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பொதுசனக் கருத்துரைக்கான கட்டளை வரைவு
DRAFT STANDARD FOR PUBLIC COMMENT

(වෙනස්වීමට ඉඩ ඇත. திருத்தத்திற்குட்படக்கூடியது. Liable to alteration)

නිකුත් කළ දිනය
வெளியீட்டுத் திகதி
Date of Issue

} 2020-10-09

අදහස් එවිය යුතු අවසාන දිනය
அபிப்பிராயங்களை தெரிப்பதற்கான இறுதித்திகதி
Latest Date for Receipt of Comments

} 2020-12-09



Draft Sri Lanka Standard
SPECIFICATION FOR BEST AQUACULTURE PRACTICES REQUIREMENTS
FOR SHRIMP PRODUCTION
(DSLS :)

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இவ்வரைவு இலங்கைக் கட்டளையெனக் கருதப்படவோ அன்றிப் பிரயோகிக்கப்படவோ கூடாது
This draft should not be regarded or used as a Sri Lanka Standard.

අදහස් එවිය යුත්තේ : ශ්‍රී ලංකා ප්‍රමිති ආයතනය, 17, වික්ටෝරියා පෙදෙස, ඇල්විටිගල මාවත, කොළඹ 08.

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**Draft Sri Lanka Standard
BEST AQUACULTURE PRACTICES REQUIREMENTS
FOR SHRIMP FARMING**

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Draft Sri Lanka Standard
BEST AQUACULTURE PRACTICES REQUIREMENTS
FOR SHRIMP FARMING

FOREWORD

This Standard was approved by the Sectoral Committee on Agriculture and was authorized for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on

Shrimp farming has been the most profitable commercial aquaculture activity in Sri Lanka. Two shrimp species, *Penaeus monodon* and *Litopenaeus vannamei* are cultured by the shrimp industry in Sri Lanka. The primary hazards associated with shrimp farming are contamination from pathogens and residues from unapproved drugs. The origins for these hazards are from production farms and can remain in or on the product throughout the normal cleaning, rinsing and packaging process. Therefore, the establishment of the Standard for Best Aquaculture Practices (BAP) for shrimp farming is to promote and develop the production in terms of quality and safety to establish a trust of shrimp production to be accepted by both domestic and international level as well as to promote export of cultured Sri Lankan shrimp. The BAP are focused on ensuring food safety, food quality, environmental integrity, social responsibility and animal health and welfare.

This Standard is subjected to the restrictions imposed under the Fisheries and Aquatic Resources Act No. 02 of 1996, the National Environmental Act No. 47 of 1980, the Fauna and Flora Protection Ordinance No. 02 of 1937, the Employment of Women, Young Person and Children Act No. 47 of 1956 and the regulations framed there under, wherever applicable.

In the preparation of this Standard, the valuable assistance derived from the publications of the Codex Alimentarius Commission, Global Aquaculture Alliance and National Aquaculture Development Authority is gratefully acknowledged.

1 SCOPE

This Standard specifies the requirements for BAP at hatchery, nursery and grow-out farming practices including harvesting and post-harvest handlings prior to transportation to be applied for sustainable shrimp production that is legally compliant, environmentally sound, socially acceptable and economically viable to ensure quality products that are safe and suitable for human consumption.

2 REFERENCES

- SLS 10 Quick frozen prawns or shrimps
- SLS 143 Code of practice for general principles of food hygiene

3 DEFINITIONS

For the purpose of this Standard, the following definitions shall apply:

