

Benchmarking of the Thai National Shrimp Certification Scheme against the FAO Aquaculture Certification Guidelines

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Aquaculture has an important role to play in the global efforts to eliminate hunger and malnutrition by supplying fish and other aquatic products for human consumption. Aquaculture also makes significant contributions to poverty reduction by improving employment opportunities and increasing returns on resource use. Statistics have shown that in 2008, aquaculture accounted for 46% of the total food fish supply considering that the global food fish from aquaculture reached 52.5 million metric tons out of the 142.0 million metric tons of total fish production from capture fisheries and aquaculture (FAO, 2010). However, the rapid increase of aquaculture production and trade had also ushered in concerns regarding the potential negative impacts of aquaculture development on the environment, communities and consumers. Certification in aquaculture was therefore initiated as means of ensuring that the negative impacts of aquaculture are minimized, while the benefits to society and consumers are enhanced and confidence in aquaculture production and marketing is restored. Thailand being the top producer and exporter of aquaculture products especially shrimps recognized this need and developed the Thai National Shrimp Certification Scheme for its cultured shrimp to access the world market. Meanwhile, the FAO Guidelines on Aquaculture Certification had been recently promoted to serve as guide for the development and implementation of credible aquaculture certification schemes. Considering the existence of the Thai Scheme and the FAO Guidelines, the Department of Fisheries of Thailand initiated a benchmarking of the Thai Scheme against the FAO Guidelines to assess the extent for which the Thai Scheme could be aligned with the FAO Guidelines and minimize confusion among the country's aquaculture producers and exporters.

The results of the benchmarking clearly showed the compliance of the Thai Scheme with that of the FAO Aquaculture Certification Guidelines both in terms of critical and major requirements at acceptable levels. The four minimum substantive criteria such as animal health and welfare, food safety, environmental integrity, and socio-economic aspects including the institutional and procedural requirements such as standard setting, accreditation and certification of the FAO Guidelines are being complied to by the Thai National Shrimp GAP criteria. This could indicate that the result of the benchmarking of the two schemes has enabled a mutual recognition for the Thai National Shrimp Certification Scheme as conforming to the FAO Aquaculture Certification Guidelines. It is recommended that the benchmarking of the standard and/or certification of the Thai Scheme against the FAO Guidelines can be carried out by applying or modifying the methodology used as a tool for any benchmarking exercise. The results of the benchmarking could also be used as reference for the other countries in the ASEAN region and elsewhere in their efforts towards developing their respective aquaculture certification schemes, and be able to access the high-end market for their aquaculture products.

In view of the increasing world demand for food fish, aquaculture production has been given much attention in the last decade in terms of certification by both public and private sectors to ensure food safety and quality of aquaculture products, and that production takes into consideration environment-friendly methods, as well as concerns on animal health and welfare, and social responsibility. During this decade, a large number of public and private food standards and certification schemes have been promoted in fisheries and aquaculture, including those by many NGOs. These schemes have been borne out of a desire to improve the image of farmed fish and seafood as safe and sustainable alternative to wild capture fish, and are generally aimed at industry improving practices including reduction of the negative impacts of the production on the environment (Washington and Ababouch, 2011).

Nevertheless, the emergence of a wide range of certification schemes and accreditation bodies created confusion among producers and consumers alike. It was therefore deemed necessary to come up with more globally accepted norms

for aquaculture production, which could provide guidance and serve as basis for improved harmonization as well as facilitate mutual recognition and the establishment of equivalence between certification schemes.

It was towards this objective that the Food and Agriculture Organization of the United Nations (FAO) was requested during the 3rd Session of the Sub-Committee on Aquaculture to convene expert consultations and/or workshops to develop the guidelines on aquaculture certification (FAO, 2007). The development of such guidelines has taken four years through six expert consultations and one technical consultation, where the considerations were taken up during the 4th Session of the Sub-Committee on Aquaculture and subsequently adopted by the 5th Session of the Sub-Committee on Aquaculture. Finally, the Guidelines were endorsed by the 29th Committee on Fisheries in February 2011.

The FAO Guidelines on Aquaculture Certification also referred to as the FAO Guidelines contain provisions

and guidance for the development, organization and implementation of credible aquaculture certification schemes that cover four minimum substantive criteria, namely: a) animal health and welfare; b) food safety; c) environmental integrity; and d) socio-economic aspects associated with aquaculture (FAO, 2011). The FAO Guidelines also prescribe that under institutional and procedural requirements, credible aquaculture certification schemes should consist of three components: i) standard setting; ii) accreditation; and iii) certification. Each component should comprise minimum requirements that a body or entity should meet in order to be recognized as credible and reliable in executing the relevant duties and responsibilities. While **standard setting** encompasses the tasks of developing, monitoring, assessing, reviewing, and revising the standards, **accreditation** is an independent assessment of the competence of the certification body or entity, and **certification** is the procedure by which a body or entity gives written or equivalent assurance that the aquaculture operation or activity under consideration conforms to the relevant aquaculture certification standards.

In Thailand, the Thai National Shrimp Certification Scheme had been developed since the last decade. As a matter of fact, the World Bank (2005) mentioned that Thailand has taken a proactive strategy to access high-end markets

by building its national reputation as a producer of safe quality products. The strategy pursued by the Department of Fisheries of Thailand (DOF) consisted in developing two standards for sustainable shrimp aquaculture: the Code of Conduct (CoC) in 1998 and Good Aquaculture Practice (GAP) in 2000. These two standards have incorporated the various international standards including those from the *Codex Alimentarius*, ISO 14001 standard, and relevant FAO codes.

CoC and GAP are meant to address the environmental management issues in aquafarming systems and those of aquafarms' neighboring areas, shrimp disease control, as well as the concept of antibiotics-free shrimp production and traceability. Under the responsibility of the DOF, the development of such standards had been carried out through its Thai Quality Shrimp Program which encompassed not only the development of standard *per se* but also the certification systems for CoC and GAP. In 2008, the Thai National Shrimp Certification Scheme underwent a major change creating three entities responsible for standard setting, accreditation and certification. The Ministry of Agriculture and Cooperatives through the National Bureau of Agricultural Commodity and Food Standards (ACFS), a national standard setting body, formed a technical committee which initiated a review of the Thai National



Shrimp Standard using as basis the draft FAO Guidelines on Aquaculture Certification. Subsequently, the ACFS released the Thai Agricultural Standard (TAS 7401-2009) on Good Aquaculture Practices for Marine Shrimp Farms generally known as the new Thai Shrimp GAP or Thai National Shrimp GAP in 2009 (National Bureau of Agricultural Commodity and Food Standards, 2010). The DOF also reviewed its role in certification since 2008 with the Aquaculture Development and Certification Center (ADCC) serving as a certification body using ISO/IEC Guide 65 in setting up the certification system for Thai aquaculture shrimp and fish. The ACFS plays an important role in serving as an accreditation body using the ISO/IEC 17011 as basis for the development of the accreditation system (Thailand Industrial Standard Institute, 2004) which also applies to the shrimp certification scheme.

In order to establish the conformity of the requirements of the Thai National Shrimp Certification Scheme with the FAO Aquaculture Certification Guidelines, benchmarking was carried out through the initiatives of DOF. WTO (2007) considers benchmarking as significant and crucial as it could provide the means of comparing the requirements of various standards. Washington and Ababouch (2011) cited that the FAO Aquaculture Certification Guidelines provide minimum substantive requirements upon which any aquaculture certification scheme could be assessed for benchmarking any initiatives in setting aquaculture standards and certification. For instance, the Global Food Safety Initiative (GFSI) had recognized the alignment of the food safety elements of the GLOBAL G.A.P. of aquaculture and livestock schemes through benchmarking activities (GFSI, 2010). Moreover, the World Wide Fund for Nature (WWF) in its study on standards and certification schemes currently used in aquaculture, evaluated and benchmarked a wide range of schemes against a range of criteria including environmental impacts, social issues and animal welfares (WWF, 2007; Washington and Ababouch, 2011).

