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Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals

and

The Beijing Consensus and Implementation Strategy

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PREPARATION OF THIS DOCUMENT

This document presents the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and their associated implementation plan, the Beijing Consensus and Implementation Strategy (BCIS). Together, they provide the 21 Asian governments that participated in the FAO Technical Co-operation Programme (TCP) Project - "Assistance for the Responsible Movement of Live Aquatic Animals" with detailed expert guidance for developing national and regional strategies for reducing the risks of disease due to trans-boundary movement of live aquatic animals. The Technical Guidelines are the result of an extensive consultative process, undertaken between 1998-2000, involving input from government-designated National Co-ordinators (NCs), NACA, FAO, OIE, and regional and international specialists. The final Technical Guidelines were unanimously endorsed at the Final Workshop on Asia Regional Health Management for the Responsible Trans-boundary Movement of Live Aquatic Animals, held in Beijing, PR China, 27th-30th June 2000.

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ABSTRACT

The Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and their associated implementation plan, the Beijing Consensus and Implementation Strategy (BCIS), provide expert guidance for national and regional efforts in reducing the risks of disease due to trans-boundary movement of live aquatic animals. The Technical Guidelines were initiated due to increased recognition that disease emergence is often linked to live aquatic animal movements, and that the associated economic losses, including impacts on rural livelihoods and national efforts in poverty alleviation and food security, are highly significant. New trade agreements and requirements generated by the World Trade Organization (WTO) further reinforced the necessity for improved live aquatic animal health management. Recognising the need for a region-wide approach to aquatic animal health management, the national governments of countries of the Asia Region requested FAO, through NACA, to assist production of a set of technical guidelines that could be used to improve and harmonise aquatic animal health management strategies for responsible trans-boundary movement of live aquatic animals.

An FAO Technical Co-operation Programme (TCP) Project - "Assistance for the Responsible Movement of Live Aquatic Animals" was launched by NACA in 1998, with the participation of 21 countries from throughout the region. This programme complemented FAO's efforts in assisting member countries to implement the relevant provisions in Article 9 - Aquaculture Development - of the Code of Conduct for Responsible Fisheries (CCRF), at both the national and regional levels. A set of Guiding Principles, formulated by a group of aquatic animal health experts at the Regional Workshop held in 1996 in Bangkok, formed the basis for an extensive consultative process, between 1998-2000, involving input from government-designated National Co-ordinators (NCs), the Network of Aquaculture Centres in Asia-Pacific (NACA), FAO, the Office International des Épizooties (OIE), and regional and international specialists. The Technical Guidelines were unanimously endorsed at the Final Workshop on Asia Regional Health Management for the Responsible Trans-boundary Movement of Live Aquatic Animals, held in Beijing, China, 27th-30th June 2000. Recognising the crucial importance of implementation of the Technical Guidelines, the participants prepared a detailed implementation strategy, the Beijing Consensus and Implementation Strategy (BCIS), focussing on National Strategies and with support through regional and international co-operation. The NCs gave unanimous endorsement of the Technical Guidelines, in principle, as providing valuable guidance for national and regional efforts in reducing the risks of disease due to the trans-boundary movement of live aquatic animals, and the workshop participants unanimously approved the associated implementation strategy.

Implementation of the Technical Guidelines will contribute to securing and increasing income of aquaculturists in Asia by minimising the disease risks associated with trans-boundary movement of aquatic animal pathogens. They will also contribute to regional efforts to improve rural livelihoods, within the broader framework of responsible management, environmental sustainability and protection of aquatic biodiversity.

(Key words: Asia, Aquaculture, Health Management, Aquatic animal diseases, Quarantine, Health Certification, Guidelines)

PREFACE

The Food and Agriculture Organization of the United Nations (FAO) and the Network of Aquaculture Centres in Asia-Pacific (NACA) are pleased to present this document entitled *Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals and the Beijing Consensus and Implementation Strategy.* The *Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals* (hereafter referred to as the "*Technical Guidelines*") and their associated implementation plan, the *Beijing Consensus and Implementation Strategy (BCIS*), were developed by representatives from 21 Asian governments[1], scientists and experts on aquatic animal health[2,3], as well as by representatives from several national, regional and international agencies and organisations[4].

The *Technical Guidelines* provide valuable guidance for national and regional efforts in reducing the risks of disease due to trans-boundary movement of live aquatic animals. Their implementation will contribute to securing and increasing income of aquaculturists in Asia by minimising the disease risks associated with trans-boundary movement of aquatic animal pathogens. In many countries in Asia, aquaculture and capture fisheries provide a mainstay of rural food security and livelihoods, and implementation of the *Technical Guidelines* will contribute to regional efforts to improve rural livelihoods, within the broader framework of responsible management, environmental sustainability and protection of aquatic biodiversity.

The *Technical Guidelines* are based on a history of regional collaboration and discussion. They were initiated due to increased recognition of disease emergence being linked to live aquatic animal movements. The associated economic losses, impacts on rural livelihoods and national efforts in poverty alleviation and food security were recognised as being highly significant. New trade agreements and requirements generated by the World Trade Organization (WTO) further reinforced the necessity for improved live aquatic animal health management. The initial programme, upon which the *Technical Guidelines* were subsequently based, was the FAO/NACA Asia Regional Aquatic Animal Health Management Programme, officially launched in 1996 with the convening of the *Regional Workshop on Health and Quarantine Guidelines for the Responsible Movement (Introduction and Transfer) of Aquatic Organisms,* held in January 1996, in Bangkok, Thailand.

The governments participating in this regional programme clearly recognised the need for a region-wide approach to aquatic animal health management. They, therefore, requested FAO, through NACA, to assist production of a set of technical guidelines that could be used to improve and harmonise aquatic animal health management strategies for responsible trans-boundary movement of live aquatic animals.

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[1] For the purpose of these *Technical Guidelines*, the term "country" covers an entity which may be a nation, a region of a country or a government.

[2] See Annex I for the list of National Co-ordinators who represented the participating countries during drafting of these *Technical Guidelines.*

[3] See Annex II for the list of Regional Working Group (RWG) and Technical Support Services (TSS) members who assisted with the *Technical Guidelines*.

[4]See Annex III for the list of agencies and organisations that participated in the development of the *Technical Guidelines*.

An FAO Technical Co-operation Programme (TCP) Project (TCP/RAS 6714 (A) and 9065 (A) - "Assistance for the Responsible Movement of Live Aquatic Animals") was launched by NACA in 1998, with the participation of 21 countries from throughout the region. This programme complemented FAO's efforts in assisting member countries to implement the relevant provisions in Article 9 - Aquaculture Development - of the *Code of Conduct for Responsible Fisheries* (CCRF), at both the national and regional levels. A set of Guiding Principles, formulated by a group of aquatic animal health experts at the Regional Workshop held in 1996 in Bangkok, formed the basis for an extensive consultative process, between 1998-2000, involving input from government-designated National Co-ordinators (NCs), NACA, FAO, OIE, and regional and international specialists. Based on reports from these workshops, as well as intersessional activities co-ordinated by FAO and NACA, the final *Technical Guidelines* were presented and discussed at the *Final Workshop on Asia Regional Health Management for the Responsible Trans-boundary Movement of Live Aquatic Animals,* held in Beijing, China, 27th-30th June 2000.

The *Technical Guidelines* were reviewed and discussed by the participants of this meeting, which included the NCs, FAO, NACA, OIE (Representatives of the Fish Disease Commission and Regional Representation in Tokyo), and many regional and international aquatic animal health management specialists. The NCs gave unanimous agreement and endorsement of the *Technical Guidelines,* in principle, as providing valuable guidance for national and regional efforts in reducing the risks of disease due to the trans-boundary movement of live aquatic animals.

The States have primary responsibilities for implementation of the *Technical Guidelines,* and the workshop recommended that the *Technical Guidelines* be integrated within national development plans, and implemented in a phased manner building on current resources.

Recognising the crucial importance of implementation of the *Technical Guidelines*, the participants prepared a detailed implementation strategy, the *Beijing Consensus and Implementation Strategy (BCIS),* focussing on National Strategies[5] and with support through regional and international co-operation. This comprehensive implementation strategy was unanimously adopted by the workshop participants.

The *Technical Guidelines* are also supported by the *Manual of Procedures for the Implementation of the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals* (hereafter referred to as the *Manual of Procedures*), which will be published in late 2000. The *Manual of Procedures* provides background material and detailed technical procedures to assist countries and territories in the Asia Region in implementing the *Technical Guidelines*. In addition, an Asia Diagnostic Guide to Aquatic Animal Diseases was prepared to support regional countries in diagnosis of aquatic animal disease. This document will also be published in late 2000.

The countries that participated in the development of the *Technical Guidelines* and *BCIS* are Australia, Bangladesh, Cambodia, China P.R., Hong Kong China, India, Indonesia, Iran, Japan, Korea (D.P.R.), Korea (R.O.), Lao (P.D.R.), Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

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[5] The National Strategies of the participating countries for implementation of the *Technical Guidelines* will be published separately by FAO/NACA.

FAO and NACA extend special thanks to all the governments, agencies, and organisations that took part in this significant, and sometimes daunting, endeavour, as well as to all the individuals who generously contributed time, effort and expertise to the compilation of this document and other information produced during the process.

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FOREWORD

Movement[1] of live aquatic animals is a necessity for development of aquaculture on both a subsistence and commercial level. However, such movements increase the probability of introducing new pathogens, which can have dire consequences on aquaculture, capture fisheries and related resources, as well as the livelihoods which depend on them. In order to minimise or avoid the risk of pathogen transfer via aquatic animal movements, it is essential that the individuals and organisations involved in such activities appreciate, and participate in, the overall health management process[2].

The adverse social, economic and environmental impacts which have resulted from the irresponsible or ill-considered movement of live aquatic animals and their products have led to global recognition of the need for health management protocols to protect aquaculture, fisheries resources and the aquatic environment. In many cases, these impacts have been a direct result of the absence of effective national and regional health management strategies. However, formulation of effective quarantine measures[3], health certification and guidelines applicable on an international scale is complicated. A wide range of social, economic and environmental circumstances have to be considered, along with the range of aquatic animal species involved and their pathogens and diseases. In addition, differing reasons for moving live aquatic animals and products impose a further set of variables to the process. Nevertheless, the serious impacts of unrestricted regional and international movement of aquatic animals merit international recognition - a fact clearly reflected in the *International Aquatic Animal Health Code* and the *Diagnostic Manual of Aquatic Animal Diseases* of the Office International des Épizooties (OIE 2000a, 2000b), which provide guidelines and recommendations for reducing the risk of spreading specific pathogens considered relevant to international trade of aquatic animals.