- 3.1 economically viable:** Production that gives positive returns on a sustainable basis.
- 3.2 environmentally sound:** Farm practices with minimal effect on the environment.
- 3.3 hazard:** Biological, chemical or physical agent in food, with the potential to cause an adverse health effect.
- 3.4 best aquaculture practices (BAP):** Activities and procedures that maximize environmental and economic sustainability, product quality and safety, animal health, and worker safety, while also minimizing the likelihood of a disease outbreak on the farm.
- 3.5 grow-out farm:** The shrimp are grown to maturity under bio secured conditions. The post larvae from the hatchery or the juvenile from the nursery are transferred to Grow out ponds where they are fed until they reach marketable size, which takes about another three to five months.
- 3.6 hatchery:** A facility where shrimp eggs are hatched under bio secured and artificial conditions and grown up to fully – fromed shrimp – Post Larvae for commercial sale for the stocking in shrimp nurseries or grow out ponds.
- 3.7 larvae:** The shrimp fry that are newly hatched from eggs and undergone metamorphosis through 3 larval stages; nauplius, zoea and mysis within 8-11 days.
- 3.8 legally compliant:** Adherence to all existing legal, regulatory and statutory requirements.
- 3.9 mangrove:** The woody plants that grow in the land-sea interface, bays, estuaries, lagoons, backwaters, and in the rivers, reaching upstream up to the point where the water still remains saline. They are often called as ‘tidal forests’, ‘coastal woodlands’ or ‘oceanic rainforests’.
- 3.10 nursery:** High – biosecurity facilities to grow post larvae at high and hyper intensive densities, from 2 mg to as large as 3 g. The aim is to produce healthy, strong and uniform juveniles with significant potential for compensatory growth after their transfer for final grow out.
- 3.11 post larvae (PL):** The marine shrimp fry that undergo mysis stage and reach post larval stage at which its abdominal appendages are fully developed as same as adult.
- 3.12 produce:** Shrimp that are produced according to this Standard.
- 3.13 product:** Product that has been produced, processed, and/or handled in compliance with this Standard.

3.14 shrimp broodstock: The fertile adult marine shrimp from wild-caught, imported, or reared for breeding purpose.

3.15 shrimp farming: The farming of shrimp involving intervention in the rearing process to enhance production and the individual or corporate ownership of the stock being cultivated. It does not include processing, distribution, and retailing.

3.16 shrimp: The Penaeidae family in genus of *Penaeus* (*Penaeus* spp.), *Metapenaeus* (*Metapenaeus* spp.) and *Litopenaeus* (*Litopenaeus* spp.) which spawns and grows in the brackish water or seawater by its nature. such as Black tiger shrimp (*Penaeus monodon*), Pacific White Legged Shrimp (*Litopenaeus vannamei*)

3.17 socially acceptable: Meeting concerns on the welfare and safety of persons working or living within the farmer surrounding the farms.

3.18 SPF(specific pathogen free): The shrimps have been assured of being free from specific pathogens, but not necessarily free of all pathogens.

3.19 traceability: The ability to trace the history, application, use and location of an item or its characteristics through recorded identification data.

3.20 veterinary drug: Any substance applied or administered to any food producing animal, whether used for therapeutic, prophylactic or diagnostic purposes or for modification of physiological functions or behavior.

4 LEGAL REQUIREMENTS

4.1 Property rights and regulatory compliance

4.1.1 Farms shall comply with Sri Lankan national laws and environmental regulations, and provide current documentation that demonstrates legal rights for land use, water use, construction, operation and waste disposal. Following licenses may be required:

- a) business registration certificates;
- b) aquaculture management licenses;
- c) land deeds, leases or concession agreements;
- d) land use taxes;
- e) construction permits;
- f) water use permits;
- g) protection of mangroves or other sensitive habitats;
- h) effluent permits;
- i) adherence to veterinary and animal health regulations; and
- j) adherence to environmental regulations.

5 GENERAL REQUIREMENTS

5.1 Community Relations

5.1.1 Farm shall accommodate local inhabitants by not blocking traditional access routes to public areas, common land, fishing grounds, wetland areas and other public resources.

5.1.2 Farm shall manage water usage to avoid restricting the amount of water available to other users.

5.1.3 Farm shall demonstrate interaction with the local community to avoid or resolve conflicts through meetings, committees, correspondence, service projects or other activities performed annually or more often.

5.2 Site selection and farming facilities

5.2.1 Farm site should meet technical requirements to achieve efficient aquaculture. The guidance for farm site selection is as follows:

5.2.1.1 Farm site should have the access to brackish water, sea water and fresh water.

5.2.1.2 Farm should be built in an environmentally suitable location.

5.2.1.3 Water used for shrimp nursery, hatchery and grow-out farming should be of a suitable quality.

5.2.1.4 Water source and soil condition shall not be at risk of contamination from contaminants which may affect shrimp health and safety of consumer.