Benchmarking of the Thai Scheme against the FAO Guidelines

Objectives

In order to benchmark the Thai National Shrimp Certification Scheme against the FAO Aquaculture Certification Guidelines, the four minimum substantive criteria under the FAO Guidelines (animal health and welfare, food safety, environmental integrity, and socio-economic aspects) were considered, as well as the institutional and procedural requirements covering standard setting, accreditation and certification. It was envisaged that the comparative analysis resulting from the benchmarking exercise could indicate the extent of alignment of the Thai Scheme with the FAO Guidelines.

Methodology

The four minimum substantive criteria as well as the institutional and procedural requirements comprising standard setting, accreditation and certification in the FAO Aquaculture Certification Guidelines, were used as the template in the benchmarking exercise with the Thai National Shrimp Certification Scheme which embraces the Thai National Shrimp GAP, standard setting, accreditation and certification. During the benchmarking, the 10 requirements under Thai National Shrimp GAP (TAS 7401-2009): 1) farm site and registration; 2) farm management; 3) use of veterinary drugs and chemicals; 4) effluent and sediment management; 5) energy source and fuel; 6) farm sanitation; 7) harvest and post harvest handlings; 8) labour and welfare; 9) social and environmental responsibilities; and 10) record keeping (National Bureau of Agricultural Commodity and Food Standards, 2009), were examined and where applicable, re-grouped to correspond to the relevant aspects of the FAO Guidelines. Meanwhile, the institutional and procedural requirements such as standard setting, accreditation, and certification in the Thai National Shrimp Certification Scheme were directly benchmarked against the relevant requirements under the FAO Guidelines. It should be considered that such benchmarking was carried out in conformity with the four minimum substantive criteria as well as the institutional and procedural requirements. In this regard, Ababouch (pers comm.) suggested that the definitions of such criteria should distinguish the weights and relative importance of the various conformities in two levels as described in **Box 1**.

Box 1. Definition of the Criteria of Conformity of the Aquaculture Certification Scheme

Critical level: A criteria or requirement can be considered *critical* if it can **directly and negatively affect** the integrity of an aquaculture production system, including production, standard setting, accreditation, and certification. The critical concerns on production include for example unacceptable water quality which can lead to contamination of fish/shrimp, inappropriate farm site that can cause contamination of fish/shrimp, absence of or inadequate animal health management practices which can lead to disease. For accreditation, the critical concerns could include unqualified accreditor and non-transparent accreditation process. For certification, the critical concerns could include unqualified certifier, non-trained certifier, non-accredited certifier, among others. Confidentiality and independence are other key critical concerns being considered under both accreditation and certification requirements.

Major level: A criteria or requirement can be considered *major* if it does **not directly and negatively affect** the integrity of an aquaculture production system, including production, standard setting, accreditation, and certification. But if not corrected within reasonable time and occurs repeatedly, it can lead to negative impacts on the integrity of an aquaculture production system. The major concerns on production could include workers not fully trained, insufficiencies in record keeping, among others. For accreditation and certification, the major concerns include certain insufficiencies in record keeping.

Findings and Discussions

As envisaged, benchmarking was carried out in order to establish an equivalence and conformity between the Thai National Shrimp Certification Scheme with the FAO Aquaculture Certification Guidelines. The results of benchmarking considered the Thai Scheme as equivalent to the FAO Guidelines if such Scheme conforms with **all critical** requirements of the FAO Guidelines, and more than 90% of **the major** requirements (Ababouch pers comm.). Thus, in-depth interviews of key informants were conducted in order to obtain the necessary information with regards to shrimp culture operation, standard setting, accreditation, and certification. It should be noted that the Thai National Shrimp Certification Scheme contains the National Shrimp GAP or Standard, and institutional and procedural requirements covering standard setting, accreditation, and certification.

Thai National Shrimp GAP or Standard

The newly developed standard on Good Aquaculture Practices for Marine Shrimp Farm (TAS 7401-2009) was issued for use on a voluntary basis in 2009 in accordance with the Ministerial Notification of Agriculture and Cooperatives on 29 September 2009 (National Bureau of Agricultural Commodity and Food Standards, 2009). The summary of the requirements under the Thai National Shrimp GAP appears in **Box 2** while the requirements under the Thai National Shrimp GAP corresponding to each minimum substantive criteria of the FAO Guidelines are shown in **Box 3**. The institutional and procedural requirements of the Thai National Shrimp Certification Scheme are summarized hereafter under three aspects, namely: standard setting, accreditation, and certification.

Standard Setting

The National Bureau of Agricultural Commodity and Food Standards (ACFS) of the Ministry of Agriculture and Cooperatives established the steps in setting agricultural standard based on international standards especially the WTO principles taking into account transparency as the main aspect. For the establishment of marine shrimp standard, the nine-step procedures had been used based on the *Codex Alimentarius* (WHO and FAO, 2010) and Code of Practice for Fish and Fishery Products (FAO and WHO, 2009). The nine steps comprise: 1) identifying the agricultural/shrimp standard development; 2) appointing a technical committee for standard consideration; 3) drafting the standard; 4) reviewing of the standard by the technical committee; 5) seeking stakeholders' comments and public hearing; 6) submitting the standard to the policy committee for the review and submission to the Agricultural Standard



Committee; 7) notifying the WTO in case of mandatory standard; 8) approving of the standard and officially announcing the standard through Ministerial Notification; and 9) providing conditions for the review of the standard every five years or as requested by the stakeholders (National Bureau of Agricultural Commodity and Food Standards, 2010). After the establishment of the national shrimp standard was completed and coded as TAS 7401-2009, this was released for adoption since 2009.

The development of the Thai National Shrimp GAP or Thai Agricultural Standard on Good Aquaculture Practices for Marine Shrimp Farm (TAS 7401-2009) was conducted in a transparent way throughout its two years development process. A technical committee was established comprising all stakeholders involved in shrimp production such as specialists, scientists, and representatives of shrimp farmers, academia and shrimp processors. The technical committee revised the draft Thai National Shrimp GAP several times prior to seeking the stakeholders' comments and public hearing. Before eventually adopting the National Shrimp GAP, notification was made for three months to enable all stakeholders to provide comments. Records for the development of the said GAP including review documents and stakeholders' comments had been maintained.

However, it has been expected that within 1 to 2 years, there could be requests by key stakeholder(s) for revision of the Thai National Shrimp GAP particularly with respect to the FAO Guidelines. Nonetheless, it should be considered that almost all the requirements in the FAO Guidelines had already been complied with under the Thai National Shrimp GAP.

Accreditation

ACFS has been appointed by the Thai Cabinet since 29 November 2003 to be an accreditation body for agricultural assessment. The accreditation system developed by the ACFS was based on ISO/IEC 17011