Since present international protocols are not always applicable to the disease concerns of aquatic food production and trade in the Asia Region, the need for effective health management protocols which focus on the species and disease problems of this region has been recognised for many years. A regional, as opposed to national, approach is considered appropriate, since many countries in the region share social, economic, industrial, environmental, biological and geographical characteristics. A regionally adopted health management programme will facilitate trade, and protect aquatic production (subsistence and commercial) and the environment upon which they depend, from preventable disease incursions.

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[1] Terms used in this document are defined in Section 3, Definitions, of the *Technical Guidelines*.

[2] For the purpose of this document, the health management process is defined (see the *Technical Guidelines,* Section 3) as "aquatic animal health management in its broadest sense, encompassing pre-border (exporter), border and post-border (importer) activities, as well as relevant national and regional capacity-building requirements (infrastructure and specialised expertise) for addressing health management activities, and implementation of effective national and regional policies and regulatory frameworks required to reduce the risk of disease spread through movement (intra- and international) of live aquatic animals."

[3] Measures developed as a result of risk analysis to reduce the disease risks associated with the transfer of disease agents with live aquatic animal movements. This usually refers to trans-boundary movements, with pre-border, border, and post-border health management processes, however, such activities are equally applicable to intra-national movement of live aquatic animals.

A joint FAO/NACA Asia-Regional Programme on Aquatic Animal Health Management was undertaken to review:

- the need for better health management to support safe movement of live aquatic animals and,
- the applicability of existing international codes on aquatic animal health management, quarantine and health certification, including those of the OIE, the European Inland Fisheries Advisory Commission (EIFAC), and the International Council for Exploration of the Sea (ICES) to Asian circumstances.

This review (see Humphrey *et al.* 1997) highlighted the fact that the disease risks associated with pathogen transfer in the Asia Region can only be reduced through a broader approach to aquatic animal health management than currently outlined in disease-specific codes of practice (e.g., the OIE code) or in codes and protocols developed specifically for northern hemisphere countries (e.g., the ICES and EIFAC codes). In addition, it underlined the need for pre-border (exporter), border and post-border (importer) involvement in the programme, to ensure co-operative health management of aquatic animal movement. With the support of an FAO Technical Co-operation Programme (TCP) implemented by NACA, this document was compiled by a group of aquatic animal health experts within and outside the region to assist the development of effective health management procedures for safe movement of live aquatic animals within and between countries in the region. It summarises the results of the FAO-NACA review process and proposes practical and effective regional guidelines for reducing the risks associated with transfer of pathogens in the Asia Region.

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ACRONYMS AND ABBREVIATIONS

Acronyms and abbreviations appearing in the *Technical Guidelines* and the *BCIS* stand for the following organizations, programmes and titles:

AG	Advisory Group on Aquatic Animal Health
AAHRI	Aquatic Animal Health Research Institute
AAPQIS	Aquatic Animal Pathogen and Quarantine Information System
ACIAR	Australian Centre for International Agriculture Research
ADB	Asian Development Bank
ADG	Asia Diagnostic Guide to Aquatic Animal Diseases
AFFA	(Department of) Agriculture, Fisheries and Forestry – Australia
APEC	Asia Pacific Economic Co-operation
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
BCIS	Beijing Consensus and Implementation Strategy
BIMST-EC	Bangladesh-India-Malaysia-Sri Lanka-Thailand Economic Cooperation
CA	Competent Authority
CCRF	Code of Conduct for Responsible Fisheries
COFI	Committee on Fisheries
CSIRO	Commonwealth Scientific and Industrial Research Organization (Australia)
DFID	Department for International Development (United Kingdom)
EIFAC	European Inland Fisheries Advisory Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDC	Fish Disease Commission (of OIE)
GATT	General Agreement on Tariffs and Trade
ICES	International Council for Exploration of the Sea
IRA	Import Risk Analysis
LIFDC	Low-income food-deficit country
MRC	Mekong River Commission
NACA	Network of Aquaculture Centres in Asia-Pacific
NC	National Coordinator
NGO	Non-governmental Organization
OIE	Office International des Épizooties (the World Organization for Animal Health)
RWG	Regional Working Group
SAARC	South Asian Association for Regional Co-operation
SEAADCP	Southeast Asia Aquatic Disease Control Project
SEAFDEC-AQD	Southeast Asian Fisheries Development Center – Aquaculture Department
SPS	WTO Agreement on the Application of Sanitary and Phytosanitary Measures
TCP	Technical Cooperation Programme
TSS	Technical Support Services
WB	World Bank
WTO	World Trade Organization

PART I

Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals

1 SCOPE AND PURPOSE

Development of these *Technical Guidelines* has taken the different socio-economic and environmental circumstances of each country and area in the Asia Region into consideration, along with the diversity of current infrastructures (expertise and institutional capability), range of aquatic species being moved, diversity of pathogens, and the different reasons for live aquatic animal movement.

The intent of the *Technical Guidelines* is to assist countries to undertake movement of live aquatic animals in a way that minimises the disease risks associated with pathogen transfer and disease spread, both within and across boundaries. This will enhance protection of the aquatic environment and biodiversity, as well as the interests of aquaculture and capture fisheries. It also provides a mechanism to facilitate trade in aquatic species and to avoid unjustifiable trade barriers based on aquatic animal health issues. It is further hoped that the *Technical Guidelines* will assist governments to implement relevant provisions of the *Code of Conduct for Responsible Fisheries* (FAO 1995) and other international treaties and agreements applicable to the Asian Region (see *Manual of Procedures*). The *Technical Guidelines* have been developed pursuant to a set of Guiding Principles (see Section 5) agreed upon by national delegates and representatives from participating national, regional, and international agencies and organizations.

Although these guidelines are prepared for use by the countries that participated in their drafting, they are consistent with international legislation and agreements, and thus may be applicable to non-participating countries in Asia and other parts of the world.

2 BACKGROUND

The spread of pathogens with trans-boundary movements of live aquatic animals has been clearly associated with disease outbreaks and significant losses of aquaculture production and revenue. However, Asian aquatic food production has already been seriously affected by disease. With trans-boundary movement of live aquatic animals increasing for aquaculture and other purposes, practical measures which minimise the risk of introduction and spread of pathogens are urgently needed to sustain the growth of this sector (ADB/NACA 1991, Humphrey *et al.* 1996, DFID/FAO/NACA/GOB 2000).

The use of exotic species for fisheries and aquaculture diversification has been practised since the middle of the 19th century, however, recent advances in transportation efficiency, live animal trade and intensification of aquaculture have precipitated a significant increase in the number of species being moved on a global scale. On top of fisheries and aquaculture diversification, many species are introduced for sport-fisheries, the ornamental fish trade, research, biological control, and as bait and forage. Although many such introductions have been successful, others have resulted in highly publicised failure, generating controversy over protection of native biodiversity, spread of pathogens and disease, and the cost-benefits and risks for related socio-economic development.

Movement of live aquatic animals always poses some risk of pathogen transfer. Use of local stocks of native species for aquaculture development and fisheries enhancement significantly reduces this risk. In addition, native species are adapted for growth under local environmental conditions and usually have established markets. Many such species, however, have unknown

culture potential and have not been domesticated to a level which will support sustained aquaculture development. In addition, some have limited market or trade potential, or have low commercial value. In such cases, pressure for importation of exotic species (or domesticated strains) is inevitable, and effective health safeguards are required.

Policies, legislation and guidelines relating to health management of live aquatic animals have to be flexible enough to support frequent revision and modification. This is necessary due to on-going developments in aquaculture and culture-based fisheries, increasing knowledge on diseases of aquatic animals, and improved or new diagnostic techniques. Changing political, industrial and socio-economic environments also contribute to the dynamic nature of aquatic animal health management.

The Fish Disease Commission of the Office International des Épizooties (OIE) has developed recommendations and protocols for preventing the international spread of aquatic animal diseases as part of its *International Aquatic Animal Health Code* (OIE 2000a). These concentrate on health surveillance of animals used in domestic and international trade. Recommendations for reducing the risks (ecological, genetic and disease) associated with the introduction and transfer of a broader range of aquatic species have also been developed by the International Council for the Exploration of the Sea (ICES) (ICES 1995) – an organisation of North Atlantic countries with fishery interests.

These codes and protocols have limited applicability in fishery and culture conditions in the Asian Region; thus fish and shellfish continue to be introduced within this area with little or no consideration of potential disease consequences. Substantial losses and adverse socio-economic impacts have already resulted, and these must be weighed against the cost of implementing and maintaining national and regional health management programs.

Knowledge of the health status of aquatic animal populations or stocks is an essential prerequisite for risk assessment of pathogen transfer. Thus, health certification and associated quarantine measures are integral parts of the overall health management process. This process should be practical, cost-effective and easy to implement e.g., using available laboratory and administration facilities.

Since some degree of risk is inevitable with trade in live aquatic animals, health management procedures, policies and practices must operate within the concept of minimising the risk of disease and pathogen incursion while, at the same time, avoiding imposition of unjustifiable or unnecessary impediments to trade, aquaculture development and aquatic food production.

Additional background material is presented in the Manual of Procedures. Included is information on world and regional aquaculture production; the trans-boundary movement of aquatic species and the introduction and transfer of associated pathogens; the economic significance of introduced pathogens; and details on pertinent international and regional conventions and codes, codes of practice, guidelines, recommendations and current sub-regional initiatives.

3 DEFINITIONS

This section provides definitions for the most important terms used in the Technical Guidelines and the BCIS (where possible, definitions provided by the International Aquatic Animal Health Code (OIE 2000a) have been adopted).

