Final Draft

CODES OF CONDUCT

For Selected Segments of the Shrimp Aquaculture Industry in Bangladesh

Prepared by

Department of Fisheries
Government of Bangladesh

Bangladesh Shrimp and Fish Foundation

Revised and updated by

Global Aquaculture Alliance (GAA) /
The Best Aquaculture Practices (BAP) Program
(Formerly known as Aquaculture Certification Council – ACC)

July 2011

সচিব
মৎস্য ও প্রাণিসম্পদ মন্ত্রণালয়
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বাংলাদেশ সচিবালয়, ঢাকা।

Secretary
Ministry of Fisheries & Livestock
Govt. of the People's Republic of Bangladesh
Bangladesh Secretariate, Dhaka.

FOREWORD

Date: March 23, 2011

I have great pleasure to announce that the Ministry of Fisheries and Livestock adopts nine sets of Code of Conduct for nine important segments of the shrimp based industry value chain. These segments are: (i) Black tiger shrimp (Bagda) *Penaeus monodon* hatchery, (ii) *Macrobrachium* shrimp (Galda) hatchery, (iii) Black tiger *Penauus monodon* shrimp farm, (iv) Galda shrimp (*Macrobrachium*) farm, (v) Shrimp depot, (vi) Ice plants, (vii) Fishing boats, (viii) Fish carrier transport van / vessel and (ix) Shrimp / Fish feed mill. All the stakeholders of these categories will be expected to strictly comply with their respective Code.

There are suggestions that Codes are also necessary for four more segments of the shrimp industry value chain; these are: (i) Shrimp and fish auction centre, (ii) Shrimp/fish feed retailing shops, (iii) Aquaculture drug retailing shops and (iv) Fish markets.

Since the international market demand for the qualitative aspects of the of the shrimp is a dynamic process, we will be required to adjust the Codes from time to time in keeping with any changes in the international requirements.

I sincerely thank the Department of Fisheries (DoF) and Bangladesh Shrimp and Fish Foundation (BSFF) experts for their immense contributions towards formulating the Codes. We believe strict compliance with Codes will increase the accessibility of our fisheries products in the international market, thereby elevating the image of Bangladesh. Besides, compliance with the Codes will also help ensure food safety for the domestic consumers.

(Ujjwal Bikash Dutta)
Secretary

We will revise MoFL Secretary's forwarding letter

CODES OF CONDUCT

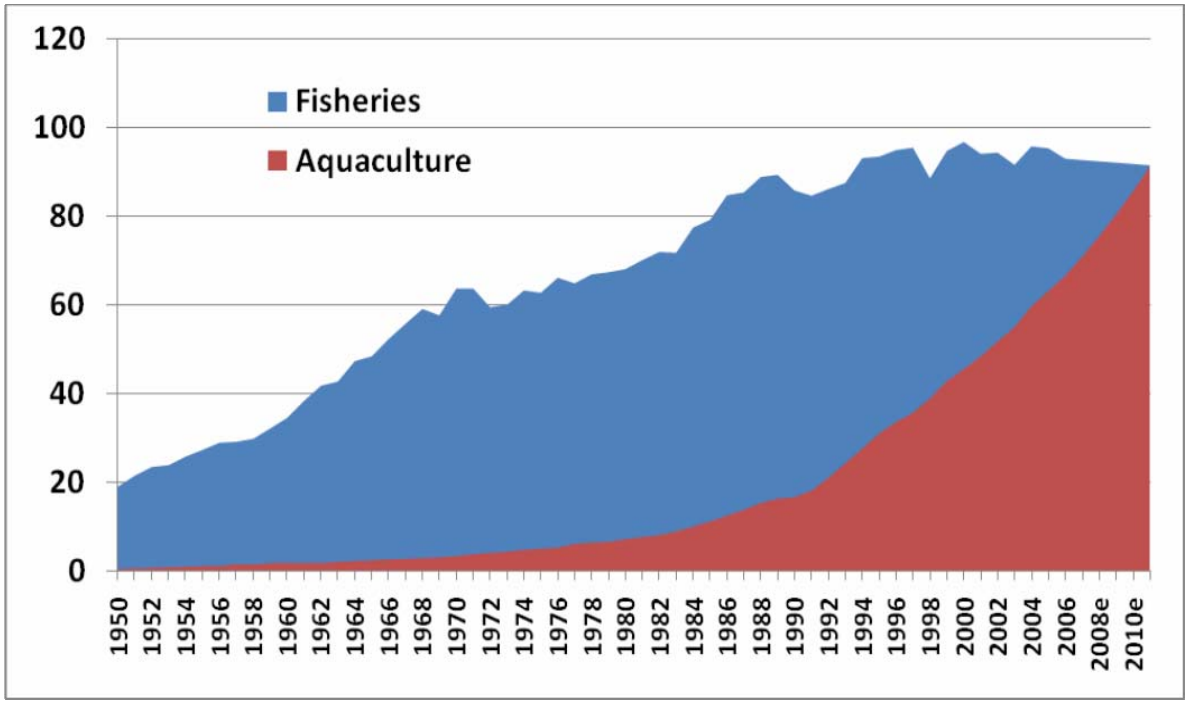
For Various Segments
of the Aquaculture-Based Shrimp Industry in Bangladesh

Table of Contents

INTRODUCTION

Background

Due to natural and varied man-made changes, the open-water fish production from the world oceans and inland waters is now declining. Aquaculture has been receiving more and more attention for increasing fish production. In 1950, about 3% of the global fish production was of aquaculture origin. By 2004, aquaculture production accounted for 38% of the global total production. Currently, global aquaculture production almost equals the total fish landing from the marine and inland open waters. In the future, aquaculture production is expected to surpass the open water catch. Nearly, 80% of the aquaculture production comes from Asian countries. Bangladesh Fisheries Sector Road Map 2015 projects a total production of 3.54 million metric tons of fish of which an estimated 57 percent will be of aquaculture origin. Out of the total export earnings from the shrimp export, aquaculture products contribute at least 90 percent.



Despite its significant contribution to the global food production and economy, aquaculture is not beyond criticism, often for valid reasons. The main points of concern relate to:

- Environmental stewardship
- Social: Legal and Community
- Food safety
- Traceability

The **environmental issues** relate mainly to:

(i) Mangrove and wetland destruction.
(ii) Bio-diversity destruction by mass collection of shrimp post-larvae along with myriad of miscellaneous non-target aquatic organisms from the sea-shore and brackish water rivers; the latter are just wasted.
(iii) Effluent discharge often with heavy loads of silt and organic matter offsetting the balance of the aquatic environment.
(iv) Releasing prohibited or harmful chemicals used in the shrimp or fish farms.
(v) Salinization of agriculture land

(vi) Releasing diseased farm animals or exotic species from the farm into the open environment.

Social issues and resource use conflicts mainly include:

(i) Obstruction of common property wetlands and flowing rivers and canals for aquaculture
(ii) Salt water intrusion in agricultural lands affecting agricultural crops
(iii) Unauthorized use of others' land
(iv) Using child labour

Food safety issues chiefly relate to:

(i) Use of agricultural pesticides that may access to aquaculture areas
(ii) Prohibited or restricted drugs and chemicals often used as preventive, curative or growth promoting agents in the farm feed or water, eventually gain access into the shrimp and fish and ultimately into human consumers.

Traceability

(i) Proper documentation of all aspects of the value chain.

In the context of Bangladesh, the *points that are more frequently raised in connection with coastal aquaculture of the shrimp* are the following:

(i) Legal ownership of the farm – Regulatory
(ii) Social conflicts on the use of common properties
    - Water usage conflicts
    - Agricultural land use conflicts
(iii) Conflicts between the rice farmers and shrimp farmers
(iv) Environmental degradation
(v) Labour law violations
(vi) Use of hazardous chemicals in aquaculture risking food safety

Many countries now realize the problems and appreciate the need of applying modern science, aquaculture techniques, experience, and good governance to rectify the problems and harness the full benefits of aquaculture. International organizations, including FAO/UN have suggested a number of principles for responsible aquaculture to address and rectify the problems stated above. Many countries have now formulated laws to protect the environment and health of the people. Some organizations or countries have taken a proactive approach and prepared Codes of Conduct for aquaculture.

What is a Code of Conduct?

A Code in the field of aquaculture industry is a set of prescribed rules and practices that one or all individuals of an organization or facility must properly comply to achieve a certain desired goal.

The principal objectives of the present work are to prepare a set of code of conduct for various segments of the shrimp aquaculture industry in Bangladesh to help ensure:

(i) Food safety by minimizing biological and chemical risks and hazards that are likely to affect human health,
(ii) Traceability of the food,
(iii) Environmental sustainability and bio-diversity,
(iv) Labour standard and,
(v) Social harmony at each step of the value chain.

All these issues are very important for sound and sustainable development of the industry providing safe, environmentally sustainable, and socially acceptable shrimp and other fisheries products for domestic consumption as well as export.

These Codes of Conduct are standards or regulations defining minimal, internationally acceptable, operations and management practices pertaining to technical, environmental, and social standards. The Codes have been developed by the Bangladesh Shrimp and Fish Foundation reflects five key areas:

- Social responsibility
- Human rights and labor rights
- Environmental sustainability
- Food safety
- Traceability

The Codes are intended to promote aquaculture production which meets international food safety standards, is sustainable, ecologically sound and socially responsible.

BSFF, in collaboration with DoF, has prepared Codes of Conduct for the following segments of the shrimp industry:

1. Black tiger or Bagda shrimp (*Penaeus monodon*) hatchery
2. Galda (*Macrobrachium*) shrimp hatchery
3. Black tiger or Bagda shrimp (*Penaeus monodon*) farm
4. Galda shrimp (*Macrobrachium*) farm
5. Shrimp / Fish feed mill
6. Shrimp collection and service centre or depot
7. Ice plants
8. Fishing boats
9. Shrimp or fish carrier transport van / vessel

Reference Documents Used:

Preparations of the above Codes have been based on the review of the following documents:

1. International Principles of Responsible Aquaculture UN/FAO/UNEP/World Bank-Netherland funded WWF- 2003
2. EU and US FDA food safety regulations
3. Best Aquaculture Practices formulated by Global Aquaculture Alliance (GAA)
4. Code of Conduct: Seal of Quality Program of USAID/ATDP-II
5. Good Aquaculture Practices(GAqPs) – JIFSAN
6. Fish & Fish Products' Inspection and Quality Control Ordinance 1983
7. Fish & Fish Products' Inspection and Quality Control Rules 1997 and Rules Amended in 2008
8. Bangladesh Labour Law 2006
9. Fish and Shrimp Hatchery Law 2010
10. Fish and Animal Feed Law 2010
11. Thailand Department of Fisheries Code of Conduct (COC) and Good Aquaculture Practices (GAP) Program

1. Black Tiger or Bagda Shrimp (*Penaeus monodon*) Hatchery

1. LEGAL OWNERSHIP AND RIGHT TO THE USE OF THE HATCHERY LAND AND INFRASTRUCTURE

Human rights, including resources rights of local populations should be respected in accordance with all relevant national laws and international treaties. In particular, agricultural lands to be converted to shrimp aquaculture should not be acquired by coercion. The terms of all leases should be respected. The rights of local communities particularly those involved in subsistence and small scale fishing and agriculture to a secure and just livelihood must be respected.

1.1 The hatchery operator must have legal documentation that proves he has the legal rights to use the hatchery either as an owner or as a leaseholder.

1.2 In case the hatchery operator is a leaseholder, he will have to have a current lease document with clearly spelt out conditions and signed both by the lease holder and the hatchery owner.

1.3 The lease holder must have a lease money clearance certificate from the hatchery owner.

1.4 Both hatchery owner and lessee must have a copy of the lease document with details of lease conditions and signed by each party and at least one witness for each party.

2. REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

2.1 The hatchery must be registered with the Department of Fisheries or any Government of Bangladesh (GOB) authorized organization.

2.2 License to the hatchery will be given only if the hatchery is in compliance with the country's established regulations with respect to social responsibilities, environmental sustainability, food safety and local development plans.

3. HARMONY WITH THE COMMUNITY

3.1 Hatcheries shall work in harmony with the local community.

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

3.3 Hatcheries sea water intake and outlet pipes, wells or other structures shall not cause erosion or other physical damage to the shoreline or beachfront where they are located.

3.4 Hatcheries shall not interfere with other normal activities of the local community.

4. LABOUR STANDARD COMPLIANCE

4.1 Hatcheries shall comply with National Labour Law applicable to hatcheries.

4.2 Hatcheries shall compensate all workers according to applicable national regulation. Payroll and or compensation records shall be maintained for all employees and be available for inspection.

4.3 Hatcheries shall not employ child labor.

4.4 There shall be no discrimination, abuse, or harassment based on gender, age, or religion in employment, including hiring, salary benefits, advancement, discipline, termination or retirement.

4.5 Workers who take maternity leave must not face dismissal nor threat of dismissal, loss of seniority or deduction of wages and must be able to return to their former employer at the same rates of pay and benefits.
4.6 There must not be any use of bonded or forced labor.
4.7 Facility owners and employees shall respect the religious, cultural, and traditional beliefs and practices of the local community.

5. WORKERS' HEALTH AND HYGIENE ISSUES

Working conditions (and employee living conditions, where applicable) shall be safe and healthy for all workers in accordance with national laws and regulations and International Organization standards. Employers must conduct risk assessments to identify hazards and any risk to the health and safety of the employees, take reasonable steps to eliminate or control these risks, and inform, educate, and protect the employees from these risks.

5.1 All workers handling brood-stocks and PL shall have a valid medical certificate that verifies that they are not suffering from any contagious or communicable disease.
5.2 A person with a contagious or communicable disease shall not be permitted access into the hatchery.
5.3 Workers shall be instructed and/ or trained in animal health as relates to hatchery, and food and personal hygiene matters related with their work activities. All training shall be properly documented, as follows:
    (i) Training location, date and subject material
    (ii) Name and qualifications of Trainer
    (iii) Names and responsibilities of attendees
5.4 Workers shall be provided with adequate training in the application of the HACCP principles and good hygiene practices.
5.5 Workers shall wear sanitary clothing dress while working in the hatchery.
5.6 The hatchery shall have an adequate number of flush lavatories (toilets); which do not open directly into the working areas'
5.7 Shall have adequate number of wash basins with hand cleaning agents.

6. ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

The industry will promote responsible and sustainable management practices to ensure the preservation and enhancement of the natural environment. Facilities shall not damage or alter the conditions of coastal wetlands, mangroves, or seagrass beds or other ecological communities near the production site.

6.1 Site selection shall not result in destruction of mangrove and or public wetlands:
6.2 Site selection for a marine hatchery shall be done in an environmentally suitable location.
6.3 The hatchery site shall be outside any mangrove area or wetland or environmentally sensitive area.
6.4 Hatchery construction and operations shall not result in any loss of mangroves or wetlands or affect sensitive coastal ecosystems or sanctuaries.
6.5 The site must permit easy transportation of hatchery inputs and outputs.
6.6 The site must have easy access to good quality sea water and fresh water.
6.7 Operation of a marine shrimp hatchery 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.
6.8 Hatchery operations shall not pollute the environment.

6.9 Hatchery must have opportunities for waste water disposal in an environmentally acceptable way.

7. BROODSTOCK MANAGEMENT

Note: While other countries in Southeast Asia and the Indian sub-continent have allowed the importation of non-native Specific Pathogen Free (SPF) stocks, specifically *Litopenaeus vannamei*, Bangladesh remains a major producer of the indigenous species, *Penaeus monodon,* and relies on the capture of mature females for PL production. Several countries as well as private companies are developing, or attempting to develop, domesticated lines of SPF *Penaeus monodon*. The progress of these efforts should be monitored by Bangladesh authorities and commercial operators. SPF *monodon* may offer advantages over locally sourced wild broodstock at some point in the future.

Broodstock Origin:

7.1 Hatcheries shall use only local species collected from local environment and shall not import any shrimp or use any non-native species without documented approval from the national authorities and observing the national quarantine rules for importation of live animals.

7.2 Hatchery animals shall be adequately contained and shall not have access to open water environment.

7.3 Hatchery shall use only mature brood shrimp collected from outside the 40 m exclusion zone with specially designed and equipped brood shrimp collection crafts. Broodstock shall not be collected with commercial trawlers.

Broodstock Health:

7.4 Hatcheries shall establish a documented shrimp health monitoring plan and control procedures to minimize the risk of disease.

7.5 Hatcheries shall not use any unchecked or PCR-positive, or virus-infected brood shrimp for the propagation of hatchery-produced post-larvae (PL).

7.6 Hatcheries shall properly dispose of infected or dead shrimp; either by burning or burying the infected or dead animals.

8. SAFE DISCHARGE OF LIQUID AND SOLID WASTE:

8.1 Hatcheries shall monitor effluent water at least bi-monthly to confirm that the hatchery effluent water meets the following standards.

Parameter	Units	Standard
pH	Standard pH units	6.0 – 9.0
Total suspended solids (TSS)	mg/L	Not more than 50
Soluble phosphorus	mg/L	0.3 or less
Total ammonia nitrogen (TAN)	mg/L	3.0 or less
5-day biochemical oxygen demand (BOD_5)	mg/L	30 or less
Dissolved oxygen (DO)	mg/L	5 or more

[Biochemical oxygen demand or **BOD** is a chemical procedure for determining the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period. It is not a precise quantitative test, although it is widely used as an indication of the organic quality of water. It is most commonly expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20 °C.]

8.2 Hatcheries shall treat the waste water before discharging it into any open water system to assure that the BOD of the discharged water meets the above criteria and is not in excess of that of the open water.
8.3 Discharged water shall not contain residues of any uncertified chemicals.
8.4 Human waste/sewage shall be disposed of responsibly to prevent entry into estuaries, water canals, or the environment.

9. Storage and Disposal of Hatchery Supplies:

9.1 Fuel, lubricants, and agricultural chemicals shall be stored and disposed of in a safe and responsible manner.
9.2 Fuel and other combustible materials storage areas shall be marked with appropriate warning signs.
9.3 Paper and plastic refuse shall be disposed of in a sanitary and responsible way.
9.4 All chemicals shall be properly labeled including information on chemical composition, potential safety hazards and expiration date.
9.5 Fuels, lubricants and chemicals should not be stored in or near living quarters, kitchen and dining areas or harvest equipment storage areas.
9.6 Hatcheries shall take precautions to avoid spills or explosions.
9.7 Measures shall be taken to exclude pests.
9.8 Garbage and other solid waste including hatchery packing materials shall be properly disposed of; either by removal or burning or composting in an environmentally acceptable manner.

10. FOOD SAFETY

Drug and Chemical Management:

10.1 Banned antibiotics, drugs and other chemical compounds shall not be used. Of particular interest are **chloramphenicol** and the **nitrofuran** group. These antibiotics are banned in all countries and should never be used under any circumstances.
10.2 Other therapeutic agents may be used as directed on product labels for control of diagnosed diseases or required management, and not for general prophylactic or preventive purposes.
10.3 All hatcheries shall maintain a record-keeping system that will document use of any approved antibiotic, chemical treatment and or other therapeutants.

11. SELLING AND TRANSPORTATION OF PL

11.1 Minimum age for sale of PL:
(i) Hatchery shall not sell PL younger than PL-10 to farmers.

Techniques to be used:

11.2 Hatchery shall sell PL only in polyethylene bags supplied with adequate oxygen.
11.3 Hatchery shall use insulated carrier and ice for long distance transportation of the PL to maintain a relatively low and stabilized (20 – 22 ºC) temperature of the water containing the PL.
11.4 Hatchery shall adjust (acclimate) the PL close to the salinity of the farming areas.
11.5 Hatchery shall ensure that the water used in the oxygen bag is free from prohibited chemicals.
11.6 Hatchery must mention on PL bags:
(i) Age of the PL in days
(ii) Adjusted salinity level (*P. monodon*)
11.7 Supplier Declaration. Written declaration that the PL are not infected with WSSV or YHV and free from prohibited antibiotics and other prohibited chemicals.

12. BIOSECURITY

Since most disease outbreaks can be traced to the importation of infected stocks or the use of unscreened wild (ocean-caught) stocks it is imperative that hatcheries implement robust biosecurity measures to prevent inadvertent contamination of the facility. These measures shall address personnel as well as broodstock and PL items.

12.1 Dead shrimp or PL shall be burned or responsibly buried.
12.2 Hatchery discharge water will be treated to eliminate potential disease organisms.
12.3 Hatchery shall have disinfecting foot baths at the entry of the hatchery.
12.4 Visitors shall register at hatchery office. No visitor that has visited another hatchery in the last 48 hours shall be granted admittance to the hatchery.
12.5 All vessels used to transport PL shall be thoroughly cleaned and disinfected prior to re-use for PL shipment.
12.6 Workers shall be trained in the importance of hatchery biosecurity.

13. TRACEABILITY RECORDS

[Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish and other aquaculture product to EU countries]

13.1 Hatchery shall systematically record sources (geographical areas), for all suppliers and dates of brood- stocks received.
13.2 Shall maintain records of all drugs used, sources of drugs, reasons for use and dates and dosages of application.
13.3 Shall maintain records of the sources of feeds, dates and quantities used.
13.4 Shall maintain records of the buyers' names and addresses along with dates, PL number and lot number of the PL sold to each buyer.

2. Galda (*Macrobrachium*) Shrimp Hatchery

1. LEGAL OWNERSHIP AND RIGHT TO THE USE OF THE HATCHERY LAND AND INFRASTRUCTURE

The human rights, including resources rights of local populations should be respected in accordance with all relevant national laws and international treaties. In particular, agricultural lands to be converted to shrimp aquaculture should not be acquired by coercion. The terms of all leases should be respected. The rights of local communities particularly those involved in subsistence and small scale fishing and agriculture to a secure and just livelihood must be respected.

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3.4 Hatcheries shall not interfere with other normal activities of the ~~place~~ local community.

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4.1 Hatcheries shall comply with National Labour Law applicable to hatcheries.

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4.3 Shall not employ child labor.

4.4 There shall be no discrimination, abuse, or harassment based on gender, age, or religion in employment, including hiring, salary benefits, advancement, discipline, termination or retirement.

4.5 Workers who take maternity leave must not face dismissal nor the threat of dismissal, loss of seniority or deduction of wages and must be able to return to their former employer at the same rates of pay and benefits.
4.6 There must not be any use of bonded or forced labor.
4.7 Facility owners and employees shall respect the religious, cultural, and traditional beliefs and practices of the local community.

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The industry will promote responsible and sustainable management practices to ensure the preservation and enhancement of the natural environment. Facilities shall not damage or alter the conditions of coastal wetlands, mangroves, or seagrass beds or other ecological communities near the production site.

6.1. Site selection shall not result in destruction of mangrove and or public wetlands:
6.2. Site selection for a marine hatchery shall be done in an environmentally suitable location.
6.3. The hatchery site shall be outside any mangrove area or wetland or environmentally sensitive area.
6.4. Hatchery construction and operations shall not result in any loss of mangroves or wetlands or affect sensitive coastal ecosystems or sanctuaries.
6.5. The site must permit easy transportation of hatchery inputs and outputs.
6.6. The site must have easy access to good quality sea water and fresh water.
6.7. Operation of a marine shrimp hatchery 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.
6.8. Hatchery operation shall not pollute the environment.
6.9. Hatchery must have opportunities for waste water disposal in an environmentally acceptable way.

7. BROODSTOCK MANAGEMENT

Broodstock Origin:

7.1. Hatcheries shall use only local species collected from local environment and shall not import any shrimp or use any non-native species without documented approval from the national authorities and observing the national quarantine rules for importation of live animals.

7.2. Hatchery animals shall be adequately contained and shall not have access to open water environment.

7.3. Hatchery shall use only mature brood shrimp collected from outside the 40 m zone with specially designed and equipped brood shrimp collection crafts, not with commercial trawlers.

Broodstock Health:

7.4. Hatcheries shall establish a documented shrimp health monitoring plan and control procedures to minimize the risk of disease.

7.5. Hatcheries shall not use any unchecked or PCR-positive, or virus-infected brood shrimp for propagation hatchery-produced post-larvae (PL).

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8.1. Hatcheries shall monitor effluent water at least bi-monthly to confirm that the hatchery effluent water meets the following standards.

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8.2. Hatchery shall treat the waste 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.

8.3. Discharged water shall not contain residues of any uncertified chemicals.

8.4. Human waste/sewage shall be disposed of responsibly to prevent entry into estuaries, water canals, or the environment.

9. Storage and Disposal of Hatchery Supplies:

9.1. Fuel, lubricants, and agricultural chemicals shall be stored and disposed of in a safe and responsible manner.

9.2. Fuel and combustible materials storage areas shall be marked with appropriate warning signs.

9.3. Paper and plastic refuse shall be disposed of in a sanitary and responsible way.

9.4. All chemicals shall be properly labeled including information on chemical composition, potential safety hazards and expiration date.
9.5. Fuels, lubricants and chemicals should not be stored in or near living quarters, kitchen and dining areas or harvest equipment storage areas.
9.6. Hatcheries shall take precautions to avoid spills or explosions.
9.7. Measures shall be taken to exclude pests.
9.8. Garbage and other solid waste including hatchery packing materials shall be properly disposed of; either by removal or burning or composting in an environmentally acceptable manner.

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10.1. Banned antibiotics, drugs and other chemical compounds shall not be used. Of particular interest are chloramphenicol and the nitrofuran group. These antibiotics are banned in all countries and should never be used under any circumstances.
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11.3. Hatchery shall use insulated carrier and ice for long distance transportation of the PL to maintain a relatively low and stabilized (20 – 22 C) temperature of the water containing the PL.
11.4. Hatchery shall ensure that the water used in the oxygen bag is free from prohibited chemicals.
11.5. Hatchery must mention on PL bags:
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11.7 Declaration. Written declaration that the PL are not infected with WSSV or YHV and free from prohibited antibiotics and other prohibited chemicals.

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12.6. Workers shall be trained in the importance of hatchery biosecurity.

13. TRACEABILITY RECORDS

[Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish and other aquaculture product to EU countries]

13.1. Hatchery shall systematically record sources (geographical areas), for all suppliers and dates of brood- stocks received.
13.2. Shall maintain records of all drugs used, sources of drugs, reasons for use and dates and dosages of application.
13.3. Shall maintain records of the sources of feeds, dates and quantities used.
13.4. Shall maintain records of:
- (i) Buyers' names and addresses along with dates
- (ii) PL number and lot number of the PL sold to each buyer
- (iii) Names and addresses along with dates
- (iv) PL number and lot number of the PL sold to each buyer.

1.1 Record keeping should be done as per the format to be given by the Competent Authority.

3. Black Tiger or Bagda Shrimp (*Penaeus monodon*) Farm

Shrimp productivity depends to a large extent on good animal husbandry. Production efficiencies can often be increased with little additional cost, either in monetary or environmental terms. For instance, overstocking and stocking PL directly to the grow-out pond without any acclimatization, predator control or nursing can cause high mortalities. Water management is critical to coastal shrimp aquaculture.

Disease can cause heavy losses and can be difficult to control and isolate when disease management is lacking, when traceability of PL supplies is limited and when the design of water supply/flushing structures is poor. Poor pond water quality management also leads to higher levels of animal stress and disease-related mortality. The following management practices are recommended to improve productivity, reduces the risk of disease, and reduces the potential for conflicts over land and water use.

1. LEGAL OWNERSHIP OR RIGHT TO THE USE OF THE FARM LAND AND INFRASTRUCTURE

1.1 The farm operator must have legal documentation that proves he has the legal rights to use the farm either as an owner or as a leaseholder.

1.2 In case the farm operator is a leaseholder, he will have to have a lease document with clearly spelt out conditions and signed both by the lease holder and the farm owner.

1.3 The lease holder must have a lease money clearance certificate from the farm owner.

1.4 Both farm owner and lessee must a copy of the lease document with details of lease conditions and signed by each party and at least one witness for each party.

2. REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

2.1 The farm must be registered with the Department of Fisheries or any Government of Bangladesh (GOB) authorized organization.

2.2 License to the farm will be given only if the farm is in compliance with the country's ~~set~~ established regulations with respect to social responsibilities, environmental sustainability, food safety and local development plans.

3. COMMUNITY HARMONY

3.5 Farms shall work in harmony with the local community.

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

3.7 Farm sea water intake and outlet pipes, wells or other structures shall not cause erosion or other physical damage to the shoreline or beachfront where they are located.