Box 2. Summary of the Requirements under the Thai National Shrimp GAP

1. Farm site and registration	
1.1	Farms shall not be located in environment that has risks of contamination that affects shrimp health and safety of consumers
1.2	Farms shall be located close to quality water suitable for shrimp culture
1.3	Farms shall be conveniently accessible to transportation both outside and inside the farm, in order to provide convenient operation and rapid transportation of shrimps
1.4	Farms shall be registered with the Department of Fisheries
1.5	Farmers shall have legal land rights or other land use permits
1.6	Farms shall be located outside mangroves and/or conserved wetland areas prescribed by laws
1.7	Farms shall not be located in the prohibited area/zone prescribed by laws
2. Farm management	
2.1	Manual of Farm Management should be made available and implemented
2.2	Water testing from sources should be conducted in accordance to the specified time intervals in the manual
2.3	Vacating and/or preparing pond between crops
2.4	Stocking density of shrimp larvae shall be as appropriate, and record/certificate/health test report should be made available
2.5	Inlet water should be filtered to prevent the entering of exotic species to pond
2.6	Aerator or other aeration system shall be adequately placed in the pond
2.7	Use of registered, good quality and not expired formulated feed, and in case feed is prepared on farm, feed ingredients should be clearly stated, while legally prohibited ingredients shall not be used
2.8	Efficient feeding management shall be provided according to the requirements of shrimp culture
2.9	Feed shall be stored in secured place to prevent contamination and its quality should be maintained
2.10	Analysis of water quality in shrimp pond should be done on regular basis
2.11	Preventive measures for predators and disease carriers entering the ponds during pond and water preparation, and shrimp culture should be in place
2.12	Shrimp health should be monitored regularly
2.13	In case shrimp shows sign of poor health and/or symptom, diagnosis, cause analysis and corrective actions should be carried out
2.14	Preventive measures and control of disease outbreak should be in place
2.15	In case of disease outbreak, farmer should inform the competent authority immediately
3. Use of veterinary drugs, chemicals, hazardous substances and probiotics in aquaculture	
3.1	Veterinary drugs, chemicals, hazardous substances and probiotics used in aquaculture shall be registered with the competent authority and prudently used, while those prohibited by law shall not be used.
3.2	In case authorized veterinary drugs or chemicals are applied prior to harvesting, withdrawal period shall be strictly followed or used according to the label instruction
3.3	Veterinary drugs, chemicals, hazardous substances and probiotics shall be appropriately stored to prevent deterioration and danger
4. Effluent and sediment management	
4.1	Quality of effluent shall be complied with relevant laws and regulations
4.2	Effluent shall be treated or controlled its quality prior to discharge
4.3	Preventive system of saline water discharged into freshwater area shall be in place for environmental protection
4.4	Sediment shall not be disposed into public or non-permitted area
5. Energy source and fuel	
5.1	Fuel and lubricants shall be stored properly and securely
5.2	Machine used on farm shall be in good condition without any fuel or lubricant leakage to water source
5.3	Used lubricant shall be disposed of in container and properly eliminated
5.4	There shall be safe electricity system on farm
5.5	Save use of energy and/or renewable energy sources
6. Farm sanitation	
6.1	Garbage, refuse, veterinary drug containers and hazardous substances shall be separately managed to prevent cross-contamination
6.2	Production inputs, materials and equipment should be kept in order so as not to harbour disease carrier animals/pests
6.3	Bathroom and toilet shall be hygienically designed to prevent contamination to culture pond, canal and/or water source
6.4	Manure shall not be used but if necessary, it shall be completely decomposed
6.5	Pets should not be allowed in the production area
7. Harvest and post-harvest handlings prior to distribution	
7.1	Prohibited chemicals shall not be used during harvesting, but if chemicals are used, it should be properly used in terms of type and quantity
7.3	Select buyer/collector that has been certified in good hygienic practices of the post-harvest handling and transportation or registered with the Department of Fisheries
7.4	Good hygienic practices on harvesting to prevent contamination
8. Labor and welfare	
8.1	Farm workers shall be legally employed, and wages should be as prescribed by law.
8.3	Welfare for workers shall be appropriately provided
8.4	Provide precautions and working equipment for safe operation while workers shall be trained on safety of operation.
9. Social and environmental responsibilities	
9.1	Farm shall site not obstruct the customary access and/or interfere with the living condition and activities of the local community
9.2	Farmer should have good relationship with local community
9.3	Join and participate in shrimp farm organizations or other related professional organizations
9.4	Participate in conference or training on issues related to environment-friendly shrimp culture, shrimp health and animal welfare, and food safety.
10. Record keeping	
10.1	Fry movement document (FMD) and Movement Document (MD) shall be presented upon request.
10.2	Records shall be made on: use of veterinary drugs, chemicals, hazardous substances and probiotics; and use of chemicals during harvesting.
10.3	Records on the relevant data/other necessary information shall be kept for further inspection

Box 3. Thai National Shrimp GAP Requirements Categorized under Each Minimum Substantive Criteria of FAO Guidelines

FAO Minimum Substantive Criteria	Thai National Shrimp GAP Requirements
1. Animal health and welfare	<ol style="list-style-type: none"> 1. Farm management 2. Use of veterinary drugs, chemicals, hazardous substances and probiotics used in aquaculture 3. Labor and welfare 4. Social and environmental responsibilities
2. Food safety	<ol style="list-style-type: none"> 1. Farm site and registration 2. Farm management 3. Use of veterinary drugs, chemicals, hazardous substances and probiotics used in aquaculture 4. Farm sanitation 5. Harvest and post harvest handlings prior to distribution 6. Social and environmental responsibilities 7. Record keeping
3. Environmental integrity	<ol style="list-style-type: none"> 1. Farm site and registration 2. Farm management 3. Use of veterinary drugs, chemicals, hazardous substances and probiotics used in aquaculture 4. Effluent and sediment management 5. Energy source and fuel 6. Farm sanitation
4. Socio-economic aspects	<ol style="list-style-type: none"> 1. Labor and welfare

on Conformity Assessment – General Requirements for Accreditation Bodies Accrediting Conformity Assessment Bodies (Thailand Industrial Standard Institute, 2004). The requirements for accreditation cover four aspects, namely: i) accreditation body concerning legality, structure, impartiality, confidentiality, activity of accreditation body; ii) management including management system, document control, records, nonconformities and corrective actions, preventive actions, internal audits, management reviews, complaints; human resources covering personnel associated with the accreditation body, personnel involved in the accreditation process, monitoring, personnel records; iii) accreditation process concerning criteria and information, application on accreditation, subcontracting the assessment, preparation for assessment, document and record review, on-site assessment, analysis of findings and assessment report decision-making and granting accreditation, appeals, reassessment and surveillance, extending accreditation, suspending, and withdrawing or reducing accreditation; and iv) responsibilities of accreditation body.

As an accreditation body, the management of ACFS comprises the Accreditation Committee, Accreditation Review Panel, Appealing Committee (on *ad hoc* basis), Management Review Board, and Management Team responsible for matters related to the abovementioned requirements. With regards to the accreditation of the certification body, the ADCC of DOF is still undergoing the necessary processes and it is expected that the ADCC will be accredited by ACFS before the end of 2011.

Certification

The Aquaculture Development and Certification Center (ADCC) has been mandated by the Department of Fisheries

of Thailand to be responsible for the certification of fish and shrimp production and its products in accordance with shrimp and fish standards, *i.e.* CoC, GAP, and Thai National Shrimp GAP (TAS 7401-2009). The ADCC has adopted the ISO/IEC Guide 65 as basis for its certification and management since February 2010. ADCC has already developed a Quality Manual containing requirements that are in accordance with ISO/IEC Guide 65 such as the requirements for a certification body, *i.e.* impartiality, non-discrimination, independence; conditions and procedures for granting, maintaining, extending, suspending, and withdrawing certification; internal audit and management reviews, record keeping, confidentiality, certification body personnel; changes in certification requirements; appeals, complaints, disputes; application of certification; evaluation and its report; surveillance; use of licenses, certificates and marks of conformity; and complaints of suppliers (Thailand Industrial Standard Institute, 1996).

ADCC management comprises the Board of Directors, the Certification Committee, the Suspending/Withdrawal Committee, the Appealing Committee, Quality Management Representatives, and Management Team responsible for quality management, monitoring, auditing, certificate issuance, and administration. Since May 2010 the ADCC has conducted seven pilot auditing sub-units for shrimp and fish culture certification, which are located in five coastal and two freshwater aquaculture centers of DOF. Moreover, the application of certification based on ISO/IEC Guide 65 has already been applied nationwide to certify marine shrimp and Nile tilapia production. The ADCC, including the seven auditing sub-units, has submitted the request for an accreditation to ACFS since mid-March 2011. It is expected that ADCC and the seven auditing sub-units will

be ISO/IEC Guide 65 accredited by ACFS before the end of 2011. At the present, the DOF through the ADCC plans to subcontract the works related to certification to capable and credible private companies that are already ISO/IEC Guide 65 accredited. However, it is also important to note that based on national legislation, it is no longer necessary for a certification body such as ADCC which works under DOF, the competent authority, to be accredited by the ACFS. It is the DOF's choice to request an accreditation for ADCC in order to gain transparency and credibility of its certification system/body.

FAO Aquaculture Certification Guidelines¹

Minimum Substantive Criteria

There are four minimum substantive criteria under the FAO Aquaculture Certification Guidelines. These are: animal health and welfare, food safety, environmental integrity, and socio-economic aspects.

