/resource speakers (3 from Canada, Thailand and Italy) and laboratory technicians (5) participated in this regional training/workshop. There were seven country presentations, more than five hrs of lectures and at least 15 hrs of laboratory work and final discussion on the way forward. A Fisheries Technical Paper "Molluscan Health Management Programme: Country Reports and Training Manual" which will be presented into 3 parts: Part 1 will contain background and highlights of Phases 1,2 and 3; Part 2 will contain country case studies (Australia, China, Indonesia, Japan, Malaysia, Philippines, South Korea, Sri Lanka, Thailand and Viet Nam covering abalone, clam, Babylon snail, edible oyster, green mussel, pearl oyster and scallop); and Part 3 will be a Training Manual which will consist of basic anatomy, sample collection, diagnostics (Levels 1,II and III) and normal and basic pathology.

- Expert Workshop on Understanding and Applying Risk Analysis in Aquaculture Production, June 2007, Rayong, Thailand (with NACA). The workshop brought together 42 policy makers/risk analysis practitioners/technical experts with a broad range of specialization in the field of fish disease, food safety and public health, genetics, environment, aquaculture, fisheries, genetics, including social and economic aspects of aquaculture. Fourteen plenary presentations were followed by three Working Group (WG) discussions on the following aspects: (i) WG 1 tackled the outline of the Manual on Understanding and Applying Risk Analysis in Aquaculture, (ii) WG 2 deliberated on the following risks from aquaculture (pathogen, food safety and public health, ecological/environmental, genetics) and (iii) WG 3 discussed socio-economic risks. WG 2 and WG 3 elaborated on the four principal steps of the risk analysis process, i.e. hazard identification, risk assessment, risk management and risk communication. One day was spent on plenary presentations and two days were spent on WG discussions and presentations. Expected documentation products include: (i) Report of the Workshop as an FAO Fisheries Proceedings which will contain 10 peer-reviewed technical papers, (ii) A Manual on Understanding and Applying Risk Analysis in Aquaculture Production as an FAO Fisheries Technical Paper.

GULF REGION (Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates)

- Regional aquatic animal health capacity and performance survey will commence from December 2007 to February 2008, outcomes and analysis to be presented during a regional technical workshop being organized to be held in Saudi Arabia in April 2008; the workshop will include session on assessment of future needs for aquatic animal health capacity, including mechanisms for increased regional cooperation, sharing of expertise, information, etc., and a seminar on current issues in international aquatic

animal health; and a session to discuss a draft proposal for a regional aquatic animal health development programme for the region

PACIFIC ISLANDS

- TCP/RAS/3101 Sustainable aquaculture development in Pacific Micronesia (Palau, Federated States of Micronesia, Kiribati, Marshall Islands and Nauru), includes components on health management and risk analysis

- Support to regional effort (e.g. by the Secretariat of the Pacific Community) towards upgrading regional knowledge and skills on aquatic biosecurity with the ultimate aim of developing a regional programme on aquatic biosecurity.
- Support to national level capacity building on risk assessment for Marshall Island and Federated States of Micronesia

On Aquaculture Certification. FAO in collaborating with NACA is preparing guidelines for aquaculture certification for international agreement. These guidelines encompasses aquatic animal health management aspects of aquaculture and refers to regional and global scenarios and OIE guidelines and the Code.

On Climate Change Issues. FAO will convene a high level conference on World Food Security and the Challenges of Climate Change and Bioenergy in Rome (June 2008). A Working Group on Climate-related Transboundary Pests and Diseases Including Relevant Aquatic Species will convene an expert consultation to have a broader understanding on the impact of climate change covering four major questions pertaining to the following: (1) whether present knowledge provide a basis to assess climate change impact of pests and diseases of animal, plant, forest and aquatic species; (2) prediction methods; (3) impacts on food security; and (4) future interdisciplinary research activities to clarify and quantify possible connections between climate change, ecosystems, disease transmission and consequences.

More on Aquatic Biosecurity: FAO is planning, assuming availability of funding support, to organize some work on the topic – prudent use of chemicals in aquaculture – to revisit the developments in these area since 1996 when FAO (with SEAFDEC and CIDA) convened an expert meeting on this subject.

