

CHAPTER 15 -

MARINE INVASIVE SPECIES

Table of Contents

Introduction	2
1. Scoping	2
2. Overview of Coastal and Marine Invasive Species Cooperation in ASEAN	2
3. ASEAN Institutional Bodies Relevant to Coastal and Marine Invasive Species	3
4. ASEAN's Rules on Coastal and Marine Invasive Species	3
4.1 High-Level Declarations and Statements	3
4.2 Blueprints and Action Plans	4
5. ASEAN's Activities on Coastal and Marine Invasive Species	6
5.1 Information on Invasive Species	7
5.2 Measures to Address Invasive Species from Live Aquatic Animals and Aquaculture	7
5.3 Measures to Address Invasive Species from Ballast Water	8
6. Work in other bodies	9
7. Preliminary Findings	12

Introduction

There has been little research done into the issue of coastal and marine invasive species in Southeast Asia.¹ Nonetheless, even with the little information available, there is a general suspicion that the region is vulnerable to introductions of invasive coastal and marine species due to the high concentrations of shipping and mariculture in the region.² Individual case studies have shown that the introduction of certain marine invasive species have led to devastating ecological results, e.g. the introduction of dinoflagellate have caused harmful algae blooms that resulted fish kills in Philippine waters, and foreign diseases introduced (e.g. Whitespot virus) have caused millions of dollars of losses to the Asian shrimp industry.³ There is also an understanding that invasive species can have impacts that are not only ecological, but also economic and harmful to human health.

As such, the ASEAN Centre for Biodiversity (ACB) has consistently recognised invasive species as one of the threats to the region's biodiversity.⁴ Yet, as this chapter will show, ASEAN as an organisation has not done much to tackle the issue. This is despite AMS' frequent reaffirmation of their commitments to the CBD and the Aichi Targets, which includes Target 9 on controlling/eradicating priority invasive species to reduce this direct pressure on biodiversity.

1. Scoping

There is no definition of "coastal and marine invasive species" in any of the high-level ASEAN documents. However, the ASEAN Biodiversity Outlook 2, a publication by the ACB, has defined "invasive species" as "animals, plants, fungi, and microorganisms whose introduction or spread outside of their natural habitats causes economic or environmental problems".

2. Overview of Coastal and Marine Invasive Species Cooperation in ASEAN

As a regional organisation, ASEAN has not done much to address the problem of coastal and marine invasive species. Apart from the yet-ratified ASEAN Agreement on Conservation of Nature and Natural Resources (see Chapter 2), few high-level ASEAN documents mention the issue. This indicates a lack of political impetus to address the problem, despite the potential negative impacts invasive species may have upon the coastal and marine environment, the economy and human health.

Nevertheless, ASEAN has implemented some initiatives that have a bearing upon coastal and marine invasive species in the region. These efforts are spread out across three Sectorals (i.e. Coastal and Marine Environment, Fisheries and Maritime Transport), with no overarching coordinating strategy between them. The Coastal and Marine Environment Sectoral appears to have only recently started looking into the issue, and has been tasked with developing a regional management plan for coastal and marine invasive species under the ASEAN Strategic Plan for the Environment (2016-2025). It also

¹ Kelvin SH Peh, "Invasive Species in Southeast Asia: the Knowledge Thus Far" (2010) 19 Biodiversity Conservation 1083.

² Jennifer Molnar et al, "Assessing the global threat of invasive species to marine biodiversity" (2008) 6(9) Front Ecol Environ 485.

³ Reference

⁴ ASEAN State of the Environment Reports 2 to 5 (need to check 1st) + ABOs

appears to recognise that the main pathways for introduction of invasive species are ballast water, ornamental marine life and aquaculture activities. The Fisheries and Maritime Transport Sectorals have, from time to time, implemented initiatives that address these pathways for invasive species.

Overall, there has been a dearth of regional cooperation within ASEAN on coastal and marine invasive species. AMS instead cooperate within other organisations that have had a stronger focus on invasive species (e.g. APEC, CABI, SEAMEO).

