



THAI AGRICULTURAL STANDARD

TAS 7413-2007

ORGANIC MARINE SHRIMP FARMING

National Bureau of Agricultural Commodity and Food Standards

Ministry of Agriculture and Cooperatives

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50 Phaholyothin Road, Ladyao, Chatuchak, Bangkok 10900

Telephone (662) 561 2277 www.acfs.go.th

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Ad hoc Sub-Committee on the Elaboration of Standards for Organic Marine Shrimp Farming

1. Mrs. Mali Boonyaratpalin Chairperson
2. Representative of the Fisheries Technological Development Division,
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Mrs. Niracha Wongchinda Member
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3. Representative of the Fish Inspection and Quality Control Division,
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Mrs. Supanoi Subsinserm (alternate)
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Mr. Putt Songsangjinda Member
6. Representative of the Office of the Consumer Protection Board, Prime Minister's Office
-
7. Representative of the Office of Commodity and System Standards, National Bureau of
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Mrs. Usa Bamrungbhuet (alternate)
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9. Representative of the Thai Marine Shrimp Association
-
10. Experts
Associate Professor Prathak Tabthipwan
Mr. Chao Sriwichai
Mr. Prayoon Hongrat
11. Representatives of the National Bureau of Agricultural Commodity and Food Standards
Mr. Manat Larpphon Secretary
Ms. Chitrlada Booncharoen Assistant Secretary

Marine shrimps are economically significant export products of Thailand. Currently, consumers pay attention to safety, quality and source of foods, particularly products that are produced by an organic system. Therefore, it is deemed necessary for the Ministry of Agriculture and Cooperatives to establish the standard on organic marine shrimp farming which will be a guidance to the development of marine shrimp farming to provide products of quality and safety for consumers.

The establishment of this standard is based on the information of the following documents:

Department of Fisheries. B.E. 2547 (2004). A Research Project Report to support Thai Organic Shrimp Framing.

FAO/WHO. 2005. Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003, Rev.2-2005). Joint FAO/WHO Food Standards Programme, FAO, Rome

FAO/WHO. 2001. Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods (GL 32-1999, Rev.1-2001). Joint FAO/WHO Food Standards Programme, FAO, Rome.

Ministry of Agriculture and Cooperatives . B.E. 2546 (2003). Thai Agricultural Standard, Organic Agriculture Standard, Part 1: The Production, Processing, Labeling and Marketing of Organic Agriculture (TAS. 9000-2003). National Bureau of Agricultural Commodity and Food Standards.

Organic Agriculture Certification Thailand. B.E. 2548 (2005). Organic Agriculture Standard.

Remark:

The standard title has been revised from “Thai Agricultural Commodity and Food Standard (TACFS)” to “Thai Agricultural Standard (TAS)” in accordance with the enforcement of the Agricultural Standards Act B.E. 2551 (2008).



**NOTIFICATION OF THE NATIONAL COMMITTEE ON
AGRICULTURAL COMMODITY AND FOOD STANDARDS**

**SUBJECT: THAI AGRICULTURAL STANDARD:
ORGANIC MARINE SHRIMP FARMING**

B.E. 2550 (2007)

The resolution of the 1/2550 session of the National Committee on Agricultural Commodity and Food Standards dated 2 May B.E. 2550 (2007) endorsed the Thai Agricultural Standard: Organic Marine Shrimp Farming. This standard would be of benefits for quality improvement, facilitating trade and protecting consumers.

By virtue of the Cabinet Resolution on Appointment and Authorization of the National Committee on Agricultural Commodity and Food Standards dated 3 April B.E. 2550 (2007), the Notification on Thai Agricultural Standard: Organic Marine Shrimp Farming is hereby issued as a voluntary standard, the details of which are attached herewith.

Notified on 29 May B.E. 2550 (2007)

Mr. Teera Sutabutr

Minister of Agriculture and Cooperatives

Chairperson of the National Committee on Agricultural Commodity and Food Standards

THAI AGRICULTURAL STANDARD

ORGANIC MARINE SHRIMP FARMING

1 SCOPE

This Thai Agricultural Standard applies to organic marine shrimp farming practices including cultivation, harvesting and transportation. The standard aims to achieve quality and safety organic shrimp products for consumption. The standard shall be used in conjunction with the Thai Agricultural Standard on Organic Agriculture Part 1: The production, processing, labeling and marketing of Organic Agriculture (TAS. 9000)

2 DEFINITIONS

For the purpose of this standard:

2.1 **Organic marine shrimp farming** means farm management practices for marine shrimp that introduces specific requirement to an organic standard. They are based on the holistic agriculture management, environmentally friendly and sustaining biodiversity. All input materials shall be natural products, avoid using synthetic products and any genetically modified organisms or genetic engineering. In order to maintain the specific qualities of organic status, this management shall be practiced throughout the production chain.

2.2 **Organic marine shrimp** means marine shrimp produced from a farm under an organic production principle as mention in 2.1

2.3 **Extensive marine shrimp farming** means marine shrimp farming system that produces shrimp without feeding and aeration.