Recent global publications:

- FAO. 2007. Aquaculture development. 2. Health management for responsible movement of live aquatic animals. FAO Technical Guidelines for Responsible Fisheries. No. 5, Suppl. 2. Rome, FAO. 2007. 31p. Description. The FAO Technical Guidelines for Responsible Fisheries which were prepared to support sections of FAO's Code of Conduct for Responsible Fisheries (CCRF). They address responsible fisheries management, aquaculture development, international trade and fisheries research. The global guidelines have expanded the perspective and considered strategies at national level and health management at the farm level as parallel measures. The global guidelines have two major components: (1) national strategy and biosecurity and (2) farm-level health management and biosecurity programmes, the elements/components of which are listed below. The National Strategy on Aquatic Animal Health and Biosecurity contains the following elements: policy, legislation and enforcement; risk analysis; pathogen lists; information systems; health certification; quarantine; disease surveillance, monitoring and reporting; zoning; emergency preparedness; research; institutional structure; human resources development; and regional and international cooperation. The Farm-Level Health Management and Biosecurity Programmes contain the following elements: cluster management, better management practices; compliance with national legislation;

certification; on-farm disease prevention; surveillance and reporting of disease outbreaks; emergency preparedness and information sharing and farmer education.

- Bondad-Reantaso, M.G., McGladdery, S.E. & Berthe, F.C.J. 2007**.** Pearl oyster health management: a manual. *FAO Fisheries Technical Paper* No. 503. Rome, FAO. 2007. 121p. (in press). Description. The pearl oyster industry is a growing multibillion dollar sector of molluscan aquaculture. The end product of pearl farming, the pearl, is unique to this sector. Pearl production is entirely based upon health. The pearl itself is a product of the oyster's immune defences as a response to soft-tissue irritation. Today, most disease problems are caused by opportunistic pathogens taking advantage of oysters weakened by the stress of handling, including pearl surgery and sub-optimal growing conditions. Further development of the industry will inevitably lead to increased risk of disease introduction, spread or emergence. Against such an unwanted future, health management is the critical line of defence. This publication provides guidance on the management of pearl oyster health and reviews pearl oyster mortalities and disease problems that will be useful for designing programmes aimed at reducing the risks from diseases. Part 1 consists of pearl oyster health – the current interest in it and an overview of the cultured marine pearl industry. Part 2 examines pearl oyster health management and consists of seven sections, namely: (a) introduction; (b) general information on husbandry and handling, hatchery production, introductions and transfers; (c) disease diagnostic protocols dealing with field collections of samples, gross external examination, gross internal examination and laboratory protocols; (d) health zonation; (e) disease outbreak protocols; (f) national strategies on aquatic animal health; and (g) references. Certain countries in the pearl oyster producing regions have acquired a great deal of experience in health management of cultured species. Experiences from Australia, the Cook Islands, Japan, French Polynesia, the Philippines, China, the Persian Gulf and the Red Sea are included in Part 3 which also contains a general review of pearl oyster mortalities and disease problems.

- Arthur, J.R., Bondad-Reantaso, M.G., & Subasinghe, R.P. 2008. Procedures for the quarantine of live aquatic animals: a manual. FAO Fisheries Technical Paper. No. 502. Rome, FAO 2008. 60p. (in final preparation). Description: Quarantine is an important risk management measure and a key activity that should be considered when developing national strategies on aquatic animal health management. This manual outlines the technical requirements for setting up quarantine facilities at three levels, based on the general level of risk (as determined by risk analysis) represented by the specific consignment of aquatic animals being moved: (i) the quarantine of "high risk" species (e.g. aquatic animals being moved either internationally (introductions and transfers) or domestically between regions of different health status that are destined for use in aquaculture, capture fishery development or other applications where release or escape of animals or any pathogens they may be carrying into the natural environment is likely to occur; (ii) the quarantine of "lower risk" species (e.g. aquatic animals destined for the ornamental trade) to improve biosecurity for aquatic animals whose trade is an established practice and (iii) the routine quarantine of aquatic animals at production facilities (e.g. new, domestically produced or locally captured broodstock or juveniles or animals whose movement has been contingent upon additional, more stringent, risk management measures, such as the use of Specific Pathogen Free (SPF) stocks, international health certification, pre-border and/or border quarantine, etc.).