3. ASEAN Institutional Bodies Relevant to Coastal and Marine Invasive Species

There are three Sectoral Working Groups that have the mandate to address invasive species and/or their pathways. These are the ASEAN Working Group on Coastal and Marine Environment (AWGCME) under the Environment Sectoral, the ASEAN Sectoral Working Group on Fisheries (ASWGFi) under the Fisheries Sectoral and the ASEAN Maritime Transport Working Group (MTWG) under the Transport Sectoral.

As the primary Working Group that handles issues related to the coastal and marine environment, the AWGCME oversees the conservation of coastal and marine biodiversity and the direct threats upon such biodiversity. Its most recent Work Plan specifically recognises the problem of invasive species upon coastal and marine biodiversity, and contains several activities that would allow the AWGCME to determine the status of the invasive species problem in the region's coasts and seas.

The ASWGFi is the Working Group in charge of fisheries matters in ASEAN, including aquaculture and the ornamental fish trade. It is thus tangentially involved in the prevention of the introduction of exotic species into the coastal and marine environment through these activities.

Similarly, the MTWG is also involved in addressing invasive species as it has a mandate over shipping activities that could introduce alien species into the marine environment (e.g. ballast water and hull fouling). As the MTWG also oversees the implementation of IMO conventions within ASEAN, it oversees the implementation of the Ballast Water Management Convention which aims to prevent the spread of harmful aquatic organisms from one region to another.

4. ASEAN's Rules on Coastal and Marine Invasive Species

4.1 High-Level Declarations and Statements

There are few high-level ASEAN declarations and statements that make mention of the invasive species problem or the potential pathways for invasive species (e.g. ballast water, intentional/accidental release of exotic species from the live fish trade or aquaculture). The three high-level ASEAN declarations that mention the issue are in Table 3.1.

Table 15.1. List of high-level declarations that mention invasive species and/or their pathways.

Declaration	Level of Adoption	Text

2016 ASEAN Joint Statement to the Thirteenth Meeting of the Conference of Parties to the Convention on Biological Diversity	ASEAN Leaders	We, the Heads of State/Government of ... Member States of the Association of Southeast Asian Nations (ASEAN) ... do hereby agree to: • Improve actions to address the threat of invasive alien species, including identifying pathways of introduction through among others, sharing of experiences and lessons learned, capacity development and partnerships
2014 Statement by the ASEAN Environment Ministers for the Twelfth Meeting of the Conference of the Parties to the Convention on Biological Diversity	ASEAN Environment Ministers	We, the Ministers responsible for the environment of the Association of Southeast Asian Nations (ASEAN) ... • HIGHLIGHTING the negative impacts of invasive alien species (IAS) introduced as pets, aquarium and terrarium species, and as live bait and live food, on biodiversity, and the risk of escape and release; • ENCOURAGE Parties to incorporate IAS management and control measures into the National Biodiversity Strategies and Action Plans; and develop and support the implementation of National Invasive Species Strategies and Action Plans
2011 Resolution On Sustainable Fisheries For Food Security For the ASEAN Region Towards 2020	ASEAN-SEAFDEC Ministers	We, the Ministers of ASEAN-SEAFDEC Member Countries who are responsible for fisheries ... do hereby resolve ... to: 17. Mitigate the potential impacts of aquaculture on the environment and biodiversity including the spread of aquatic animal diseases caused by the uncontrolled introduction and transfer of exotic aquatic species and over-development of aquaculture

4.2 Blueprints and Action Plans

The issue of invasive species has only appeared in two out of the four iterations of the ASEAN Blueprints that were adopted by the ASEAN Leaders. Yet, even in these blueprints, the action lines are framed in rather general terms (see Table 3.2 below).