Animal Health and Welfare

This criterion is concerned with aquaculture activities conducted in a manner that assures the health and welfare of farmed aquatic animals by minimizing stress, reducing aquatic animal disease risks, and maintaining healthy culture environment throughout all phases of the production cycle. The requirements are set by the World Organisation for Animal Health (OIE) with specific normative basis. For this purpose, reference to animal welfare applies only insofar as it affects animal health consistent with the current and future OIE standards. The criterion focuses on aquatic animal health management in aquaculture operations, movement of aquatic animals and related products, culture environment concerned with animal health and welfare as well as risks reduction, responsible use of veterinary medicines, use of species in polyculture, and training of workers.

Food Safety

This criterion is concerned with aquaculture activities conducted in a manner that ensures food safety by implementing appropriate national or international standards and regulations including those defined by FAO/WHO *Codex Alimentarius*. Although the *Codex Alimentarius* cover both safety and quality issues concerning aquatic products, the FAO Guidelines mainly focused on the safety aspect but not much on the quality. The focus of this criterion is on aquaculture location, aquaculture operations, veterinary drugs and chemical use in aquaculture, water used in aquaculture, source of

broodstock, traceability and record keeping, hygienic conditions of aquaculture facilities and operations, monitoring, and training of the workers.

Environmental Integrity

This criterion focuses on the aquaculture practices in environmentally responsible manner in accordance with appropriate local, national and international laws and legislations, environmental impact assessment in aquaculture, environmental monitoring, evaluation and mitigation of adverse impacts on natural ecosystem, responsible wild seed collection, responsible use of feeds, chemicals, and veterinary drugs, exotic species, risk assessment of genetic materials of aquatic organism use, proper management of effluents, and responsible waste disposal.

Socio-economic Aspects

These criteria are concerned with aquaculture conducted in a socially responsible manner with national rules and regulations taking into consideration the International Labor Organization (ILO) convention on labor rights, not jeopardizing the livelihood of aquaculture workers and local communities. Socio-economic issues should be considered at all stages of aquaculture planning, development and operation. The importance of cooperative social responsibility from aquaculture to local communities should also be recognized.

The details of the criteria on animal health and welfare, food safety, environmental integrity as well as on the socio-economic aspects, and the corresponding sub-criteria are shown in **Table 1**.

Institutional and Procedural Requirements

The institutional and procedural requirements under the FAO Aquaculture Certification Guidelines comprise three major aspects. These are: standard setting, accreditation, and certification. The details of the criteria on standard setting, accreditation, and certification, and the corresponding sub-requirements are also shown in **Table 3**.

Standard Setting

Standard setting encompasses the tasks of developing, monitoring, assessing, reviewing, and revising standards. Its minimum requirements comprise transparency, participation by interested parties, content and comparable systems, notification provisions, keeping of records, review and revision of standards and of standard setting procedures, and validation of standards.

¹ FAO (2011)

Table 1. Benchmarking of Thai National Shrimp Certification Scheme against FAO Guidelines Based on Four Minimum Substantive Criteria

FAO Minimum Substantive Criteria		Level ^a	Thai National Shrimp GAP
1. Animal health and welfare			
1.1	Aquaculture operations should implement aquatic animal health management programs set up in compliance with relevant national legislations and regulations	C	✓
1.2	Movement of aquatic animals, animal genetic material and animal products should take place in accordance with the relevant provisions in the OIE Aquatic Animal Health Code	C	(✓) ^b
1.3	Culture environment should be maintained to benefit aquatic animal health and welfare, and reduce the risks of introduction and spread of aquatic animal diseases	C	(✓)
1.4	Veterinary medicines should be used in responsible manner and in accordance with applicable national legislations or relevant international agreements	C	✓
1.5	Use of species in polyculture or integrated multi-trophic aquaculture should be done with caution to reduce disease transmission between cultured species	M	none
1.6	Aquaculture species should be kept under farming conditions suitable for the species concerned	M	✓
1.7	Workers should be trained on good aquatic animal health and welfare management practices	M	(✓)
2. Food safety			
2.1	Aquaculture facilities should be located in areas where the risk of contamination is minimized and can be controlled or mitigated	C	✓
2.2	Aquaculture operations should include procedures for avoiding feed contamination in compliance with national regulations or as determined by internationally agreed standards	C	✓
2.3	All veterinary drugs and chemicals for use in aquaculture shall comply with national regulations, as well as international guidelines	C	✓
2.4	Water used for aquaculture should be of a quality suitable for the production of food which is safe for human consumption	M	✓
2.5	The source of broodstock and seed should not be source of carryover of potential human health hazards into the growing stocks	M	✓
2.6	Traceability and record-keeping of farming activities and inputs which impact food safety should be ensured	C	✓
2.7	Aquaculture facilities and operations should maintain good culture and hygienic conditions	M	✓
2.8	Proper management programs and relaying and depuration should be implemented in bivalve mollusks growing areas to prevent microbiological, chemical and reduce biotoxin contamination	C	n/a
2.9	Workers should be trained in good hygienic practices	M	(✓)
3. Environmental integrity			
3.1	Environmental impact assessments should be conducted, according to national legislations	C	✓
3.2	Regular monitoring of on-farm and off-farm environmental quality should be carried out	M	✓
3.3	Evaluation and mitigation of the adverse impacts on surrounding natural ecosystems	C	✓
3.4	Measures should be adopted to promote efficient water management and use as well as proper management of effluents	C	✓
3.5	Where possible, hatchery produced seed should be used, although wild seeds should be responsibly collected	M	n/a
3.6	Exotic species are to be used only when they pose an acceptable level of risk to the ecosystem health	M	(✓)
3.7	Science-based risk assessment should be used to address possible risks of using genetic material of an aquatic organism that has been altered	M	none
3.8	Infrastructure construction and waste disposal should be conducted responsibly	M	✓
3.9	Feeds, feed additives, chemicals, veterinary drugs including antimicrobials, manure and fertilizer should be used responsibly to minimize their adverse impacts	C	✓
4. Socio-economic aspects			
4.1	Workers should be treated in accordance with national labor rules and regulations and, relevant ILO conventions	C	✓
4.2	Workers should be paid wages and provided benefits and working conditions according to national laws and regulations	C	✓
4.3	Child labor should not be used in a manner inconsistent with ILO conventions and international standards	C	(✓)

^a **Critical level (C):** requirements that can directly and negatively affect the integrity of an aquaculture production system including institutional and procedural requirements. **Major level (M):** requirements that does not directly and negatively affect the integrity of an aquaculture production system and institutional and procedural requirements. But if not corrected within reasonable time and occurs repeatedly, it can lead to negative impacts on the integrity of an aquaculture production system.

^b (✓) means that the relevant requirement has already been in practice although such aspect has not been specified as requirements in the Thai National Shrimp GAP.



Accreditation

Accreditation is an independent assessment of the competence of the certification body or entity. Its minimum requirements include non-discrimination; independence, impartiality and transparency; human and financial resources; accountability and reporting; resolution of complaints concerning accreditation of certifying bodies; confidentiality; maintenance and extension of accreditation; suspension and withdrawal of accreditation; change in the accreditation requirements; and proprietor or license of an accreditation symbol, label or a logo.

Certification

Certification is the procedure by which a body or entity gives written or equivalent assurance that the aquaculture operation or activity under consideration conforms to the relevant aquaculture certification standards. Its minimum requirements include independence and impartiality; non-discrimination; human and financial resources; accountability and reporting; certification fees; confidentiality; maintenance of certification; renewal of certification; suspension and withdrawal of certification; maintaining the chain of custody; use and control of a certification claim, symbol, label or a logo; resolution of complaints, record keeping on complaints; and appeals concerning certification.