3.8 Farm shall not interfere with other normal activities of the ~~place~~ local community.

4. **LABOUR STANDARD COMPLIANCE**

4.1 Farm shall comply with National Labour Law applicable to hatcheries.

4.2 Farm shall compensate all workers according to applicable national regulation. Payroll and or compensation records shall be maintained for all employees and be available for inspection.
4.3 Shall not employ child labor.
4.4 There shall be no discrimination, abuse, or harassment based on gender, age, or religion in employment, including hiring, salary benefits, advancement, discipline, termination or retirement.
4.5 Workers who take maternity leave must not face dismissal nor threat of dismissal, loss of seniority or deduction of wages and must be able to return to their former employer at the same rates of pay and benefits.
4.6 There must not be any use of bonded or forced labor.
4.7 Facility owners and employees shall respect the religious, cultural, and traditional beliefs and practices of the local community.

5. WORKERS' HEALTH AND HYGIENE ISSUES

Working conditions (and employee living conditions, where applicable) shall be safe and healthy for all workers in accordance with national laws and regulations and International Organization standards. Employers must conduct risk assessments to identify hazards and any risk to the health and safety of the employees, take reasonable steps to eliminate or control these risks, and inform, educate, and protect the employees from these risks.

5.1 All workers handling shrimp products shall have a valid medical certificate that verifies that they are not suffering from any contagious or communicable disease.
5.2 A person with a contagious or communicable disease shall not be permitted access into the farm.
5.3 Workers shall be instructed and/ or trained in animal health as relates to the shrimp farm, food and personal hygiene matters related with their work activities. All training shall be properly documented, as follows:
    (i) Training location, date and subject material
    (ii) Name and qualifications of Trainer
    (iii) Names and responsibilities of attendees
5.4 Workers shall be provided with adequate training in the application of the HACCP principles and good hygiene practices.
5.5 Workers shall wear sanitary clothing dress while working at the farm.
5.6 The farm shall have an adequate number of flush lavatories (toilets); which do not open directly into the working areas
5.7 Shall have adequate number of wash basins with hand cleaning agents.

6. ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

The shrimp farming industry will promote responsible and sustainable management practices to ensure the preservation and enhancement of the natural environment. Facilities shall not damage or alter the conditions of coastal wetlands, mangroves, or seagrass beds or other ecological communities near the production site.

6.1 **Farm Site Selection and Saving Mangroves:**

6.1.1 Any new farm shall be located outside the mangrove area and shall not cause any damage to neighboring mangrove cover.

6.1.2 Mangroves shall not be removed for the construction of ponds, canals or any other purpose.

6.1.3 Any existing farm in a mangrove area shall plant mangrove plants on the strip of land, if existing and available to him, in between the adjacent river and the riverward dike of the farm.

6.1.4 The farm shall not occupy any part of common property wetland or obstruct or interfere with the flowing canal.

6.1.5 Site selection shall not result in destruction of ~~saving~~ mangrove and or public wetlands:

6.1.6 Site selection for a shrimp farm shall be done in an environmentally suitable location.

6.1.7 The farm site shall be outside any mangrove area or wetland or environmentally sensitive area.

6.1.8 Farm construction and operations shall not result in any loss of mangroves or wetlands or affect sensitive coastal ecosystems or sanctuaries.

6.1.9 The site must permit easy transportation of farm inputs and outputs.

6.1.10 The site must have easy access to good quality sea or brackish water, suitable for the culture of *Penaeus monodon*.

6.1.11 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.

6.1.12 Farm operations shall not pollute the environment.

6.1.13 Farm must dispose of waste water in an environmentally acceptable way.

6.2 **Farm Design, Construction and Operation:**

6.2.1 Design and construction of the farm dikes, intake or drainage canals or the sluice gates shall not result in loss of any mangrove or erosion of river banks or neighboring land.

6.2.2 Shall not obstruct or change the flow of any neighboring canal.

6.2.3 Pond construction shall not expose any acid-sulfate soil.

6.2.4 Shall not cause soil erosion.

6.2.5 Pond's effective depth will be 1.0 – 1.5 meters.

6.2.6 Pond should have sufficient freeboard (height above pond operation level) to avoid overtopping during severe rains or floods.

6.3 **Water Conservation:**

6.3.1 Pond will use only surface water, no underground (bore) water.

6.3.2 Farm construction and operations shall not allow any saline water to seep into neighboring agricultural land or cause salinization of underground water supplies (aquifers).

6.4 **PL Source:**

6.4.1 For the sake of environmental sustainability, farmers shall not use PL from wild sources as this reduces natural bio-diversity and compromises traceability, but shall use PL from a certified hatchery.

6.4.2 Farmer shall use only PCR-negative and disease-free healthy hatchery PL.

6.4.3 Farm shall comply with government regulations regarding the importation of native and exotic shrimp seed stocks.

6.5 **Water Quality and Effluent Management:**

Shrimp productivity depends to a large extent on good animal husbandry. Production efficiencies can often be increased with little additional cost, either in monetary or environmental terms. For instance, overstocking and stocking PL directly to the grow-out pond without any acclimatization, predator control or nursing can cause high mortalities. Water management is critical to coastal shrimp aquaculture.

Disease can cause heavy losses and can be difficult to control and isolate when disease management is lacking, when traceability of PL supplies is limited and when the design of water supply/flushing structures is poor. Poor pond water quality management also leads to higher levels of animal stress and disease-related mortality. Shrimp health management should focus on disease prevention and stress reduction rather than disease treatment.

The following management practices are recommended to improve productivity, reduces the risk of disease, and reduces the potential for conflicts over land and water use.

Farms shall monitor effluent water at least bi-monthly to confirm the following:

6.5.1 Required water quality parameters

Parameter	**Units**	**Standard**
pH	Standard pH units	6.0 – 9.0
Total suspended solids (TSS)	mg/L	Not more than 50
Soluble phosphorus	mg/L	0.3 or less
Total ammonia nitrogen (TAN)	mg/L	3.0 or less
5-day biochemical oxygen demand (BOD_5)	mg/L	30.0 or less
Dissolved oxygen (DO)	mg/L	5.0 or more

6.5.2 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.

6.5.3 Water samples should be collected at a point where the effluent leaves the farm property. For farms with multiple effluent points a composite sample shall be collected.

6.6 **Biosecurity:**

6.6.1 Water exchange should be managed carefully and kept to a minimum when possible:

(i) In order to not impact the environment with excess effluents.

(ii) To avoid introduction of potential disease carrying vectors (crabs, other shrimp species, etc.)

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

6.6.3 A fine mesh fence, at least two feet high and buried six inches into the ground, can be built around the perimeter of the shrimp farm to keep out virus carrying crabs and other small animal pests.

6.6.4 Gates and barriers should be constructed to keep dogs and farm animals out.

6.6.5 Visitors shall register at farm office. No visitor that has visited another farm in the last 48 hours shall be granted admittance.

6.6.6 All vessels used to transport PL shall be thoroughly cleaned and disinfected prior to re-use for PL shipment.

6.6.7 Workers shall be trained in the importance of farm biosecurity.

6.7 **Sediment Management:**

6.7.1 Farms shall contain sediment from ponds, canals, and settling basins and not throw them into open water or others' land causing ecological or social problems.

6.8 **Fisheries Resources Conservation:** The conservation of marine fisheries resources (fish meal and fish oil) is a growing concern for the entire aquaculture community. All shrimp and fish farmers should be aware of the amounts and sources of the formulated feeds offered to their products.

6.8.1 Feed Conversion Ratio (FCR): Farms should record the FCR for each harvest according to the following formula:

FCR = Total Amount of Feed Fed ÷ Total Amount of Shrimp Produced

7. STORAGE AND DISPOSAL OF FARM SUPPLIES

Farms use fuel to power aerators tractors and other farm vehicles. Farms likewise use agricultural chemicals for fertilizer and cleaning and disinfection. Improper storage of these materials presents a potential environmental and worker safety issue. Food safety can also be compromised if these materials are stored in such a way that could lead to cross contamination.

7.1 Fuel, lubricants, and agricultural chemicals shall be stored and disposed of in a safe and responsible manner**.**

7.2 Paper and plastic refuse shall be disposed of in a sanitary and responsible way.

7.3 All chemicals shall be properly labeled including information on chemical composition, potential safety hazards and expiration date.

7.4 Fuels, lubricants and chemicals should not be stored in or near living quarters, kitchen and dining areas or harvest equipment storage areas.

7.5 Farms shall take precautions to avoid spills or explosions.

7.6 Measures shall be taken to exclude pests.

7.7 Garbage and other solid waste shall be properly disposed of; either by removal or burning or composting in an environmentally acceptable manner.

8. FOOD SAFETY

8.1 **Microbial Sanitation:**

8.1.1 Cow dung, poultry litter and human wastes shall not be used as fertilizers in ponds.

8.1.2 No animal or bird pets shall be allowed inside the farm premises.

8.1.3 No run off water likely to carry pathogenic bacteria shall be allowed to enter the ponds.

8.2 **Drug and Chemical Management:**

8.2.1 A land having a history of agricultural pesticide contamination, particularly with long life pesticides, shall not be used**.**

8.2.2 Agricultural pesticides with long residual effect shall not be used in the field used for agriculture-aquaculture rotation.

8.2.3 Banned antibiotics, drugs and other chemical compounds shall not be used any time. Of particular interest are chloramphenicol and the nitrofuran group. These antibiotics are banned in all countries and should never be used under any circumstances.

8.2.4 Approved therapeutic or curative agents may be used as directed on product labels for control of diagnosed diseases or required management**.**

8.2.5 Drugs shall not be used for prophylactic or preventive purposes**.**

8.2.6 Withdrawal period as prescribed by the pharmaceutical company for any curative medicine shall be followed.

9. FEED AND FEED MANAGEMENT:

9.1 Feed or feed ingredients not certified by the manufacturers to be free from non-approved antibiotics, drugs or other chemicals including artificially formulated growth hormones, shall not be used (procuring safe feed is the responsibility of the farm operator).

9.2 Any uncooked feed ingredients of animal origin shall not be used.

9.3 The use of supplemental feeds should be managed and controlled to limit over feeding, improve the food conversion ratio, and minimize contamination of the pond and outside environment feeding frequency/day.

9.4 Feed that contains shrimp, or shrimp processing by-products or crab shell, shall not be used.

9.5 Any oversupply of feed shall be strongly discouraged to avoid water pollution, besides wastage of expensive feed.

10. HARVEST AND TRANSPORT

10.1 **Shed and Shrimp Dumping Facilities at Harvesting Points:**

10.1.1 The farm shall have a clean shed with a raised and smooth cemented or mosaic floor for dumping and sorting shrimp after harvest; if such a platform not possible, place shrimp on a thick and clean plastic sheet spread under the shed.

10.1.2 Farms shall use only certified plastic baskets for holding shrimp.

10.1.3 Farm shall not use any bamboo baskets and mats of bamboo, jute or other plant materials.

10.2 **Water Supply:**

10.2.1 Farm shall have adequate supply of clean water for washing shrimp, shrimp handling and transport equipment and all other facilities.

10.2.2 Farm shall have supply of drinking water for the workers.

10.3 **Ice supply:**

10.3.1 Farm shall have adequate ice storage facilities made of materials that can be effectively cleaned and disinfected regularly.

10.3.2 Ice shall be procured only from those factories that are certified by the appropriate authorities to have used water free from arsenic or excessive iron and is of acceptable microbiological standard.

10.4 **Synchronizing Farm Harvesting and Shrimp Transportation to Depot/Processing Factory at the Earliest to Ensure Freshness of the Shrimp:**

10.4.1 Farmer and depot or its agents will work together to synchronize harvesting at the farms, supplying adequate ice of good hygienic quality to the farms, transporting of the shrimp in ice to depot and then to factories within the shortest possible time to ensure shrimp freshness and more efficiently utilize the processing facilities.

10.4.2 The supplier or its agent will organize and supervise shrimp harvest, gather shrimp in the farm side shed, wash the shrimp in clean water and put the shrimp in ice water filled chill tank as soon after harvest as possible to cool the shrimp uniformly to temperature below 5 ^{o}C.

10.4.3 Put the shrimp in shrimp box with layers of high quality flake or finely crushed block ice in 1:1 ratio.

10.4.4 Transport the iced shrimp in insulated motor van / carrier vessel to depot soonest; in the absence of an insulated motor van, use a paddle van, but it must have a hood providing adequate shade to the shrimp boxes.

10.5 **Daily Cleaning and Sanitation – Standard Operating Procedure (SOP):**

10.5.1 Sweeping to remove solid wastes and dirt particles**.**

10.5.2 Rinse to remove fine particles of dirt**.**

10.5.3 Apply alkaline or chlorinated alkaline detergent, workout foam with a brush or ‘green pad’and thoroughly clean shrimp dumping floor or plastic sheet, weighing balance, fish boxes, ice crushing box, iced water cooling tank, etc.

10.5.4 Rinse with safe water**.**

10.5.5 Apply sanitizer in the form of 100-200 ppm chlorine water to shrimp dumping floor, plastic sheet, shrimp boxes, ice crushing boxes, cooling tank weighing balance, etc.

10.5.6 After cleaning and sanitizing, completely dry all parts**.**

10.5.7 Keep lavatories clean and disinfected all the times**.**

10.5.8 Nobody with any contagious disease or wounds in hands should be allowed to handle shrimp.

11. TRACEABILITY RECORDS

[Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish to EU countries]

11.1 Farm shall systematically record data in the DoF prescribed Record Book.

11.2 Pre-stocking pond preparation data:

(i) Date and quantities of lime.

(ii) Fertilizers or other chemicals used.

11.3 Supply water sources and chemical and microbiological data.

11.4 Shall maintain records of all drugs used, sources of drugs, reasons for use and dates and dosages of application.

11.5 Shall maintain records of the sources of feeds, dates and quantities used.

11.6 Shall maintain records of sources of PL.

11.7 Shall maintain records of the shrimp buyers' names and addresses along with dates.

4. Galda (*Macrobrachium*) Shrimp Farms

1. LEGAL OWNERSHIP OR RIGHT TO THE USE OF THE FARM LAND AND INFRASTRUCTURE

1.1 The farm operator must have legal documentation that proves he has the legal rights to use the farm either as an owner or as a leaseholder.