5.2.2 Farmer shall have legally land rights or other land use permits. In case farmer does not own the land, evidence of land use permits or aquaculture permit shall be available.

5.2.3 Farm site should have basic infrastructures and they should minimize negative impacts on local communities and other resource users.

5.2.4 Farming facilities should be designed and operated in ways that prevent contamination by workers, sewage/toilets, domestic animals, machinery oil/fuel and other possible sources.

5.2.5 Site selection for the farm shall be obtained approval Aquaculture Management Licence from NAQDA.

5.3 Soil and Water Conservation

5.3.1 If ponds are constructed on permeable soil, measures such as the use of pond liners shall be taken to control seepage and avoid contamination of aquifers, lakes, streams and other natural bodies of freshwater.

5.3.2 Use of water from wells, lakes, streams, springs shall not cause ecological damage or subsidence in surrounding areas.

5.3.3 Any accumulated sludge removed from ponds, reservoirs or sedimentation basins shall be confined within the farm property or consolidated and used locally for landfill or agriculture.

5.3.4 Removed sediment shall be properly contained and located to prevent the salinization of soil and groundwater and not cause other ecological nuisances.

5.3.5 Farm shall take measures to control erosion and other impacts caused by outfalls.

5.3.6 Using of water pump and aerator should be under control measure for water conservation and energy saving.

5.4 Farm sanitation

5.4.1 Garbage and refuse should be separately kept for proper disposal and to prevent the contamination to the culture pond.

5.4.2 Bathroom and toilet shall not be located near the culture pond and not directly drained that may contaminate the pond. Disposal tank of the toilet shall be no leakage and equipped with highly efficient decomposed system. Besides, waste water and effluence from other resident buildings shall be well managed away from production pond and surrounding area.

5.4.3 Only fertilizers that are approved shall be used in ponds.

5.4.4 Human waste and untreated animal manure shall not be used to fertilize ponds. If necessary, the manure shall be treated by any means in order to prevent contamination to the culture pond.

5.4.5 Run off water shall not be allowed to enter the ponds.

5.5 Biosecurity

5.5.1 Shrimp ponds should have separate screened inlets and outlets and water should be carefully filtered to keep competitors, predators, and disease carrying organisms out.

5.5.2 Bird net should be built around the perimeter of the shrimp farm to keep out birds.

5.5.3 Crab net should be used to screen out pest and undesirable species into the pond during the periods of pond preparation, water preparation and raising.

5.5.4 Animals and birds shall not be allowed to access farms.

5.5.5 Visitors shall register at farm office.

5.5.6 All vessels used to transport larvae shall be thoroughly cleaned and disinfected prior to re-use.

5.5.7 Workers shall be trained on the importance of farm biosecurity.

5.5.8 All equipments, containers and crates shall be kept cleaned and disinfected properly before re-use.

5.5.9 Good Hygiene Practices (GHP) should be implemented in all sections of the farm.

5.5.10 Biosecurity controls shall be in place to prevent the introduction and/or spread of disease agents and disease on the farm. These include regular disease surveillance, sanitation of equipment and personnel, quarantine of diseased animals and controlled movement of personnel and equipment.

5.5.11 Farm staff and visitors shall be trained in and apply biosecurity measures.

6 HATCHERY AND NURSERY MANAGEMENT

6.1 Broodstock management

6.1.1 Source of broodstock origin shall be identified.

6.1.2 Broodstock shall be fertile, healthy, and disease-free or nondisease carrier.

6.1.3 Stocking density of broodstock shall be appropriate with the size of culturing area.

6.1.4 After the first spawning, female broodstock shall be used for hatching within a reasonable period of time corresponding to shrimp species.

6.2 General management

6.2.1 Stocking density for nursery shall be appropriate.

6.2.2 Hatcheries shall accurately monitor feed inputs and take steps to minimize risks of contamination or spoilage.

6.2.3 Preventive measures against the entry of exotic species and disease carrier animals shall be taken during the pond preparation, water preparation, and hatchery and nursery operations.

