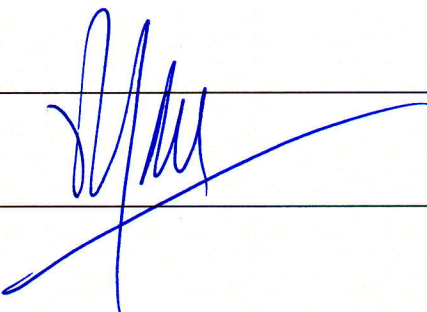




GOOD AQUACULTURE PRACTICE FOR FISH FARMING (BGAqP)

Document updated on 28 October 2017
Department of Fisheries
Ministry of Primary Resources and Tourism Brunei Darussalam

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With increasing investment into commercial fish cage operation/ farming in Brunei Darussalam, providing clear guidelines that can help mitigate the risks of economic losses due to disease outbreaks arising from cross-contamination and malpractices at farm level, has become very important. Therefore the Department of Fisheries has developed a series of Brunei Good Aquaculture Practice guidelines that provide the fundamental guides on codes of conduct that all aquaculture operators/ farmers can use to ensure that their operation supports healthy and safe environment for their fish and workers alike and therefore produce top quality aquaculture products that comply with national food safety requirement, as well as buyers' and importing countries safety and quality specifications.

The ASEAN Good Aquaculture Practices (ASEAN GAqP) for Food Fish and the FAO Technical Guidelines are used as reference in developing all BGAqP Guidelines.

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Legal documents supporting BGAqP

- i. Fisheries Order 2009.
- ii. The Fisheries (Fish Culture Farms) Regulations, 2002.

Good Aquaculture Practice Guidelines for Safe and Quality Fish Farming

This Brunei Good Aquaculture Practice for Fish Farming (BGAqP) is a Guideline developed by the Department of Fisheries (DOF), Ministry of Primary Resources and Tourism, Brunei Darussalam specifically for fish cage operation/ farming. It provides the fundamental guides on codes of conduct and specification that all fish cage operators/ farmers can use to ensure that their operation supports healthy and safe environment for their fish and workers. It therefore provides specific guides on the following key areas:

- Farm structure and maintenance
- Farm management
- Farming and packaging practices
- Fish health management
- Farm environment
- Human health and safety at work

The farmers are expected to familiarize themselves with this Guideline, and behave in a manner consistent with the codes contained therein. The fish farmers are also expected to incorporate the guidance and codes into their individual farm's Standard Operating Procedures (SOP) and farm policies. The standard operating procedures, manuals and farm policies should provide sufficient guidance for all personnel and workers to be able to distinguish between acceptable and unacceptable conduct in a variety of situation in a fish cage operation/farm.

In order to raise awareness and compliance with the SOP by personnel and workers, specific training should also be conducted. The fish farmers/ operators should also consider, as appropriate, adopting a process/ system by which their managers/ technicians/ supervisors periodically attest to the supervision of their workers, with respect to compliance with the farm standard operating procedures and policies. The BGAqP and the farm SOP and policies shall be the basis for farm audits that will be performed by Department of Fisheries, as well as be that basis for the approval for the award of a Certificate of BGAqP Compliance.

Good Aquaculture Practice for Fish Farming

1. Farm Structure and Maintenance

- 1.1 Structure of farm must be of materials that do not pose risks to the workers, the public and the environment.
- 1.2 The materials used for construction should be selected based on suitability, durability, robustness, and lifespan, and able to withstand exposure to weather elements and marine environment.
- 1.3 Farm structures should be frequently checked for any signs of damage to prevent and minimize the risk of fish escapes.
- 1.4 Farms need to take appropriate measures to prevent predators from entering the fish culture area.
- 1.5 Farm layout arrangements need to be well designed, to ensure safety hazards at the farm are minimized.
- 1.6 The farm must comply with the terms and conditions of the Fisheries (Fish Cage Culture) License.