1.2 In case the farm operator is a leaseholder, he will have to have a lease document with clearly spelt out conditions and signed both by the lease holder and the farm owner.

1.3 The lease holder must have a lease money clearance certificate from the farm owner.

1.4 Both farm owner and lessee must a copy of the lease document with details of lease conditions and signed by each party and at least one witness for each party.

2. REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

2.1 The farm must be registered with the Department of Fisheries or any Government of Bangladesh (GOB) authorized organization.

2.2 License to the farm will be given only if the farm is in compliance with the country's ~~set~~ established regulations with respect ~~of~~ to social responsibilities, environmental sustainability, food safety and local development plans.

3. COMMUNITY HARMONY

3.1 Farms shall work in harmony with the local community.

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

3.3 Farm sea water intake and outlet pipes, wells or other structures shall not cause erosion or other physical damage to the shoreline or beachfront where they are located.

3.4 Farm shall not interfere with other normal activities of the local community.

4. **LABOUR STANDARD COMPLIANCE**

4.1 Farm shall comply with National Labour Law applicable to hatcheries.

4.2 Farm shall compensate all workers according to applicable national regulation. Payroll and or compensation records shall be maintained for all employees and be available for inspection.

4.3 Shall not employ child labor.

4.4 There shall be no discrimination, abuse, or harassment based on gender, age, or religion in employment, including hiring, salary benefits, advancement, discipline, termination or retirement.

4.5 Workers who take maternity leave must not face dismissal nor threat of dismissal, loss of seniority or deduction of wages and must be able to return to their former employer at the same rates of pay and benefits.

4.6 There must not be any use of bonded or forced labor.

4.7 Facility owners and employees shall respect the religious, cultural, and traditional beliefs and practices of the local community.

5. WORKERS' HEALTH AND HYGIENE ISSUES

Working conditions (and employee living conditions, where applicable) shall be safe and healthy for all workers in accordance with national laws and regulations and International Organization standards. Employers must conduct risk assessments to identify hazards and any risk to the health and safety of the employees, take reasonable steps to eliminate or control these risks, and inform, educate, and protect the employees from these risks.

5.1 All workers handling shrimp products shall have a valid medical certificate that verifies that they are not suffering from any contagious or communicable disease.
5.2 A person with a contagious or communicable disease shall not be permitted access into the farm.
5.3 Workers shall be instructed and/ or trained in animal health as relates to the shrimp farm, food and personal hygiene matters related with their work activities. All training shall be properly documented, as follows:
    (i) Training location, date and subject material
    (ii) Name and qualifications of Trainer
    (iii) Names and responsibilities of attendees
5.4 Workers shall be provided with adequate training in the application of the HACCP principles and good hygiene practices.
5.5 Workers shall wear sanitary clothing dress while working at the farm.
5.6 The farm shall have an adequate number of flush lavatories (toilets); which do not open directly into the working areas
5.7 Shall have adequate number of wash basins with hand cleaning agents.

6.0 ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

The Macrobrachium farming industry will promote responsible and sustainable management practices to ensure the preservation and enhancement of the natural environment. Facilities shall not damage or alter the conditions of coastal wetlands, mangroves, or seagrass beds or other ecological communities near the production site.

6.1 Site Selection:

Site selection for a shrimp farm shall be done in an environmentally suitable location. Site selection shall not result in destruction of public wetlands. Any new farm shall be located outside the wetland area and shall not cause any damage to neighboring aquatic resources.

6.1.1 Wetlands or other ecologically important habitats shall not be removed for the construction of ponds, canals or any other purpose.
6.1.2 Any existing farm in a wetland area shall plant native plants on the strip of land, if existing and available to him, in between the adjacent river and the riverward dike of the farm.
6.1.3 The farm shall not occupy any part of common property wetland or obstruct or interfere with the flowing canal.
6.1.4 The site must permit easy transportation of farm inputs and outputs.
6.1.5 The site must have easy access to good quality fresh or brackish water, suitable for the culture of *Macrobrachium*.
6.1.6 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.
6.1.7 Farm operations shall not pollute the environment.
6.1.8 Farm must dispose of waste water in an environmentally friendly acceptable way.

6.2 Design, construction and operation

6.2.1 Design and construction of the farm dikes, intake or drainage canals or the sluice gates shall not result in loss of any wetland or erosion of river banks or neighboring land.

6.2.2 Shall not obstruct or change the flow of any neighboring canal.

6.2.3 Pond construction shall not expose any acid-sulfate soil.

6.2.4 Shall not cause soil erosion.

6.2.5 Water from one pond shall not have access to another pond

6.2.6 Pond's effective depth will be 1.0 – 1.5 meters.

6.2.7 Pond should have sufficient freeboard (height above pond operation level) to avoid overtopping during severe rains or floods.

6.3.1 **Water Quality and Effluent Management**

Shrimp productivity depends to a large extent on good animal husbandry. Production efficiencies can often be increased with little additional cost, either in monetary or environmental terms. For instance, overstocking and stocking PL directly to the grow-out pond without any acclimatization, predator control or nursing can cause high mortalities. Water management is critical to coastal shrimp aquaculture.

Disease can cause heavy losses and can be difficult to control and isolate when disease management is lacking, when traceability of PL supplies is limited and when the design of water supply/flushing structures is poor. Poor pond water quality management also leads to higher levels of animal stress and disease-related mortality. Shrimp health management should focus on disease prevention and stress reduction rather than disease treatment.

The following management practices are recommended to improve productivity, reduces the risk of disease, and reduces the potential for conflicts over land and water use.

Farm shall monitor effluent water at least bi-monthly to confirm the following:

6.3.2 Required water quality parameters

Parameter	**Units**	**Standard**
pH	Standard pH units	6.0 – 9.0
Total suspended solids (TSS)	mg/L	Not more than 50
Soluble phosphorus	mg/L	0.3 or less
Total ammonia nitrogen (TAN)	mg/L	3.0 or less
5-day biochemical oxygen demand (BOD_5)	mg/L	30.0 or less
Dissolved oxygen (DO)	mg/L	7 or more

6.3.3 Farm 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.

6.3.4 Water samples should be collected at a point where the effluent leaves the farm property. For farms with multiple effluent points a composite sample shall be collected.

6.4 Sediment Management

6.4.1 Farms shall contain sediment from ponds, canals, and settling basins and not throw them into open water or others' land causing ecological or social problems.

6.5 Soil/Water Conservation

The opinion of the Best Aquaculture Practices (BAP) Program is that underground water resources may be used but with careful monitoring to insure that aquifers are not negatively affected.

6.5.1 Pond will use only surface water and shall not draw underground water for farming purpose.

6.5.2 Farm construction and operations shall not allow any saline water to seep into neighboring agricultural land

6.6 **Biosecurity:**

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

6.6.4 Gates and barriers should be constructed to keep dogs and farm animals out.

6.6.5 Visitors shall register at farm office. No visitor that has visited another farm in the last 48 hours shall be granted admittance.

6.6.6 All vessels used to transport PL shall be thoroughly cleaned and disinfected prior to re-use for PL shipment.

6.6.7 Workers shall be trained in the importance of farm biosecurity.

6.7 **Fisheries Resources Conservation:**

The conservation of marine fisheries resources (fish meal and fish oil) is a growing concern for the entire aquaculture community. All shrimp and fish farmers should be aware of the amounts and sources of the formulated feeds offered to their products.

6.7.7 Feed Conversion Ratio (FCR): Farms should record the FCR for each harvest according to the following formula:

FCR = Total Amount of Feed Fed (MT) ÷ Total Amount of Shrimp Produced (MT)

7. **Storage and Disposal of Farm Supplies**

Farms use fuel to power aerators tractors and other farm vehicles. Farms likewise use agricultural chemicals for fertilizer and cleaning and disinfection. Improper storage of these materials presents a potential environmental and worker safety issue. Food safety can also be compromised if these materials are stored in such a way that could lead to cross contamination.

7.1 Fuel, lubricants, and agricultural chemicals shall be stored and disposed of in a safe and responsible manner**.**

7.2 Paper and plastic refuse shall be disposed of in a sanitary and responsible way.

7.3 All chemicals shall be properly labeled including information on chemical composition, potential safety hazards and expiration date.

7.4 Fuels, lubricants and chemicals should not be stored in or near living quarters, kitchen and dining areas or harvest equipment storage areas.

7.5 Farms shall take precautions to avoid spills or explosions.

7.6 Measures shall be taken to exclude pests.

7.7 Garbage and other solid waste shall be properly disposed of; either by removal or burning or composting in an environmentally acceptable manner.

8. FOOD SAFETY

8.1 Microbial Sanitation:

8.1.1 Cow dung, poultry litter and human wastes shall not be used as fertilizers in ponds.

8.1.2 No animal or bird pets shall be allowed inside the farm premises.

8.1.3 No run off water likely to carry pathogenic bacteria shall be allowed to enter the ponds.

8.2 Drug and Chemical Management:

8.2.1 A land having a history of agricultural pesticide contamination, particularly with long life pesticides, shall not be used**.**

8.2.2 Agricultural pesticides with long residual effect shall not be used in the field used for agriculture-aquaculture rotation.

8.2.3 Banned antibiotics, drugs and other chemical compounds shall not be used any time. Of particular interest are chloramphenicol and the nitrofuran group. These antibiotics are banned in all countries and should never be used under any circumstances. Also for Macrobrachium the use of Malachite Green and Gentian violet is prohibited.

8.2.4 Approved therapeutic or curative agents may be used as directed on product labels for control of diagnosed diseases or required management**.**

8.2.5 Drugs shall not be used for prophylactic or preventive purposes**.**

8.2.6 Withdrawal period as prescribed by the pharmaceutical company for any curative medicine shall be followed.

9. FEED AND FEED MANAGEMENT

9.1 Feed or feed ingredients not certified by the manufacturers to be free from non-approved antibiotics, drugs or other chemicals including artificially formulated growth hormones , shall not be used (procuring safe feed is the responsibility of the farm operator).

9.2 Any uncooked feed ingredients of animal origin shall not be used.

9.3 The use of supplemental feeds should be managed and controlled to limit over feeding, improve the food conversion ratio, and minimize contamination of the pond and outside environment feeding frequency/day.

9.4 Any oversupply of feed shall be strongly discouraged to avoid water pollution, besides wastage of expensive feed.

10. HARVEST AND TRANSPORT

10.1 Shed and Shrimp Dumping Facilities at Harvesting Points

10.1.1 The farm shall have a clean shed with a raised and smooth cemented or mosaic floor for dumping and sorting shrimp after harvest; if such a platform not possible, place shrimp on a thick and clean plastic sheet spread under the shed.

10.1.2 Farms shall use only certified plastic baskets for holding shrimp.

10.1.3 Farm shall not use any bamboo baskets and mats of bamboo, jute or other plant materials.

10.2 **Water Supply:**

10.2.1 Farm shall have adequate supply of clean water for washing shrimp, shrimp handling and transport equipment and all other facilities.

10.2.2 Farm shall have supply of drinking water for the workers.

10.3 **Ice Supply:**

10.3.1 Farm shall have adequate ice storage facilities made of materials that can be effectively cleaned and disinfected regularly.

10.3.2 Ice shall be procured only from those factories that are certified by the appropriate authorities to have used water free from arsenic or excessive iron and is of acceptable microbiological standard.

10.4 **Synchronizing Farm Harvesting and Shrimp Transportation to Depot/Processing Factory at the Earliest to Ensure Freshness of the Product:**

10.4.1 Farmer and depot or its agents will work together to synchronize harvesting at the farms, supplying adequate ice of good hygienic quality to the farms, transporting of Macrobrachium in ice to depot and then to factories within the shortest possible time to ensure freshness and more efficiently utilize the processing facilities.

10.4.2 The supplier or its agent will organize and supervise harvest, gather shrimp in the farm side shed, wash the product in clean water and put in ice water filled chill tank as soon after harvest as possible to cool the product uniformly to temperature below 5C.

10.4.3 Put the Galda in boxes with layers of high quality flake or finely crushed block ice in 1:1 ratio.

10.4.4 Transport the iced product in insulated motor van / carrier vessel to depot soonest; in the absence of an insulated motor van, use a paddle van, but it must have a hood providing adequate shade to the boxes.

10.5 **Daily Cleaning and Sanitation – Standard Operating Procedure (SOP):**

10.5.1 Sweeping to remove solid wastes and dirt particles**.**

10.5.2 Rinse to remove fine particles of dirt**.**

10.5.3 Apply alkaline or chlorinated alkaline detergent, workout foam with a brush or ‘green pad’and thoroughly clean shrimp dumping floor or plastic sheet, weighing balance, fish boxes, ice crushing box, iced water cooling tank, etc.

10.5.4 Rinse with safe water**.**

10.5.5 Apply sanitizer in the form of 100-200 ppm chlorine water to shrimp dumping floor, plastic sheet, shrimp boxes, ice crushing boxes, cooling tank weighing balance, etc.

10.5.6 After cleaning and sanitizing, completely dry all parts**.**

10.5.7 Keep lavatories clean and disinfected all the times**.**

10.5.8 Nobody with any contagious disease or wounds in hands should be allowed to handle shrimp.

11. TRACEABILITY RECORDS

[Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish to EU countries]

11.1 Farm shall systematically record data in the Record Book as prescribed by the DoF (Competent Authority)

11.2 Pre-stocking pond preparation data: Date and quantities of lime, fertilizers, or other chemicals used.

11.3 Supply-water sources and chemical and microbiological data.

11.4 Shall maintain records of all drugs used, sources of drugs, reasons for use and dates and dosages of application.

11.5 Shall maintain records of the sources of feeds, dates and quantities used.

11.6 Shall maintain records of sources of PL.

11.7 Shall maintain records of the shrimp buyers' names and addresses along with dates, and quantities used.

11.8 Shall maintain records of:

(i) Buyers' names and addresses along with dates

(ii) Pond or lot number and kilos of Galda sold to each buyer.

11.9 Record keeping should be done as per the format to be given by the Competent Authority.

5. Feed Mill

1. LEGAL OWNERSHIP AND RIGHT TO THE USE OF THE FEED MILL

1.1 The farm owner must have a legal document that he has legal rights to use the feed mill either as an owner or as a leaseholder.

1.2 In case the feed miller is a leaseholder, he will have to have a lease money clearance certificate from the mill owner.