6.2.4 Fry health shall be monitored regularly.

6.2.5 Preventive measures and control of disease outbreak shall be in place.

6.2.6 Hatchery shall establish a documented shrimp health monitoring plan and control procedures, including those relating to brood shrimp and pests to minimize the risk of disease or contamination.

6.2.7 Hatchery shall not use any unchecked or PCR-positive, that is, virus-infected, or otherwise diseased brood shrimp for hatchery use, and shall not use brood shrimps exceeding the permitted levels of microbiological hazards or contaminants.

6.2.8 Hatchery shall properly dispose of infected or dead shrimp, either by burning or burying in safe distance from the hatchery. During the harvest and postharvest, fry shall be hygienically managed and handled to prevent contamination.

6.2.9 Veterinary drug residues or prohibited chemical residues shall not be found in fry.

6.2.10 If chemicals are used, they shall be used properly in terms of type and quantity.

6.2.11 Packing methods, containers, equipment and packing density shall be appropriate to the size of fry and the duration of transport.

6.2.12 Hatchery shall transport PL only under conditions that do not alter their health status.

7 GROW-OUT FARMING

7.1 Larvae selection and stocking

7.1.1 Farmers shall use SPF PL obtained from the certified hatchery and recommended quantity by NAQDA.

7.1.2 Farmer shall use only PCR-negative and disease-free healthy PL. The record of certificate of, or testing report on health should be made available.

7.1.3 Larvae shall be uniform size, coloured and actively swimming.

7.1.4 Stocking density shall be appropriate in order to minimize stress as per NAQDA guidelines.

7.2 Farm management

7.2.1 Farm layout should be technically designed in order to facilitate further inspection and record keeping.

7.2.2 Equipment used on farm and buildings shall be always in good working conditions.

7.2.3 A manual of shrimp farming practices in accordance with the requirements of this Standard shall be developed, implemented and made available.

7.2.4 Pond vacating and/or appropriate preparation should be practiced prior to stocking of shrimp larvae.

7.2.5 Water from one pond shall not have access to another pond.

7.2.6 Water in the pond should be maintained in appropriate depth as well as appropriate management to supply sufficient oxygen. Water quality should meet the requirements in Annex A.

7.2.7 Farmer shall increase water exchange rate in accordance with the density.

7.2.8 Aerator should be installed to maintain suitable living condition of shrimp and located in proper position to reduce soil leaching into the pond.

7.2.9 Where needed, proper water treatment should be put in place.

7.2.10 All movements of shrimp at all stages in the life cycle within and from the farm shall be recorded and traceable.

7.3 Shrimp health and welfare

7.3.1 Farm staff shall make regular inspections of the culture facility, water quality, shrimp health and behavior conditions.

7.3.2 If the health problem was found, diagnosis and analysis shall be done immediately. If the dead or sick shrimp is found, the cause of symptoms diagnosis shall be done immediately. While, improving water quality, reducing feed or increasing aeration should be performed in order to reduce shrimp stress. If the mortality is continuously observed, the harvest of shrimp production is followed the NAQDA instruction.

7.3.3 Strictly preventive measures such as disinfect the farm equipment, assign responsible worker for such infected pond and stop water exchange shall be in place to control the disease transmission from pond to pond or from farm to farm.

7.3.4 In case of the outbreak of aquatic animal disease, NAQDA and surrounding farmers, members of the shrimp organization shall be notified immediately.

7.3.5 Shrimp farms should be operated in economically viable ways that make efficient use of fuel/energy, feeds and water. And also farm inputs should be used in a responsible manner to minimize negative environmental impacts.

7.4 Feed management

7.4.1 Feed or feed ingredients to be used at the farm shall be certified by the manufacturers to be free from prohibited drugs, including antibiotics or other substances.

7.4.2 Places for feed preparation, equipment and buildings should be separately located and orderly kept clean at all times.

7.4.3 Feed storage shall be separately located. The storage area shall be dry, clean and with a proper condition to maintain feed quality, temperature, and prevent the contamination.