TERM	DEFINITION
Aquatic animals	Live fish, molluscs and crustaceans, including their reproductive products, fertilised eggs, embryos and juvenile stages, whether from aquaculture sites or from the wild.
Aquaculture site	Hatchery, nursery or grow-out area, including land-based, flow-through and open-water based systems.
Competent authority	National veterinary authority, or other aquatic animal health authority of a country/territory, with the officially approved responsibility and competence to ensure and supervise the implementation of aquatic animal health management in line with the OIE's International Aquatic Animal Health Code and the Technical Guidelines.
Contingency plan	A detailed plan of action for dealing with serious aquatic animal disease outbreaks.
Diagnosis	Identification of the cause of a specific disease or syndrome.
Disease	Clinical or non-clinical infection with an aetiological agent (as applied to the Technical Guidelines). NB. The classic definition of disease includes non-infectious pathology, however, this does not normally apply to health management measures related to movement of live aquatic animals.
Health certificate	A certificate issued by an exporting country's competent authority attesting to the health status of a shipment of aquatic animals. (also see the OIE's International Aquatic Animal Health Code and its model health certificates)
Health management process	Aquatic animal health management in its broadest sense, encompassing pre-border (exporter), border and post-border (importer) activities, as well as relevant national and regional capacity-building requirements (infrastructure and specialised expertise) for addressing health management activities, and implementation of effective national and regional policies and regulatory frameworks required to reduce the risk of disease spread through movement (intra- and international) of live aquatic animals.
Holding facilities	Facilities used to hold live aquatic animals for disease inspection at an importing border.
Import risk analysis (IRA)	The process by which hazards associated with the movement of a particular commodity are identified and mitigative options are assessed. The results of these analyses are communicated to the authorities responsible for approving or rejecting the import.
Introduction	The human-assisted movement of an aquatic animal to an area outside its natural range.
Monitoring	Collection and analysis of information necessary to detect changes in prevalence or intensity of infection.
Movement	Human-mediated movement of aquatic animals within or across political

TERM	DEFINITION
	borders (international, state/provincial or regional boundaries).
Pathogen	An infectious agent capable of causing disease.
Quarantine	Holding or rearing of aquatic animals under conditions which prevent their escape, and the escape of any pathogens they may be carrying, into the surrounding environment. This usually involves sterilisation/disinfection of all effluent and quarantine materials.
Quarantine measures	Measures developed as a result of risk analysis to prevent the transfer of disease agents with live aquatic animal movements. This usually refers to trans-boundary movements, with pre-border, border and post-border health management processes, however, such activities are equally applicable to intra-national movements of live aquatic animals.
Risk	The probability of negative impact(s) on aquatic animal health, environmental biodiversity and habitat and/or socio-economic investment(s).
Surveillance	Systematic observation and examination of samples of population(s) of aquatic animals designed to detect the presence of infectious agents or occurrence of clinical disease in order to control disease outbreaks/spread.
Transfer	The movement of an aquatic animal to an area within the established or historical range of the species.
Zone	1. An area containing an aquatic species which has been determined to have a homogenous health profile for a specified pathogen or disease. The pathogens or diseases used to delineate these areas as positive or negative are those considered to pose significant risk if transferred from infected to uninfected populations of the same (or related) species. 2. An area of one or more countries/territories comprising: I) an entire catchment area from the source of a waterway to the estuary, ii) more than one catchment area, iii) part of a catchment area from the source of a waterway to a barrier, iv) a part of a coastal area, or v) an estuary with a precise geographical delimitation, that consists of an homogeneous hydrological system.
Zoning	Identifying zones for disease control purposes.

4 GUIDING PRINCIPLES

These *Technical Guidelines* have been developed based on a set of Guiding Principles which were reached by consensus among the participating countries during the Second Project Workshop held in Bangkok, Thailand, in February 1999. They are:

1. Movement of living aquatic animals within and across national boundaries is a necessity for economic, social and development purposes.

2. Such movements may lead to the introduction of new and emerging pathogens and to disease establishment and, therefore, may pose risks to the importing country's animal, plant and human health status.

3. The role of health management is to reduce the risks arising from the entry, establishment or spread of pathogens to a manageable level with the view to protecting animal, plant and human life. Health management should also protect living aquatic resources, the natural aquatic environment and aquatic biodiversity, as well as support the movement of aquatic animals and protect trade.

4. The health management process is defined, in the broad sense, as aquatic animal health management encompassing pre-border (exporter), border and post-border (importer) activities, as well as relevant national and regional capacity-building requirements (infrastructure and specialised expertise) for addressing health management activities, and development and implementation of effective national and regional policies and regulatory frameworks required to reduce the risk of disease spread through movement (intra- and international) of live aquatic animals.

5. Health management measures should be practical, cost-effective and easy to implement by utilising readily available facilities. Individual countries may need to adopt, modify or vary these *Technical Guidelines* to suit their own particular situations and resources.

6. The varying capacity of developing countries to implement programmes on health management should be acknowledged by relevant international organizations and financial institutions. These organizations should give full recognition to the special circumstances and requirements of many developing countries.

7. Health management measures shall be based on an assessment of the risk to animal, plant and human life or health. In assessing the risk, prevalence of specific pathogens in both the region of origin and the region of destination shall be a crucial issue. The likelihood of new or emerging pathogens becoming established in the region of destination is a major consideration.

8. All movements of aquatic animals should be conducted within the provisions given in existing relevant international agreements and instruments. Health management measures should not be applied in a manner which would constitute a disguised restriction on trade. Health management measures should be applied only to the extent necessary to protect animal, plant or human life or health, and must be based on scientific principles and not be maintained without sufficient scientific evidence.

9. In determining the appropriate level (stringency) of health management measures to be applied, relevant economic and ecological factors have to be taken into account. These are, *inter alia*: potential damage due to loss of production or value, and the cost of control or eradication. A conservative approach should be adopted in cases where insufficient knowledge exists in relation to disease risks posed by a particular import; a higher stringency of health management procedures should be adopted where inadequate knowledge exists.

10. The first movement (introduction) of a new species into a new area will require special health management considerations in light of the need to evaluate scientific evidence regarding the risk of introducing pathogens to new areas.

11. Different regions should attempt to harmonise health management procedures to facilitate safe movement of aquatic animals within and between regions.

12. Considering the free movement of aquatic species in trans-boundary waterways, division of regions into manageable sub-regional units based on factors such as geography, hydrography, ecosystems, epizootiological surveillance and effectiveness of control is necessary for the effective implementation of health management procedures. The basis for the establishment of such units should be uniform, clear and unambiguous.

13. Honest, conscientious and transparent reporting is essential for health management to be effective.

14. Technical co-operation among regional experts is essential to promote exchange of information and expertise.

15. Collaboration among the governments, public institutions, and the private sector, including all stakeholders, is important to achieve the full purpose of implementing effective health management. Opportunities for sharing the benefits of health management among all stakeholders should be explored.

5 PATHOGENS TO BE CONSIDERED

This section provides guidance in the preparation of a list of aquatic animal pathogens that should be considered when developing health management policies.

In establishing specific quarantine and health certification requirements, it is necessary to identify pathogens of importance and justify exclusion of others. These requirements are restricted to conditions justified as necessary to avoid or reduce the disease risks associated with the movement of live aquatic animals to acceptable limits. Requirements should not be a disguised restriction of trade.

This section, and the corresponding section of the *Manual of Procedures,* do not provide a definitive list, but rather guidance on how countries can develop a list that is appropriate to their special situations. In general, such a list should include diseases exotic to that country, in addition to those diseases/disease agents listed in the NACA/FAO and OIE *Quarterly Aquatic Animal Disease Reports (Asia-Pacific)* (see NACA/FAO 1999). The principles for drawing up these lists are outlined below, and are based on the *International Aquatic Animal Health Code* (OIE 2000a). More detailed treatment of the suggested procedures used to select pathogens to be included in regional or national pathogen lists is given in the *Manual of Procedures*, along with information on the use of pathogen inventories and databases to support these efforts.

5.1 Reasons for inclusion of a pathogen on a list

i. Presence or absence of a disease or a pathogen in the importing country - The disease or pathogen is:

- exotic to the entire country;
- occurs in parts of the country, but there are zones that are officially recognised as free and that need to be
- occurs in parts of the country, and the country is running control programmes to minimise spread of the disease and/or to eradicate it.

ii. Pathogenicity - The disease or pathogen has a significant adverse effect on host health.

iii. Infectious aetiology of the disease - The disease is caused by an infectious agent which is transmissible horizontally and/or vertically, as well as directly or indirectly (via carriers or intermediate hosts existing in the receiving waters).

iv. Adverse socio-economic, public health or ecological impacts – The disease or pathogen is known or likely to cause significant adverse socio-economic, public health[9] or ecological impacts.

5.2 Reasons for exclusion of a pathogen from a list

A disease or pathogen should not be included if:

- it occurs widely within the region with no infectious mortality or
- socio-economic impact, or
- it is controlled through improved husbandry handling
- (nonchemotherapeutic intervention).

5.3 Existing international pathogen lists

As indicated above, not every disease or infectious agent exotic to a country requires quarantine and health certification. Those which do are described in the following lists. More detailed information is given in the *Manual of Procedures*.

5.3.1 OIE lists of diseases of aquatic animals

In the *International Aquatic Animal Health Code* (OIE 2000a), the section on notification and epidemiological information states that "Countries shall make available to other countries, through the OIE, whatever information is necessary to minimise the spread of important aquatic animal diseases and their aetiological agents and to assist in achieving better world-wide control of these diseases."

The OIE has two lists of diseases of aquatic animals: "diseases notifiable to the OIE," and "other significant diseases." Definitions and the current lists are given in the *Manual of Procedures*.

[9] Pathogens of public health significance are **not** covered under the *Technical Guidelines*, although such concerns can justify national listing. Human health concerns usually fall under the mandate of public health or food inspection authorities.

These diseases, especially the notifiable ones, are of significance in international trade. The OIE lists are updated regularly, but do not yet include all diseases of concern in the Asia-Pacific Region. Thus, disease agents considered by regional health experts to pose significant risk if transferred from infected to uninfected populations (both within and from outside the Asia-Pacific Region) have been added to the original OIE lists when compiling the NACA/FAO and OIE regional lists (see below).

5.3.2 NACA/FAO and OIE lists of diseases of aquatic animals

The NACA/FAO and OIE lists of diseases reportable for the Asia-Pacific Region were developed to reflect the Asian situation. These lists, which are identical, include all "notifiable" and "other significant diseases" listed by the OIE, as well as a number of other serious diseases that occur in areas of the Asia-Pacific Region. A more detailed picture of the occurrence of these diseases is anticipated as more pathogen data are collected from participating countries submitting region-specific NACA/FAO and OIE *Quarterly Aquatic Animal Disease Reports*. The NACA/FAO list is given in the *Manual of Procedures* (see also NACA/FAO 1999).

As with the OIE disease lists, which are periodically reviewed by the OIE Fish Disease Commission (OIE/FDC), the NACA/FAO disease list will be reviewed and updated by members of the Asia Advisory Group on Aquatic Animal Health (AG) under NACA (supersedes the Regional Working Group (RWG) and Technical Support Services (TSS)). The AG, as did the RWG/TSS, will have collaborative links with the OIE/FDC to ensure full exchange of information on each other's activities and decisions.

The lists are flexible to permit addition of new or emerging diseases of regional significance, as well as the removal of diseases which, because of changes in distribution or pathogenicity, are no longer considered to pose a high risk to the countries of the region. Changes to the NACA/FAO regional disease list will be signalled to OIE/FDC for consideration during review of the OIE disease lists and vice versa.

5.4 Process of compiling a list of diseases

In compiling national lists of diseases, the following points should be considered:

5.4.1 Technicalities of the process

Countries should design a "decision matrix" (see *Manual of Procedures*) using the criteria listed above.