Results of Benchmarking of the Thai Scheme against the FAO Guidelines

As envisioned, the main objective of benchmarking the Thai National Shrimp Certification Scheme or Thai Scheme against the FAO Aquaculture Certification Guidelines or

FAO Guidelines is to determine the extent for which the Thai Scheme could be aligned with the FAO Guidelines, and eventually to enable the Thai Scheme to gain recognition and equivalence as the standard for aquaculture. The results of the benchmarking could also serve as reference for the other countries in the ASEAN region in their efforts towards developing their respective credible aquaculture certification schemes. The results of the benchmarking are grouped into the Minimum Substantive Criteria comprising four aspects with corresponding sub-criteria, and the Institutional and Procedural Requirements comprising three requirements and corresponding sub-requirements. Each sub-criteria and sub-requirements are categorized into critical and major levels depending on whether these directly or indirectly affect negatively the integrity of an aquaculture production system including the institutional and procedural requirements.

Minimum Substantive Criteria

The results of the benchmarking of the four minimum substantive criteria between the Thai Scheme and the FAO Guidelines are shown in **Table 1** where the compliance and non-compliance at critical and major levels are indicated. The summary of the result of benchmarking of the four minimum substantive criteria, *i.e.* animal health and welfare, food safety, environmental integrity, and socio-economic aspects is shown in **Table 2**.

Regarding the first criteria on animal health and welfare (Criteria 1, Tables 1 and 2), it can be seen that the Thai Scheme has complied with the four critical sub-criteria 1.1 to 1.4 of the FAO Guidelines concerning the

implementation of aquatic health management, movement of aquatic animals, a culture environment and responsible use of veterinary medicines. For the three major sub-criteria 1.5 to 1.7 the Thai scheme conforms to the two sub-criteria 1.6 and 1.7 concerning suitable farming conditions and workers' training on good aquatic animal health and welfare management.

It should be noted that sub-criteria 1.2, 1.3, and 1.7 on the implementation of aquatic animal health management, movement of aquatic animal and related genetic materials/products as well as workers' training on the good aquatic animal health and welfare management have already been practiced in Thailand as imposed by the Department of Fisheries (DOF) regulations even with the absence of specific text in the GAP guidelines. It is therefore suggested that in the future revision of the Thai National Shrimp GAP by the standard setting body or ACFS, these concerned practices should be taken into consideration and correspondingly included in the requirements.

For the food safety criteria (Criteria 2, Tables 1 and 2), the Thai Scheme conforms to all four critical sub-criteria 2.1, 2.2, 2.3 and 2.6 of the FAO Guidelines concerning the locality and contamination control of aquaculture facilities, safeguarding feed contamination in aquaculture operations, the use of veterinary drugs and chemicals, and traceability and record keeping. However, it should be noted that sub-criteria 2.8 concerning bivalve mollusks had been considered not applicable. Moreover, the Thai Scheme is also in compliance with all four major sub-criteria 2.4, 2.5, 2.7 and 2.9 of the FAO Guidelines concerning water quality use for aquaculture, source of quality broodstock and seed, good culture and hygienic conditions of aquaculture facilities and operations. As indicated in Table 1, the sub-criteria 2.9 concerning workers' training in good hygienic practices has already been practiced under the Thai Scheme but it is not indicated in the text. The standard setting body such as the ACFS should take this into consideration for possible adjustment of the guidelines to include the missing text in the next revision of the Thai Scheme.



In terms of environmental integrity (Criteria 3, Tables 1 and 2), the Thai Scheme complies with four critical sub-criteria 3.1, 3.3, 3.4, and 3.9 of the FAO Guidelines concerning environmental impact assessment of aquaculture operations according to national legislation, evaluation and mitigation of adverse impacts on surrounding national ecosystems, efficient water use and management including effluent management, and responsible use of feeds, feed additives, chemicals, veterinary drugs, antimicrobials, manure and fertilizer. The Thai Scheme also conforms to three out of five major sub-criteria 3.2, 3.6, and 3.8 concerning regular farm monitoring on environmental quality, the use of exotic species only when reaching an acceptable level of risk to the ecosystem health, and responsible waste disposal of infrastructure construction. In fact, the concern on the introduction of exotic shrimp species in 3.6, particularly the white shrimp (*Peneaus vanamei*) has already been in practice but not been written in the GAP guidelines. Moreover, the concern under major sub-criteria 3.7 on the application of the science-based risk assessment should be

Table 2. Summary of the Results of Benchmarking of the Minimum Substantive Criteria of the Thai National Shrimp GAP against the FAO Aquaculture Certification Guidelines

Criteria	Critical level		Major level	
	FAO	Thai	FAO	Thai
Animal Health and Welfare	4	4	3	3
Food Safety	5	4 + 1 na	4	4
Environmental Integrity	4	4	5	3 + 1 na
Socio-economic Aspects	3	3	-	-
Total	16	15 (+ 1 na)	12	10 (+1 na)

taken into consideration in the future works under the Thai Scheme. Therefore, the two sub-criteria 3.6 and 3.7 should be considered in the revision of the standard by the ACFS. Nonetheless, the issue regarding wild seeds collection under the sub-criteria 3.5 is not applicable to the shrimp culture in Thailand.

For the socio-economic aspects (Criteria 4, Tables 1 and 2), the Thai Scheme practically complies with all three critical sub-criteria (4.1 to 4.3) of the FAO Guidelines. Specifically, the aspects of responsible treatment to workers as well as the paid wages and benefit provision are already included in the Thai Scheme based on the Thai Labor Protection Act B.E. 2541—A.D. 1998, Revised (Labor Protection and Welfare Department, 2010) in accordance with relevant ILO convention. The issue on child labor under 4.3 has also been addressed particularly in Thailand under the Ministerial Notification of the Ministry of Labor complying ILO convention, 1973, No. 138 on minimum age and ILO Convention, 1999 No.182 on worst form of child labor. However, while the first two aspects have already been captured in the text form of the Thai Scheme, it is important to include the written text reflecting child labor issues in aquaculture to be complied with the two ILO conventions in the future revision of the Thai National Shrimp GAP Guidelines.

Institutional and Procedural Requirements

The results of the benchmarking of the institutional and procedural requirements between the Thai Scheme and the FAO Guidelines are shown in **Table 3** depicting the compliance of the requirements in both critical and major levels. **Tables 4, 5** and **6** show the summary of the compliance of the requirements in terms of standard setting, accreditation and certification, respectively.

Standard Setting

The results of benchmarking the requirements on standard setting are shown in **Table 3** and **Table 4**. There are 15 sub-requirements for standard setting that are both critical and major, concerning transparency, participation by interested parties, content and comparable systems, notification provision, keeping of records, review and revision of standards and standards setting procedures, and validation of standards. The Thai Scheme complies with eleven critical and four major sub-requirements of the FAO Guidelines. As a matter of fact, the standard setting of the Thai Scheme was based on the *Codex Alimentarius* and Code of Practice for Fish and Fishery Products which are in accordance with the normative basis of the FAO Guidelines. The development of Thai Scheme has been transparent throughout the two years of development process. The technical committee

had been established comprising all stakeholders involved in shrimp production such as specialists, scientists, as well as representatives from the shrimp farmers, the academia, and shrimp processors.

The technical committee reviewed the draft Thai national shrimp GAP several times prior to submitting the Scheme for stakeholders' comments and public hearing. Thus, before adopting the national shrimp GAP, a notification was advocated to all stakeholders for three months requesting for their comments. Records regarding the GAP setting including review documents, stakeholders' comments were kept and maintained. Nevertheless, as a result of the recent adoption of the FAO Aquaculture Certification Guidelines by the 29th COFI in February 2011, the ACFS might be requested by key stakeholder(s) to revise the Thai National Shrimp GAP, after its adoption for 1 to 2 years, in order to follow the same format as that of the FAO Guidelines although most of the requirements had already been complied with under the Thai Scheme.

Accreditation

Results of the benchmarking on accreditation between the two schemes are shown in **Table 3** and **Table 5**. As shown in **Table 3**, there are 15 critical and 20 major sub-requirements under the requirement on accreditation. The 15 critical sub-requirements concern the non-discrimination; independence, imparity, and transparency; human and financial resources; accountability and reporting; resolution of complaints accreditation of certifying bodies; confidentiality; and suspension and withdrawal of accreditation. The 20 major sub-requirements include human and financial resources; accountability and reporting; resolution of complaints accreditation of certifying bodies; maintenance and extension of accreditation; change in the accreditation requirement; and proprietor or license of an accreditations symbol, label or a logo. As a result of benchmarking, it could be gleaned that the Thai Scheme has complied with all the critical and major sub-requirements. This is due to the fact that the Thai accreditation body or ACFS has been using the same normative basis, *i.e.* ISO/IEC 17011 as that of the FAO Aquaculture Certification Guidelines.