7.4.4 Feed bag or sac shall be elevated by pallet for moisture prevention and good ventilation.

7.4.5 Feed shall be provided according to the requirements of shrimp.

7.4.6 Farm shall only use approved additives, preservatives and growth promoters.

7.4.7 Uncooked organisms and their by-products shall not be used as feed in ponds.

7.5 Chemical and veterinary drug Management

7.5.1 Proactively banned antibiotics, veterinary drugs and other chemical compounds shall not be used in any stage of shrimp production.

7.5.2 Drug treatments shall be based on recommendations and authorizations administered by a veterinarian or fishery biologist or fish health specialist only to treat diagnosed diseases, accompanied by antibiotic sensitivity testing in accordance with instructions on product labels and national regulations.

7.5.3 The application of veterinary drugs shall be restricted according to the manufacturer's instruction.

7.5.4 Records shall be maintained for every application of drugs and other chemicals that include the date, compound used, reason(s) for use, antibiotic sensitivity test results, dose and harvest date for treated production lots.

7.5.5 In case authorized veterinary drugs are applied prior to harvesting, withdrawal period shall be strictly followed.

7.5.6 The storage of veterinary drugs shall be adhered to the label and direction.

7.5.7 The expired veterinary drugs according to product label shall not be used. The handling or disposal of expired veterinary drugs shall be in responsible manner.

7.6 Harvest and post harvest handling

7.6.1 Water and ice used during harvesting and grading should be of quality suitable for the production of food which is safe for human consumption.

7.6.2 There shall be a plan for harvesting and good health condition to prevent contaminations during harvesting and post harvest handlings prior to distribution.

7.6.3 Force to death or anesthetic technique shall be simple, quick, less suffered and hygienic. The best way is to use icy-water tank with controlled temperature.

7.6.4 Chemicals used during harvest or post harvest shall be in appropriate quantity and prohibited substances shall not be used for harvesting.

7.6.5 Farm worker who is responsible for harvest shall not be infected with contagious disease or other disease that may cause an objectionable shrimp product for consumption.

7.6.6 Workers with wounds, open sores or skin infections shall be prohibited from handling harvested products.

7.6.7 Farms shall use only food grade plastic baskets for holding shrimp.

7.6.8 Containers, harvesting and transportation technique shall not cause any negative effect on shrimp quality as well as storage quality and contamination that affect to safety of the consumers. Containers shall not directly contact with ground or floor.

7.6.9 Equipment and containers used to harvest and transport shrimp shall be cleaned, sanitized, and be free of lubricants, fuel, metal fragments and other foreign material. After

work, all equipments shall be cleaned immediately in order to prevent accumulation of microbials.

7.6.10 All equipments for shrimp transportation shall be made from corrosive resistant materials and in good working condition.

7.6.11 Ice shall be procured only from those factories that are licensed by appropriate authorities to have used water free from hazardous substances and of an acceptable microbiological standard.

7.6.12 Farmer shall put the shrimp into box with layers of high quality flake or finely crushed block ice in 1:1 ratio.

7.6.13 Iced shrimp shall be transported to processing plants or other markets in a manner that maintains temperature control and prevents physical damage or contamination.

7.6.14 Non-approved chemicals shall not be applied directly or indirectly to shrimps during transport.

7.6.15 Sulfites shall be handled responsibly to control risks to consumers and the environment.

8 STORAGE, DISPOSAL OF FARM SUPPLIES AND WASTES

8.1 Fuel, lubricants, feed and aqua health products shall be labeled, stored, used and disposed of in a safe and responsible manner.

8.2 Precautions shall be taken to prevent spills, fires and explosions.

8.3 Devices and equipment for removal and cleaning up fuels on the ground should be promptly provided.

8.4 Paper and plastic refuse shall be disposed of in a prompt, sanitary and responsible way.

8.5 Household trash and other farm wastes, discarded farm supplies and equipment shall not be dumped in mangrove areas, wetlands or other vacant land and shall be removed and disposed of responsibly.