In principle, the list should be an integral part of any import risk analysis (see Section 11 of the *Technical Guidelines* and the *Manual of Procedures*).

Certification of freedom from disease based solely on clinical freedom and aquatic animal population history is of limited value. This is also true for those diseases for which no specific diagnostic tests exist, or for which the sensitivity/specificity of the test is limited.

5.4.2 Policy of the process

Compilation of the list should be a consultative process, including state policy makers, aquatic animal disease experts and relevant representatives from the aquatic production sector (including farmers, service providers etc.) of the importing and exporting countries or within-country zones/provinces/regions. The process needs to be transparent to enable understanding and acceptance by potential exporting countries.

6 DISEASE DIAGNOSIS

The purpose of this section is to briefly discuss specific issues of diagnosis of regionally important diseases related to the movement of live aquatic animals.

Many factors play a role in a disease outbreak, and most disease agents are rarely so pathogenic that exposure of a host population is, by itself, sufficient to cause an epizootic. Thus, in the process of disease diagnosis, it is essential that a complete information package is submitted, along with actual samples of diseased specimens or their tissues, for diagnosis.

Diagnosis requires various levels of data, starting with farm- or site-level observations and progressing in technical complexity to electron microscopy, immunological and nucleic acid assays and other biomolecular methods. This means all levels of expertise, including that of the farmer and extension officer working at the pond side, make essential contributions to rapid and accurate disease diagnosis. For this purpose, the Technical Guidelines emphasise capacity building (facilities and expertise) for basic diagnosis and surveillance at the farm level. This is essential for early detection of, and implementation of response protocols to disease outbreaks in order to minimise their social and economic impacts.

6.1 Important diagnostic issues

Regional and national policy makers and planners need to consider disease diagnosis at different levels. The three levels (Levels I, II and III) agreed-upon by the countries participating in the development of the *Technical Guidelines* (see *Manual of Procedures*) for broad-scale application to disease detection and diagnosis are outlined in the following table. For the diagnosis of a given disease or pathogen, countries can move from one level to the next as they build capacity and experience.

Level	Site	Activity	Requirement
I	Field	Observation of animal and the environment Clinical examination	***Investment in training, access to information – little or no equipment required. (Site access may require boat or negotiation of co-operation with culture-site managers/employees.)*** Investment in training and basic equipment; access to information required.
II	Lab	Parasitology Bacteriology Mycology Histopathology	Significant investment in training, equipment and running costs. Access to current information required.
III	Lab	Virology Electron microscopy Molecular biology Immunology	Considerable investment in training and equipment and considerable running costs. Access to current information required.

At both the regional and national levels, there is an urgent need for improved capacity to diagnose aquatic animal diseases. This includes training of appropriately skilled personnel and establishment and/or upgrading of regional and national diagnostic laboratories. In order to take full advantage of this training/up-scaling process, it is essential that the region move towards a standardisation of diagnostic techniques. Procedures for the validation of the methods used by different laboratories should also be developed. Preparation of the *Asia Diagnostic Guide to Aquatic Animal Diseases (ADG)* is a step in this direction. This will require good communication, regionally and intra- and internationally, if a rapid and effective response is going to be achieved as diseases emerge. International collaboration is, therefore, essential for optimising communication and avoiding laboratory competitiveness that can hinder effective disease control.

7 HEALTH CERTIFICATION AND QUARANTINE MEASURES

The purpose of this section is to provide guidance on how to develop and implement effective programmes for health certification and quarantine measures for aquatic animals.

The purpose of applying quarantine measures and health certification is to facilitate trans-boundary trade in living aquatic animals, while minimising the risk of spreading infectious diseases. An effective system of quarantine measures and health certification also increases protection of surrounding resources e.g., harvest fisheries, non-exploited species and other components of the environment.

Aquatic animals differ from terrestrial animals and birds in their biology, anatomy, physiology and environmental requirements. This has to be clearly recognised when considering disease diagnosis, control, quarantine and certification for aquatic animals (see *Manual of Procedures*). Effective implementation and maintenance of health control measures also require a degree of flexibility, to adapt to changing circumstances, scientific knowledge (pathology, immunology, epidemiology etc.) and trade dynamics. However, the policy and related health management practices, by their very nature, must be based on established scientific knowledge and supported by legislation sufficiently adequate to encourage compliance.

Quarantine measures and health certification must also take into account both the existing and anticipated needs of the aquatic food production sector, many of which have developed in the absence of effective health management procedures. Such programmes must be responsive and effective, both internationally and nationally, in order to prevent the spread of disease agents into countries or zones where they have not previously occurred. The same principles apply to local quarantine and health certification programmes designed to protect individual aquatic resource stakeholders from disease losses.

At the international and national levels, quarantine and health certification programmes form an integral part of much broader strategies aimed to protect the natural environment and native faunas from the deleterious impacts of exotic species or diseases (e.g., ecological and genetic competition). Governments developing national health management strategies should also take these other factors into account (see *Manual of Procedures*). Each import request must be considered on an individual basis, with quarantine conditions imposed commensurate with risks. These risk factors will vary according to the source and destination of the aquatic animal transfer (see *Manual of Procedures*). The ultimate risk to be avoided is exposure to circumstances which favour the introduction and establishment of an exotic pathogen in a new environment/population (see Guiding Principles, Section 4).

Although some serious pathogens are host specific, many show little host specificity and may occur in both marine and freshwater species. Furthermore, since transmission of pathogens can occur across major taxonomic groups of aquatic animals, arbitrary distinctions between marine and freshwater species, or between wild, cultured or ornamental species, with respect to quarantine measures is scientifically unsound.

Because of the diversity of species, the purposes for which they are imported, and other variable factors described below, it is not possible to construct a single quarantine and health certification protocol applicable to all imports of live aquatic animals. Although routine movements may eventually result in development of appropriate general health certification procedures, all "first-time" cases must have their risk factors and mitigative measures considered case-by-case (see *Manual of Procedures*).

7.1 Some considerations related to health certification and quarantine measures

Current requirements for, and levels of, aquatic animal health certification and quarantine vary greatly from country to country within the region. Some countries have highly protective policies, supported by legislation, to ensure importations of aquatic animals are free from specific pathogens. Other countries have inadequately enforced, or no, legislation. In some countries, health certification and quarantine are supported by specific regulations and acts; however, other countries have only recently begun to consider the need to develop such legislation. This disparity in health certification requirements and quarantine also means that the vulnerability of aquatic resources differs between countries. In order to enhance trade and reduce risk of disease spread there is, therefore, a clear need to harmonise health certification and quarantine measures across the region. This section outlines some basic considerations related to this objective.

The foundation for success in this endeavour is open communication among Competent Authorities (CA) from the region, as well as maintenance of effective health certification programmes.

The Manual of Procedures provides details for participating countries to use in the development and implementation of meaningful health certification for aquatic animals, as does the OIE International Aquatic Animal Health Code (OIE 2000a).

Individual countries, obviously, retain the right to develop health certification protocols to meet their own the requirements; however, the list of regionally important diseases reportable to NACA/FAO and OIE should be considered as a basic component for all aquatic animal health certification programmes.

In some cases, health certificates currently used in the region are based solely on visual inspection for gross clinical signs, or on diagnostic procedures of limited or questionable scientific validity. Such certification lacks scientific input and, thus, has little value for protection against introduction or spread of specific disease.

Countries with such certification practices must revise them, in order to: i) ensure adequate diagnostic capability for the listed diseases; ii) avoid unjustifiable restrictions on movement, and iii) optimise protection from high-risk imports or exports.

Certification procedures adopted by countries indicating freedom from specific pathogens should comply with those outlined in the Asia Diagnostic Guide to Aquatic Animal Diseases and the OIE Diagnostic Manual for Aquatic Animal Diseases (OIE 2000b). In addition, successful international trade hinges upon mutual trust. Countries must, therefore, strive to maintain the highest possible ethical standards in the overall process of health certification, as well as to develop and maintain diagnostic capability. Schemes for evaluation of health risks associated with imports of live aquatic animals, and the consequent level of quarantine required to mitigate these risks, are described in the Manual of Procedures. Some importations may be assessed as having risks that are negligible. In such cases, measures such as the holding (see Section 3, Definitions) of animals in quarantine may not be required.

Conversely, importations considered to comprise a "high risk" will require more stringent procedures, such as those outlined in the *ICES Code of Practice on the Introductions and Transfers of Marine Organisms* (ICES 1995).

8 DISEASE ZONING

The purpose of this section is to provide guidance on how to develop zoning plans for delineating aquatic animal disease status in the countries of Asia. As Asia has little experience and capacity in zoning for aquatic animal diseases, the information given is based mainly on experience outside the region.

The advantage to developing countries of zoning is that it allows for part of a nation's territory to be identified as free of a particular disease, rather than having to demonstrate that the entire country is free. This is particularly helpful for diseases where eradication is not a

feasible option in the foreseeable future, as it permits protection of zones free of the disease by restricting introduction of aquatic animals to those originating from other free zones.

Because most aquatic animal transfers within the Asian Region are from open- or flow-through aquatic environments, it is generally more difficult to establish health status on a farm-by-farm or facility-by-facility basis (as is the case for most terrestrial health management programmes). In addition, natural migrations of some species which are moved between areas further broaden the geographic range over which specific disease agents may be distributed. In order to address this, the concept of "zoning" is commonly applied to aquatic environments and species with the goal of: i) facilitating trade between zones of equal health status, and ii) protecting zones determined to be free of specific disease agents from introductions from zones which are positive for these disease agents.

Traditionally, political boundaries have been used to delineate the aquatic animal disease status within a country. Often this has been extended to the country as a whole, even where the diseases of concern have a limited within-country distribution. This has been a common scenario due to administrative ease, rather than a reflection of true health profiles of aquatic animals being moved from one area or country to another.

Ecological, geographical, hydrographical or climatological barriers, rather than political boundaries, form a stronger basis for defining actual disease agent distribution. Since non-political boundaries, by definition, do not necessarily coincide with political boundaries (e.g., multinational river catchment areas, bays or ocean coastlines), this requires multinational or multi-jurisdictional collaboration in order for health management of aquatic animal movements to be effective.

Further detailed information on zoning and the principles governing the movement of aquatic animals between zones is presented in the *Manual of Procedures.*

8.1 Important considerations related to zoning

Zoning can be a highly effective tool to restrict the spread of important pathogens and aid in their eradication. Thus, the general principles of zoning should be considered by participating countries and sub-regions when preparing strategies for disease containment and eradication. This may require trans-boundary collaboration.