Certification

The results of benchmarking the requirement on certification of the two schemes are shown in **Tables 3** and **6**. There are 22 critical sub-requirements which the Thai Scheme conforms with which include independence and impartiality; non-discrimination; human and financial resources; accountability and reporting; confidentiality; maintenance of certification; suspension and withdrawal of certification; use and control of certification claim, symbol, label or a logo; resolution of complaints and

Table 3. Benchmarking of Thai National Shrimp Certification Scheme against the FAO Guidelines on Institutional and Procedural Requirements

FAO Institutional and Procedural Requirements	Level ^a	Thai National Shrimp GAP
1. Standard Setting		
1.1 Transparency		
1.1.1 Transparency in the setting of standards is essential.	C	✓
1.1.2 Standard setting body should carry out activities in a transparent fashion, following written rules of procedure.	C	✓
1.1.3 On a regular basis as appropriate, the standard setting body should publicize its work programme as widely as possible.	M	✓
1.1.4 On the request of any interested party, the standards setting body should provide within reasonable time, a copy of standard setting procedures, work program, draft or final standards.	M	✓
1.1.5 Based on the needs of users, standard setting body should translate the standard setting procedures, work program, draft or final standards into appropriate languages.	M	✓
1.2 Participation by interested parties		
1.2.1 Standards setting body should strive to achieve balanced participation by independent technical experts and by representatives of interested parties in the standards development, revision and approval process.	C	✓
1.2.2 Interested parties should be associated in the standard setting process through an appropriate consultation forum or appropriate alternative mechanisms.	C	✓
1.3 Content and comparable systems		
1.3.1 The standards setting process should seek to include international reference standards and agreement, identify needs to fill gap review comparable systems and encourage mutual recognition among certification schemes.	C	✓
1.4 Notification provisions		
1.4.1 Before adopting standard(s), the standards setting body should allow a period of an appropriate duration for the submission of comments on the draft standards by interested parties.	C	✓
1.4.2 Standards setting body should take into account the comments received during the period for comments.	C	✓
1.5 Keeping of records		
1.5.1 Proper records of standards and development activity should be prepared and maintained.	C	✓
1.6 Review and revision of standards and of standards setting procedures		
1.6.1 Standards should be reviewed at regular basis and published in intervals in consultation with appropriate stakeholders.	C	✓
1.6.2 Proposals for revisions can be submitted by any interested party and should be considered through a consistent and transparent process.	C	✓
1.6.3 The procedural and methodological approach for setting standards should also be updated.	M	✓
1.7 Validation of standards		
1.7.1 In developing and revising standards, an appropriate procedure should be put in place to corroborate the standard vis-à-vis the minimum requirements for aquaculture as laid out in these guidelines.	C	✓
2. Accreditation		
2.1 Non-discrimination		
2.1.1 Access to the services of the accreditation body should be open to all certification entities irrespective of their location.	C	✓
2.1.2 Full recognition should be given to the special circumstances and requirements of certification bodies in developing countries and countries in transition.	C	✓
2.2 Independence, impartiality and transparency		
2.2.1 The accreditation body should be independent and impartial.	C	✓
2.3 Human and financial resources		
2.3.1 The accreditation body should have adequate financial resources and stability for the operation of an accreditation system.	C	✓
2.3.2 The accreditation body should employ a sufficient number of personnel having the necessary training, technical knowledge and experience for performing accreditation functions in aquaculture.	C	✓

Table 3. Benchmarking of Thai National Shrimp Certification Scheme against the FAO Guidelines on Institutional and Procedural Requirements (*Cont'd*)

FAO Institutional and Procedural Requirements	Level ^a	Thai National Shrimp GAP
2.3.3 Information on the relevant qualifications, training and experience of each member of the personnel involved in the accreditation process should be maintained and kept up to date.	M	✓
2.3.4 When an accreditation body decides to sub-contract work, the requirements for such an external body should be no less than for the accreditation body itself.	C	✓
2.4 Accountability and reporting		
2.4.1 The accreditation body should be a legal entity and should have clear and effective procedures for handling applications for accreditation procedures.	C	✓
2.4.2 A properly documented contractual or equivalent agreement describing the responsibilities of each party should be drafted.	M	✓
2.4.3 The accreditation body should have defined objectives and commitment, procedures and instructions in a quality manual and established effective system for quality.	M	✓
2.4.4 The accreditation body should conduct periodic internal audits covering all procedures in a planned and systematic manner.	C	✓
2.4.5 The accreditation body may receive external audits on relevant aspects. The results of the audit should be accessible by the public.	M	✓
2.4.6 Qualified personnel, attached to the accreditation body, should be nominated by the accreditation body .	C	✓
2.4.7 Personnel nominated for the assessments should provide the accreditation body with a report of its findings as to the conformity of the body assessed to all of the accreditation requirements.	M	✓
2.4.8 The accreditation body should have policy and procedures for retaining records of what happened during the assessment visit for a period consistent with its contractual, legal or other obligations.	M	✓
2.5 Resolution of complaints concerning accreditation of certifying bodies		
2.5.1 The accreditation body should have a written policy and procedures for dealing with any complaints.	C	
2.5.2 The procedures should include establishment, of an independent and impartial committee to respond to a complaint.	C	
2.5.3 The accreditation body should keep a record of all complaints, and take appropriate corrective.	C	
2.5.4 Information on procedures for handling complaints concerning accreditation should be made publicly available.	M	✓
2.5.5 This does not exclude recourse to other forms of legal and administrative processes as provided for in national legislation or international law.	M	✓
2.6 Confidentiality		
2.6.1 The accreditation body should have adequate arrangements, consistent with applicable laws, to safeguard confidentiality of the information obtained in the course of its accreditation activities at all levels of its organization.	C	✓
2.6.2 Where the law requires information to be disclosed to a third party, the body should be informed of the information provided, as permitted by the law.	C	✓
2.7 Maintenance and extension of accreditation		
2.7.1 The accreditation body should have arrangements to define the period of accreditation of a certifying body, with clear monitoring procedures.	M	✓
2.7.2 The accreditation body should have arrangements to ensure that an accredited certification body informs it without delay of changes in any aspects of its status or operation.	M	✓
2.7.3 The accreditation body should have procedures to conduct reassessments in the event of changes significantly affecting the capabilities or scope of activities of the accredited body.	M	✓
2.7.4 Accreditation should be re-assessed at sufficiently close intervals to verify that the accredited certification body continues to comply with the accreditation requirements.	M	✓
2.8 Suspension and withdrawal of accreditation		
2.8.1 The accreditation body should specify the conditions under which accreditation may be suspended or withdrawn, partially or in total, for all or part of the scope of accreditation.	C	✓
2.9 Change in the accreditation requirements		
2.9.1 The accreditation body should give due notice of any changes it intends to make in its requirements for accreditation to all stakeholders involved.	M	✓

Table 3. Benchmarking of Thai National Shrimp Certification Scheme against the FAO Guidelines on Institutional and Procedural Requirements (*Cont'd*)