2.4 **Semi intensive marine shrimp farming** means marine shrimp farming system that produces shrimp under the control of stocking density which shall not exceed 10 tails / m³ of shrimp larvae, with or without feeding and aeration.

2.5 **Intensive marine shrimp farming** means marine shrimp farming system that produces shrimp under the control of stocking density which shall not exceed 15 tails / m³ of shrimp larvae, with proper feeding and aeration.

3 REQUIREMENTS AND INSPECTION METHODS

Organic marine shrimp farming specifications are as follows:

Items	Requirements	Inspection Methods
1. Production principle	<p>1.1 Working Instruction of organic marine shrimp production manual shall be available.</p> <p>1.2 Restore and maintain good qualities of soil and water in shrimp production pond.</p> <p>1.3 Maintain the ecosystem in farm and overall sustainability.</p> <p>1.4 Maintain the biodiversity of overall ecosystem.</p> <p>1.5 There shall be a buffer zone for protecting contamination from conventional farms.</p> <p>1.6 Protect and avoid all activities that may pollute environment.</p> <p>1.7 Observe energy saving principle.</p> <p>1.8 All inputs shall not be derived from genetically modified organisms.</p> <p>1.9 Shrimp shall be grown under organic farming condition at least two-third of their production cycle.</p>	<p>1.1.1 Inspection on Working Instruction.</p> <p>1.1.2 Assessment of practices in compliance with the manual.</p> <p>1.2 Visual inspection on practices according to principles of restoration and maintenance of environment.</p> <p>1.3 Visual inspection on practices according to ecological system.</p> <p>1.4 Visual inspection on practices according to principles of ecological system and biodiversity.</p> <p>1.5 Visual inspection on practices according to buffer zone principle (Annex A.).</p> <p>1.6 Visual inspection on practices according to environment protection principles.</p> <p>1.7 Visual inspection on practices according to energy saving principles.</p> <p>1.8 Inspection on validity of inputs certification.</p> <p>1.9 Inspection on production planning for transition to organic system.</p>
2. Transition to organic system	<p>2.1 At least 1 production cycle of transition period (from pond preparation until harvesting) shall be fully applied. The transition depends upon farm history.</p>	<p>2.1.1 Inspection on production records.</p> <p>2.1.2 Inspection on farm history records.</p>

Items	Requirements	Inspection Methods
<p>3. Site selection</p> <p>3.1 Farm location</p> <p>3.2 Water sources</p>	<p>3.1.1 Farm shall not be located in prohibitive area for marine shrimp farming.</p> <p>3.1.2 The area shall be appropriate for organic marine shrimp farming.</p> <p>3.1.3 Buffer zone between organic and conventional farms shall be established in an appropriate distance to prevent contamination.</p> <p>3.1.4 Farm shall not be located in an area affected by contamination.</p> <p>3.2 Water sources shall be without risk from hazardous substances and other contamination.</p>	<p>3.1.1.1 Inspection according to relevant regulations.</p> <p>3.1.1.2 Inspection on mangrove conservation area.</p> <p>3.1.2.1 Farm location, infrastructure, soil, and water quality in the farm shall be inspected based on the organic farming practices.</p> <p>3.1.2.2 Land use history shall be assessed.</p> <p>3.1.3 Visual inspection on buffer zone.</p> <p>3.1.4 Visual inspection.</p> <p>3.2 Inspection on water quality.</p>
<p>4. Farmer</p>	<p>4.1 Farmer shall register with the competent authority as required by regulation.</p> <p>4.2 Farmer shall acquire knowledge or proper training in organic marine shrimp farming.</p>	<p>4.1 Inspection on aquaculture farmer registration.</p> <p>4.2 Assessment of pertaining knowledge or inspection on training certification.</p>
<p>5. Fry management</p> <p>5.1 Fry selection</p>	<p>5.1.1 Use only healthy and disease resistance fry.</p> <p>5.1.2 Genetically modified fry is prohibited.</p> <p>5.1.3 If there is an organic hatchery, all fry shall come from organic hatchery only.</p> <p>5.1.4 Fry Movement Document shall be presented.</p>	<p>5.1.1 Inspection on fry purchase records.</p> <p>5.1.2 Inspection on fry purchase records.</p> <p>5.1.3 Inspection on fry origin records.</p> <p>5.1.4 Inspection on Fry Movement Document.</p>