Implementation of zoning requires a high level of diagnostic, surveillance, monitoring and reporting capability, as well as adequate regulatory control mechanisms. Thus, some participating countries may not be able to establish zones in the immediate future. Zoning based on Level I diagnostic capability, however, is a valuable first step, while diagnostic capability, national legislation and related infrastructure are developed.

Pilot projects and exchange of information between countries will be necessary to further evaluate the feasibility of zoning within the region.

The nature and maintenance of zones will vary, depending on the particular disease(s) for which they are established. Thus, the size, location and delineation of the zone will depend on the characteristics of the disease, its modes of spread and prevalence in the country(ies) within the zone.

Some diseases will require zonation comprising an entire river catchment from source to sea, or two or more river catchments that are linked to each other. Other cases may permit zonation within part of a river system e.g., river stretches below a physical or ecological barrier could harbour hosts of infected or unknown health status, while upstream of the barrier hosts could be disease-free. The reverse situation is less likely.

Zoning for health status in coastal areas is often difficult due to the complexity of identifying distinct demarcations in contiguous stretches of water.

Where there are zones of equal health status, there is little, if any justification, on disease-risk grounds, for preventing trade in aquatic animals between them. This applies equally to trade between zones which have been demonstrated to be free of particular disease(s), and trade between zones which are positive for the same disease(s).

9 DISEASE SURVEILLANCE AND REPORTING

The purpose of this section is to provide guidance on developing national and regional disease surveillance and reporting systems.

To produce meaningful reports on the disease status of a farm, zone, country or region, some systematic process of gathering information about the occurrence of important diseases and pathogens must be in place. This process is known as surveillance. Surveillance will thus support import risk analysis, justify import health certification requirements, and enable export health certification, by providing evidence to substantiate claims of absence of a particular disease.

A national surveillance programme is a structured plan for the detection of specified diseases or disease agents in susceptible aquatic populations[10] throughout a country. It involves input from personnel trained in disease recognition in the field, who report their observations, in a systematic fashion, to designated district or national health management personnel.

The programme is supported by reporting and diagnostics procedures to ensure accurate and rapid identification of pathogens. This surveillance applies to detection of the emergence of a "new" disease situation, as well as to monitoring the status (prevalence, geographic distribution etc.) of established disease agents. Surveillance data can usefully be entered into a database to allow easy access and analysis.

In addition to collection of data essential to support import risk analyses and zoning programmes, countries with national reporting systems for surveillance of aquatic animal health status have a greater capability to detect and identify disease outbreaks, and to quickly implement contingency plans for disease containment and eradication. An example of a developmental process to address surveillance and reporting issues conducted in the Asia-Pacific Region is that undertaken by Australia, as outlined in "AQUAPLAN" (AFFA 1999).

[10] I.e., aquatic animal populations that are susceptible to being infected by a given disease agent.

The regional reporting system that has been developed by NACA, FAO and OIE, the Quarterly Aquatic Animal Disease Reports (Asia and Pacific Region), is founded upon the national reporting systems being established by participating countries.

9.1 Major considerations

While countries may differ in their ability to diagnose diseases of aquatic animals or collect data through national networks, this should not be seen as a hindrance to developing and maintaining national surveillance and reporting systems. Every country can prepare National Summaries on a quarterly basis, to the best of their ability, while disease diagnosis infrastructure is being developed.

Several strategies for disease surveillance are recognised (see Manual of Procedures). Countries which have basic disease diagnostic capability are encouraged to continue developing capability for disease diagnosis, surveillance and reporting.

Investigations of suspected disease are significantly enhanced by access to appropriately trained and motivated personnel, standardised field and laboratory methodology, appropriate training/reference manuals and training workshops or programmes.

The design and structure of a surveillance programme depends on its purpose; however, all surveillance programmes have some common features. These include a clear purpose; a defined list of problems, diseases and pathogens of interest; the capability and resources necessary to conduct the surveillance to the required level of diagnostic certainty; and a well-defined system to collect, record and collate the data, as well as report the findings and conclusions.

It is in the interests of all participating countries to aim for regional consistency in surveillance and reporting. Thus, all countries are encouraged to work collectively to develop standardised data codes, recording formats and standards for laboratory diagnostic practices. This will facilitate development of a standard, low-cost, computerised database accessible to all countries requiring surveillance assistance. There are many benefits to such an approach.

FAO's Aquatic Animal Pathogen and Quarantine Information System (AAPQIS), where the Asian component (AAPQIS-Asia) is maintained by NACA, is an example of a computerised system which provides scientific information to help develop effective national surveillance programmes.

Regardless of the method of information management, countries should maintain clear records, which permit tracing of the source documentation/material upon which summary reports are based.

For more detailed information on surveillance and reporting, refer to the *Manual of Procedures.*

10 CONTINGENCY PLANNING

The purpose of this section is to provide guidance on contingency planning, the development of a detailed action plan outlining how to deal with any serious aquatic animal disease outbreak, whether at the national, sub-national or farm level, before any such disease outbreak occurs.

The advantage of contingency planning is that it provides a rapid and planned response for containment of a disease outbreak which can greatly reduce the impact, scale and costs of the outbreak.

Contingency planning applies to detection of an exotic pathogen, regardless of associated pathology, if it is considered significant and/or present on the regional list of diseases. There is a close link between the surveillance system, disease zoning and contingency planning.

Effective contingency planning ensures that all requirements are defined and available to ensure control of a potential disease emergency, and that these resources can be activated and deployed promptly. It is also important to establish a clear structure for effective decision-making with clearly defined responsibilities and authority.

The consequences of not planning the response to a significant disease emergency are clearly demonstrated by the difficulties faced by the governments within the region when attempting to deal with sudden major disease outbreaks, such as epizootic ulcerative syndrome (EUS) and white spot syndrome (WSS), that have swept the region.

Advance planning and rapid action can significantly reduce the social and economic impacts of aquatic animal disease, as well as control or reduce spread. Under rare, but opportune, circumstances, contingency planning may even be effective in eradicating the disease agent.

More details on the procedures required to support participating countries in contingency planning are given in the Manual of Procedures.

10.1 Some major considerations for contingency planning

Although contingency planning, by necessity, is often complex (see Manual of Procedures) the advantages clearly merit the effort required. Even if an “ideal” level of contingency planning is not initially obtainable in some participating countries, an incomplete plan will still be a valuable resource should governments suddenly be confronted by a disease emergency. It can be used to initiate rapid action and will form a strong framework which can be refined as aquatic animal health infrastructure is developed. Contingency planning should be recognised (as with all other aspects of aquatic animal heath management) as an on-going activity. Individual countries should develop plans which meet their particular situations and resources.

11 IMPORT RISK ANALYSIS

The purpose of this section is to outline the role of import risk analysis (IRA) in minimising trans-boundary movements of significant infectious agents associated with trade in live aquatic animals.

The movement of live aquatic animals involves a degree of disease risk to the importing country. Import risk analysis (IRA) is the process by which hazards associated with the movement of a particular commodity are identified and mitigative options are assessed. The results of these analyses are communicated to the authorities responsible for approving or rejecting the import.

An effective IRA recommends measures which will reduce the identified risk(s)to a level acceptable to the importing authorities. Two of the most important conditions for import are the availability of aquatic animal health certification and the presence of established health management protocols at the source of export.

It is important to note that the methods used in evaluating risk may differ between countries, and approaches taken by an importing country may vary for different commodities. Whatever methods are used, they should be science-based, transparent, and standardised (as far as possible), and the process must include detailed documentation.

The methodologies discussed, and guidelines provided in this section, are consistent with those of the OIE *International Aquatic Animal Health Code* (OIE 2000a) defined as: "...to provide importing countries with an objective and defensible method of assessing the disease risks associated with importation of aquatic animals, aquatic animal products, aquatic animal genetic material, foodstuffs, biological products and pathological material."

11.1 Main strategies of import risk analysis

The main components of import risk analysis are: hazard identification, risk assessment, risk management and risk communication (see *Manual of Procedures*).

The first stage of an import risk analysis involves identification of any hazards, including all pests and disease agents associated with the commodity, which can be reasonably deemed (i.e., scientifically justified) to be of potential threat to any aquatic animals or component of the importing waters.

This is followed by a risk assessment, where the effect of each hazard under unrestricted importation conditions is evaluated. The risk assessment includes evaluation of the probability of an exotic disease agent becoming established in the importing environment and the consequences of that establishment. Depending on the epidemiological data available for each infectious agent identified, the risk may be estimated qualitatively, semi-quantitatively or quantitatively. Details of this process are given in the *Manual of Procedures*.

11.2 Ethics and import risk analysis

Ethics and transparency are essential for effective import risk analysis. The Competent Authority (CA) for the importing country that is undertaking the IRA relies on information

provided by the CA for the exporting country. The CA for the exporting country relies on the ethical use of its information for scientifically sound import risk analysis. Abuse of trust on the part of either side, either in terms of non-declared infectious agents or through the rejection of imports on unfounded health risks, renders the whole process useless.

Thus, the importing country has an obligation to ensure that the IRA is: i) based on science, ii) adequately documented and iii) consistent with its international obligations. It must also ensure that claims about its own aquatic animal health status are accurate and based on systems of monitoring and surveillance that are as rigorous as those demanded of exporting countries.

Equally, the CA of an exporting country should ensure that information provided on its health status is accurate and based on internationally accepted standards for monitoring and surveillance. It also has an obligation to report any significant changes in health status to all trading partners in line with international conventions.

Finally, the CA of the exporting country should be prepared, and willing, to supply the importing CA with information on the structure of its veterinary (or equivalent) services and the authority they exercise.

11.3 International trading obligations

Member nations of the World Trade Organization (WTO) have certain rights and obligations under WTO agreements, including the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement).

At present, the SPS Agreement recognises the standards, guidelines and recommendations developed by the OIE as the international standard for animal health and zoonoses. Under the SPS Agreement, members are encouraged to ensure their health control measures are consistent with international standards. Members may require higher or supplemental levels of protection where these are based on a scientific risk analysis (see *Manual of Procedures*).

11.4 General guidelines on IRA

IRA provides a standardised, documented and defensible process for decision making. These *Technical Guidelines* on import risk analysis are consistent with OIE standards and the SPS Agreement.

The importing country uses the results of scientifically based IRA to determine whether or not the disease risks and related control measures (where applicable) are acceptable or not. All IRAs must, therefore, include a level of sanitary and phytosanitary protection which is appropriate to the disease risks identified. Since all IRAs must be transparent, objective and based on solid science, each analysis should be clearly documented and supported by references to scientific literature and other reliable expertise and resources. Transparency must be achieved through open communication and use of bilateral agreements to secure additional information to resolve outstanding issues arising from the IRA.