2. Farm Management

- 2.1 Manager or farm supervisor must be identified to ensure the compliance of the BGAqP is effectively supervised.
- 2.2 All farm activities related to culture, trade or transfer, such as fish species, period of culture, stock, size and density of stocking, source of fry, feeding rate, should be documented and trackable.
- 2.3 Farm Standards Operational Procedures (SOP), log records, instruction manuals, laboratory tests and other information must be up to date.
- 2.4 All records relating to fish stock must be filed and are up-to-date
- 2.5 Records of harvesting and traceability such as date of harvesting, amount harvested, etc. must be kept for at least two years.
- 2.6 Farm staff must be trained on BGAqP and SOP. Such training should be recorded and updated.

3. Farming and operational practices

Management of Fish Stock

- 3.1 Fish stocks must be in a good health, free from OIE-listed diseases (Refer url: <http://www.oie.int>) such as Spring viraemia of carp, Epizootic ulcerative syndrome, Koi herpesvirus disease, Viral Nervous Necrosis (VNN), Grouper iridoviral disease.
- 3.2 The seed fry/fingerlings/juvenile must be of known from reliable source and approved origin. The invoice should be kept for at least two years.

- 3.3 New fish stock should be quarantined and separated from the other standing fish stock, not less than a period of two weeks or any other time period as directed by DOF.
- 3.4 Stocking schedule, stock transfer and harvesting must be properly documented.
- 3.5 It is recommended for the cages to be properly labelled to facilitate identification.

Feed Management

- 3.6 All fish should be fed with adequate quantities of feed that meets their nutritional requirements.
- 3.7 Avoid over-feeding to minimize water pollution.
- 3.8 Farms are recommended to feed fish using on dry, formulated pellets.
- 3.9 Farm feeding regimes must be recorded.
- 3.10 Feeds must be properly stored to prevent spoilage/decomposition/contamination
- 3.11 Expiry dates or Production dates of fish feed must be clearly stated on the storage containers/bags and expired feeds should be disposed of in appropriate manner and, approved location/ site as directed by DOF.
- 3.12 Records of fish feed purchases (suppliers, dates, etc.) must be kept properly.
- 3.13 Feeds used must be of the brand/ type or from sources/ suppliers that are approved and authorized by DOF.

Use of veterinary drugs, chemicals and additives

- 3.14 Veterinary drugs, chemicals and additives used, must be approved by DOF.
- 3.15 Application of veterinary drugs, chemicals and additives, must be as advised by DOF and must adhere to the manufacturer's instructions.
- 3.16 Veterinary drugs, chemical and additives must always be labelled and stored properly at the appropriate temperature and away from fish feeds, fertilizers and other farm utensils.
- 3.17 Unused veterinary drugs, chemicals and additives must be safely and properly disposed. Do not recycle empty containers for other uses.
- 3.18 Records of purchase, application (log records, procedures, or instruction manual) of the veterinary drugs, chemicals and additives must be kept and produced during farm audit.
- 3.19 Withdrawal periods of the veterinary drugs, chemicals and additives prior to harvest must be strictly observed and recorded.

Harvesting and Packaging

- 3.20 Only healthy fish can be harvested for sale.
- 3.21 Fish should not be fed before harvesting for a minimum period necessary to clear the gut.
- 3.22 Use clean containers/boxes/ice to pack the fish.
- 3.23 Fish to be packed/transported chilled must be packed with sufficient ice until point of retail.
- 3.24 Packaging area in the farm should be clean, organized and well maintained. Schedules for cleaning and procedures to be in place and performed regularly.
- 3.25 Appropriate harvesting and partial harvest handling, of aquaculture products within the farm should be practiced to minimize contamination and physical damage.

Materials and Facilities

- 3.26 Materials and facilities used at the farm must be well maintained, disinfected (if necessary) and kept in proper storage.
- 3.27 Aquaculture facilities should be designed, operated and maintained in ways that prevent contamination from workers, sewage/toilets, domestic animals, machinery oil/fuel and other possible sources in order to maintain hygienic conditions.