Table 15.2. Action lines on invasive species and/or their pathways in the ASEAN Blueprints

ASEAN Blueprint	Action Line on Invasive Species and/or Their Pathways
ASEAN Vision (2016-2025)	-
ASEAN Roadmap (2009-2015)	ASCC Blueprint • <i>D.8. Promoting Sustainable Management of Natural Resources and Biodiversity</i> ix. Promote effective management policies and practices to reduce the impact of invasive alien species at the regional and international levels;
Vientiane Action Programme (2004-2010)	ASCC Blueprint • <i>Programme 3.3 Promoting Environmental Sustainability</i> 3.3.8 Nature Conservation and Biodiversity 3.3.8.8 Address issues pertaining to invasive alien species
Hanoi Plan of Action (1999-2004)	-

With the scant political attention on the issue, only four Sectoral and ASEAN-Plus Work Plans have contained specific and concrete action lines on invasive species and/or their pathways. Notably, three of these Work Plans are recent and cover ASEAN cooperation for the period of 2016 to 2020 or 2025. This indicates an uptick of awareness on the gravity of the problem and may result in increased efforts to tackle the issue.

Interestingly, the only ASEAN-Plus mechanism that has promoted cooperation on invasive species (particularly ballast water management) is the ASEAN-China Dialogue Partnership. While ballast water was only featured in the 2005-2010 ASEAN-China Plan of Action (with no subsequent Plans of Actions mentioning the issue), the brief attention on the issue had resulted in the concrete 2010 ASEAN-China Memorandum of Understanding on Maritime Consultation Mechanism that institutionalised ASEAN-China cooperation on ship's ballast water management (see Section 3.2.4 below).

Table 15.3 List of Sectoral and ASEAN-Plus Work Plans that contain action lines on invasive species and/or their pathways

Work Plan	Action Line on Invasive Species and/or Their Pathways
<i>Sectoral Work Plans</i>	
ASEAN Strategic Plan on Environment (2016-2025)	Strategic Priority 2: Coastal and Marine Environment ● <i>Programme 5: Coastal and Marine Invasive Alien Species</i> ○ Output: Regional status of coastal and marine invasive alien species (IAS), including ratification of Ballast Water Management Convention, and recommendations on way forward 1. Exchange knowledge and share experiences, including good practices on national regulatory frameworks, identification of IAS and potential vectors, new technologies, etc. 2. Identify needs and gaps 3. Explore regional collaborative activities 4. Develop regional management plan for IAS ○ Output: Regional status of IAS from trade in ornamental marine life and aquaculture activities and recommendations on way forward 5. Exchange knowledge and share experiences, including good practices, on national regulatory frameworks, identification of IAS potential vectors, new technologies, etc. 6. Identify needs and gaps 7. Explore regional collaborative activities 8. Develop regional management plan for IAS
Strategic Plan of Action on ASEAN Cooperation on Fisheries (2016-2020)	Strategic Thrust 1: Enhance quantity and quality of production with sustainable, 'green' technologies, resource management systems, and minimise pre- and post-harvest losses and waste ● <i>1.2. Develop new and appropriate technologies, best practices and management systems to ensure food safety and address health/disease and environmental issues, particularly in the fast growing aquaculture sectors</i> ○ 1.2.4 Promote the implementation of ASEAN Guidelines for Standard Operating Procedures for Responsible Movement of the Live Aquatic Animals

	▪ <i>Sub-Activity:</i> Pilot implementation of SOP in three selected countries for the ASEAN Guidelines for Standard Operating Procedures for Responsible Movement of the Live Aquatic Animals
Kuala Lumpur Transport Strategic Plan (ASEAN Transport Strategic Plan) (2016-2025)	Sustainable Transport • <i>ST-2.4 Implement effective measures to accommodate international standards and execute them in cooperation with international transport organisations</i> - o ST-2.4.1 Initiate cooperation for exploring regional requirements on ballast water management (BWM) technology for coastal ships, including risk assessment, emergency measures and port biological baseline surveys - o ST-2.4.2 Establish a framework of regional cooperation for the implementation of IMO BWM Convention
ASEAN-Plus Work Plans	
ASEAN-China Strategy on Environmental Cooperation (2016-2020)	4.4 Biodiversity and Ecological Conservation • <i>Activities:</i> - o (g) Conducting study on policy tools and practices of biodiversity and ecological conservation. Such studies would include but not limited to: ▪ (iii) Management and eradication of invasive alien species
ASEAN-China Strategy on Environment Protection Cooperation (2009-2015)	5.3.1 Biodiversity Conservation • <i>Activities:</i> - o Establish a platform for cooperation in preventing the introduction of alien species
Plan of Action to Implement the Joint Declaration on ASEAN-China Strategic Partnership for Peace and Prosperity (2005-2010)	2. Economic Cooperation • <i>2.6 Transport Cooperation</i> - o 2.6.2 Formalise a consultation mechanism for maritime transport cooperation under the ASEAN-China Transport Ministers' Meeting in close coordination with other related ASEAN fora and carry out mutually beneficial projects in such areas as maritime safety and security, search and rescue at sea, marine environmental protection against pollution from ships, ship ballast water management, port state control and international shipping;

ASEAN-India Work Plan?