1.3 Both mill owner and lessee must a copy of the lease document with details of lease conditions and signed by each party and at least one witness for each party.

2. REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

2.1 The feed mill must be registered with the Department of Fisheries or the Competent Authority

2.2 Feed mill must have a license from the Competent Authority for manufacturing, marketing, distribution or holding of its own products

2.3 All vendors of fish and animal feed or feed ingredients must be licensed and conformed to the storage, marketing and transportation rules as set by the Competent Authority

2.4 An importer of feed ingredients or finished feed must have a license from the Competent Authority

2.5 All imported feed ingredients or finished feed must conform to the same conditions as laid down at section on Packaging Labeling as stated above.

3. HARMONY WITH THE COMMUNITY

3.1 Feed mill shall work in harmony with the local community.

3.2 Feed mill shall not deny local communities access to public mangrove areas, fishing or gathering grounds or other public resources.

4. WORKERS' HEALTH AND HYGIENE ISSUES

4.1 All workers handling feed ingredients and finished feed shall have a valid medical certificate that they are not suffering from any contagious disease.

4.2 A person with a contagious or communicable disease shall not be permitted access into the feed mill.

4.3 Workers shall be instructed and/ or trained in food hygiene matters related with their work activities.

4.4 Workers shall be provided with adequate training in the application of the HACCP principles and good hygiene practices.

4.5 Workers shall wear neat and tidy dress while working in the hatchery.

4.6 The feed factory shall have an adequate number of flush lavatories; lavatories are not to open directly into the working areas.

4.7 Shall have adequate number of wash basins with hand cleaning agents.

5. LABOUR STANDARD COMPLIANCE

5.1 Labor standard compliance.

5.2 Feed mill shall comply with country's Labor Law.

5.3 Shall have all the essential labor-related documentations as per requirements under the Labor Law and keep them up to date.

5.4 Shall strictly comply with the child labor law.

6. ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

6.1 **Construction and Operation:**

6.1.1 Feed mill construction and operations shall not cause any harm to the mangrove or other sensitive habitat.

6.1.2 Shall not cause any threat to the neighboring wetland with the factory effluents.

6.1.3 Shall not pollute or disturb the neighboring environment or any part of the ecosystem.

6.2 **Fish Meal and Fish Oil Conservation**:

Aquafeed producers have an important role to play in adopting sustainable sourcing policies, formulating and manufacturing nutritionally balanced diets that increase feed efficiency, and providing reliable information to their customers.

It is recommended that aquafeed producers actively favor marine oils and proteins derived from fisheries that are classified by reputable international third parties such as the FAO and ICES as sustainably fished, fully fished or underexploited.

One example of an appropriate tool for developing a responsible sourcing plan is the Fishsource data bank created by the Sustainable Fisheries Partnership (www.fishsource.org).

6.2.1 Feed mills shall strive to reduce dependence on wild fisheries and obtain marine meals and oils from sustainable sources. Certified mills shall provide reliable information on inclusion of such ingredients in compound feeds.

7. LOCATION, LAYOUT DESIGN AND CONSTRUCTION

7.1 **Location:**

7.1.1 The site shall be above average monsoon flood or highest high tide line.

7.1.2 Feed mill shall be easily accessible by road and /or water transports for easy and quick transport of inputs to and finished feed from the feed mill for marketing.

7.1.3 Must have easy access to and ample supply of good quality water free from excessive iron, arsenic and other heavy metals as well as other hazardous pesticides, chemicals, silt and pathogenic bacteria.

7.1.4 The environment of the feed mill shall be neat and clean.

7.2 **Layout Design and Construction**:

7.2.1 The feed mill floor shall be at least 45 cm above the surrounding ground level.

7.2.2 The floor and the walls, up to 6 ft. height, should be smooth and made of non-absorbent material fit for regular cleaning and disinfecting.

7.2.3 Permit adequate maintenance, cleaning and disinfection.

7.2.4 Avoid or minimize air-borne contamination.

7.2.5 Protect against insects, rodents, lizards, birds and pet animals that may contaminate feed ingredients and finished feed with pathogenic germs and filth.

7.2.6 Protect against the accumulation of dirt, contact with toxic materials, the shedding of particles into feed.

7.2.7 Provide adequate working space to allow hygienic performance of all operations.

7.2.8 Provide suitable handling and storage conditions of feed ingredients and feed at appropriate temperatures.

7.2.9 Provide an adequate number of flush lavatories that should not open directly into rooms in which ice is handled.

7.2.10 Provide an adequate number of washbasins suitably located and designated for cleaning hands.
7.2.11 Have foot dips with disinfectants before entering the feed making and handling areas.
7.2.12 Have adequate natural and/or artificial lighting and ventilation.
7.2.13 Have adequate drainage facilities designed and constructed to avoid the risk of contamination; waste does not flow from a contaminated area towards or into a clean area.
7.2.14 Ensure facilities for waste disposal in an environment friendly way.
7.2.15 Ensure storage area for cleaning agents and disinfectants is separated by a partition wall from the fish handling and storage areas.
7.2.16 Ensure that used water goes directly into the drain not overflowing the working areas.
7.2.17 Feed mill will have adequate solid waste disposal arrangements.
7.2.18 At the entry of the feed ingredient and finished feed storage and feed production area, there shall be a disinfecting foot-dip

8. STORAGE AND DISPOSAL OF FEED MILL SUPPLIES AND WASTE

8.1.1 Fuel, lubricants and agricultural chemicals shall be stored and disposed of in a safe and responsible manner.
8.1.2 Fuels, lubricants and chemicals should not be stored in or near living quarters, kitchen and dining areas or feed ingredient storage areas.
8.1.3 Paper and plastic refuse shall be disposed of in a sanitary and responsible way.
8.1.4 Unused or waste feed ingredients shall be segregated to avoid accidental incorporation into feeds and shall be disposed of properly.

9. FOOD SAFETY

9.1 **HACCP Plan:**

9.1.1 Feed mill shall have a current HACCP plan that documents all processes and process controls. Together with Good Manufacturing Practices (GMPs) the implementation of a HACCP plan (or equivalent) will form the basis for the systematic control of foodd safety related hazards.
9.1.2 At a minimum the hazard analysis shall address:
(i) Potential chemical contamination of ingredients with pesticides, heavy metals or other environmental contaminants.
(ii) Potential biological hazards such as *e. coli, salmonella*, etc.
(iii) For medicated feeds, the risk of mislabeling

9.2 **Use of Drug and Chemicals:**

9.2.1 Feed mill shall not use any prohibited antibiotics, growth hormones, steroids, pesticides or any other hazardous chemicals in the feed or feed ingredients, nor shall he use any feed ingredients already contaminated elsewhere with the above materials.

9.3 Feed mill shall not use shrimp, crab or other crustacean shell as a feed ingredient, since the crustacean shell may contain high levels of banned antibiotics (i.e., nitrofurans a group of prohibited antibiotics).
9.4 Feed factory must have facilities and employed the facilities for disinfecting the ingredients by steaming.

Maximum permissible level:

9.4.1 Feed mill may use any permitted chemicals provided the feed does not contain the chemicals beyond the nationally and internationally set maximum permissible levels.
9.5 No feed shall be marketed unless it is contained in an air tight packet or container with the declaration on it that the content is free from any prohibited antibiotics, growth hormones and steroids.

9.6 The package or the box shall also provide the following information:

(a) Declaration that the content of the packet is free from any prohibited antibiotics or other chemicals.
(b) Maximum Residue Level (MRL) of any restricted chemicals used.
(c) Manufacturer's name, address and Registration Number.
(d) Net weight of the feed in container.
(e) Names of ingredients used with percent composition of various nutrients.
(f) Names of the farmed shrimp, fish or other animals for which the feed is meant.
(g) Date of manufacture and date of expiry.
(h) Recommended storage temperature and other specifications.
(i) Traceability code.

10. TRACEABILITY RECORDS

[*Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish to EU countries]*

10.1 Feed mill shall systematically record detailed sources, dates and quantities of all imported or all locally procured feed ingredients, additives or any chemicals and drugs used in the feed preparations.

10.2 Feed mill shall maintain a record of selling of feed along with the names and addresses of buyers, quantities of sales by dates and buyers, etc as per requirement of the country's Competent Authority.

10.3 Shall maintain records of all drugs used, sources of drugs, reasons for use and dates and dosages of application.

6. Shrimp Collection and Service Centre / Depot

1. LEGAL OWNERSHIP OR RIGHT TO THE USE OF THE DEPOT AND INFRASTRUCTURE

1.1 The depot owner must have a legal document that he has legal rights to use the depot and the infrastructure either as owner or as a leaseholder.

1.2 In case the depot owner is a leaseholder, he will have to have a lease money clearance certificate from the depot owner.

1.3 Both depot owner and lessee must a copy of the lease document with details of lease conditions and signed by each party and at least one witness designated by each party.

2. COMMUNITY HARMONY

2.1 Depot shall work in harmony with the local community.

2.2 Depot shall not deny local communities access to public mangrove areas, fishing grounds or other public resources.

3. LABOUR LAW

3.1 Depot operators / Supplier will comply with the National Labour Law.

3.2 Depot shall not use child labour.

4. REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

4.1 Depot must be registered with the Department of Fisheries or any GoB authorized organization.

4.2 License for depot operation will be given or renewed only if the depot is in compliance with the country's set regulations in respect of food safety, social responsibilities, environmental sustainability and local development plans.

5. WORKERS' HEALTH AND HYGIENE ISSUES

5.1 Medical fitness: All workers handling shrimp must have a valid medical certificate that they are physically fit to handle shrimp and ice.

5.2 Restrictions related to worker's health: A person with a contagious or communicable disease and any wounds in hands should not be permitted to handle shrimp.

5.3 Dress: Workers should wear disinfected gum boot, hand gloves, neat and tidy dress, preferably apron and head gear, while handling shrimp.

5.4 Depot owners are to ensure that workers are supervised and instructed and/ or trained in HACCP principles and good hygiene practices related with their work activities.

6. ENVIRONMENTAL PROTECTION AND SUSTAINABILITY

6.1 Site selection saving mangrove and common property wetland

6.1.1 Any new depot shall be outside the mangrove area and shall not cause any damage to neighboring mangrove cover.

6.1.2 Any existing depot in a mangrove area shall plant mangrove plants on the strip of land, if existing and available to him, in between the adjacent river and the depot.

6.1.3 The depot does not occupy or deny access to any part of common property: road, wetland or flowing canal.

6.1.4 Must have opportunities to discharge solid and liquid wastes from the depot in an environmentally friendly way

7. FOOD SAFETY

7.1 Location

7.1.1 Site must be above highest high tide level and monsoon flood level.

7.1.2 Depot shall be easily accessible by road and /or water transports for easy transport of ice to the shrimp farms, easy landing of shrimp from farms to the depot and easy and quick transport of the shrimp to the processing plants.

7.1.3 Must have easy access to and ample supply of good quality water free from hazardous chemicals and pathogenic bacteria loads.

7.1.4 Must have easy access to hygienically safe ice.

7.2 Layout Design and Construction

7.2.1 Depot floor shall be at about 45 cm above the ground level.

7.2.2 The floor and the walls, up to 6 ft. height, should be smooth and made of non-absorbent material fit for regular cleaning and disinfecting

7.2.3 Shall have sufficient working spaces allowing efficient and hygienic operation and cleaning.

7.2.4 For dumping the shrimp, there shall be raised mosaic or tile-covered platforms, at least 30 cm high from the floor; this will protect the shrimp from being easily contaminated with dust or dirt.

7.2.5 For easy handling and sorting of the shrimp by the workers standing on foot, there shall be stainless steel tables.

7.2.6 Depot, along with its ice crushing area, will have an enclosure preventing entry of pet animals, birds and rodents.

7.2.7 Doors and windows will have insect and lizard proof screens.

7.2.8 Storage area for cleaning agents and disinfectants is to be separated by a partition wall from the fish handling and storage areas.

7.2.9 Used water should go directly into the drain not overflowing the working areas.

7.2.10 There should be an adequate number of flush lavatories; lavatories are not to open directly into the area in which fish is handled.

7.2.11 There should be an adequate number of washbasins; washbasins are to be provided with materials for cleaning and disinfecting hands.

7.2.12 Depot shall have adequate natural and artificial lighting arrangements.

7.2.13 Depot will have a good drainage system.

7.2.14 Depot will have adequate solid waste disposal arrangements.

7.2.15 At the entry of the shrimp area, there shall be a disinfecting foot-dip.

7.3 **Synchronizing farm harvesting and shrimp transportation to depot and then to factories at the earliest to ensure freshness of the shrimp.**

7.3.1 Depot and shrimp suppliers or their agents will work together to synchronize harvesting of the farms, supplying adequate ice of good hygienic quality to the farms, transporting of the shrimp in ice to depot and then to factories within the shortest possible time to ensure shrimp freshness and more efficiently utilize the processing facilities.

7.3.2 The supplier or its agent will organize and supervise shrimp harvest, gather shrimp in the farm side shed, wash the shrimp in clean water and put the

shrimp in ice water filled chill tank as soon after harvest as possible to cool the shrimp uniformly to temperature below 5C.

7.3.3 Put the shrimp in shrimp box with layers of high quality flake or finely crushed block ice in 1:1 ratio.

7.3.4 Transport the iced shrimp in insulated motor van / carrier vessel to depot soonest; in the absence of an insulated motor van, use a paddle van, but it must have a hood providing adequate shade to the shrimp boxes

7.4 Shrimp shall not be de-headed or de-shelled at farm or depot.

7.4.1 The supplier or their agent will not remove the shrimp head or shell anywhere at the field level; shrimp head or shell can be removed only at the processing factory premises under hygienic conditions**.**

7.4.2 Sorting of the shrimp either for grading or separating bad quality shrimp must be completed as soon as possible**.**

7.4.3 All handling of the shrimp must be done in hygienic flake or finely crushed ice**.**

7.4.4 Depot must use hygienic ice from certified ice factories**.**

7.4.5 Depot shall use only approved and sanitized plastic boxes for shrimp storage or transport**.**

7.4.6 Depot shall not use any bamboo baskets, Hogla or jute mats for storage or packaging of shrimp.

7.4.7 Shrimp must be repacked in layers of ice in certified plastic shrimp box carried in refrigerated / insulated/ covered carriers to the factories.