At the request of the importing country, the exporting country should be prepared to supply information on its aquatic animal health status and national aquatic animal health system(s). This may be necessary for the importing country to determine whether the exporting country

is free of, or has zones free of, diseases notifiable to the OIE and/or NACA. The information required could include:

- the regulations in force to maintain its free status;
- information on the appearance or occurrence of transmissible diseases;
- details of the country's ability to control or prevent diseases notifiable to the OIE and/or NACA from introduction and/or spread and, where appropriate, other diseases;
- information on the structure of the Competent Authority and the authority that it exercises; and
- technical information, particularly on diagnostic tests and vaccines applied in all or part of the national territory.

An importing country should consider all alternative mitigative measures proposed by the exporting country that would provide a level of protection equivalent to that acceptable by the importing country. Where there is a lack of information on the presence or prevalence of disease in the source population, and available diagnostic tests are of limited use, the IRA may adopt a science-based precautionary principle until sufficient data are gathered.

In the event of an importing country's decision to refuse importation or impose significant constraints on importation, however, it should be prepared to justify the decision by providing details of the analysis to the exporting country.

12 NATIONAL STRATEGIES AND POLICY FRAMEWORKS

This section provides guidance on the policy issues which have to be considered in the framing of legislation in support of these Technical Guidelines and the institutional issues to be considered by countries for development of their National Strategies.

The implementation of these *Technical Guidelines* in an effective manner requires an appropriate national administrative and legal framework, as well as sufficient expertise, manpower and infrastructure.

Additional information on institutional and policy analysis is provided in the *Manual of Procedures*.

12.1 Legislative and policy frameworks

Responsibility

The responsible authorities for aquatic animal health management vary from country to country, but most mandates lie within the ministries or departments responsible for agriculture, livestock and/or fisheries. The variety of governmental organizations responsible for aquatic animal health management and quarantine policy reflects the differing systems of government and the levels of aquaculture development across the region. Some countries have no government body with responsibility for live aquatic animal quarantine or health certification policy.

In order to effectively prevent the spread of controllable diseases, responsibility for aquatic animal health control needs to be clearly assigned, or confirmed in cases where jurisdiction is unclear. To this end, designation of a Competent Authority is essential. This CA should be

capable of collating input from fisheries, environmental and animal health science expertise, as well as from quarantine and veterinary services.

Legislation and regulation

Participating countries should work to harmonise national legislation and regulations related to aquatic animal health management.

Regulations vary from country to country, however, all present legislation for trans-boundary movement of live aquatic animals is more comprehensive than that for movement within a country. In addition, most import legislation is more precise and stringent than export legislation. This reflects the fact that, in terms of health, export regulations are governed predominantly by importing country requirements.

Countries that have environmental or conservation policy or regulations which impact upon the movement of live aquatic animals, must take these policies and regulations into consideration when framing separate aquatic animal health protection legislation. Such legislation must also clearly address jurisdictional responsibility and ensure that it is consistent with international standards and obligations (e.g., the OIE's *International Aquatic Animal Health Code* and the World Trade Organization's *Agreement on the Application of Sanitary and Phytosanitary Measures* (SPS Agreement)).

12.2 Institutional requirements

Trained personnel and infrastructure are required to implement and conduct strategies to control trans-boundary diseases.

Assessment of available institutional capacity and expertise to develop national policy and legislation is required. This must take into account the disease problems to be dealt with, and the institutional responsibilities and requirements. The different sections of the *Technical Guidelines* can be used as the basis for identifying institutional requirements, including the requirements for those organizations responsible for policy development, application and enforcement of the regulations.

Communication between departments responsible for preparing national policy, legislation and related regulations, and departments mandated to implement and enforce such policy and regulations is essential to ensure technical feasibility. In addition, the roles, interests and opinions of other organizations in this area, such as governmental and semi-governmental research organizations, universities, international research institutes and private-sector companies with diagnostic capability, should also be carefully considered when framing legislation.

12.3 Resource requirements

Resources required for aquatic animal disease control take many forms. These may be grouped as institutional, laboratory and human resources. Some guidance for consideration by participating countries is presented below. More specific and complete information relating to human and physical infrastructure is provided in the *Manual of Procedures*.

Extension services and integrated networks of support services, whether managed at a national or state level, are very effective for aquatic animal health management and should, therefore, be included. These help offset situations where diagnostic capability is not sufficient to meet the immediate needs of proposed health management activities. Enhancement of laboratory facilities and expertise has also been identified as an area of importance.

Training and infrastructure development should be clearly matched against specified requirements (e.g., potential pathogen risks, economic importance). Many of the least costly activities are ultimately the most important and are likely to generate the greatest benefits e.g., enhanced record keeping at the field level. Analysis of cost-benefits from investments in infrastructure and training should be considered early in the development of national strategies.

The capacity to carry out problem-solving research must also be available. This must be focussed on direct application to the health concerns of aquatic food-production industries. Research results must be delivered in a timely manner and in a form that serves both the research and user communities.

The range of expertise required will vary between countries and for different disease situations. Efficient staff development requires national institutions to define their requirements and areas of need, identify staff and provide them with the training and resources necessary to develop the facilities and services required. Provision of incentives to keep trained staff for prolonged periods (years) is also necessary to ensure the development of experience. Such experience is invaluable for maintaining a consistent health management programme and refining "apprenticeship" or "in-house" training. Most skills and facilities required already exist in this region. An inventory and database of personnel and institutions should be developed to assist in identifying them.

Lack of finance can hinder development of infrastructure, diagnostic facilities and relevant expertise. As beneficiaries of improvement in the aquatic animal health status in the region, the private sector should be considered as a potential source of funds for the development of disease control strategies. This requires a more innovative look into the application of the "user pays" principle in aquatic animal health management. Collaboration between terrestrial and aquatic animal health systems will provide increased efficiency and a larger workforce of trained staff at times of peak demand, as well as facilitate meeting international obligations.

Finally, capacity building is essential to support the implementation of these *Technical Guidelines*. Implementation at the national level requires supporting educational and training institutions to ensure long-term capacity building. Individual countries can assess training and educational needs to identify requirements and methods by which they can be met.

13 REGIONAL CAPACITY BUILDING

***This section provides guidance on regional-level capacity building in support of the implementation of the* Technical Guidelines.**

As is clearly demonstrated in the development of these *Technical Guidelines*, aquatic organisms do not respect political boundaries, and the nature of regional and international trade means that effective aquatic animal health management requires international co-operation.

General principles are outlined in these guidelines, while more specific and complete procedures relating to regional-level human and physical infrastructure development are provided in the *Manual of Procedures*.

Participating countries should continue to work together to collectively improve the ability of all countries to diagnose and report diseases of concern. This includes identification of regional laboratories which maintain reference material and can verify diagnosis of diseases important to the region. Such laboratories need to be identified and their capacities reinforced. The regional disease list can be used as the basis for identification of the laboratories and skills required.

An emergency response mechanism also needs to be developed through regional-level contingency planning. Additional mechanisms for sharing experience e.g., publications and meetings, must also be encouraged at a regional level, and sources of support and funding for these must be identified.

Regional training and education programmes to assist with building national capacity, ensuring uniform and acceptable standards of diagnosis and reporting, should be further enhanced. Training is particularly needed in countries where technical skills are scarce (e.g., in epidemiology, histopathology, immunology and molecular biology, virology, extension methodology, mycology, research methodology and design, and risk analysis and management). Regional-level monitoring systems and databases should be enhanced and supported, with strong links to the Aquatic Animal Pathogen and Quarantine Information System (AAPQIS). This includes maintenance of the NACA/FAO and OIE Aquatic Animal Disease Reporting Systems.

A regional expert working group, the Advisory Group on Aquatic Animal Health (AG) is required to provide continued high-level support for development and implementation of the Technical Guidelines. Its active involvement in aquatic animal disease issues within the region must be sustained, in order to respond to new challenges and provide consistent leadership for regional developments in this field.

14 IMPLEMENTATION OF THE TECHNICAL GUIDELINES

In recognition of the potential benefits from application of these regional *Technical Guidelines* in terms of food production, income generation, poverty alleviation and protection of rural livelihoods based on aquatic food resources, the following implementation strategies are recommended:

- Countries adopting the *Technical Guidelines* should agree to implement them in line with their national circumstances and capacity.

- To assist the region in implementation of the *Technical Guidelines*, the Advisory Group on Aquatic Animal Health (AG), under the NACA Governing Council, should be supported to provide expert advice on aquatic animal health matters, including regular review of the diseases of importance (the *NACA/FAO Regional Disease Reporting List*).

- NACA has accepted to integrate the AG within its regular regional programme, and FAO and OIE are requested to support this activity. Linkage should also be established with other global organizations to provide a more coherent and stronger voice representing the region in international aquatic animal health affairs.

- Regional laboratories and specialised centres with responsibilities for providing diagnostic services, training for capacity building and maintaining reference material within Asia must be identified and designated.

- Monitoring of implementation of the *Technical Guidelines* is essential. The primary responsibility for this lies with the national governments. However, the AG is requested to provide guidance.

- A regular report on aquatic animal health should be provided by each government, as part of the regular reporting on the implementation of the FAO *Code of Conduct for Responsible Fisheries*, to the NACA Governing Council, FAO Committee on Fisheries (COFI), and other relevant subsidiary bodies and expert groups, as appropriate.

- Donors and regional/international organizations are requested to assist countries in building capacity to assist implementation of the *Technical Guidelines*.

- FAO, NACA and OIE are requested to provide support from their programmes, with special consideration of lesser-developed countries within the region, to assist in building their capacity to implement the *Technical Guidelines*.

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PART II

The Beijing Consensus and Implementation Strategy

THE BEIJING CONSENSUS

Representatives from governments of the Asian Region[7], several regional and international organizations and aquatic animal health experts, met in Beijing between the 27th – 30th June 2000. The workshop was co-organised by the Network of Aquaculture Centres in Asia-Pacific (NACA) and the Food and Agriculture Organization of the United Nations (FAO), hosted by the Ministry of Agriculture of the People's Republic of China and held in co-operation with the Office International des Épizooties (OIE).

The Technical Guidelines are based on a history of regional collaboration and discussion. They were initiated due to increased recognition of disease emergence being linked to live aquatic animal movements. The associated economic losses, and impacts on rural livelihoods and national efforts in poverty alleviation and food security, were recognised as being highly significant. New trade agreements and requirements generated by the World Trade Organization (WTO) further reinforced the necessity for live aquatic animal health management. The initial programme, upon which the Technical Guidelines were subsequently based, was the FAO/NACA Asia Regional Aquatic Animal Health Management Program, officially launched in 1996.

The governments participating in this regional programme clearly recognised the need for a region-wide approach to aquatic animal health management. They, therefore, requested FAO, through NACA, to assist production of a set of technical guidelines that could be used to improve and harmonise aquatic animal health management strategies for responsible trans-boundary movements of live aquatic animals.