Items	Requirements	Inspection Methods
5.2 Fry stocking	<p>5.2.1 Stocking density of fry shall not exceed 15 fry/m³.</p> <p>5.2.2 In case of fry reduction in pond due to production problem, substitution for loss fry is not allowed.</p>	<p>5.2.1 Inspection on fry stocking records.</p> <p>5.2.2 Inspection on fry stocking records.</p>
<p>6. General farm management</p> <p>6.1 Farm layout</p> <p>6.2 Production pond</p> <p>6.3 Equipments</p> <p>6.4 Farm sanitation</p> <p>6.5 Farm ecosystem</p>	<p>6.1 Farm layout shall be done according to farm management principle. Proper reservoir/treatment pond shall be adequate for intensive shrimp farming system.</p> <p>6.2.1 Use organic or natural products free from prohibitive substances listed in Annex B.</p> <p>6.2.2 Water pump or aerator in production ponds shall be complied with principles of water and energy saving.</p> <p>6.2.3 Production pond shall be equipped with aerator to provide suitable condition for shrimp.</p> <p>6.3 All equipments shall not be contaminated so as to affect shrimp health and ecosystem.</p> <p>6.4.1 All workers shall have a good health with no contagious disease.</p> <p>6.4.2 Restroom and bathroom shall be constructed with good hygiene to prevent contaminations from sewage disposal to production ponds.</p> <p>6.4.3 All litter and waste shall be collected.</p> <p>6.5.1 Biodiversity shall be maintained in farm by appropriate plantation or natural vegetation.</p>	<p>6.1.1 Inspection on farm layout to identify each field and area in the farm.</p> <p>6.1.2 Visual inspection.</p> <p>6.2.1 Inspection on farm management records.</p> <p>6.2.2 Visual inspection on pump and aerator operation.</p> <p>6.2.3 Visual inspection.</p> <p>6.3 Visual inspection.</p> <p>6.4.1 Visual inspection and interview workers.</p> <p>6.4.2 Visual inspection on restroom, bathroom, drainage and sewage disposal system.</p> <p>6.4.3 Visual inspection on waste and litter discharge management system.</p> <p>6.5.1 Visual inspection on farm landscape and farm ecosystem.</p>

Items	Requirements	Inspection Methods
	6.5.2 In case of farm location nearby mangrove area, conservation and rehabilitation shall be planned.	6.5.2 Inspection for conservation and rehabilitation plan.
<p>7. Feed management</p> <p>7.1 Shrimp feed production</p> <p>7.2 Chemical substances</p>	<p>7.1.1 Feed shall be produced from natural raw or organic materials complied with the Thai Agricultural Standard for Organic Agriculture Vol. 1.</p> <p>7.1.2 In case of unexpected situations such as natural disaster, human error or any unpredicted climate circumstance, an exemption for using of natural feed sources in composition are allowed at lower than standard level, with the limited time interval.</p> <p>7.2 Chemical substances and anti-biotics including prohibited substances listed in Annex C. are not allowed in feed.</p>	<p>7.1.1.1 Inspection on feed sources document.</p> <p>7.1.1.2 Inspection for organic feed. certification or visit feed factory.</p> <p>7.1.1.3 Inspection on feed formula.</p> <p>7.1.2 Inspection on feed record.</p> <p>7.2.1 Inspection on organic feed certification or visit feed factory.</p> <p>7.2.2 Inspection on materials and chemical storage unit.</p>
<p>8. Shrimp health management</p> <p>8.1 General health management</p> <p>8.2 Prevention and Curative measures</p>	<p>8.1 Shrimp health and water quality in production pond shall be regularly checked.</p> <p>8.2.1 Prevention and curative measures shall be complied with organic farming regulation.</p> <p>8.2.2 Prevention and curative measures for shrimp disease outbreak shall be in place.</p> <p>8.2.3 Anti-biotics or chemical substances for pest and disease control not listed in Annex D are not allowed.</p>	<p>8.1 Inspection on shrimp health checking records and curative measures if shrimp show abnormal sign.</p> <p>8.2.1 Inspection on prevention and curative measures records.</p> <p>8.2.2 Inspection on prevention and curative measures.</p> <p>8.2.3 Inspection on anti-biotics and chemical substances usage records.</p>

Items	Requirements	Inspection Methods
	8.2.4 If necessary, substances and natural products listed in Annex E are allowed.	8.2.4 Inspection on substances and natural products usage records.
9. Effluent and Sediment management	<p>9.1 Quality of effluent shall be complied with relevant regulations.</p> <p>9.2 Effluent shall not be discharged to natural fresh water sources and arable land.</p> <p>9.3 Effluent discharge shall not affect natural water resources and surrounding environment.</p> <p>9.4 Sediment disposal shall not affect environment.</p>	<p>9.1.1 Visual inspection on effluent management.</p> <p>9.1.2 Inspection on effluent quality analysis records.</p> <p>9.2.1 Visual inspection on drainage system.</p> <p>9.2.2 Interview the local community or farms in vicinity area.</p> <p>9.3 Visual inspection on natural water resources and surrounding area at discharge site.</p> <p>9.4 Visual inspection on sediment disposal management.</p>
10. Harvesting, post harvest handlings and Distribution 10.1 Harvesting	<p>10.1.1 Harvesting and distribution plan shall take place when shrimp are in good health and be as quick as possible in order to maintain freshness of shrimp and organic status.</p> <p>10.1.2 Randomly check chemical and anti-biotic residues in shrimp before harvesting in case of possible contamination risk.</p> <p>10.1.3 Use proper sedative measure by freezing in clean and cold water.</p> <p>10.1.4 All inputs used during harvesting and post-harvesting period shall be derived from natural substances.</p>	<p>10.1.1 Inspection on harvesting, transportation and distribution action plan.</p> <p>10.1.2 Inspection on anti-biotic and chemical residues analysis records.</p> <p>10.1.3 Visual inspection and inspection on harvesting records.</p> <p>10.1.4 Inspection on substances usage records during harvest and post harvesting.</p>