FAO Institutional and Procedural Requirements	Level ^a	Thai National Shrimp GAP
2.9.2 It should take account of views expressed by interested parties before deciding on the precise form and effective date of the changes.	M	✓
2.9.3 It should verify that each accredited body carries out any necessary adjustments to its procedures within such time as, in the opinion of the accreditation body, is reasonable.	M	✓
2.9.4 Special considerations should be given to accredited bodies in developing countries and countries in transition, without compromising the integrity of the certification process.	M	✓
2.10 Proprietor or licensee of an accreditation symbol, label or a logo		
2.10.1 The provisions on the use and control of a certification claim, symbol, label or logo are addressed in the following section on certification.	M	✓
2.10.2 The accreditation body that is proprietor or licensee of a symbol or logo, intended for use under its accreditation program, should have documented procedures describing its use.	M	✓
2.10.3 The accreditation body should not allow use of its accreditation mark or logo in any way that implies that the accreditation body itself approved a product, service or system certified by a certification body.	M	✓
2.10.4 The accreditation body should take suitable action to deal with incorrect references to the accreditation system.	M	✓
3. Certification		
3.1 Independence and impartiality		
3.1.1 The certification body should be legally, financially independent from the owner of the certification scheme and have no any conflict of interest.	C	✓
3.1.2 The certification body should have no commercial, financial or any other interest in the aquaculture operation to be assessed other than for its certification services.	C	✓
3.1.3 The certification body should ensure that the personnel who conduct assessment in view of certification are different from the personnel which grant the certificate.	C	✓
3.1.4 The certifying body should not delegate authority for granting, maintaining, extending, reducing, suspending or withdrawing certification to an outside person or body.	C	✓
3.2 Non-discrimination		
3.2.1 Access to the services of the certification body should be open to all types of aquaculture operations.	C	✓
3.2.2 Access to the certification body should not be conditional upon the size or scale of the aquaculture operations.	C	✓
3.3 Human and financial resources		
3.3.1 The certification body should have adequate financial resources and stability for its conduct operations and/or activities.	C	✓
3.3.2 The certification body should employ a sufficient number of personnel having the necessary qualifications for performing conformity and/or chain of custody assessments in aquaculture.	C	✓
3.3.3 Information on the relevant qualifications, of the personnel involved in the certification process should be maintained by the certification body and kept up to date.	M	✓
3.3.4 When a certification body decides to sub-contract work, the requirements for such an external body should be no less than for the certification body itself.	C	✓
3.4 Accountability and reporting		✓
3.4.1 The certification body should be a legal entity having clear and effective procedures for handling applications for certification of aquaculture operations.	C	✓
3.4.2 A properly documented contractual describing the rights and duties of each party should be drafted between the certification body and its clients.	M	✓
3.4.3 The certification body should conduct periodic internal audits covering all procedures in a planned and systematic manner.	C	✓
3.4.4 The certification body may receive external audits on relevant aspects. The results of the audits should be accessible by the public.	M	✓
3.4.5 The certification body should have a policy and procedures for retaining records for a period consistent with its contractual, legal or other obligations.	M	✓
3.4.6 The certification body should make appropriate, non-confidential documents available on request.	M	✓

Table 3. Benchmarking of Thai National Shrimp Certification Scheme against the FAO Guidelines on Institutional and Procedural Requirements (*Cont'd*)

FAO Institutional and Procedural Requirements	Level ^a	Thai National Shrimp GAP
3.5 Certification fees		
3.5.1 If the certification body charges fees, it should maintain a written fee structure for applicants and certified aquaculture operations that should be available on request.	M	na
3.6 Confidentiality		
3.6.1 The certification body should have adequate arrangements, consistent with applicable laws, to safeguard confidentiality of the information obtained in the course of its certification at all levels of its organization.	C	✓
3.6.2 Where requires information to be disclosed to a third party, the client should be informed of the information provided, as permitted by the law.	C	✓
3.7 Maintenance of certification		
3.7.1 The certification body should carry out periodic surveillance and monitoring at appropriate intervals to verify that certified aquaculture operations continue to comply with the certification requirements.	M	✓
3.7.2 The certification body should require the client to notify it promptly of any intended changes to the management of the aquaculture.	C	✓
3.7.3 The certification body should have procedures to conduct reassessments in the event of changes significantly affecting the status and management of the certified aquaculture operation.	M	✓
3.7.4 The period of validity of a certificate should not exceed five years. The assessment required for re-certification should give particular attention to changes made in the conduct of the aquaculture operation or in the management practices.	M	✓
3.8 Renewal of certification		
3.8.1 On the basis of proper monitoring and auditing, the validity of certification should be renewed for an agreed period, not to exceed five years.	M	✓
3.9 Suspension and withdrawal of certification		
3.9.1 The certification body should specify the conditions under which certification may be suspended or withdrawn, partially or in total, for all or part of the scope of certification.	C	✓
3.9.2 The certification body should require that a certified aquaculture operation suspension or withdrawal of its certification discontinues use of all advertising matter and returns any certification documents.	C	✓
3.10 Maintaining the chain of custody		
3.10.1 All certified aquaculture products must be identified and differentiated from non-certified aquaculture products.	M	✓
3.10.2 The certification body should ensure that a recipient of certified aquaculture products should maintain pertinent chain of custody records, including all records relating to shipment, receipt and invoicing.	M	✓
3.10.3 The certification body should have documented procedures defining auditing methods and periodicity of audits.	M	✓
3.10.4 All inspection/audit records should be incorporated into a written inspection/audit report .	M	✓
3.10.5 The inspection/audit report should contain, as a minimum.	M	✓
3.11 Use and control of a certification claim, symbol, label or a logo		
3.11.1 The owner of the certification scheme should have documented procedures describing the requirements, restrictions or limitations on the use of symbols, labels or logos indicating that an aquaculture product comes from a certified aquaculture operation.	C	✓
3.11.2 The owner of the certification scheme should not issue any license to affix its mark/claim/label/logo or issue any certificate for any aquaculture operations or products unless it is assured that the product bearing it is in fact produced from certified sources.	C	✓
3.11.3 The certification body, accreditation body or owner of the certification scheme is responsible that no fraudulent or misleading use is made with the use and display of its certification mark, labels or logos.	M	✓
3.11.4 The aquaculture operation and any aquaculture product from it may use the specified symbol, label or logo only as authorized in writing by it.	M	✓
3.11.5 The certification body, accreditation body or owner of the certification scheme should take suitable action to deal with incorrect references to the certification system or misleading use of symbols, labels and logos found in advertisements and catalogues.	M	✓

Table 3. Benchmarking of Thai National Shrimp Certification Scheme against the FAO Guidelines on Institutional and Procedural Requirements (Cont'd)

FAO Institutional and Procedural Requirements	Level ^a	Thai National Shrimp GAP
3.11.6 All certificates issued should include necessary information to clearly indicate validity of certified aquaculture operator.	M	✓
3.12 Resolution of complaints, record keeping on complaints and appeals concerning certification		
3.12.1 The accreditation body or owner of the certification scheme should have written policy and procedures, applicable to accredited certification bodies, for dealing with any complaints and appeals from involved parties.	C	✓
3.12.2 The procedures should include an independent and impartial committee to respond to any complaint.	C	✓
3.12.3 Does not exclude recourse to other forms of legal and administrative processes as provided for in national and regional legislation or international law.	C	✓
3.12.4 The certification body, accreditation body or promoter/owner of the certification scheme should keep a record of all complaints and appeals take appropriate corrective and preventive action and safeguard confidentiality of information obtained .	C	✓
3.12.5 Information on procedures for handling of complaints and appeals concerning certification should be made publicly available.	M	✓

^a **Critical level (C):** requirements that can directly and negatively affect the integrity of an aquaculture production system including institutional and procedural requirements. **Major level (M):** requirements that does not directly and negatively affect the integrity of an aquaculture production system and institutional and procedural requirements. But if not corrected within reasonable time and occurs repeatedly, it can lead to negative impacts on the integrity of an aquaculture production system.

appeals. Moreover, out of 20 corresponding major sub-requirements the Thai Scheme is in compliance with 19 covering the sub-requirements on human and financial resource; accountability and reporting; maintenance of certification; renewal of certification; maintaining the chain of custody; use and control of a certification claim, symbol, label or a logo; and resolution of complaints and appeals. The other major sub-requirement on the certification fees is not applicable to the Thai Scheme as the Thai certification body ADCC is a government agency of the Department of Fisheries, which does not charge any certification fee. Nonetheless, in the future when the certification scheme would be sub-contracted to other parties, certification fees structure will be required according the requirements outlined in 3.5.