An FAO Technical Cooperation Programme (TCP) Project (TCP/RAS 6714 (A) and 9065 (A) - "Assistance for the Responsible Movement of Live Aquatic Animals") was launched by NACA in 1998, with the participation of 21 countries from throughout the region. This programme complemented FAO's efforts in assisting member countries to implement the relevant provisions in Article 9 - Aquaculture Development - of the Code of Conduct for Responsible Fisheries (CCRF), at both the national and regional levels. A set of Guiding Principles formulated by a group of aquatic animal health experts formed the basis for an extensive consultative process, between 1998-2000, involving input from government-designated National Co-ordinators (NCs), NACA, FAO, and regional and international specialists. Based on reports from these workshops, as well as intersessional activities co-ordinated by FAO and NACA, the final Technical Guidelines were presented and discussed at the Final Workshop on Asia Regional Health Management for the Responsible Trans-boundary Movement of Live Aquatic Animals held in Beijing, China, 27th-30th June 2000.

The Technical Guidelines were reviewed and discussed by the participants of this meeting, which included representatives from governments of the Asian Region, FAO, NACA, OIE (Representatives of the Fish Disease Commission and OIE Representation for Asia and the Pacific), regional and international aquatic animal health management specialists, and representatives from regional organizations. The National Co-ordinators gave unanimous agreement and endorsement of the Technical Guidelines, in principle, as providing valuable

[7] Representatives from Australia, Bangladesh, Cambodia, DPR Korea, Hong Kong China, India, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Pakistan, PR China, Republic of Iran, Republic of Korea, Republic of the Philippines, Singapore, Sri Lanka, Thailand, and Vietnam attended the Beijing Workshop and Japan subsequently agreed to the Consensus.

guidance for national and regional efforts in reducing the risks of disease due to trans-boundary movement of live aquatic animals.

The Workshop participants further noted that implementation of the *Technical Guidelines* would contribute to securing and increasing income of aquaculturists in Asia by minimising the disease risks associated with trans-boundary movement of aquatic animal pathogens. In many countries in Asia, aquaculture and capture fisheries provide a mainstay of rural food security and livelihoods, and implementation of the *Technical Guidelines* will contribute to regional efforts to improve rural livelihoods, within the broader framework of responsible management, environmental sustainability and protection of aquatic biodiversity.

The States have primary responsibilities for implementation of the Technical Guidelines, and the workshop recommended that the Technical Guidelines be integrated within national development plans, and implemented in a phased manner building on current resources. Recognising the crucial importance of implementation of the Technical Guidelines, the participants prepared a detailed implementation strategy, focussing on National Strategies and with support through regional and international co-operation. This comprehensive implementation strategy, as adopted by the workshop participants, is given below.

THE IMPLEMENTATION STRATEGY

Preamble

This section provides the implementation plan for the Asia Regional Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals (hereafter referred to as the *Technical Guidelines*) as adopted by the government participants and experts during the Beijing workshop.

Objectives

The implementation strategies outlined for the *Technical Guidelines* emphasise national-level implementation and the role of regional and international co-operation in supporting these National Strategies.

This implementation strategy, therefore, pays special attention to the requirements of Low-Income Food-Deficit Countries (LIFDCs) and to potential strategies for consideration by countries at different stages of national development. The implementation strategy, as outlined below, gives special emphasis to the concept of "*phased implementation based on national needs.*" No matter where countries are in national development, the *Technical Guidelines* provide an entry point to build capacity.

Setting of priorities

The Asia Region has diverse economic, social and ecological conditions, within which aquaculture development occurs. With countries at different stages of development; and with access to different levels of technical, financial and institutional resources; setting of priorities and a phased approach to implementation of National Strategies are essential.

The priority setting should be based on a realistic analysis of needs and setting of strategies which target priority needs. A first priority for implementation, therefore, is to undertake an assessment of the strategy for implementation of the *Technical Guidelines* in full consultation with relevant stakeholders.

Integration into national aquaculture development plans

The implementation process should consider incorporation of elements of the *Technical Guidelines* into national aquaculture development plans.

Within the context of small-scale rural aquaculture development, it is recommended that basic health management considerations (such as Level I diagnosis, basic surveillance and appropriate contingency planning) be included within rural livelihood programmes involving aquaculture.

Legislation and policy. An effective policy and legal framework is a pre-requisite for designation of responsibilities and legal enforcement of disease control measures and health management. The legal provisions may, for example, be applied to registration of farms and hatcheries, mandatory reporting of certain diseases, designation and control of disease zones, permit surveillance and to establish and enforce contingency plans. The detailed options are elaborated in the *Manual of Procedures*.

In many cases, considerable progress can be made through incorporating relevant elements within existing policy and legal frameworks. A national review of existing policy and legal frameworks is recommended to provide a basis for identifying improvements. Specific guidance may also be provided at the sub-regional and regional levels to assist countries in the development and harmonisation of legal frameworks.

National co-ordination. A competent national authority and regulatory body to oversee implementation of quarantine and health certification, in consultation with aquatic animal health expertise, is essential. National Co-ordinators have an important responsibility for the co-ordination of the implementation process at the national level. Promotion of the *Technical Guidelines* and the need for their implementation among high-level policy makers is essential.

Where participating countries have not already done so, the designation of Competent Authorities (CA) empowered with the necessary responsibilities and mandates should be given high priority.

Where not already available, a national health committee, comprising relevant responsible stakeholders, is suggested to oversee implementation of the *Technical Guidelines*.

Pathogens to be considered. An understanding of the basic aquatic animal health situation is a pre-requisite for prioritising activities, developing national policy and identifying pathogens of national importance. A high priority should be given to such assessments, as without a clear and detailed understanding of hazards and risks, it is difficult to prioritise health management actions to manage risks.

Institutional resources. The institutional responsibilities and resources required to implement the *Technical Guidelines* should be clarified, such as needs for quarantine and holding facilities, diagnosis, information management, training and education, *etc*. Official

designation of laboratories, institutions, and individuals for health certification of exports is also required. States are encouraged to identify and designate national centres with responsibilities for health management support, under a comprehensive national health management strategy.

Implementation should emphasise the effective use of existing resources through co-ordination and co-operation between national fisheries agencies, veterinary authorities, research institutions and universities, supported by effective regional and sub-regional co-operation.

Institutional analyses may be carried out to help identify requirements for institutional development.

Diagnostics. The building of diagnostic capacity, where required, should be phased, driven by needs. In developing countries, emphasis should be given to widespread implementation of Level I diagnostic procedures, before considering investments in Level II or Level III diagnostics. In such cases, support to higher-level diagnostics could be provided, initially at least, through regional or sub-regional collaboration.

The establishment of an effective Level I capacity should be regarded as an essential base requirement before moving to Level II and Level III. Higher level diagnostic measures, surveillance and other components of the *Technical Guidelines* will not be successful without this Level I basis. It is strongly recommended that national priorities for capacity building should be given to development of Level I diagnostic capacity and farm-level surveillance. This approach will require close consultation with farmers, building on their experiences and development of simple keys and manuals in local languages.

The long-term objective should be to harmonise, as far as possible, national diagnostic, quarantine and health certification protocols with other national, regional and international standards to facilitate reliable information exchange and trade. Such an objective will require a continued national commitment to regional co-operation in aquatic animal health management.

Disease zoning. Disease zoning, a relatively new concept for most countries in the region, offers potential to reduce risks from spread of aquatic animal diseases and facilitate trade and development, particularly in countries sharing common watersheds. Use of sub-regional groupings (e.g., SAARC, MRC, ASEAN, etc.) as possible channels for co-ordination of disease zoning efforts should be further explored.

As a first step, a number of sub-regional and national pilot studies on disease zoning should be undertaken. This information should be shared among countries within Asia to gain better understanding of the role and practicalities of zoning for disease control before more widespread adoption of this strategy.

Surveillance and reporting. A national disease surveillance system and means for collation of disease surveillance data (such as a national database system) are required to respond effectively to disease outbreaks, and to analyse epidemiological data.

This national surveillance system should initially be based on use of Level I diagnosis and basic surveillance, linked to Levels II and III for advanced diagnosis, where required for

selected diseases. Sub-regional or regional co-operation should be used to provide access to Level II and III diagnostics capability where national facilities are not yet available.

Wherever possible, basic surveillance systems should be integrated within existing extension services, and should include establishing functional linkages between fisheries and veterinary authorities, rather than building new systems and structures.

Where not available, a national disease reporting system and an aquatic animal health information system should be developed to support the surveillance system. A detailed national-level technical document on surveillance and reporting should be prepared as an initial step to support a phased and realistic approach to implementation of national surveillance systems.

Contingency planning. The concept of contingency planning, at the state and farm level, is new for many countries in the region. The options for development of a contingency plan are provided in the *Manual of Procedures*. As limited guidance exists within the individual countries of Asia, regional co-operation to share experiences and build capacity for national contingency planning is recommended.

Import risk analysis. The concept of import risk analysis (IRA) is also new for many countries in the region. Therefore, there is an initial need to build awareness among policy makers and administrators, and capacity to understand and implement risk analysis at national and regional levels.

Capacity-building requirements

The implementation of the *Technical Guidelines* requires people with appropriate knowledge and skills, and access to institutional and financial resources. In some countries, there is a serious shortage of trained manpower to implement the *Technical Guidelines,* and this reality has to be addressed through effective use of existing human resources and by a longer-term approach to capacity building for aquatic animal health management.

Institutional analyses and national assessments of existing capacities within countries to implement the *Technical Guidelines* (e.g., assessment of diagnostics capabilities) can be used as a first step for determining the levels of institutional strengthening required to permit effective implementation.

To support long-term capacity building within countries, it is recommended that more attention be given to curriculum development in higher educational systems, and establishing a co-ordinated approach to training and education in aquatic animal health management which will make effective use of existing institutional resources, including fisheries and veterinary authorities, as appropriate. A system of accreditation (or professionally recognised qualification) for aquatic animal health professionals, including quarantine officers, should be considered.

Epidemiological skills, in particular, are required and this need should be addressed by longer-term capacity building.

Awareness building and communication

A high priority should be given to raising awareness of the *Technical Guidelines* and the need for their implementation within government agencies and the private sector, including aquaculturists and NGOs. Local workshops concerning the *Technical Guidelines* and this implementation strategy and translation of the *Technical Guidelines* into local languages, as appropriate, should be given initial priority. However, awareness building and effective communication on aquatic animal disease control measures should be a continuous activity. The electronic and print media should also be effectively used in this direction

Participation of the private sector

The private sector has a key role to play in the implementation of the *Technical Guidelines,* and a priority should be given to awareness building in the private sector on the benefits of, and requirements for responsible movement of live aquatic animals, and active participation in implementation. The private sector – which comprises producers, fry/fingerling traders and hatchery/nursery operators, among others – should be actively involved in the development of strategies and as partners for implementation of the *Technical Guidelines*.