Items	Requirements	Inspection Methods
10.2 Distribution and Selling	<p>10.1.5 Water and ice shall be in hygienic condition and complied with regulations of the Public Health Ministry.</p> <p>10.1.6 Organic shrimp shall be transported separately from conventional one.</p> <p>10.2 Movement Document shall be presented.</p>	<p>10.1.5.1 Inspection on water and ice sources.</p> <p>10.1.5.2 Randomly check on water and ice qualities used during harvesting and post harvest handling.</p> <p>10.1.6.1 Visual inspection on handlings during transportation.</p> <p>10.1.6.2 Inspection on transportation records.</p> <p>10.2 Inspection on a copy of Movement Document.</p>
11. Social responsibility	<p>11.1 Participation in social activities.</p> <p>11.2 Use local resources with careful manner and support mangrove conservation activity.</p> <p>11.3 Labor hiring shall comply with labor law and welfare shall be appropriately provided.</p>	<p>11.1 Inspection on social activities evidences.</p> <p>11.2 Visual inspection on farm environment.</p> <p>11.3.1 Inspection on labor hiring records.</p> <p>11.3.2 Interview workers.</p>
12. Group organization and Training	<p>12.1 Group organization shall be set up for regularly exchange of technical knowledge on farm management.</p> <p>12.2 Conduct meeting and training program in order to gain knowledge on farm management, inputs usage and relevant laws.</p>	<p>12.1 Interview farmers in neighborhood.</p> <p>12.2 Inspection on the training certificate.</p>
13. Data and Record keeping	<p>13.1 All important activities in shrimp farming shall be recorded.</p> <p>13.2 All data and record shall be kept for traceability at least three production cycles.</p>	<p>13.1 Inspection on data and record keeping.</p> <p>13.2 Inspection on data and record keeping.</p>

4. RECOMMENDATIONS FOR ORGANIC MARINE SHRIMP FARMING (Annex A)

The recommendations for organic marine shrimp farming are issued with the purpose of guiding the farmer on good practices. Such farming practices will lead to good quality shrimp that are safe for consumers, environmentally friendly, optimize and sustain natural resources.

ANNEX A

RECOMMENDATIONS FOR ORGANIC MARINE SHRIMP FARMING

The recommendations for organic marine shrimp farming aim to provide good practices for farmers who register their farms with the competent authority in order to be certified. The principles are provided as follows:

A.1 Production Principles

The principles mainly dedicate as general basic production procedures. Farmer shall have a full understanding of the practices in production system. The principles are as follows:

- 1) Work Instruction (WI) for organic farm practices shall be provided with organic shrimp production principles according to standards. It shall include procedures and practices which shall be clear and easy to understand. If there are any references in the standard document, farmer shall mention of such references and always be made available with WI.
- 2) Farmer shall demonstrate on how to maintain ecosystem balancing within the farm and to renew available resources for maximum utilization such as recycling of water and waste sediments. The external inputs utilization shall be limited.
- 3) Farmer shall demonstrate that he has methodology to restore and maintain water and soil fertility by using organic substances such as animal manure, green manure or compost.
- 4) Farmer shall demonstrate that he has effective buffer zone for protection of organic from conventional production. The buffer zone shall be at least three meters in width (from upper edge of the pond) depending on the risk level. In case there is high risk of contamination, the CB may recommend to extend the buffer zone. In case of water contamination risk, farmer shall construct a reserved pond to reduce such risk. In case of airborne contamination such as virus transmission from bird, farmer shall set up a net to keep the bird out of organic pond unit.
- 5) Farmer shall demonstrate that he intends to minimize the pollution in his farm by reducing any activity that leads to such problem e.g. using noisy machine, using eco-polluted fuel and any activity that induces dust and causes air polluted problem.
- 6) Farmer shall understand and be aware of activities during production thereby applying natural approach for conserving energy and minimizing the impact to environment.
- 7) Farmer shall demonstrate on how to maintain ecosystem balancing within the farm and surrounding area such as crop diversification, growing or maintaining crop which can be host to useful insects, birds, and other animals.
- 8) Farmer shall follow the principles of organic shrimp production by avoiding genetically modified seedlings and feeding ingredients.
- 9) Farmer shall have the production plan to demonstrate that the organic shrimp farming has been practiced at least two - thirds of the production cycle.

A.2 Transition to Organic System.