9 EFFLUENT AND SEDIMENT MANAGEMENT

9.1 Inlet and outlet canals and dike shall be regularly maintained to reduce soil leaching and sedimentation.

9.2 Farms shall monitor their effluents to confirm compliance with the effluent water quality criteria defined by Environmental Authority or Marine Environmental Protection Authority.

9.3 Farms shall treat the effluent water before discharging it into any open water system to assure that the BOD of the discharged water is not in excess of that of the open water.

9.4 Material or tools such as net or seine at the inlet and outlet water should be used for prevention the escaped shrimp and the entry of exotic species.

9.5 Discharges of water, sediment and sludge shall not be discharged to the fresh water canals and arable lands causing any environmental or social problem.

9.6 Farms shall properly manage and dispose of sediment from ponds.

9.7 Water exchange shall be limited to reduce overall environmental impacts.

10 WORKERS' HEALTH, SAFETY, WELFARE AND EMPLOYEE RELATIONS

10.1 Farms shall comply with Sri Lankan labor laws, including those related to young and/or underage workers, migrant workers to assure adequate worker safety, compensation and, where applicable, on-site living conditions.

10.1.1 All employment conditions shall comply with national employment regulations.

10.2 Workers handling shrimp products shall have a valid and current medical certificate that verifies that they are not suffering from any contagious or communicable disease.

10.3 No one with any contagious disease or wounds in hands should be allowed to handle shrimp.

10.3.1 A person with a contagious or communicable disease shall not be permitted access into the farm.

10.4 Farm shall provide for equal opportunity with respect to recruitment, compensation, access to training, promotion, termination and retirement.

10.5 Farm shall treat workers with respect and not engage in or permit physical, verbal or sexual abuse, bullying or harassment.

10.6 There shall be a written worker grievance process, made available to all workers, that allows for the anonymous reporting of grievances to management without fear of retaliation.

10.7 Farm shall not engage in or support the use of child labor. Farm shall comply with Sri Lankan child labor laws regarding minimum working age.

10.8 Farm shall meet or exceed the minimum wage rate, benefits, required by Sri Lankan labor rules and regulations.

10.8.1 Farm shall abide by the wages board related to shrimp farming.

10.9 Safe drinking water shall be readily available to employees.

- 10.10** Workers shall wear clean clothing while working at the farm.
- 10.11** Farm shall have an adequate number of sanitary toilets and the toilets must be well separated from the farming area and it must be well protected from any kind of seepage.
- 10.12** Farm shall have an adequate number of wash basins with hand cleaning disinfecting agents.
- 10.13** Cleaning and disinfecting agents shall only contain chemicals that are approved for such uses.
- 10.14** Welfare for worker should be appropriately provided for such as accommodation, medicine cupboard and other facilities.
- 10.15** Safety environment for work and living condition such as well ventilate dwelling place, bathroom and toilet should be provided adequately.
- 10.16** Farm shall identify and eliminate or minimize any workplace health and safety hazards by conducting a thorough risk assessment.
- 10.17** The farmer shall provide training in personal hygiene, sanitation, work safety, first aid and contamination risks to all employees. Safety documents shall be available in a language understood by the workforce.
- 10.18** First-aid boxes shall be readily available to employees, and any expired content shall be replaced.
- 10.19** Accident and emergency procedures shall be available with clear instructions to all workers. These procedures shall be displayed in the appropriate language for the workforce. Instructions shall be supported by warning signs and symbols where appropriate.
- 10.20** In the event of accidents or emergencies, farm shall provide basic medical care, including access to or communication with medical authorities.
- 10.21** An emergency response plan shall be prepared for serious illnesses or accidents.
- 10.22** Selected workers shall be made familiar with details in emergency response plans and trained in the first aid of electrical shock, profuse bleeding, drowning and other possible medical emergencies.
- 10.23** Farm shall appoint a management person responsible for ensuring worker health, safety and training.
- 10.24** Protective gear and equipment in good working order shall be provided for employees.
- 10.25** Electrical pumps and aerators shall be wired according to standard safe procedures. Machinery shall have proper driveshaft and/or drive belt safety guards.