In summary, the results of the benchmarking of the four minimum substantive criteria, *i.e.* animal health and welfare, food safety, environmental integrity, and socio-economic aspects as well as the three requirements for standard setting, accreditation, and certification appear in **Table 7**. The results show that the Thai National Shrimp Certification Scheme has been in compliance with 63 out of 64 critical sub-requirements of the FAO Aquaculture Certification Guidelines. Only one critical sub-criterion on food safety is not applicable as it is related to bivalve mollusks farming but not on shrimp aquaculture. As for the major requirements and criteria, the Thai Scheme is in compliance with 53 out of 56 sub-requirements of the FAO Guidelines representing 94.6% of the total compliance. There are two sub-requirements under the environmental integrity and certification that are not applicable to the Thai

Scheme which concern about the collection of wild seeds and certification fees.

Conclusion and Recommendations

Conclusion

The results of the benchmarking clearly showed the compliance of the Thai Scheme with that of the FAO Aquaculture Certification Guidelines both in terms of critical and major requirements at acceptable levels. The four minimum substantive criteria, *i.e.* animal health and welfare, food safety, environmental integrity, and socio-economic aspects of the FAO Guidelines are being complied to by the Thai National Shrimp GAP criteria. The development of Thai standard setting by the ACFS has been carried out in a transparent manner, with the participation of all stakeholders and others following



Table 4. Summary of Benchmarking Results of Standard Setting of the Thai National Shrimp GAP against the FAO Aquaculture Certification Guidelines

Criteria	Critical level		Major level	
	FAO	Thai	FAO	Thai
1. Transparency	2	2	3	3
2. Participation by interested parties	2	2	-	
3. Content and comparable systems	1	1	-	
4. Notification provision	2	2	-	
5. Keeping of records	1	1	-	
6. Review and revision of standards and standards setting procedures	2	2	1	1
7. Validation of standards	1	1	-	-
Total	11	11	4	4

Table 5. Summary of Benchmarking Results of Accreditation of the Thai National Shrimp GAP against the FAO Aquaculture Certification Guidelines

Criteria	Critical level		Major level	
	FAO	Thai	FAO	Thai
1. Non-discrimination	2	2	1	-
2. Independence, impartiality, and transparency	1	1	-	-
3. Human and financial resources	3	3	1	1
4. Accountability and reporting	3	3	5	5
5. Resolution of complaints concerning accreditation of certifying bodies	3	3	2	2
6. Confidentiality	2	2	-	-
7. Maintenance and extension of accreditation	-	-	4	4
8. Suspension and withdrawal of accreditation	1	1	-	-
9. Change in the accreditation requirement	-	-	4	4
10. Proprietor or license of an accreditations symbol, label or a logo	-	-	4	4
Total	15	15	20	20

Table 6. Summary of Benchmarking Results of Certification of the Thai National Shrimp GAP against the FAO Aquaculture Certification Guidelines

Criteria	Critical level		Major level	
	FAO	Thai	FAO	Thai
1. Independence and impartiality	4	4	-	-
2. Non-discrimination	2	2	-	-
3. Human and financial resources	3	3	1	1
4. Accountability and reporting	2	2	4	4
5. Certification fees	-	-	1	na
6. Confidentiality	2	2	-	-
7. Maintenance of certification	1	1	3	3
8. Renewal of certification	-	-	1	1
9. Suspension and withdrawal of certification	2	2	-	-
10. Maintaining the chain of custody	-	-	5	5
11. Use and control of a certification claim, symbol, label or a logo	2	2	4	4
12. Resolution of complaints, record keeping on complaints and appeals concerning certification	4	4	1	1
Total	22	22	20	19 + (1 na)

Table 7. Summary of Benchmarking Results of Minimum Substantive Criteria and Requirements of Standard Setting, Accreditation, and Certification of the Thai National Shrimp GAP against the FAO Aquaculture Certification Guidelines

Requirements/criteria	Critical level		Major level	
	FAO	Thai	FAO	Thai
1. Minimum substantive criteria	16	15 + 1 na	12	10 + 1 na
2. Standard setting	11	11	4	4
3. Accreditation	15	15	20	20
4. Certification	22	22	20	19 + (1 na)
Total	64	63 + (1 na)	56	53 + (2 na)

the *Codex Alimentarius*. In addition, accreditation of the Thai system has been developed by ACFS based on ISO/IEC 17011 which is the same as the FAO Guidelines with the significant minimum requirements on independence, non-discrimination, impartiality and transparency, accountability and reporting, and others. The certification system has been established by the ADCC of the DOF of Thailand using ISO/IEC Guide 65 as normative basis, especially the important minimum requirements for independence and impartiality, non-discrimination, confidentiality, suspension and withdrawal of certification, and others. The three entities for standard setting, accreditation, and certification are independent from each other thus, avoiding conflict of interest. Although at this stage the certification body has not yet been ISO/IEC 65 accredited by the ACFS but by law the Thai certification body for the Thai National Shrimp GAP can be functional and credible without being accredited. But, it is actually the choice of the ADCC to gain transparency and credibility from the national accreditation body for its professional work in the future.

Thus, this could indicate that the result of the benchmarking of the two schemes has enabled a mutual recognition for the Thai National Shrimp Certification Scheme as conforming to the FAO Aquaculture Certification Guidelines. Nevertheless, more work is needed to improve or revise the text of the Thai National Shrimp Certification Scheme to be in line with the practices as well as streamline with the text and conditions of the FAO Guidelines. In terms of operational work, as the Thai National Shrimp GAP TAS 7401-2009 is relatively new compared with the CoC and GAP shrimp standards, it is important that this new Thai GAP should be well disseminated and introduced through education and awareness building to the shrimp farmers nationwide. Nonetheless, the long experience of the Thai shrimp farmers over the past decade on the implementation of shrimp standard such as the CoC and GAP, it is envisioned that the implementation of the new Thai National GAP would be well perceived and widely accepted for adoption by the Thai shrimp farmers within at most two years.

Recommendations

To date there have been an increasing number of public and private aquaculture standards and/or certification schemes in the global and regional context that respond to the consequent public perceptions and market requirements. However, a credible, transparent and globally acceptable system is very important and crucial to the world aquaculture industry and market.

The benchmarking of the standard and/or certification of the Thai Scheme against the FAO Guidelines can be made by applying or modifying the methodology used as a tool for any benchmarking exercise. Washington and Ababouch (2011) pointed out that a number of private standards and/or private aquaculture certification scheme has proliferated, such as for example the Aquaculture Certification Council (ACC), Global G.A.P., WWF (World Wide Fund for Nature) Aquaculture Dialogues, and Naturland. These private standards/certification schemes have been established and used to serve the international market, mostly the retailers who are primarily located in Europe and the US. It is indicated that various stakeholders at different levels have expressed their concerns about the number and varying quality of schemes, which very often, become the bone of contention of aquaculture producers and processors in producing countries especially those that have already used their own national standards or certification schemes. The requirements of international retailers had actually created a duplication of work for the producers to comply with not only in terms of the national standards but also the various private standards required by the retailers/importers. This has also created confusion as well as high and unnecessary resource wastage. The FAO Aquaculture Certification Guidelines define minimum substantive requirements against which certification scheme or standard can be assessed. It is therefore recommended that an important solution to prove the credibility and equivalence of national aquaculture standards or certification schemes with any private standards/schemes is to benchmark these public and private standards/certification schemes against the FAO Aquaculture Certification Guidelines. This

will help minimize unnecessary duplicated efforts and costs, time and human resource inputs in the aquaculture operation and certification. Most importantly, international retailers should accept equivalent standards taking into consideration their requirements for certified seafood products by private standards. In fact, Walmart as one of the world's largest retailers is a case in point. Recently, the Global Aquaculture Alliance (2011) stated that Robert Fields, a senior director for fresh meat, seafood and gourmet deli at Sam's Club expressed that Walmart and Sam's Club will require their seafood products to come from sources sustainably certified based on Best Aquaculture Practices or equivalent standards. Fields (2011) also pointed out that Walmart defines the equivalence for farmed seafood based on the FAO Guidelines for Aquaculture Certification.

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