Farmer who intends to convert to organic farming, shall study and understand all procedures of organic practices with strong determination to follow. All staffs shall also be encouraged to fully understand such procedures in order to prevent the problem which may occur during production period. Transition to organic farming shall be complied with requirements and

obligations by CB. The transitional period shall be clearly indicated in the production plan starting from the last date of input application of conventional system to the date of organic system certification. The recommendations for transition are as follows:

- 1) The transitional period is starting from the first date of organic production practices until the farm is certified as organic marine shrimp farming which shall cover at least one production cycle. The transitional period is subject to be changed depending on land usage, farm history and other information and to be approved by CB.
- 2) The certified farm not intended to continue organic farming, shall notify the CB at least one production cycle in advance. If failed to do so, it may lead to objection by CB in the future.

A.3 Site Selection

Site selection is the priority factor in shrimp farming business, however the farm site for organic shrimp farming shall be located in the permitted area by law. The surrounding area shall be kept as co-existence with, and the protection of the environment. Organic shrimp farm shall be located by the sea, fully accessed with infrastructures, appropriate water and soil quality for raising shrimp. Buffer zone shall be set up at least three meters in width for protection of organic from conventional production. If there is a mangrove forest in farm area or nearby, conservation plan for ecosystem protection shall be provided in order to keep co-existence with natural environment. The recommendations are as follows:

- 1) The provision of site selection shall be complied with relevant laws. Farm shall not be located in mangrove conservation area. This includes rights of land use and holding or legal land rent.
- 2) Farmer shall know about land usage history and surrounding area information such as analysis records of heavy metal, agricultural hazards, toxic substances, water quality and soil sediments in order to assess the risk. The appropriate land shall be safe from any contamination or no detection at all.
- 3) Shrimp farm shall meet technical requirements as follows:
 - 3.1) Water depth in pond shall not be deeper than 1.8 meters as it will affect farm management.
 - 3.2) Water quality shall be complied with the quality in Annex F.
- 4) Farm site shall be located by the sea with normal tide. Water quality shall meet the standard or be able to be treated to meet the standard and adequate for shrimp farming.
- 5) Water and soil sources shall not be at risk for contamination with agricultural hazards and toxic substances.
- 6) Farm site shall not be located in polluted area and shall have good water circulation.
- 7) Buffer zone for protection of contamination between organic and conventional production unit shall be provided at least three meters in width (from upper edge of the pond) depending on risk assessment. In case contamination risk was found in organic production unit, the CB may recommend to extend the buffer zone. In case of water contamination, farmer shall set up a separate reserved pond in order to treat water before using in organic production unit. In case of airborne contamination such as virus transmission by bird, farmer shall prevent by using a net to keep the bird out of organic production pond units.
- 8) Mangrove forest in farm or nearby shall be conserved or additionally planted.

9) Farm location shall have basic infrastructures such as electricity system, tap water system and transportation system to facilitate the transport of fry and feed. Farm shall also be located near processing plant and distribution center in order to keep product freshness.

10) Farm shall be located in area that organic feed are available in adequate amount and can be purchased easily all year round.

A.4 Farmer

Farmer who intends to convert to organic production system, shall have a full understanding and willing to comply with every procedure of the management practices. This also includes all staffs in the farm. All procedures described in WI shall be complied with organic management practices in order to prevent problems and obstacles. The recommendations are as follows:

1) Farm owner who intends to operate organic shrimp farming shall study practices thoroughly. Attention shall be paid to information on demand and quantity.

2) Aquaculture Farm Registration;

Farmer shall register with the competent authority present in the area.

3) Knowledge in organic marine shrimp farming;

Farmer shall have full understanding or experiences in training course of organic marine shrimp farming.

A.5 Fry Management

Fry selection is one of the key successes for marine shrimp farming. Healthy fry will yield high growth and survival rates. Fry stocking density is also an important factor. High stocking density will increase feeding rate that may cause water pollution which affects shrimp health as well as high concentration of organic substances in effluent. Fry shall be purchased from organic shrimp hatchery. The recommendations are as follows:

1) Fry shall be obtained from hatchery with deep sea brood stock and raised under environmentally friendly system especially hatchery certified as CoC or GAP by the Department of Fisheries.

2) Fry origin shall be a native species. In case of imported species, they shall be able to fully adapt themselves to local environment. Attention shall be paid on preventive measures regarding to impact on local ecosystem.

3) Use healthy and disease-resistant fry.

4) Genetically modified fry is not allowed.

5) If organic shrimp hatchery available from which fry shall be obtained. In case fry were obtained from conventional hatchery, farmer shall provide the future plan on where to obtain organic fry.

6) In case the organic shrimp fry are not available and conventional shrimp fry are needed for farm production, farmer shall provide evidences to prove that fry is not produced through genetically modified technology and no prohibited chemicals and antibiotics. After the farm was converted to organic production fry shall be raised under organic management practices at least two - thirds of shrimp production cycle.

7) Fry Movement Document (FMD) shall be presented to inform the details and source of fry.

- 8) Shrimp stocking density in pond shall not exceed 15 tails/m³ in order to prevent shrimp stress.
- 9) In case of shrimp loss during the production period due to any problem, substitution is not allowed but new production cycle may be started.