5. ASEAN's Activities on Coastal and Marine Invasive Species

Generally, there has been minimal ASEAN activity on coastal and marine invasive species. Of note, the ACB had apparently attempted to strengthen ASEAN cooperation on invasive species before. According to the ASEAN Biodiversity Outlook 2, the ACB had drafted a regional proposal to address IAS for possible GEF support, but this proposal was not pursued in the end. The reasons for this dropping of the proposal were not disclosed.

Nevertheless, with the recent attention on invasive species in the latest Sectoral Work Plans (see Section 3.2.3.2 above), ASEAN cooperation on the issue may strengthen in the next few years. This is especially as the AWGCME has been tasked with developing a regional management plan for coastal

and marine invasive species that recognises the role of the fisheries and shipping sectors in the problem.

There appears to be three main types of activities that have been pursued to address coastal and marine invasive species in ASEAN:

- (1) Information on Invasive Species
- (2) Measures to Address Invasive Species from the Ornamental Fish Trade and Aquaculture
- (3) Measures to Address Invasive Species from Ballast Water

5.1 Information on Invasive Species

The ASEAN Environment Sectoral thus far has not done much to address invasive species. Nevertheless, the ASEAN Centre for Biodiversity (ACB) appears to have maintained a database of almost 34,000 invasive and potentially invasive species in the region on its Clearing-House Mechanism (CHM) website⁵. This database acts as an early warning facility for AMS.⁶ (It is unclear how the ACB has compiled this information.)

Notably, in the ASEAN Biodiversity Outlook 2, the ACB highlighted that apart from the identification and listing of key invasive species affecting forests, agriculture and aquatic ecosystems, there has yet to be comprehensive documentation on the pathways of introduction and on the extent of eradication of invasive species. It is clear that more research needs to be done to bolster the understanding of invasive species in ASEAN.

(Harmonisation of national strategies?)

5.2 Measures to Address Invasive Species from Live Aquatic Animals and Aquaculture

In regulating aquaculture and the live aquatic animal trade in ASEAN, the ASEAN Fisheries Sectoral has developed guidelines that incidentally seek to prevent the intentional/unintentional release of exotic species into the coastal and marine environments.

The first guideline is the 2014 Guidelines on ASEAN Good Aquaculture Practices (ASEAN GAqP) for Food Fish Environmental Integrity, which was developed with funding from Australia under the ASEAN-Australia Development Cooperation Programme (AADCP). The ASEAN GAqP aims to prevent or minimise the risks in aquaculture of food fish, including to environmental integrity. Under the principle that aquaculture should be planned and practiced in an environmentally responsible manner, the ASEAN GAqP says that exotic species should only be used “when they pose an acceptable level of risk to the natural environment, biodiversity and ecosystem health”.

The second guideline is the 2015 ASEAN Guidelines for Standard Operating Procedures for Responsible Movement of the Live Aquatic Animals, which was developed with funding from the US. While the main aim of this Guideline is to reduce the risk of spread of transboundary aquatic animal

⁵ <http://chm.aseanbiodiversity.org/invasivealienspecies/>

⁶ ASOER 5th, p 120

diseases resulting from the movement of aquatic animals, it calls for the strict control of movement of animals, including exotic species, that could help to prevent the introduction of exotic species and their pathogens into the region's coastal and marine ecosystems.