11 TRAINING

- 11.1** All workers shall be trained on first appointment and annually thereafter.
- 11.2** Workers shall be trained in shrimp husbandry, health and welfare management practices.
- 11.3** Workers shall be trained in Good Hygienic Practices to ensure they are aware of their roles and responsibilities for protecting aquaculture products from food safety risks such as contamination and deterioration.
- 11.4** All workers working in the processing plant shall be trained in food safety.
- 11.5** All training shall be properly documented.

12 RECORD KEEPING AND TRACEABILITY

- 12.1** All data shall be recorded, kept, maintained for each culture unit and each production cycle.
- 12.2** After completion of each production cycle, data analysis should be conducted.
- 12.3** All records shall be maintained up-to-date for a minimum of 2 years unless stipulated by any specific legislation, otherwise.
- 12.4** The produce shall be traceable to the farm where it has been originally produced.
- 12.5 Internal audit**
 - 12.5.1** Internal audit shall be carried out at least once in 06 months based on the requirements of this Standard. It shall be completed and documented.
 - 12.5.2** Corrective actions shall be implemented and documented.
- 12.6 Record of complaints**

Records of complaints on all produce not in compliance with requirements in this Standard and their remedial actions shall be made available on-site.

13 ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

- 13.1** Farm construction and operations shall not result in any damage to neighboring mangrove cover or wetlands or sensitive coastal ecosystems or sanctuaries.
- 13.2** Farm shall not occupy any part of common property wetland or obstruct or interfere with the flowing canal.

13.3 Farms shall not create any obstacles for the local communities to access the public mangrove areas, fishing grounds or other public resources.

13.4 Sea water intake and outlet pipes, wells or other structure of the farm shall not cause erosion or other physical damage to the shoreline or beachfront where they are located.

13.5 Operation of a shrimp farm shall not interfere with the natural environment and other normal activities of the location, including access to traditional fishing or gathering grounds for local inhabitants.

13.6 Farm design, construction, or operation shall not pollute the environment.

13.7 Farms shall have an Environmental Protection Licence (EPL).

13.8 Farm activities shall not alter the hydrological conditions of the surrounding watershed, and the normal flow of brackish water to mangroves or freshwater to wetlands shall not be altered, unless specific permits apply.

13.9 If wetland restoration has been conducted, the restored vegetation shall be maintained in a healthy state, viable and appropriately diverse.

14 PACKAGING REQUIREMENTS

14.1 Packaging materials shall be stored in clean storage areas to avoid contamination.

14.2 All containers and packages used for packaging shrimp products shall be made of food grade materials. The farmer should obtain food-grade certificate from the supplier with Material Safety Data Sheet (MSDS).

15 MARKING AND/OR LABELLING REQUIREMENTS

15.1 BAP certified product shall be labeled with batch code or any reliable method to be able to trace back issued by competent authority.

15.2 The following shall be marked or labeled legibly and indelibly on each package/container to cover BAP and general labeling requirements:

- a) Name of the produce or product;
- b) Grade (quality/ size);
- c) Name and address of the producer;
- d) Batch or code number;
- e) Net mass in grams or in kilograms;
- f) Date of manufacture;
- g) Date of expiry; and
- j) Storage condition.

Annex A
Recommendation on water quality suitable for shrimp farming production

Parameters	Suitable Level
Temperature	28 °C to 32 °C
Dissolved Oxygen	≥5 mg/l
Water pH	7.5-8.5
Salinity	15-25 ppt
Calcium hardness (as CaCO ₃)	≥ 100 mg/kg
Magnesium hardness (as CaCO ₃)	≥ 50 mg/kg
Total Alkalinity (as CaCO ₃)	80-200 ppt
Ammonia (NH ₃)	≤ 0.01 ppm
Nitrite (NO ₂ ⁻)	≤ 1 mg/l
Nitrate (NO ₃ ⁻)	≤ 60 mg/l
Total suspended solid	≤ 100 mg/l
Total coliform bacteria	≤ 1,000 MPN/100ml (Most Probable Number per 100 milliliters)
Fecal coliform bacteria	≤ 70 cfu /100ml (colony forming unit per 100 milliliters)