A.6 General Farm Management

Good farm management planning can reduce contamination and negative impact to environment. This can be managed by selection of disease-resistant shrimp species, seasonal farm production and suitable equipments and machinery. Overall management shall be well planned starting from pond preparation until harvesting. The recommendations are as follows:

- 1) Farm map and technical layout shall be provided in order to facilitate record keeping and inspection.
- 2) Production pond shall be technically designed and constructed according to the fundamental aquaculture basis and suitable for control on water contamination from surrounding area.
- 3) An appropriate preparation of the bottom soil in the pond shall be done such as tilling to prevent undesirable sediment. If necessary this sediment shall be relocated to treatment pond in the farm where it can be properly managed to prevent contamination to the environment.
- 4) Emphasis shall be placed on the use of organic and natural derived substances that are free from prohibited substances indicated in the Thai Agricultural Standard, Part 1: Organic Agriculture (TAS 9000-2003).
- 5) Water pumping machine or aerator shall be used under provision of energy efficiency and conservative measures.
- 6) If needed, aerator is allowed to maintain suitable living condition of shrimp.
- 7) Aerator shall be located in proper position to reduce soil erosion in the pond.
- 8) Attention shall be paid to selection of machineries and equipments used in farm such as metal of machinery and paint shall not contain toxic substances that may cause environment and shrimp health problems. Also, farmer shall prevent the contamination of toxic substances and oil leak from pumping machine into the pond.
- 9) Screen and net shall be used for pest prevention, instead of chemicals.
- 10) Staff residences and resting area, office, feed and equipments storage shall be proportionately located and orderly kept.
- 11) All staffs shall have a good health, no contagious disease or infectious wound or objectionable disease. If they are found illness of contagious disease, they shall be temporarily vacated and immediately sent for medical treatment until full recovery before starting work again.
- 12) Food preparation area and buildings separately located and orderly kept clean at all times.
- 13) Bathroom and toilet shall not be located near the production pond and no directly drained that may contaminate the pond. Disposal storage tank of the toilet shall be equipped with decomposed efficiency system and no leakage. Besides, waste water and effluent from other resident buildings shall be well managed away from pond and surrounding areas.
- 14) Pets shall not be allowed to enter the production site. In case guarding dog is needed, careful attention shall be paid to dog droppings and the site shall be properly cleaned.

15) Waste and litter shall be kept in garbage tank which shall be separately located from other buildings for proper disposal and to prevent the contamination to the production pond.

16) Biodiversity in farm shall be conserved. At least 50% of pond dike shall be planted with local species or let plants grow naturally.

17) In case farm is located near mangrove area, conservation and rehabilitation plan shall be established.

A.7 Feed Management

Feed used in organic shrimp production shall be produced from natural ingredients. Materials derived from GMOs are not allowed. Besides, efficiency of feed management can reduce left over feed which affects feed conversion ratio and environmental problem. The recommendations are as follows:

1) Feed for organic shrimp production can be divided into two groups namely natural feed and commercial feed.

1.1) Natural feed means live animals and plants in the water resource used for shrimp farming. This also includes feed from agricultural activities such as fishery, livestock and plant products that can be used as shrimp feed.

1.2) Commercial feed means manufactured feed defined in The Animal Feed Quality Control Act, B.E. 2525 (1982).

2) Feed shall be derived from certified organic ingredients or natural ingredients.

3) Ingredients in the feed shall be from natural source or derived from organic agricultural products. In case of feed shortage, CB may allow to use ingredients that are not complied with this requirement, however the composition of organic or natural derived ingredients shall not be less than 60% of total feed dry weight.

4) In case farmer can prove that he is unable to use feed as described in 1) which may be caused by extreme climate or human mistake. Farmer is allowed to use non-organic feed composition above the level of limited in the requirement, but only within a limited period. Farmer has to solve this problem as soon as possible.

5) Ingredients used in shrimp feed shall be from those inappropriate for human as much as possible. Although, farmer shall consider that the feed formula shall be suitable for digestibility and high growth rate.

6) In case of using natural ingredients, farmer shall take responsibility of his collecting or capture method that would have the least affect to environment.

7) Feed composition shall contain suitable and safety ingredients.

8) Vitamins and minerals shall be derived from natural sources. Synthetic vitamins or minerals shall be allowed to use only by CB or relevant authorities.

9) Prohibited substances indicated in The Animal Feed Quality Control Act, B.E. 2525 (1982), its amendment in B.E. 2542 (1999) and in the Thai Agricultural Standard, Organic Agriculture Part 1 (TAS 9000-2003) are not allowed.

10) Feed storage shall be separated from other buildings. The storage area shall be dry, clean, and with a proper condition to maintain feed quality, temperature, cleanliness and prevent the disease-carriers such as rats, birds and others.

- 11) Feed containing in a bag or sac shall have a strong pallet for moisture prevention and good ventilation.
- 12) Fresh feed is allowed only in necessary case and if used, proper management shall be practiced to prevent water pollution.
- 13) Any waste part of shrimp or by products from processing is not allowed as shrimp feed.