SEAFDEC Guidelines

5.3 Measures to Address Invasive Species from Ballast Water

In the bid to implement the Ballast Water Management Convention, the MTWG developed the 2013 ASEAN Regional Strategic Action Plan to Minimise the Transfer of Harmful Aquatic Organisms and Pathogens in Ships' Ballast Water and Sediments. This Action Plan apparently aims to (i) facilitate consideration for the ratification and implementation of the Ballast Water Management Convention by AMS; (ii) provide a platform for dialogue, consultation and exchange of information amongst national and regional stakeholders; and (iii) establish a framework of regional cooperation.⁷ However, this Action Plan is not publicly available and we are thus unable to analyse the comprehensiveness of its provisions. Add current adoption status of CBWM by ASEAN CME

Besides the Action Plan, the MTWG has cooperated with Chinese Transport Officials on ballast water management. In 2004, there was the ASEAN-China Workshop on Ships' Ballast Water Management that was held in Beijing, China. That same year saw the adoption of the 2004 MOU Between the Governments of the Member Countries of the ASEAN and the Government of the People's Republic of China on Transport Cooperation, which featured "marine environmental protection against pollution" as one of its cooperation areas. Under this MOU, AMS and China had agreed to "undertake cooperation within the IMO framework on the management of ship's ballast water and marine environmental protection against pollution from ships". It is unclear how exactly this MOU has been implemented since its adoption.

Additionally, in 2010, AMS and China adopted another MOU to set up the ASEAN-China Maritime Consultation Mechanism. Under this MOU, ASEAN and China have agreed to "cooperate on ship's ballast water management by holding regional workshops, seminars or trainings including exchange of information and best practices".⁸ Despite this MOU, there has been no visible workshops or activities conducted on ballast water management since the 2004 Workshop in Beijing.

ASEAN-India Cooperation Project on 'Extent of Transfer of Alien Invasive Organisms in South/Southeast Asia Region by Shipping' - under SCMSAT

- 2nd phase of project - aim to establish an exemption zone within the ASEAN-India region vis-a-vis IMO Ballast Water Convention (see Arga Chandrashekar Anil, Koh Siang Tan, "ASEAN-India Cooperation Project on 'Extent of Transfer of Alien Invasive Organisms in South/Southeast Asia Region by Shipping'" (2018) 35: 1-2 ASEAN Journal on Science & Technology for Development 1.

SAME RISK AREA

Glofouling - In order to determine that it is a same risk area, data would be needed that are unlikely to be available given the absence of on-going monitoring

⁷ KL Transport Plan

⁸ <https://asean.org/wp-content/uploads/images/archive/transport/MOU-AMS-China-MCM.pdf>

6. Work in other bodies

UNCLOS - Art.195

<http://repository.seafdec.org/bitstream/handle/20.500.12066/1007/SP15-1improving%20fisheries%20management.pdf?sequence=1&isAllowed=y>

<http://www.imo.org/en/MediaCentre/PressBriefings/Pages/11-MEPSEASLAUNCH.aspx>

CABI/UNEP/GEF - Removing Barriers to Invasive Species Management in Production and Protection Forests in SE Asia

- Indonesia, Philippines, Vietnam, Cambodia together with other stakeholders including ACB – overall goal of conserving important forests, species and genetic diversity
- Regional Workshops on Classical Biological Control (CBC) of Invasive Alien Species, 2014 – organised with ACB

Southeast Asian ministers of Education Organisation Regional Centre for Tropical Biodiversity (SEAMEO-BIOTROP)

- **2014 Regional Seminar-Workshop on Harmonizing Approaches to Risk Assessment and Management of Forest Invasive Alien Plant Species in SEA**
- **Regional Workshop on Classical Biological Control of Invasive Alien Species, Sept 2014** – jointly organised by ACB and Centre for Agriculture and Biosciences International (CABI)
 - Four priority forest IAS were identified as requiring interventions
- The Southeast Asian Ministers of Education Organisation Regional Centre for Tropical Biodiversity (SEAMEO-BIOTROP) regularly conducts a regional training course on IAS management
 - SEAMEO-BIOTROP and UN-FAO organised a Regional Seminar-Workshop on Harmonizing Approaches to Risk Assessment and Management of Forest Invasive Alien Plant Species in Southeast Asia

2002 Bangkok workshop, “Prevention and Management of Invasive Alien Species: Forging Cooperation throughout South and Southeast Asia”.