FAO's participation in global and regional conferences as invited plenary speaker:

- 29th World Veterinary Congress, July 2008, Vancouver, Canada
- World Fisheries Congress 2008, October 2008, Yokohama, Japan
- 5th International Symposium of the Japanese Society for Fish Pathology, October 2008, Tokyo, Japan

2. **Item 6.1 Progress in ADG:**

ADG is being revised. We have received many chapters and await for few. The work is expected to complete by March 2008

The updating of FAO Fisheries Technical Paper 402/2 Asia Diagnostic Guide to Aquatic Animal Diseases is in good progress. A Scoping document has been prepared. The revised Diagnostic Guide will now have a global scope. Twenty seven (27) global experts (from Australia, Canada, China, Denmark, France, India, Italy, New Zealand, Norway, Spain, Thailand, UK, USA) have accepted FAO's invitation to participate either as contributing authors and peer-reviewers and/or both. There will be at least 50 diseases/pathogens that will be included and each disease chapter will have the following information: background information, causative agent, host range, geographic distribution, clinical aspects, diagnostic methods, corroborative diagnostics, modes of transmission, control measures and their impacts, and up to 10 key references.

3. **Item 6.2 Progress in AAPQIS:**

 AAPQIS is currently being upgraded and the new version will be available by January 2008. The aim is to expand the range of contents to cover additional aquatic animal health aspects and to increase compatibility with other FAO resources such as FI Homepage, FIGIS, Aquaculture Gateway Page, etc. The available resources will be integrated and XML will be integrated into all new and existing databases. RSS feeds for primary information assets will be created and various tagging will be included to increase information usability. Possibility of social networking will be explored to increase knowledge of online aquaculture community and a new content to cover broader issues of Governance will be developed.

4. **Regarding the Quarterly Aquatic Animal Disease Report (QAAD)**, FAO thinks it should be continued as a joint single FAO/NACA/OIE Report. FAO is happy to explore the possibilities of joint publication (with corresponding logos). If QAAD can be incorporated into WAHIS, still retaining the contributions by FAO, NACA and OIE/Asia, it should be considered as a viable option. FAO encourages continued collaboration with NACA and OIE (HQ and Asia) on this issue and happy to discuss further on possible options for way forward. FAO is happy to hear the suggestions and recommendations of the AG.

Annex E: Assessment of non OIE-listed diseases (from the 2007 QAAD) and emerging diseases for listing in the QAAD 2008

(a) Non OIE-listed finfish diseases in the 2007 QAAD

	OIE listing criteria[11] (applied regionally)	Epitheliocystis	GID[12]	VER	ESC	BKD	IPN	CCVD	Piscirickettsiosis
	Consequences								
1	The disease has been shown to cause significant production losses at a national or multinational (zonal or regional) level.	n		y	y	n	n	y	n
2	**Or:** The disease has been shown to or scientific evidence indicates that it is likely to negatively affect wild aquatic animal populations that are an asset worth protecting for economic or ecological reasons.	n		n	?	n	n	n	n
3	**Or:** The agent is of public health concern.	n		n	n	n	n	n	n
	And Spread								
4	Infectious aetiology of the disease is proven.	y		y	y	y	y	y	y
5	**Or:** An infectious agent is strongly associated with the disease, but the aetiology is not yet known.	Na		Na	Na	Na	Na	Na	Na
6	**And:** Potential for international spread, including via live animals, their products or fomites.	n		y	y	y	y	y	y
7	**And:** Several countries or countries with *zones* may be *declared free* of the disease based on the general surveillance principles outlined in Chapter 1.1.4. of the *Aquatic Manual.*	?		?	?	y	y	y	y
	And Diagnosis								
8	A repeatable and robust means of detection/diagnosis exists.	y		y	y	y	y	y	y
	Recommendation	**delete**	**retain**	**retain**	**retain**	**delete**	**delete**	**retain[13]**	**delete**

[11] Refer to Article 1.2.2.1 of the OIE *Aquatic Animal Health Code*

[12] There have been changes in the taxonomy of iridoviral diseases in fish that could affect the names currently given. The AG decided to wait and see whether OIE will change the name of listed iridoviral diseases such as RSID in the *Aquatic Code*.

[13] CCV is so far exotic, but if introduced, the consequences could be serious. Susceptible species are present in the region.

(b) Non OIE-listed mollusc diseases in the 2007 QAAD

	OIE listing criteria (applied regionally)	*Marteilia sydneyi*	*Marteilioides chungmuensis*	*Mikrocytos mackini*
	Consequences			
1	The disease has been shown to cause significant production losses at a national or multinational (zonal or regional) level.	n	y	?
2	**Or:** The disease has been shown to or scientific evidence indicates that it is likely to negatively affect wild aquatic animal populations that are an asset worth protecting for economic or ecological reasons.	n	n	n
3	**Or:** The agent is of public health concern.	n	n	n
	And Spread			
4	Infectious aetiology of the disease is proven.	y	y	y
5	**Or:** An infectious agent is strongly associated with the disease, but the aetiology is not yet known.	Na	Na	Na
6	**And:** Potential for international spread, including via live animals, their products or fomites.	?	y	y
7	**And:** Several countries or countries with *zones* may be *declared free* of the disease based on the general surveillance principles outlined in Chapter 1.1.4. of the *Aquatic Manual.*	y	?	y
	And Diagnosis			
8	A repeatable and robust means of detection/diagnosis exists.	y	y	y
	Recommendation	**delete**	**retain**	**delete?**