A.8 Health Management

Preventive approach is the best way for disease control and keeping shrimp health. The proper shrimp health management will reduce stress and mortality as well as enhance better growth rate. The prevention can be done in many ways such as proper feeding practice, water and soil quality management. Organic marine shrimp farming is not allowed to use veterinary drugs or chemical substances, as in conventional farming. The recommendations are as follows:

- 1) Regularly check for shrimp health and water quality. If the health problem was found, diagnosis and analysis shall be done immediately.
- 2) Vaccine derived from GMOs is prohibited.
- 3) Synthetic hormone is prohibited.
- 4) In case of disease infection or outbreak, water quality shall be improved such as aeration, water exchange, and treatment with medical herbs as soon as possible in order to reduce stress in shrimp. If shrimp health condition is not recovered, harvesting shall be done immediately.
- 5) Preventive measures shall be in placed to control the disease transmission from pond or farm to another.
- 6) In case of an aquatic animal disease outbreak, competent authority and surrounding farms shall be informed immediately.
- 7) Veterinary drugs and chemical substances not indicated in Annex D are prohibited.
- 8) If necessary, chemicals or natural substances indicated in Annex E are permitted.

A.9 Effluent and Sediment Management

Effluent contains high levels of nutrients, microorganisms, planktons, and other substances. A good farming practice will reduce effluent but enhance quality. Efforts shall be taken to improve the quality of effluent and to meet standard as required by laws. Sediment and effluent management shall be done with the proper method to avoid the environmental impact. The recommendations are as follows:

- 1) Regularly maintain inlet and outlet canals and dike to reduce soil erosion and sedimentation.
- 2) Use organic compost from organic agricultural farm to increase the natural feeds, if necessary. This shall be done with efficient feeding to minimize the excess feed supply.
- 3) Effluent shall be treated so as to meet qualifications as required by laws as the followings:
 - 3.1) pH 6.5-8.5.
 - 3.2) Salinity not higher than 50% of the surrounding effluent salinity.
 - 3.3) BOD not exceed 20 mg/l.

- 3.4) Suspension solid not exceed 70 mg/l.
- 3.5) NH₃-N not exceed 1.1 mgN/l.
- 3.6) Total phosphorus not exceed 0.4 mgP/l.
- 3.7) Total nitrogen not exceed 4.0 mgN/l.
- 3.8) Hydrogen Sulfide not exceed 0.01 mg/l.
- 4) Precaution shall be taken during effluent discharge, in order to control floating of suspension particles. Flow rate of the effluent discharge shall be controlled.
- 5) Effluent and sediments shall not cause environmental impact.
- 6) Effluent shall not be discharged to the water canals and arable lands.
- 7) Sediments discharge shall not cause environmental impact, if possible these sediments shall be reused.
- 8) Sediments from production ponds, outlet canals, and reservoirs shall be reused or discharged without causing environmental impact.

A.10 Harvesting, Post Harvest Handling and Distribution

Harvesting is a very important practice to control shrimp quality and prevent pollution. A good practice on harvesting such as quick harvest, primary cleaning, quick chilling and proper transportation shall keep the freshness and quality of shrimps.. Selling methods such as direct sell to processor (processing plant) in order to keep freshness and quality of shrimps is also recommended. The recommendations are as follows:

- 1) There shall be a plan for harvesting and quick sell while shrimp are in good health in order to keep the best quality and nature of organic products as well as to prevent contaminations.
- 2) In case of contamination risk, chemical residues shall be sampled and analyzed.
- 3) Good harvesting practices shall avoid pollution to the environment and contamination to shrimps.
- 4) Anesthetic technique to be simple, quick, less suffered and good hygienic shall be icy-water with control temperature between 4 °C to 5 °C. If possible, saturated-carbon dioxide water with ice is the best way for maintaining shrimp quality.
- 5) Substances used during harvesting and post harvesting shall be from natural sources.
- 6) Harvester shall be healthy and not infected with any contagious disease.
- 7) Container used in harvesting, harvest method, and transportation shall not cause any negative impact on shrimp quality. Container shall not directly contact with ground or floor.
- 8) In order to prevent chemical contamination, organic shrimp shall be separated from non organic shrimp during transportation.
- 9) All equipments shall be cleaned and made from corrosive resistant materials. Equipments shall be in good condition to work. After work, all equipments shall be cleaned immediately in order to prevent accumulation of microbials.
- 10) Container of vehicle shall be designed for heat resistance and made from materials to be easily cleaned, preventing dust and dehydration.

11) In case buildings, equipments, containers and machines are used for both organic and conventional shrimp, farmers shall provide cleaning measures prior to be used for organic shrimp. In addition, managements and document systems shall be clearly defined.

12) Water and ice shall be clean, safe and complied with standards under the notification of the Ministry of Public Health .They shall not be definitely reused.

13) The Movement Document: MD issued by the DOF or accredited agency shall be presented to consumers or stakeholders to inform its origin.