Yunnan workshop on international mechanisms to address alien species held in August 2003

APEC workshop on marine pests held in Chile April 2004

The APEC Marine Resources Conservation Working Group (MRCWG) held a second workshop on the “Development of a Regional Management Framework for APEC Economies for Use in the Control and Prevention of Introduced Marine Pests (IMP)” on May 3-5, 2004 in Puerto Varas, Chile, co-hosted by Chile and Australia.

[Revise from here]

NACA-FAO

The ASEAN countries have ambitious plans to increase aquaculture production and trade in ornamental fishes. Due to economic losses caused by diseases, significant efforts have been initiated in ASEAN countries to tackle alien pathogens through NACA and FAO initiatives. For example, NACA and the FAO published the “Technical Guidelines on Health Management for the Responsible Movement of Live Aquatic Animals” in 2000 (FAO/NACA 2001). This document provides valuable guidance for national and regional efforts in reducing risks of disease due to the transboundary movement of live aquatic animals. However, there has been no regional initiative for non-pathogenic invasive alien species.

USAID-GISP

the Global Invasive Species Program (GISP), with funding from the U.S. Department of State organized a regional workshop, Prevention and Management of Invasive Alien Species: Forging Cooperation throughout South and Southeast Asia’ in August 2002 in Bangkok, Thailand (GISP 2003a). While this GISP-organized workshop supported the broader ASEAN Cooperation Plan goal of addressing transnational issues, and the ASEAN 2020 vision of enhancing food security and international competitiveness of food, agricultural and forest products, it focused more on terrestrial alien species, as reflected in the participants from agricultural and environmental ministries and organizations. However, there have been two international meetings focusing on aquatic alien species and stocks of relevance to this region. An international workshop on, “International Mechanisms for the Control and Responsible Use of Alien Species in Aquatic Ecosystems” was held in Xishuangbanna, People’s Republic of China in August 2003. The workshop’s goal was to assist countries in the Greater Mekong/Lancang sub-region by increasing familiarity with, and making effective use of international mechanisms for the control and responsible use of alien species in aquatic ecosystems. This current workshop, ‘Building capacity to combat impacts of invasive alien species and associated transboundary pathogens in ASEAN countries’ held in July 2004 in Penang, and the proposed regional workshop on “Preparedness and Response to Aquatic Animal Health Emergencies’ to be held in Jakarta, Indonesia, during September 2004 by FAO will help to bring greater awareness and clarity on the issues concerning invasive alien species affecting aquatic environments and aquaculture. Finally, the ‘Expert Consultation on Ecological Risk Assessment of Genetically Improved Fish’ convened in Bangladesh in August 2003 (WorldFish Center 2003) examined how to determine the risks of invasiveness of aquatic organisms that may be altered genetically to increase their aquaculture potential (e.g., growth, disease resistance, etc.).

Cooperation within ASEAN (p120)

Within ASEAN, there has also been much welcomed efforts at promoting closer collaboration among ASEAN members in aquatic animal disease control. The Department of Fisheries, Malaysia, in collaboration with NACA, organised a regional Seminar “Harmonization of Quarantine Procedures for Live Fish among ASEAN Member Countries” in February 2003, in Penang, Malaysia. The seminar succeeded in developing “Draft Guidelines for harmonization of quarantine procedures of live fish among ASEAN member countries”. The ASEAN Sectoral Working Group on Fisheries is now working towards further development of the document and comprehensive procedures for implementation of the guidelines at the operational level. Further collaboration within ASEAN is evidenced by this workshop, where the Department of Fisheries, Malaysia, in collaboration with NACA and FAO, and with support from the United States Department of State, have organized this workshop on “Building capacity to combat invasive alien species and associated transboundary pathogens in ASEAN countries”. The workshop is expected to help ASEAN countries build their national capacities to

combat the impacts of aquatic invasive alien species (IAS) and associated transboundary pathogens in aquaculture.