7.5 Daily cleaning and sanitization at the end of work.

7.5.1 Sweep to remove solid wastes and dirt particles.

7.5.2 Rinse to remove fine particles of dirt.

7.5.3 Apply alkaline or chlorinated alkaline detergent, workout foam with a brush or 'green pad' and thoroughly clean shrimp dumping floor or plastic sheet, weighing balance, fish boxes, ice crushing box, iced water cooling tank, etc.

7.5.4 Rinse with safe water.

7.5.5 Apply sanitizer in the form of 100-200 ppm chlorine or 25 ppm iodine or 200 ppm quat sanitizer (quaternary ammonium) to shrimp boxes, plastic wares, gloves, ice crushing boxes, weighing balance, etc.

7.5.6 For floors, walls, foot-dips, toilets: Sanitizer concentration may be doubled.

7.5.7 After cleaning and sanitizing, completely dry all parts.

7.5.8 Keep lavatories clean and disinfected all the time.

7.5.9 Nobody with any contagious or communicable disease or wounds in hands shall be allowed to handle shrimp. Clean the foot-dip every day and refill with fresh disinfecting liquid (200 ppm chlorine water).

8. TRACEABILITY

[Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish to EU countries]

8.1 Shrimp Collection and Service Centre/Depot must obtain records from each supply farm or boat at least the following information:

a. Farm/boat Registration Number,

b. Name and address of the supply farm/boat and its owner,

c. Date and geographical location of harvesting of the shrimp or fish,

d. Type of gear used for harvesting,

e. Shrimp/fish iced or not immediately after harvest,

f. Source of ice and Registration number of the ice plant producing the ice,

g. Date of receiving the shrimp/fish by species and quantity

8.2 The depot, on the other hand, must provide to the next buyer of the fish the above and the following information:

(a) Name and address of the depot
(b) Registration number of the depot
(c) Care provided to the shrimp/fish
(d) Date, quantity of shrimp/fish by species sold
(e) Name and address of the buyer

7. Ice Plants

1. LEGAL OWNERSHIP OR RIGHT TO THE USE OF THE ICE PLANT LAND AND INFRASTRUCTURE

1.1 The ice plant owner must have a legal document that he has legal rights to use the ice plant and the infrastructure either as owner or as a leaseholder.

1.2 In case the plant owner is a leaseholder, he will have to have a lease money clearance certificate from the ice plant and infrastructure owner.

1.3 Both ice plant owner and lessee must a copy of the lease document with details of lease conditions and signed by each party and at least one witness designated by each party.

2. REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

2.1 The ice plant must be registered with the Department of Fisheries or any GoB authorized organization.

2.2 License for ice plant operation will be given or renewed only if the ice plant is in compliance with the country's set regulations in respect of food safety, social responsibilities, environmental sustainability and local development plans

3. LABOUR LAW

3.1 Ice plant operators will comply with the National Labour Law.

3.2 Ice plant shall not use child labor.

4. WORKERS' HEALTH AND HYGIENE ISSUES

Restrictions related to workers health:

4.1 **Medical fitness:** All workers handling ice must have a valid medical certificate that they are physically fit to handle product and ice.

4.2 **Contagious or communicable diseases:** A person with a contagious or communicable disease and any wounds in hands should not be permitted to handle ice.

4.3 Dress: Workers should wear disinfected gum boot, hand gloves, neat and tidy dress, preferably apron and head gear, while handling ice

4.4 Plant owners are to ensure that workers are supervised and instructed and/ or trained in HACCP principles and good hygiene practices related with their work activities.

5. ENVIRONMENT

5.1 **Site selection saving mangrove and common property wetland**

5.1.1 Any new ice plant shall be outside the mangrove area and shall not cause any destruction to neighboring mangrove cover.

5.1.2 Any existing ice plant in a mangrove area shall plant mangrove plants on the strip of land, if existing and available to him, in between the adjacent river and the ice plant.

5.1.3 Must have opportunities to discharge solid and liquid wastes from the ice plant in an environmentally friendly way.

5.2 **Tidal and monsoon flood level**

5.2.1 Ice plant site shall be above the monsoon flood or highest high tide levels

6. COMMUNITY RELATIONSHIP

6.1 The ice plant shall not deny access to or occupy any part of common property, road, wetland or flowing canal.

6.2 Shall operate in such a way as not to create any social conflict with the community.

7. FOOD SAFETY

7.1 Location

7.1.1 Site must be above highest high tide level and monsoon flood level.
7.1.2 Ice plant shall be easily accessible by road and /or water transports for easy and quick transport of the ice to the depot and farms.
7.1.3 Must have easy access to and ample supply of good quality water free from excessive iron, arsenic or other hazardous chemicals, silt and pathogenic bacteria loads.
7.1.4 Ice plant site shall be neat and clean.

7.2 Layout design and construction

7.2.1 Layout design, construction, and size of ice plant shall ensure that the ice plant floor is at least 45 cm high above the ground level.
7.2.2 Ensure that the floor and the wall up to 6 ft height are made of non-absorbent material fit for regular cleaning and disinfecting.
7.2.3 Permit adequate maintenance, cleaning and disinfection.
7.2.4 Avoid or minimize air-borne contamination.
7.2.5 Protect against insects, birds and pet animals that may contaminate ice factories and the ice with germs and filth.
7.2.6 Protect against the accumulation of dirt, contact with toxic materials, the shedding of particles into ice.
7.2.7 Provide adequate working space to allow hygienic performance of all operations.
7.2.8 Provide suitable temperature-controlled handling and storage conditions of sufficient capacity for maintaining ice at appropriate temperatures.
7.2.9 Provide a raised platform of smooth and non-absorbent and non-toxic surface for keeping the ice blocks before their disposal; this will prevent any possible contamination from the floor.
7.2.10 Provide an adequate number of flush lavatories that should not open directly into rooms in which ice is handled.
7.2.11 Provide an adequate number of washbasins suitably located and designated for cleaning hands.
7.2.12 Have adequate natural and/or artificial lighting and ventilation.
7.2.13 Have adequate drainage facilities designed and constructed to avoid the risk of contamination; waste does not flow from a contaminated area towards or into a clean area.
7.2.14 Ensure facilities for waste disposal in an environment friendly way.
7.2.15 Ensure storage area for cleaning agents and disinfectants is separated by a partition wall from the ice handling and storage areas.
7.2.16 Ensure that used water goes directly into the drain not overflowing the working areas.
7.2.17 At the entry of the ice production and storage area, there shall be a disinfecting foot-dip.

7.3 Daily cleaning and sanitization

7.3.1 Cleaning and sanitization at the end of day's operation.
7.3.2 Perform dry cleaning by way of sweeping to remove solid wastes and dirt particles.
7.3.3 Rinse to remove fine particles of dirt.

7.3.4 Apply alkaline or chlorinated alkaline detergent, workout foam with a brush or ‘green pad’and thoroughly clean all parts of the fish landing sites, fish handling tables, implements, weighing balance, fish boxes, etc.
7.3.5 Rinse with safe water.
7.3.6 Apply sanitizer:
    a. Processing, grading, packaging tables: 100-200 ppm chlorine or 25 ppm iodine or 200 ppm quat sanitizer (quaternary ammonium)
    b. Floors, walls, food dips, toilets: Sanitizer concentration doubled
7.3.7 After cleaning and washing, completely dry all parts.
7.3.8 Keep lavatories clean and disinfected all the time.
7.3.9 Nobody with any contagious or communicable disease or wounds in hands should be allowed to handle fish.
7.3.10 Ice plant shall not use any bamboo baskets, Hogla or jute mats for storage or packaging of ice.
7.3.11 Ice must be carried in refrigerated / insulated/ covered carriers.
7.3.12 All workers or visitors must disinfect his/her feet in foot-dip (200 ppm chlorine) and hands at the hand washing basins before entering the ice production and handling areas

8. TRACEABILITY

[Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish to EU countries]

8.1 Ice plant must be registered with an authorized organization.
8.2 Must have information on the sources of water and report on the quality analysis of the water with which ice has been made.
8.3 Ice plant must obtain records from each buyer the following information:
    a. Name and address of the buyer farm/boat/depot and its owner and the dates of selling ice to them
    b. Farm/boat/depot Registration Number of the buyers

8. Fishing Boats and Vessels

1. **LABOUR STANDARD COMPLIANCE**
   1.1. The boat/trawler must comply with National Labour Law for the workers of the boat.
   1.2. Child labour shall not be employed.

2. **LAYOUT DESIGN AND CONSTRUCTION**

2.1. For all vessels

For ease of cleaning and disinfecting

2.1.1 Vessels should be designed and constructed to minimize sharp inside corners and projections in order to avoid dirt traps.
2.1.2 Construction should facilitate ample drainage.
2.1.3 A good supply of clean water or potable water.
2.1.4 Fish landing deck or space must be of non-absorbent materials that can be easily and effectively cleaned & disinfected.
2.1.5 Surfaces with which fishery products come into contact must be of corrosion-resistant material that is smooth and easy to clean and disinfect.
2.1.6 Surface coatings must be durable and non-toxic.
2.1.7 Equipment and material used for working on fishery products be made of corrosion-resistant, easy to clean and disinfect.

2.2 For minimizing contamination

2.2.1 Vessels be so designed as not to cause contamination of the products with bilge-water, sewage, smoke, fuel, oil, grease or other objectionable substances.
2.2.2 Deck areas for handling fish be completely separated from storing areas for fuel, chemicals, cleaning materials.
2.2.3 Equipped with suitable holds, tanks or containers for the storage of fishery products on ice.
2.2.4 Fish hold to ensure that maximum stowage height of fish is 1 metre.
2.2.5 Surface coatings must be durable and non-toxic.
2.2.6 Equipment and material used for working on fishery products be made of corrosion-resistant, easy to clean and disinfect.
2.2.7 Water storage must be situated away from any contamination sources

2.3 Additional requirements for vessels making voyages of more than 24 hours and require to preserve fresh fishery products for voyage period.

2.3.1 Be equipped with suitable sanitary facilities and hand wash basin for the crew.
2.3.2 Adequate insulated holds for ice and iced fish with facilities for drainage of melt water from the iced fish holds.
2.3.3 Separate holds or tanks for storage of bait if the fishing vessel is a long liner.
2.3.4 Be equipped with a first aid box containing adequate antiseptic and waterproof wound dressings.

2.4 Additional requirements for freezer and factory vessels (1/2)

2.4.1 Must be designed to allow each successive catch to be separated.
2.4.2 Protect the products from the sun or any source of contamination.
2.4.3 Must have freezing equipment with sufficient capacity to lower the temperature rapidly so as to achieve a core temperature of minus 18ºC.
2.4.4 Refrigeration equipment to maintain fishery products in the storage holds at or below minus 18ºC.

2.4.5 Refrigerated hold must be equipped with an easily readable temperature-recording device.
2.4.6 Fish sorting, processing and packaging areas should be easy to clean and disinfect.
2.4.7 Should be provided with suitable wash hand basins, soap and paper towels or other means of hand drying.
2.4.8 Taps should be non-hand operable.
2.4.9 Hygienic storage and disposal of waste.
2.4.10 If waste is stored and processed on board, separate areas must be allocated for that purpose.
2.4.11 Separate holds for storage of by-products.
2.4.12 Separate areas for storage of i) packaging materials i) chemicals and iii) cleaning materials

3. **FOOD SAFETY**

Action of the decomposing bacteria and enzyme can be greatly reduced by lowering down fish temperature around 0 – 5 ºC.

3.1 Icing fish immediately after harvest

3.1.1 Fish should best be chilled in adequate ice, immediately after its harvest.
3.1.2 Put a layer of ice in the fish hold or fish box and then put a layer of fish and then again a layer of ice; continue this way until the box or the hold is full.
3.1.3 Proportion of ice and fish should be 1:1.
3.1.4 Use ice made of potable water free from pathogenic organisms, heavy metals, pesticides or other hazardous chemicals, filths and dirt.
3.1.5 Fish hold to ensure that maximum stowage height of fish is 1 metre to avoid crushing effect of off upper layers on bottom layers of fish.

3.2 Handle fish carefully to avoid any physical injuries to the fish

3.2.1 Easy bacterial contamination through injuries.
3.2.2 Fish with injuries will not be acceptable to export markets.

3.3 Take precautionary measures to avoid contamination of the net with engine oil.
3.4 Fishermen should avoid fishing in areas known to be heavily contaminated with hazardous chemicals.

3.5 Cleaning and sanitization at the end of day's operation

3.5.1 Perform dry cleaning by way of sweeping to remove solid wastes and dirt particles.
3.5.2 Rinse to remove fine particles of dirt.
3.5.3 Apply alkaline or chlorinated alkaline detergent, workout foam with a brush or 'green pad'and thoroughly clean all parts of the fish landing sites, fish handling tables, implements, weighing balance, fish boxes, etc.
3.5.4 Rinse with safe water.
3.5.5 Apply sanitizer
   a. Processing, grading, packaging tables: 100-200 ppm chlorine or 25 ppm iodine or 200 ppm quat sanitizer (quaternary ammonium).
   b. Floors, walls, food dips, toilets: Sanitizer concentration doubled.
3.5.6 After cleaning and washing, completely dry all parts.
3.5.7 Keep lavatories clean and disinfected all the time.
3.5.8 Nobody with any contagious or communicable disease or wounds in hands should be allowed to handle fish.

5. TRACEABILITY

[Traceability is a system by which fish (or any other food products) and any inputs that may have been incorporated into the fish can be traced from its origin to the consumer level. Providing traceability records is mandatory to export fish to EU countries]

5.1 Fishing boat must keep records of at least the following information and deliver the information to the buyer of the fish:

a. Boat Registration Number
b. Name and address of the owner of boat
c. Date and geographical location of harvesting of the fish
d. Quantity of fish harvested by species, date and geographical area
e. Type of gear used
f. Fish iced or not immediately after harvest with ice of certified hygienic quality
g. Source of ice
h. Date of delivering the fish by species and quantity
i. Name and address of the buyers

9. Shrimp or Fish Carrier Transport Van

1. DESIGN AND CONSTRUCTION

1.1 For transportation of iced products, insulated van and for frozen products refrigerated van shall be used.

1.2 Fresh and chilled fisheries products must be kept at melting ice temperature or at or less than 5 C; frozen products at or below a constant temperature of -18C

1.3 Fish transport van or vehicle must be suitably constructed and equipped to maintain a constant low temperature throughout the period of transport

1.4 The transport vehicle should be designed and constructed to minimize sharp inside corners and projections in order to avoid dirt traps.