(c) Non OIE-listed crustacean diseases in the 2007 QAAD

	OIE listing criteria (applied regionally)	BMGN	NHP
	Consequences		
1	The disease has been shown to cause significant production losses at a national or multinational (zonal or regional) level.	n	n
2	**Or:** The disease has been shown to or scientific evidence indicates that it is likely to negatively affect wild aquatic animal populations that are an asset worth protecting for economic or ecological reasons.	n	n
3	**Or:** The agent is of public health concern.	n	n
	And Spread		
4	Infectious aetiology of the disease is proven.	?	y
5	**Or:** An infectious agent is strongly associated with the disease, but the aetiology is not yet known.	Na	Na
6	**And:** Potential for international spread, including via live animals, their products or fomites.	?	?
7	**And:** Several countries or countries with *zones* may be *declared free* of the disease based on the general surveillance principles outlined in Chapter 1.1.4. of the *Aquatic Manual.*	?	y
	And Diagnosis		
8	A repeatable and robust means of detection/diagnosis exists.	n	y
	Recommendation	**delete**	**delete**

(d) Non OIE-listed emerging mollusc disease in the 2007 QAAD

	OIE listing criteria[14] (applied regionally)	Akoya oyster disease
1	Infectious aetiology of the disease is proven.	n
2	**Or:** An infectious agent is strongly associated with the disease, but the aetiology is not yet known.	y
3	**And:** The agent is of public health concern.	n
4	**Or:** Significant spread in naive populations of wild or cultured *aquatic animals*.	y
	Recommendation	**retain**

[14] Refer to Article 1.2.2.2 of the OIE *Aquatic Animal Health Code*

(e) Non OIE-listed emerging crustacean disease

	OIE listing criteria (applied regionally)	MSGS	MLD	Loose shell syndrome
1	Infectious aetiology of the disease is proven.	n	y	n
2	**Or:** An infectious agent is strongly associated with the disease, but the aetiology is not yet known.	y	y	n
3	**And:** The agent is of public health concern.	n	n	n
4	**Or:** Significant spread in naive populations of wild or cultured *aquatic animals*.	?	?	?
	Recommendation	**list**[15]	**list**[16]	**do not list at this stage**

(f) Non OIE-listed emerging mollusc diseases

	OIE listing criteria (applied regionally)	OOD	AVN
1	Infectious aetiology of the disease is proven.	N	y
2	**Or:** An infectious agent is strongly associated with the disease, but the aetiology is not yet known.	?	y
3	**And:** The agent is of public health concern.	n	n
4	**Or:** Significant spread in naive populations of wild or cultured *aquatic animals*.	Y	Y
	Recommendation	**do not list at this stage**	**list**

[15] MSGS is associated with retinopathy caused by LSNV. LSNV is a possible necessary cause, but not a sufficient cause. While the criterion is not fully met, collecting epidemiological information from the region is felt necessary, hence listing was supported.

[16] While the criteria are not fully met, listing was supported to raise awareness and facilitate collation of epidemiological information.

Annex F: List of Diseases in the Asia-Pacific *Quarterly Aquatic Animal Disease Report (Beginning 2008)*