The importance of cooperation among countries of the same watershed was highlighted in the Asia Regional Technical Guidelines. Within the Mekong/Lancang basin, an international workshop, International Mechanisms for the Control and Responsible Use of Alien Species in Aquatic Ecosystems, was convened during August 2003, in Xishuangbanna, People's Republic of China, to promote cooperation in the Mekong/ Lancang in responsible movement of aquatic animals, including both disease and exotic species issues. The workshop involved cooperation between the Asian Institute of Technology (AIT), Food and Agriculture Organization of the United Nations (FAO), Mekong River Commission (MRC), Network of Aquaculture Centres in Asia-Pacific (NACA), University of California Sea Grant College Program (UCSG), World Conservation Union (IUCN), Ministry of Agriculture of the Peoples Republic of China and the FAO/Netherlands Partnership Programme (FNPP). The outcome, as agreed among the senior policy makers and scientists present, provides a strong basis for further cooperation among the six Mekong/Lancang basin in control and responsible movement of aquatic animals.

Implementation of the Asia Regional Technical Guidelines in the ASEAN

The Asia Regional Technical Guidelines (FAO/NACA 2000, 2001) provide some guidance for national and regional efforts to reduce these risks and a strong platform for mutual cooperation at the national, regional and international levels. There is strong technical and political endorsement from regional, inter-governmental and global organizations and a shared commitment from national governments to support its implementation.

The ASEAN countries were among the 21 governments adopting the Technical Guidelines. In addition, the ASEAN Fisheries Working Group adopted the policy document in 2001, further strengthening their implementation within the ASEAN. The main elements of the Technical Guidelines are as follows:

1. Scope, purpose, and background
2. Definitions and guiding principles
3. Pathogens to be considered
4. Disease diagnosis
5. Health certification and quarantine measures
6. Disease zoning
7. Disease surveillance and reporting
8. Contingency planning
9. Import risk analysis
10. National strategies and policy frameworks
11. Regional capacity building
12. Implementation of the technical guidelines
13. The Beijing consensus and the implementation strategy

The comprehensive framework summarized above considers the major requirements for managing risk associated with live aquatic animal movements and transboundary pathogens (Bondad-Reantaso 2004).

There has been considerable progress in implementing the Technical Guidelines in several countries in ASEAN (Table 2). However, progress in some countries is limited.

As implementation of the Technical Guidelines is a long-term process, continuous effort to motivate and support governments in initiating their health management programs is required. Regional workshops, where governments come together and share knowledge and lessons learnt, have proved useful in the past, and should be initiated where appropriate to facilitate the process of implementation. Such actions may be required in the ASEAN. Governments tend to give more attention to their international obligations when trade issues start to affect them, and aquatic animal diseases are becoming a more significant international trade issue. Commitment and willingness on the part of the governments is a primary basis for implementation of the Technical Guidelines.

NACA/ASEAN/FAO/World Fish Center/US State Department **Workshop on Transboundary Aquatic Invasive Alien Species Associated with Aquaculture in Southeast Asia, 12-16 Jul 2004**, Penang, Malaysia // “Building Capacity to Combat Impacts of Aquatic Invasive Alien Species and Associated Transboundary Pathogens in ASEAN Countries”

- o https://books.google.com.sg/books?id=U6OQ2iqAkR0C&pg=PA128&lpg=PA128&dq=Workshop+on+transboundary+aquatic+invasive+alien+species+asean-us&source=bl&ots=HSp3lbSWYy&sig=ACfU3U2S1-2PaX7DT_x07pMF04K_RfwJaA&hl=en&sa=X&ved=2ahUKEwiR1rrEz5zqAhWy8XMBHV-1AikQ6AEwAXoECAsQAQ#v=onepage&q=Workshop%20on%20transboundary%20aquatic%20invasive%20alien%20species%20asean-us&f=false
- o UNCLEAR WHETHER THIS IS AN ASEAN ACTIVITY – MORE RESEARCH NEEDED
- o Interestingly, recommendations were for the Fisheries sectoral to coordinate regional action, come up with a legitimate regional framework

7. Preliminary Findings

- No ASEAN document focused on the introduction of marine non-indigenous species (NIS) and aquatic invasive species.
- Pathways to the introduction of NIS are numerous and recent international policy developments are not reflected