1.5 The inside surfaces of the fish hold must be smooth and should be made of materials that are non-absorbent, non-corrodible and can be easily cleansed and sanitized for disinfecting

1.5 Fish should never be transported exposed to the sun.

2. REGISTRATION WITH AND LICENSE FROM AN APPROPRIATE ORGANIZATION

2.1. The transport vehicle must be registered with the Department of Fisheries or any GoB authorized organization.

2.2. License for transport vehicle will be given or renewed only if the vehicle complies with the country's set regulations in respect of food safety

3. LABOUR LAW

3.1 The transport vehicle operators will comply with the National Labour Law and shall not use child labour.

4. WORKERS' HEALTH AND HYGIENE ISSUES

Restrictions related to worker's health:

4.1. **Medical fitness:**

4.1.1 All workers handling fish or shrimp must have a valid medical certificate that they are physically fit to handle fish.

4.2. **Contagious or communicable diseases:**

4.2.1 A person with a contagious disease and any wounds in hands should not be permitted to handle fish

4.3 Dress:

4.3.1 Workers should wear neat and clean dress while handling fish

4.4 Training:

4.4.1 The transport operators must be trained in food hygiene and sanitation matters related with their work.

4.4.2 Personal cleanliness and hygiene.

5. FOOD SAFETY

Keep fish transport vehicles, vessels and containers, boxes another implements clean and in good repairs and hygienic condition all the time

5.1 Routine c**leaning and sanitization at the end of day's operation**

5.1.1 At the end of day's operation, brush all parts of the fish carrier vehicle or vessel, fish handling implements, fish boxes, etc. with chlorinated alkaline detergent, thoroughly wash with safe water.

5.1.2 Disinfect all parts with sanitizing agents

(i) Shelves, shovels, boxes, etc.: 100-200 ppm chlorine or 25 ppm iodine or 200 ppm quat sanitizer (quaternary ammonium)
(ii) Floors, walls, food dips: Sanitizer concentration doubled

5.1.3 After cleaning and washing, completely dry all parts.

5.1.4 No body with any contagious disease or wounds in hands should be allowed to handle fish.

5.1.5 Parking place of shrimp or fish carrier van must be clean and well maintained.

5.1.6 Smoking, spitting, eating and drinking in the fish hold or storage must be prohibited

6. **Transportation of non-fish items**

Where transport carrier vehicle or vessel and/or containers have been used for transporting anything other than fish, there is to be effective cleaning and disinfecting between loads to avoid the risk of cross contamination.

7. TRACEABILITY

7.1 The transport operator must obtain the following information from the supplier:

1. Name and address
2. Registration Number
3. Shrimp/fish iced or frozen
4. Date and time of receiving the shrimp/fish
5. Full traceability particulars of the shrimp or fish

7.2 The transport operator, on the other hand, must provide to the next buyer of the fish the above and the following information:

a. Name and address of the vehicle operator
b. Registration Number of the vehicle operator
c. Care provided to the fish
d. Date and quantities of fish or shrimp by species delivered to the buyer
e. Name and address of the buyer

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Annex 1

Best Aquaculture Practices (BAP)
Seafood Processing Plant Food Safety Standard

Recommended Testing & Verification Standards
for Antibiotics & Chemicals for Raw Material

	Acceptable Tests	Substance and/or Metabolite	MRPL*
1	LC/MC/MS/ELISA	Chloramphenicol	<0.1 ppb
2	LC/MS/MS/	Nitrofuran Metabolites	<0.3 ppb
3	AoZ / ELISA	Furazolidone	<0.3 ppb
4	AMoZ / ELISA	Furaltadone	<0.3 ppb
5	SEM/ELISA	Nitrofurazone	<0.3 ppb
6	AH/ELISA	Nitrofurantoin	<0.3 ppb
7	LC/MS/MS	Sum of Malachite green & Leucomalachite green	<0.5 ppb
8	LC/MS/MS	Sarafloxacin	1.25 ppb
9	LC/MS/MS	Ciprofloxacin	1.25 ppb
10	LC/MS/MS	Enrofloxacin	1.25 ppb
11	LC/MS/MS	Flumequine	2.5 ppb
12	LC/MS/MS	Oxolinic Acid	2.5 ppb
13	LC/MS/MS	Crystal Violet	0.5 ppb
14	ELISA	Tetracycline	20 ppb (Canada)
15	ELISA	Sulfanilamide	2 ppb (Canada)
Minimum Required Performance Limit (MRPL) as referenced in EU Commission decision 2002/657/EC ppb = parts per billion			

*Ridascreen quick test for initial screening and LC/MS/MS for confirmation of positives.

CFU/g	Colony-forming units per gram sample
MPN	Most probable number
BAM	Bacteriological Analytical Manual
AOAC	Association of Official Analytical Chemists
FSIS	Food Safety and Inspection Service
ELISA	Enzyme-linked immunoabsorbent assay
LC/MS/MS	Liquid chromatography/mass spectrometry
LC/ MSn	Liquid chromatography/mass spectrometry
LC/VIS	Liquid Chromatography/visual detection
HPLC	High-performance liquid chromatography

Annex 2

Best Aquaculture Practices (BAP)
Seafood Processing Plant Food Safety Standard

Required Tests – Cooked and Raw, Ready-to-Eat Seafood

Note: These tests are required for BAP certification.
Some of these are also required by US FDA and the EC.

	Organism or Substance	Acceptable Tests	Limit
1	Fecal coliforms	BAM, AOAC	Less than 10 CFU/g
2	Escherichia coli	BAM, AOAC	Enterotoxigenic E. coli (ETEC) – 1 x 103 ETEC/g, LT or ST positive; Generic E. coli less than 5 CFU/g
3	Staphylococcus aureus	BAM, AOAC	Positive for staphylococcal enterotoxin or S. aureus level equal to or less than 104/g (MPN)
4	Salmonella sp.	BAM, AOAC	Presence of organism
5	Listeria monocytogenes	BAM, AOAC	Presence of organism
6	Chloramphenicol	Biopharm Ridascreen (ELISA)*	Detectable limit
7	Nitrofurans	Biopharm Ridascreen (ELISA)*	Detectable limit of component metabolites
8	Malachite Green, Leuco-Malachite Green (finfish)	HPLC/MS/MS LC/ MSn Or LC/VIS	Detectable limit

*Ridascreen quick test for initial screening and LC/MS/MS for confirmation of positives.

CFU/g	Colony-forming units per gram sample
MPN	Most probable number
BAM	Bacteriological Analytical Manual
AOAC	Association of Official Analytical Chemists
FSIS	Food Safety and Inspection Service
ELISA	Enzyme-linked immunosorbent assay
LC/MS/MS	Liquid chromatography/mass spectrometry
LC/ MSn	Liquid chromatography/mass spectrometry
LC/VIS	Liquid Chromatography/visual detection
HPLC	High-performance liquid chromatography

FDA High Enforcement Priority Aquaculture Drugs

CVM has identified a number of drugs and families of drugs historically used in fish without FDA approval that are of high enforcement priority. They should not be used in fish that is to be consumed, unless a sponsor obtains an approval or index listing for them.
The following list identifies these compounds (CVM Program Policy and Procedures Manual Attachment: “Enforcement Priorities for Drug Use in Aquaculture” (Guide 1240.4200) (http:/ www fda.gov/downloads/Animal Veterinary/ Guidance Compliance Enforcement/ Policies Procedures Manual/UCM0469 1.pdf):

- Chloramphenicol;
- Nitrofurans;
- Fluoroquinolones and Quinolones;
- Malachite Green;
- Steroid Hormones.

Drugs Prohibited for Extra-Label Use

The following drugs and families of drugs are prohibited for extra-label use in food-producing animals (21 CFR 530.41(a)):

- Chloramphenicol
- Clenbuterol
- Diethylstilbestrol (DES)
- Dimetridazole, Ipronidazole, and other Nitroimidazoles
- Furazolidone, and Nitrofurazone
- Fluoroquinolones
- Glycopeptides

None of these drugs and families of drugs has been approved use in fish.
Additional information on aquaculture-related topics can be obtained from FDA/CVM at: http:// ww. da.gov/ cvm/aqualibtoc.htm.

Annex 3
US FDA: Fish and Fishery Products Hazards and Controls Guidance
Fourth Edition – April, 2011

TABLE A-5 FDA AND EPA SAFETY LEVELS IN REGULATIONS AND GUIDANCE
(Edited to include only references to shrimp and scampi)

Product	**Organism or Substance**	**Level**
Ready-To-Eat Fishery Products (Minimal Cooking By Consumer)	Listeria monocytogenes	Presence of organism in 25 gram sample.
All Fish	Salmonella spp.	Presence of organism in 25 gram sample
Ready-To-Eat Fishery Products (Minimal Cooking By Consumer)	Vibrio cholerae	Presence of toxigenic O1 or O139 or non-O1 and non-O139 in 25 gram sample.
Ready-To-Eat Fishery Products (Minimal Cooking By Consumer)	Vibrio parahaemolyticus	Vibrio parahaemolyticus - levels equal to or greater than 1 x 104/gram
Ready-To-Eat Fishery Products (Minimal Cooking By Consumer)	Vibrio vulnificus	Presence of organism
All fish	Clostridium botulinum	1. Presence of viable spores or vegetative cells in products that will support their growth; or 2. Presence of toxin.
All fish	Polychlorinated Biphenyls (PCBs)	2.0 ppm (edible portion)[1]
All fish	Aldrin and dieldrin	0.3 ppm (edible portion)
All fish	Chlordane	0.3 ppm (edible portion)
All fish	Chlordecone	0.4 ppm crabmeat and 0.3 ppm in other fish (edible portion)
All fish	DDT, TDE, and DDE	5.0 ppm (edible portion)
All fish	Endothall and its monomethyl ester	0.3 ppm[1]
All fish	Mirex	0.1 ppm (edible portion)
All fish	Diquat	0.1 ppm[1]
All fish	2, 4 D	1.0 ppm.1
All fish	Chloramphenicol; Clenbuterol; Diethylstilbestrol (DES); Dimetridazole, Ipronidazole, and other Nitroimidazoles; Furazolidone, Nitrofurazone, and other nitrofurans; Fluoroquinilones; Glycopeptides.	Drugs prohibited for extra-label use in animals - **no residue permitted**.
All fish	Methyl mercury	1.0 ppm[2]
All fish	Hard or sharp foreign object	Generally 0.3 (7 mm) to 1.0 (25 mm) in length

1 – These values are tolerances
Note: The term “fish” refers to fresh or saltwater finfish and crustaceans as defined in the Fish and Fishery Products, “Definitions,” 21 CFR 123.3(d).

FDA Approved Aquaculture Drugs

FDA-approved aquaculture drugs, with their approved sponsor, species for which they have been approved and required withdrawal times are listed below. Additional details on conditions of use (e.g., dosage levels) can be obtained from the Code of Federal Regulations (CFR) as cited below; the labeling for the drug; the FDA CVM Website, (http:// www. fda.gov/AnimalVeterinary/DevelopementApprovalProcess /Aquaculture/ucm132954.htm).

FDA's determination that these substances are approved aquaculture drugs does not exempt facilities from complying with other federal, state, tribal, territorial and local environmental requirements. For example, in the United States, facilities using these substances would still be required to comply with the National Pollutant Discharge Elimination System requirements.

Annex 4

FDA Approved Aquaculture Drugs

Chorionic gonadotropin Chorulon®	Chorulon®, supplied by Intervet, Inc., Roseland, NJ, is approved for use as an aid in improving spawning function in male and female brood finfish. The drug may be administered for up to three doses. The total dose should not exceed 25,000 I.U. chorionic gonadotropin in fish intended for human consumption. Federal law restricts this drug to use by or on the order of a licensed veterinarian (21 CFR 522.1081). Because residues are expected to be well below the safe concentration in the edible portion of fish, there is no tolerance level set for residues of gonadotropin in fish tissue 21 CFR 556.304).
Formalin Solution Paracide-F® Parasite-S®, Formacide-B® and Formalin-F®	Paracide-F®, supplied by Argent Laboratories, Redmond, WA, is approved for use as follows: in salmon, trout, catfish, largemouth bass, and bluegill for the control of external protozoa (Ichthyophthirius spp., Chilodonella, spp., Costia spp., Scyphidia spp., Epistylis spp., and Trichodina spp.) and monogenetic trematodes (Cleidodiscus spp., Gyrodactylus spp., and Dactylogyrus spp.); and on the eggs of salmon, trout, and esocids for the control of fungi of the family Saprolegniaceae (21 CFR 529.1030). There is no mandatory withdrawal time prior to harvest and no residue tolerance (formalin does not bioaccumulate in animals). This drug is approved as an over-the-counter (OTC) product, and a prescription is not required. Parasite-S®, Formacide-B® and Formalin-F® Parasite-S® is supplied by Western Chemical, Inc.,