A.11 Social Responsibility

The problems of shrimp farmers with community residents as well as labor oriented employment problems are rather complicated. A big scale shrimp farm with good management can reduce these problems. However most of the farm in Thailand are small scale. Farmer organization shall be an effective approach to enhance farming efficiency. The recommendations are as follows:

- 1) Farmers shall participate in social activities in the community.
- 2) Local resources shall be efficiently utilized and mangrove plantation shall be extended. This will strengthen a good relationship with the community residents and reduce environmental impact.
- 3) Contribution shall be provided to the local community in conserving environment.
- 4) Disseminating a proper information on function and organization of the farm to workers.
- 5) Consideration shall be paid to hiring local labors in compliance with laws. Welfare shall be sufficiently provided for such as accommodation and other facilities.

A.12 Farmer Organization and Training

Based on the shrimp developments in Thailand, it was found that the farmer organization has been taken place for exchange views and experiences on techniques and managements on how to improve efficiency. Technical knowledge on farm and environmentally friendly management require practical training. The recommendations for farmer organization and training are as follows:

- 1) Group activities are organized to regularly exchange the knowledge on farming.
- 2) Meeting or technical training are conducted on farm management, inputs application as regards organic marine shrimp.
- 3) Training on relevant laws and regulations regarding shrimp industry shall be provided.
- 4) Code of Conduct and Ethics towards social and environment shall be promoted.

A.13 Data and Record Keeping.

To achieve efficient production in marine shrimp farming and regular improvement, data and record keeping are required to be set up and possibly reviewed for the improvement of production efficiency or enhance the efficiency in the future production. In case there is production problem such as disease outbreak, farmers shall keep those data on farming for at least three production cycles in order for considering the cause of problem and finding solution for the next crop. More importantly, after completion of each production cycle, data analysis shall be conducted.

ANNEX B**Prohibited Substances in Organic Marine Shrimp Farm Management**

The following lists are prohibited substances in marine shrimp farm management.

1. Genetically modification microorganism and products derived from such microorganisms.
2. Toxic substances derived from natural sources such as heavy metal which may impact to environment and human health.
3. City manure or composed manure derived from city waste and garbage.
4. Synthetic substance for growth promotion.

ANNEX C

Prohibited Substances and Materials in Aquatic Animal Feed

The following substances and materials are prohibited in aquatic animal feeds.

1. All chemotherapeutants and antibiotics.
2. Urea.
3. Pure amino acid.
4. Synthetic appetizers.
5. Materials and product derived from genetically modification organisms.
6. Synthetic dye for feed production.
7. Substances or materials that prohibit for aquatic animal feeds as notify in Animal Feed Quality Control regulation.

ANNEX D

Permitted Substances for Predator and Disease Control in Organic Aquaculture Farm.

Substances	Specific condition / Restriction
1. Teaseed Cake	
2. Rotenone	
3. Potassium permanganate	
4. Hydrogen peroxide	
5. Povidone iodine	Use in the minimum dose only when needed.
6. Copper sulfate	
7. Benzalkonium chloride	
8. Chlorine	
9. Herbs	

ANNEX F

Appropriated Water Quality Suitable for Marine Shrimp Farming Production.

Parameter	Suitable Condition
Temperature	28 ⁰ C - 32 ⁰ C
Dissolved oxygen	≥ 5 mg / l
pH	7.0 – 8.3
Salinity	0.5 – 35 mg / g
Chloride	≥ 300 mg / kg
Sodium	≥ 200 mg / kg
Total hardness (in the form of CaCO ₃)	≥ 150 mg / kg
Calcium hardness (in the form of CaCO ₃)	≥ 100 mg / kg
Magnesium hardness (CaCO ₃)	≥ 50 mg / kg
Total Alkalinity (in the form of CaCO ₃)	≥ 100 mg / kg
NH ₃	≤ 0.03 mg / l
NO ₂ ⁻	≤ 1 mg / l
NO ₃ ⁻	≤ 60 mg / l
Total Iron	≤ 1.0 mg / l
H ₂ S	≤ 2 μg / kg
Chlorine	≤ 10 μg / kg
Cadmium	≤ 10 μg / kg
Cromium	≤ 100 μg / kg
Copper	≤ 25 μg / kg
Lead	≤ 100 μg / kg
Mercury	≤ 0.1 μg / kg
Zinc	≤ 100 μg / kg
Aldrin / Dieldrin	≤ 0.003 μg / kg
BHC	≤ 4 μg / kg
Chlordane	≤ 0.01 μg / kg
DDT	≤ 0.001 μg / kg
Endrin	0.004 μg / kg
Heptachlor	0.001 μg / kg
Toxaphene	0.005 μg / kg

ANNEX G

Unit

The units and symbols used in this Standard and the units of SI (International System of units or *Le Systèm International d' Unités*) recognized to be used are as follows:

Quantity	Unit	Symbol SI Unit
Mass	Milligram	mg
Mass	Gram	g
Mass	Kilogram	kg
-	Milligram / Gram	mg / g
-	Milligram / Kilogram	mg / kg
Length	Centimeter	cm
Length	Meter	m
Volume	Cubic Meter	m ³
Temperature	Degree Celsius	⁰ C