Special attention must be given to the development of more effective measures for self-regulation in the private sector. Incorporation of the relevant elements of the *Technical Guidelines* into industry Codes of Practice, hatchery/farm accreditation schemes and other self-regulatory measures should be given a high priority. Such activities can be supported at the regional level by creating a forum for discussion, initiating pilot-level activities and developing 'model' codes and accreditation systems.

Farmer associations and groups should be recognised as important partners for implementation of the *Technical Guidelines*, and should be consulted and involved (e.g., through a national aquatic animal health committee) in measures for their implementation.

Financial resources

National governments should identify and allocate resources for implementation of the National Strategies. In many countries, the resources currently provided to aquatic animal health management are insufficient to deal with the problems faced, and risks posed by aquatic animal diseases to aquaculture operations, enhanced fisheries and the livelihoods of people who depend on these activities. As increased resources will be required, political will to implement the *Technical Guidelines* effectively and awareness building for policy makers and administrators are essential requirements.

National implementation will require more efficient use of financial resources and sustained investment. Consideration should be given to: (a) clear prioritisation of activities based on needs; (b) institutional linkages and collaboration, including establishing functional linkages between fisheries and veterinary authorities; (c) development of cost-recovery systems, such as for diagnostic services; and (d) effective communication and promotion of ownership among the private sector.

Monitoring and evaluation for national implementation

Regular monitoring by Competent Authorities to assess the extent of implementation of the *Technical Guidelines* and the effectiveness of the national response to aquatic animal disease problems is recommended.

Regular national reviews might include evaluation of the appropriateness of the national list of diseases, the system used for reporting, and mechanisms for improving the existing system(s), surveillance and diagnostic capacity and other requirements. A more detailed monitoring framework with targeted outputs should be developed to be consistent with national situations.

Regular workshops among concerned agencies can be used to review progress, and adjustments can be made to the National Strategies to respond to changing circumstances, as necessary.

Monitoring at the regional and international levels

Monitoring and evaluation at the regional and global levels can be through reports to NACA (through the Governing Council), FAO-COFI (as part of the CCRF implementation progress reports), ASEAN Fisheries Working Group and to governing bodies of other regional organizations, such as the OIE Representation for Asia and the Pacific.

The National Co-ordinators should continue to play a key role in monitoring national progress towards implementation of the *Technical Guidelines* and through regular reporting to the Advisory Group on Aquatic Animal Health (AG) (formerly the Regional Working Group (RWG)).

The AG should assist by preparing guidelines for monitoring of implementation by NCs and preparing regional summary reports on progress.

Regional co-operation

The sharing of experiences and resources through regional and sub-regional co-operation provides essential support to national-level implementation of the *Technical Guidelines*. The important actions required at the regional level include:

- designation of aquatic animal health resource centres;
- harmonisation of national procedures for health certification, quarantine and diagnostics;
- support for capacity building;
- awareness raising, communication and information exchange;
- regional disease reporting and development of a regional emergency response mechanism; and
- joint activities for risk reduction in shared watersheds and in sub-regions.

Asia resource centres for aquatic animal health. A more cohesive networking among regional resource centres in aquatic animal health is required to provide diagnostic support and to build capacity for implementation of the *Technical Guidelines*. A network of centres in regional countries is required as:

- Reference laboratories for OIE diseases of significance in the region.
- Complementary resource centres within the Asia Region to provide national agencies with assistance in the diagnosis of key regional (non-OIE) diseases on the regional disease list, to provide more generalised support, and to act as contact centres for advice and capacity building.

NACA, in close co-operation with OIE and FAO, is requested to develop a Terms of Reference and associated procedures for designation of such centres for submission to the national authorities for their consideration. National authorities may then seek designation of the resource centres through the appropriate channels of NACA and/or OIE.

Harmonisation of procedures for health certification, quarantine and diagnosis. Regional co-operation is essential to harmonise, as far as possible, quarantine procedures, diagnostic procedures, health certification and other measures with respect to aquatic animal health. NACA is requested to co-operate with other relevant bodies, including OIE, FAO and ASEAN, to assist in harmonisation of such measures.

A comprehensive regional review on the legal aspects of aquatic animal health management should be undertaken to provide a basis for supporting countries in identifying requirements to further develop and harmonise national legislation and policy for implementation of the *Technical Guidelines*.

Support to capacity building. Regional and sub-regional co-operation through the aquatic animal health resource centres should be enhanced to assist in building the skills and knowledge base required for implementation of the *Technical Guidelines*.

A special region-wide co-operative effort is required to support the general adoption of Level I diagnostic measures throughout many countries of the region. Regional support should be directed towards developing illustrated training guides specifically aimed at aquaculturists, farm managers, and workers. These should include appropriate methods of record-keeping and health management, and methods for sample collection, preservation and delivery to trained diagnosticians. The building of communication channels between farms with the view to develop farmer groups for mutual co-operation should be supported. Regional training programmes should also be developed to support capacity building for Level II and Level III disease diagnosis.

The *Technical Guidelines* also contain some concepts new to the region, and short-term regional training and workshops should be developed to build awareness and capacity on these subjects. Regional-level courses which would be of wide benefit include: (a) import risk analysis, (b) epidemiology and surveillance techniques, (c) zoning and (d) contingency planning.

In the long term, measures should be taken to ensure epidemiology, risk analysis and other higher level skills are incorporated into higher education systems. The development of regional standards and professional qualifications for personnel involved in aquatic animal

health to raise professional standards among aquatic animal health workers should be explored.

Awareness raising, communication and information exchange. At the regional level, awareness should be raised within the farming sector and government administrations concerning the economic and social benefits to be gained from implementation of the *Technical Guidelines* and the necessity that a high priority be given to their implementation.

Further development of AAPQIS-Asia is recommended to provide aquatic animal health information to the region. The AAPQIS-Asia database and web site should be linked to other sources of relevant data, particularly the OIE database, to enable users to access a wide range of relevant information with relative ease.

As some of the concepts within the *Technical Guidelines* (e.g., zoning, contingency planning) are relatively new, sharing of information on country experiences in implementation of the principles within the *Technical Guidelines* is strongly encouraged.

Regional disease reporting. The regional disease reporting system should be continued and further developed, with the aim of improving the quality of the reports. In the short term, more epidemiological information, as well as indication of the level of the diagnostic method used to report a given disease (e.g., Level I, II, or III) should be incorporated.

National quarterly reports should continue to be prepared and submitted to OIE and NACA/FAO, quarterly reports disseminated by NACA/FAO and OIE, and effective feedback mechanisms at both the national and regional levels established. The annual summary report should also be continued, as this has proved most useful to countries in the region.

The proposed Advisory Group on Aquatic Animal Health (AG) should be responsible for provision of advice on the development of the regional disease list and the reporting format. It was agreed that the regional disease list would be automatically adjusted to account for new diseases listed (or deleted) by OIE.

Resource centres should be used to provide specialist assistance for confirmatory identification of pathogens and provision of standardised diagnostic reagents. Technical support for developing the reporting system within the region, and provision of expertise and advice to further improve surveillance and reporting capabilities, should be given high priority.

With the region's aquaculture growing rapidly, there is also a need to build up information on other diseases in key aquaculture commodities, and to determine the current status and economic and social impacts of disease. At the present time, marine molluscs and marine fish, in particular, deserve increased attention, as the regional information base on diseases of these widely cultured and traded animals is still limited.

Emergency response. National and regional contingency plans need to be developed to ensure there is quick and effective response to new serious disease outbreaks.

There is some existing experience on contingency planning at the state and farm levels which should be collated and shared with other countries to help in preparing national contingency plans. OIE, FAO and NACA are requested to organise a regional workshop to share such

experiences, provide guidance for development of national contingency plans, and develop a practical Asia-regional emergency response mechanism.

Joint activities for risk reduction in shared watersheds. A pilot exercise in disease zoning is needed to determine the feasibility of zoning for shared large watersheds, contiguous river systems and marine coastal areas in the Asia Region (e.g., the Mekong or Ganges river systems, the Bay of Bengal or the Sundarbans coastal area). Experiences from such pilot testing should be widely shared with countries throughout the region.

Should zoning prove practical, there is a need for a regional body to provide official international recognition of the status of zones (e.g., free zone, infected zone, surveillance zone, unknown status, etc.), and for standardisation and harmonisation of requirements (e.g., zoning criteria, sampling and testing procedures, etc.). There may also be a need to harmonise national legal frameworks between co-operating countries.

Mechanisms for regional co-operation

The Asia Regional Aquatic Animal Health Management Programme of NACA, implemented in co-operation with FAO and with guidance from OIE, should continue to be developed to support Asia-regional countries in implementation of the *Technical Guidelines*.

Effective partnerships with SAARC, ASEAN, MRC, APEC, BIMST-EC and other concerned regional and sub-regional bodies and organizations should be developed. Regional co-operation should be extended to technical agencies and donor organizations working in the region, such as AAHRI, ACIAR, AusAID, DFID, SEAFDEC-AQD, and others, who can support countries in implementation of the *Technical Guidelines*.

The National Co-ordinators should continue to be the national contact points for the programme, and occasional meetings should be arranged to bring the NCs together to review progress and discuss issues of mutual concern.

In support of the further development of the regional programme, an Advisory Group on Aquatic Animal Health (AG) should be established and made operational under NACA. The role and membership of this regional advisory group should be such as to ensure provision of expert advice to NACA on the implementation of the *Technical Guidelines*, including:

- the review and development of the reporting list of regional aquatic animal diseases;
- development of criteria for regional monitoring of application of the *Technical Guidelines*;
- development of criteria for the designation of Regional Aquatic Animal Health Resource Centres;
- development of a process for revision of the *Technical Guidelines* and to support the *Manual of Procedures* and the *Asia Diagnostic Guide for Aquatic Animal Diseases* (ADG) as required; and
- provision of other expert advice upon request.

Initial priority should be towards development of the work plan for this group. NACA is requested to provide institutional support for the AG at the regional level, and FAO and OIE are requested to provide advice and technical support.

Finally, the workshop suggested that complementary technical guidelines for the responsible trans-boundary movement of live exotic aquatic animals be developed in due course, specifically addressing the issue of introduction and impacts of exotic aquatic animals and biodiversity.

ANNEX I – NATIONAL COORDINATORS

List of National Coordinators who represented the participating countries during drafting of these *Technical Guidelines*.

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