	Ferndale, WA. Formacide-B® is supplied by B.L. Mitchell, Inc., Leland, MS. Formalin-F® is supplied by Natchez Animal Supply Company, Natchez, MS. Each is approved for use to control external protozoan parasites (Chilodonella spp., Costia spp., Epistylis spp., Ichthyophthirius spp., Scyphidia spp., and Trichodina spp.) and monogenetic trematodes (Cleidodiscus spp., Dactylogyrus spp., and Gyrodactylus spp.) on all finfish species; external protozoan parasites (Bodo spp., Epistylis spp., and Zoothamnium spp.) on Penaeid shrimp; and fungi of the family Saprolegniaceae on the eggs of all finfish species (21 CFR 529.1030). There is no mandatory withdrawal time prior to food animal harvest and no residue tolerance (formalin does not bioaccumulate in animals). These drugs are approved as OTC
Florfenicol	Aquaflor® Type A Medicated Article Aquaflor® Type A is supplied by Intervet, Inc., Millsboro DE/ Schering-Plough Animal Health Corporation, Roseland, NJ, and is approved for use in medicated feed for the control of mortality due to enteric septicemia of channel catfish (Ictalurus punctatus) associated with Edwardsiella ictaluri, control of mortality in freshwater-reared salmonids due to coldwater disease associated with Flavobacterium psychrophilum, and control of mortality in freshwater-reared salmonids due to furunculosis associated with Aeromonas salmonicida. The minimum withdrawal time before harvest is 12 days for catfish and 15 days for salmonids (21 CFR 558.261). The tolerance level for florfenicol amine (the marker residue) in muscle is 1 ppm (21 CFR 556.283). The product is restricted to use by or on the order of a licensed veterinarian (21 CFR 558.261). Extra-label use of medicated feed containing florfenicol is prohibited (21 CFR 558.6(a)(4) and (6)).
Aquaflor® CA1	Aquaflor® CA1 is supplied by Intervet, Inc./ Schering-Plough Animal Health Corporation, Roseland, NJ, and is approved for use in medicated feed for the control of mortality in catfish due to columnaris disease associated with Flavobacterium columnare. The drug can be used at any stage of production, from fingerling to food fish, as the sole ration for 10 consecutive days. The minimum withdrawal time before harvest is 12 days. The product is restricted to use by or on the order of a licensed veterinarian (21 CFR 516.1215) . Extra-label use of medicated feed containing florfenicol is prohibited (21 CFR 558.6(a)(4) and (6)). Because Aquaflor® CAI is a conditionally approved new animal drug, it extra-label use is also prohibited by 21 U.S.C. 360ccc(a)(1).
Tricaine methanesulfonate (MS-222)	Finquel® and Tricaine-S Finquel® is supplied by Argent Laboratories, Redmond, WA, and Tricaine-S is supplied by Western Chemical, Inc.,

	Ferndale, WA, Tricaine-S. This drug is approved for use to temporary immobilization of fish, amphibians, and other aquatic cold-blooded animals. Tricaine methanesulfonate has been recognized as a valuable tool for the proper handling of these animals during manual spawning (fish stripping), weighing, measuring, marking, surgical operations, and transport. Use in fish intended for human consumption is restricted to the following families: Ictaluridae (catfish), Salmonidae (salmon and trout), Esocidae (pike), and Percidae (perch). There is a mandatory 21day withdrawal time before harvest. In other non-food, aquatic, cold-blooded animals, the drug should be limited to hatchery or laboratory use (21 CFR 529.2503). These drugs are approved as OTC products, and a prescription is not required. There is no tolerance level set for residues in fish tissue.
Oxytetracycline: Terramycin® 200 for Fish (oxytetracycline dihydrate) Type A Medicated Article OxyMarine™, Oxytetracycline HCl Soluble Powder-343, Terramycin-343, TETROXY Aquatic	Terramycin® 200 for Fish (oxytetracycline dihydrate) Type A Medicated Article is supplied by Phibro Animal Health, Ridgefield Park, NJ. Terramycin® 200 for Fish is approved for use to treat bacterial hemorrhagic septicemia caused by Aeromonas liquefaciens and pseudomonas disease in catfish. For salmonids, Terramycin® 200 for Fish is approved for use to control ulcer disease caused by Hemophilius piscium, furunculosis caused by Aeromonas salmonicida, bacterial hemorrhagic septicemia caused by Aeromonas liquefaciens, pseudomonas disease and for control of mortality due to coldwater disease associated with Flavobacterium psychrophilium. This drug is also approved for use to mark skeletal tissue. For lobster, Terramycin® 200 for Fish is approved for use to control gaffkemia caused by Aerococcus viridians. Withdrawal times vary with indication as follows: for marking skeletal tissue in Pacific salmon, 7 days; for disease control in salmonids, 21 days; catfish, 21 days; lobster, 30 days (21 CFR 558.450). OxyMarine™ is supplied by Alpharma, Inc., Fort Lee, NJ. Oxytetracycline HCl Soluble Powder-343 is supplied by Teva Animal Health, Inc., St. Joseph, MO. Terramycin-343 is supplied by Aquatic Health Resources. TETROXY Aquatic is supplied by Cross Vetpharm Group Ltd., Dublin, Ireland. Each of these drugs is administered by immersion, approved for use to mark skeletal tissue of all finfish fry and fingerlings as an aid in identification. These drugs are approved as OTC products, and a prescription is not required. A tolerance level of 2 ppm in muscle tissue (as the sum of tetracycline residues, including oxytetracycline, chlortetracycline, and tetracycline) has been established for all finfish and lobster (21 CFR 556.500).
Hydrogen peroxide 35% PEROX-AID®	35% PEROX-AID®, supplied by Eka Chemicals, Inc., Marietta, GA, is approved for the control mortality in freshwater-reared finfish eggs due to saprolegniasis;

	freshwater-reared salmonids due to bacterial gill disease; and freshwater-reared coolwater finfish and channel catfish due to external columnaris disease. This drug is approved as an OTC product, and a prescription is not required. There are no limitations on acceptable daily intake; there is no required withdrawal time; and no tolerance has been set for residues in fish tissue. However, as with all new animal drugs, a licensed veterinarian is required to prescribe an extra-label use of 35% PEROXAID® to treat diseases or species not listed on the product label (21 CFR 529.1150).
Sulfamerazine	Sulfamerazine, supplied by Alpharma, Inc., Bridgewater, NJ, is approved for use only in trout (rainbow, brook, and brown) to control furunculosis. It may be used for treatment not more than 14 days. The withdrawal time is 21 days before harvest for marketing or stocking in stream open to fishing (21 CFR 558.582). A tolerance of zero is established for residues of sulfamerazine in the edible flesh (21 CFR 556.660).
Sulfadimethoxine/ormetoprim combination Romet-30®	Romet-30®, supplied by Pharmaq AS, Overhalla, Norway, is approved for use only in medicated feed only for control of enteric septicemia of catfish caused by Edwardsiella ictaluri and furunculosis in salmonids (trout and salmon) caused by Aeromonas salmonicida. Required withdrawal times are as follows: salmonids, 42 days; catfish, 3 days (21 CFR 558.575). The withdrawal time for catfish is shorter because any residues that might be present in the skin are removed during processing. The tolerance for Sulfadimethoxine and ormetoprim in the flesh is 0.1 ppm for each drug (21 CFR 556.490 and 556.640).

Annex 5

FDA Low Regulatory Priority Aquaculture Drugs

Acetic Acid	Used in a 1,000 to 2,000 ppm dip for 1 to 10 minutes as a parasitide for fish.
Calcium Chloride	Used to increase water calcium concentration to ensure proper egg hardening. Dosages used would be those necessary to raise calcium concentration to 10 to 20 ppm $CaCO_3$. Used up to 150 ppm indefinitely to increase the hardness of water for holding and transporting fish in order to enable fish to maintain osmotic balance.
Calcium Oxide	Used as an external protozoacide for fingerlings to adult fish at a concentration of 2,000 mg/L for 5 seconds.

Carbon Dioxide Gas	Used for anesthetic purposes in cold, cool, and warm water fish.
Fuller's Earth	Used to reduce the adhesiveness of fish eggs to improve hatchability.
Garlic (whole form)	Used for control of helminth and sea lice infestations of marine salmonids at all life stages.
Ice	Used to reduce metabolic rate of fish during transport.
Magnesium Sulfate	Used to treat external monogenic trematode infestations and external crustacean infestations in fish at all life stages. Used in all freshwater species. Fish are immersed in a 30,000 mg $MgSO_4$/L and 7000 mg NaCl/L solutions for 5 to 10 minutes.
Onion (whole form)	Used to treat external crustacean parasites, and to deter sea lice from infesting external surface of salmonids at all life stages.
Papain	Used in a 0.2% solution to remove the gelatinous matrix of fish egg masses in order to improve hatchability and decrease the incidence of disease.
Potassium Chloride	Used as an aid in osmoregulation; relieves stress and prevents shock. Dosages used would be those necessary to increase chloride ion concentration to 10-2000 mg/L.
Povidone Iodine	Used in a 100 ppm solution for 10 minutes as an egg surface disinfectant during and after water hardening.
Sodium Bicarbonate	Used at 142 to 642 ppm for 5 minutes as a means of introducing carbon dioxide into the water to anesthetize fish.
Sodium Chloride	Used in a 0.5% to 1.0% solution for an indefinite period as an osmoregulatory aid for the relief of stress and prevention of shock; and 3% solution for 10 to 30 minutes as a parasitide.
Sodium Sulfite	Used in a 15% solution for 5 to 8 minutes to treat eggs in order to improve their hatchability.
Thiamine Hydrochloride	Used to prevent or treat thiamine deficiency in salmonids. Eggs are immersed in an aqueous solution of up to 100 ppm for up to four hours during water hardening. Sac fry are immersed in an aqueous solution of up to 1,000 ppm for up to one hour.
Urea & Tannic Acid	Used to denature the adhesive component of fish eggs at concentrations of 15g urea and 20g NaCl/5 liters of water for approximately 6 minutes, followed by a separate solution of 0.75 g tannic acid/5 liters of water for an additional 6 minutes. These amounts will treat approximately 400,000 eggs.

Annex 6

EC Veterinary Residues: Banned Drugs

This list appears in Table 2 of European Commission Regulation 37/2010. Substances in this list constitute a hazard to the consumer when present in foodstuffs at whatever level. Therefore, their presence in foodstuffs is not allowed. List of pharmacologically active substances for which **no MRL can be fixed**.
• *Aristolochia* spp. and preparations thereof • Chloramphenicol • Chloroform • Chlorpromazine • Colchicine • Dapsone • Dimetridazole • Metronidazole • Nitrofurans (including furazolidone) • Ronidazole

ANNEX 7

List of MRLs of Pharmacologically Active Substances Allowed in Seafood

Adapted from Table I of European Commission Regulation 37/2010				
Pharmacologically active substance(s)	**Animal species**	**MRLs (µg/kg)**	**Target tissues**	**Other provisions**(*according to Article 14(7) of Regulation 470/2009*)
Amoxicyllin	All food-producing species	50 50 50 50	Muscle Fat Liver Kidney	*
Ampicillin	All food-producing species	50 50 50 50	Muscle Fat Liver Kidney	*
Benzylpenicillin	All food-producing species	50 50 50 50	Muscle Fat Liver Kidney	*
Chlortetracycline	All food-producing	100 300	Muscle Liver	*

	species	600 200	Kidney Eggs	
Cloxacillin	All food-producing species	300 300 300 300	Muscle Fat Liver Kidney	*
Colistin	All food-producing species	150 150 150 200 300	Muscle Fat Liver Kidney Eggs	*
Cypermethrin	Salmonidae	50	Muscle and skin in natural proportions	
Danofloxacin	All food-producing species except bovine, ovine, caprine, porcine and poultry	100 50 200 200	Muscle Fat Liver Kidney	*
Deltamethrin	Fin fish	10	Muscle and skin in natural proportions	
Dicloxacillin	All food-producing species	300 300 300 300	Muscle Fat Liver Kidney	*
Difloxacin	All food-producing species except bovine, ovine, caprine and poultry	300 100 800 600	Muscle Fat Liver Kidney	*
Diflubenzuron	Salmonidae	1000	Muscle and skin in natural proportions	
Emamectin	Fin fish	100	Muscle and skin in natural proportions	
Enrofloxacin	All food-producing species except bovine, ovine,	100 100 200 200	Muscle Fat Liver Kidney	*

	caprine, porcine, rabbits and poultry			
Erythromycin	All food producing species	200 200 200 200 150	Muscle Fat Liver Kidney Eggs	*
Florfenicol	Fin fish	1000	Muscle and skin in natural proportions	
Flumequine	Fin fish	600	Muscle and skin in natural proportions	
Framycetin - see neomycin				
Kanamycin	All food-producing species except fin fish	100 100 600 2500	Muscle Fat Liver Kidney	
Lincomycin	All food-producing species	100 50 500 1500 50	Muscle Fat Liver Kidney Eggs	*
Neomycin (including framycetin)	All food-producing species	100 50 500 1500 50	Muscle Fat Liver Kidney Eggs	*
Oxacillin	All food-producing species	300 300 300 300	Muscle Fat Liver Kidney	*
Oxolinic acid	All food producing species	100 50 150 150	Muscle Fat Liver Kidney	*
Oxytetracycline	All food-producing species	100 300 600 200	Muscle Liver Kidney Eggs	*
Paromomycin	All food-producing species	500 1500 1500	Muscle Liver Kidney	*

Sarafloxacin	Salmonidae	30	Muscle and skin in natural proportions	
Spectinomycin	All food producing species	300 500 2000 5000	Muscle Fat Liver Kidney	*
Sulphonamides (all substances belonging to the sulphonamide group)	All food-producing species	100 100 100 100	Muscle Fat Liver Kidney	* The combined total residues of all substances within the sulphonamide group should not exceed 100 µg/kg
Teflubenzuron	Salmonidae	500	Muscle and skin in natural proportions	
Tetracycline	All food-producing species	100 300 600 200	Muscle Liver Kidney Eggs	*
Thiamphenicol	All food producing species	50	Muscle	*
Tilmicosin	All food producing species	50 50 1000 1000	Muscle Fat Liver Kidney	*
Trimethoprim	All food producing species except equidae	50 50 50 50	Muscle Fat Liver Kidney	*
Tylosin	All food producing species	100 100 100 100 200	Muscle Fat Liver Kidney Eggs	*

*For fin fish the muscle MRL relates to 'muscle and skin in natural proportions'; MRLs for fat, liver and kidney do not apply to fin fish.

Additional Information Regarding EEC and Banned Veterinary Drugs.

For several substances which have been expressly prohibited from use in food producing animals in the EU (e.g. chloramphenicol, nitrofurans), or not authorised (e.g. malachite green), the concept of the minimum required performance limit (MRPL) has been established in Commission Decision 2002/657/EC.

MRPLs are defined as *"minimum content of an analyte in a sample, which at least has to be detected and confirmed"* and are the reference point for action in relation to the evaluation of consignments of food (Commission Decision 2005/34/EC pdf). To date MRPLs have been established for the following substances:

Substance and/or metabolite	**Matrices**	**MRPL**	**Reference**
Chloramphenicol	Aquaculture products	0,3 µg/kg	Commission Decision 2003/181/EC
Nitrofuran metabolites*: - furazolidone - furaltadone - nitrofurantoin - nitrofurazone	Aquaculture products		
Sum of malachite green and leucomalachite green	Meat of aquaculture products	2 µg/kg	Commission Decision 2004/25/EC pdf

With regard to each of these EU limits/levels, Member States are required to ensure that they have validated laboratory analytical methods in place which are capable of meeting these thresholds.