4. Fish health management

- 4.1 Farm staff must be trained to recognize common fish diseases. Daily observation of fish condition must be carried out and farmers must notify DOF if they encounter any abnormal mortality patterns.
- 4.2 Any dead fish must be removed from the cages and disposed of in an approved manner and must be properly recorded.
- 4.3 Preventive measures and disease treatment regimes, must be documented as part of health management record.
- 4.4 Farms must have their own, approved, Farm Standard Operating Procedures (SOP) in fish health management.
- 4.5 Equipment/utensils/materials used in handling sick/dead fish must be properly cleaned and disinfected after use.

5. Farm environment

- 5.1 Farmers shall monitor water quality parameters on regular basis and a proper record of the results will be made available upon request.
- 5.2 Farm waste materials must be disposed of properly and the method of disposal must be documented in the farm Standard Operating Procedures (SOP).

6. Human health and safety at work

- 6.1 Farm staff must have knowledge on first aid and firefighting.
- 6.2 Farm must have appropriate protection equipment for farm staff when dealing with emergency cases such as fire and other identified hazards.

7. List of Required BGAqP Records

- 7.1 Records of water quality parameter.
- 7.2 Inventory of veterinary drugs, chemicals and additives (supplier and expiry dates).
- 7.3 Records of stocking of fish fry/fingerlings/juvenile, period of culture, source of fry, size and density of stocking, feeding rate, feed used, sampling and grading and harvesting.
- 7.4 Inventory of fish feeds used (supplier and expiry dates)
- 7.5 Record of production and sales

8. STAFF TRAINING

- 8.1 Implementation of Farm Standard Operating Procedures (SOP)
- 8.2 Fish Health Management
- 8.3 Knowledge on BGAqP Guidelines

Annex 1

List of Fish Diseases

• VIRAL NERVOUS NECROSIS DISEASES

- Type of Disease: Virus
- Other names : Viral encephalopathy and retinopathy (VER)
- Causative agent: Nodavirus
- Fish susceptible: Marine fish species e.g. seabass, grouper and others
- Symptoms : Infected fish shows signs of poor appetite and swims in circles. They appeared weak and stays near surface of the water
- Treatment : No treatment available. Prevention should be practiced
- Prevention and Control: Keep infected fish separate and not to stock fishes in infected areas/cages
- Mortality : High (30% - 60%) if disease control is not practiced or managed well

• IRIDOVIROSI / IRIDO

- Type of Disease: Virus
- Other names : *Iridovirus* Infectious Disease; Systemic Iridovirus Disease
- Causative agent: Iridovirus sp.
- Fish susceptible: Marine fish species e.g. seabass, grouper and others
- Symptoms : The body and gills are pale in color. Organs like the liver and spleen is swollen and dark in coloration. Swollen cells can be observed on various parts of its organs such as the liver, spleen, heart, stomach, gills and head region
- Treatment : No known treatment. During disease outbreak, diseased fish should be separated from healthy fishes. Mortalities should be promptly removed and discarded
- Prevention and Control: Removal of dead or weak fishes from the cage. Disinfection of cage and equipment's used. Maintain optimal water quality and observe good and proper management
- Mortality : High and can reach 100% for small fry and under 100% for fish juveniles and fingerlings

• PARASITIC DISEASES

- Type of Disease: Parasites
- Major parasites : Protozoans, Flatworms, Roundworms, Crustaceans, Leeches
- Symptoms : Fish becomes weak, display low appetite or dies
- Causes : Poor cage and farm management; less than optimal water quality
- Treatment : Manually removing parasites from the body by using wet towel or gloves. Bath fish by dipping into formalin of 50-100ppm in concentration for 1h with strong aeration. Remove infected fishes to a clean and new cage, free of parasite. Parasites that were removed should be dried out, and properly disposed of on land or buried underground to prevent repeat occurrences.
(Reference: 'HUSBANDRY & HEALTH MANAGEMENT OF GROUPE'-SEAFDEC, ph. for APEC, 2001)