1. DISEASES PREVALENT IN THE REGION	
1.1 FINFISH DISEASES	
OIE-listed diseases	**Non OIE-listed diseases**
1. Epizootic haematopoietic necrosis	1.Grouper iridoviral disease
2. Infectious haematopoietic necrosis	2.Viral encephalopathy and retinopathy
3. Spring viraemia of carp	3.Enteric septicaemia of catfish
4. Viral haemorrhagic septicaemia	
5. Epizootic ulcerative syndrome	
6. Red seabream iridoviral disease	
7. Infection with koi herpesvirus	
1.2 MOLLUSC DISEASES	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infection with *Bonamia exitiosa*	1. Infection with *Marteilioides chungmuensis*
2. Infection with *Perkinsus olseni*	2. Acute viral necrosis (in scallops)
3. Abalone viral mortality	
1.3 CRUSTACEAN DISEASES	
OIE-listed diseases	**Non OIE-listed diseases**
1. Taura syndrome	1. Monodon slow growth syndrome
2. White spot disease	2. Milky lobster disease
3. Yellowhead disease (YH virus,gill-associated virus)	
4. Spherical baculovirosis (*Penaeus monodon*-type baculovirus)	
5. Infectious hypodermal and haematopoietic necrosis	
6. Tetrahedral baculovirosis (*Baculovirus penaei*)	
7. Infectious myonecrosis	
8. White tail disease (MrNV)	
1.4 UNKNOWN DISEASES OF A SERIOUS NATURE	
OIE-listed diseases	**Non OIE-listed diseases**
	1. Akoya oyster disease
2. DISEASES PRESUMED EXOTIC TO THE REGION	
2.1 Finfish	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infectious salmon anaemia	1. Channel catfish virus disease
2. Gyrodactylosis (*Gyrodactylus salaris*)	
2.2 Molluscs	
OIE-listed diseases	**Non OIE-listed diseases**
1. Infection with *Bonamia ostreae*	
2. Infection with *Marteilia refringens*	
3. Infection with *Perkinsus marinus*	
4. Infection with *Xenohaliotis californiensis*	
2.3 Crustaceans	
OIE-listed diseases	**Non OIE-listed diseases**
1. Crayfish plague (*Aphanomyces astaci*)	

Annex G: Revised Terms of Reference (TOR) of the Advisory Group.

The Terms of Reference (TOR) of the Advisory Group are to provide advice to NACA through the following activities:

- Review and evaluate quarterly regional aquatic animal disease reporting;
- Evaluate progress made on implementation of the *Technical Guidelines*;
- Revise *Technical Guidelines*[17], *Manual of Procedures*[18] and *Asia Diagnostic Guide for Aquatic Animal Diseases*[19] as required;
- Develop procedures for advising on Technical Guidelines implementation;
- Advise in identification and designation of regional aquatic animal health resources, as Regional Resource Experts, Regional Resource Centres and Regional Reference Laboratories
- Review the TOR as and when required.

The AG will consist of ten members, including: Chairperson, Vice Chairperson, and Technical Secretary. The criteria for selecting members are based on their technical competence in the subject matter areas of interest to aquatic animal health management in the region. They are as follows:

NO.	CRITERIA/COMPETENCE IN AQUATIC ANIMAL HEALTH
1	Policies and national programme development, harmonisation and standardisation of diagnostics and health management procedures
2	Quarantine and health certification. Trade related issues of aquatic animal health, international treaties, agreements, *etc.*
3	Regional Centres, research needs, training and capacity building, etc.
4	Information systems, surveillance and reporting
5	Private sector involvement including knowledge on contingency planning and early warning, *etc.*
6	Representing the OIE Regional Representation for the Asia-Pacific
7	Representing the OIE Aquatic Animal Health Standards Commission
8	Representing FAO Fisheries Department
9	Representing SEAFDEC Aquaculture Department
10	NACA Regional Aquatic Animal Health Specialist – as Technical Secretary

[17] Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing consensus and Implementation strategy, 2000. FAO/NACA. Fisheries Technical Paper No 402

[18] FAO/NACA. 2001. Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals. *FAO Fisheries Technical Paper*, No. 402, Suppl. 1. FAO, Rome. 2001. 106 p.

[19] Bondad-Reantaso, MG, McGladdery SE, East, I and Subasinghe, RP. (Eds.). Asia Diagnostic Guide to Aquatic Animal Diseases. *FAO Fisheries Technical Paper*, No. 402, Suppl. 2. FAO, Rome. 2001. 236 p.

The AG members will be recruited for an initial period of two years. The Chairperson and Vice-Chairperson will be selected by the AG. The Chairperson will serve for one term (two-years) and if required and willing, could be extended for another term, pending the Chairperson's consent and if required, the term may be extended by another two years.

As and when required the AG will co-opt technical experts for their work.

At least three selected members of the AG will only serve for a two-year term and at least three new members will be recruited at two-year intervals to guarantee a degree of continuity in the composition of the AG. NACA's Aquatic Animal Health Specialist will serve as the Technical Secretary to the AG with no fixed-term basis. The NACA Secretariat will nominate or select new membership as required on the basis of the advice of the AG.

The AG will meet on an annual basis, and the meetings will be held usually at the NACA Secretariat in Bangkok unless otherwise decided by the AG. The AG meetings will be held during the first week of November each year unless otherwise specified. The dates and venue for the next meeting will be decided at the end of each meeting by the AG.