

Development of fish cage and pen planning, zoning and siting guidelines for Local Governments

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Codes of Conduct

Codes of Conduct comprise a set of general rules and principles which should lead to the responsible and sustained development of the industry. Therefore in some cases these Codes include practical guidelines for the cultivation of aquatic organisms. In other cases they do not, and instead they are supplemented by Codes of Good and Best Practice.

Codes of Practice take into consideration the best available methods, techniques, strains, optimal feeding regimes, environmental sustainability, welfare of the animals and other issues related to aquaculture. A Code of Practice should provide a practical guide to help operators avoid causing pollution and give recommendations on practices that optimise the environmental management of the operations. In addition, economic considerations regarding the future growth and development of the sector are also included. Such Code of Best Practices (CBPs) are practical and applied guidelines, which are more specific in nature than general Codes of Conduct, and are recommended practices at farm level to ensure a responsible development of the industry.

The development of CBPs could be achieved through the education of farmers based on the latest scientific findings. The rapid technical development implies the need for continuously sharing data and practical and theoretical information between the various stakeholders.

Codes of Practice for Aquaculture in the Philippines (FAO 214)

This Code of Practice outlines principles and guidelines for environmentally-sound design and operation for sustainable development of aquaculture industry. It lists down general guidelines for site selection and evaluation, farm design and construction, water usage, water discharge, effluent management, use of drugs, chemicals, potential toxic fertilizers and pesticides, stock selection, introduction of exotic species and GMOs, feed management, fish health management, aquaculture data management and incentive schemes to encourage compliance.

Codes of practice that are relevant to the better management guidelines prepared here are included in [blue](#).

Better Aquaculture Practice Guidelines in the Philippines

The Philippine Department of Agriculture Bureau of Agriculture and Fisheries Product Standards is developing a Best Aquaculture Practice Program that leads to certification of farms.

The objectives of the certification scheme is to assist the Department of Agriculture to:

- ensure safe and quality aquaculture products;

- facilitate fish farmers'/aquaculturists' adoption of responsible, ecologically and economically sustainable aquaculture practices;
- uplift BAP farmers' profiles as members of the nationally recognized list of fish farmers/aquaculturists that is setting the benchmark for the aquaculture production of safe and quality fishery products;
- enable consumers to exercise the option of buying quality aquaculture products from traceable and certified sources; and
- increase the market access of safe and quality aquaculture products both in the local and foreign markets.

The better Management guidelines developed by the PHILMINAQ project include many of the relevant DA-BAFPS Better Aquaculture Practice Guidelines which are included in **red**.

Better Practice Guidelines for farm operators

The PHILMINAQ project has developed some better practice guidelines at farmer level which if followed, would encourage responsible and sustainable production. It is hoped that these guidelines will be taken up by producer organisations, mariculture parks, aquaculture parks, clusters of farmers and large farmers. It would be difficult for a farmer to implement all guidelines immediately but it is hoped that the farmers will start to implement some immediately and gradually implement the others as time goes by.

Different Better Practice Guidelines (BPGs) should be developed depending on species, culture system and geographical location.

It is recommended that for the Philippines the following BPGs are developed.

- Hatchery and nursery
- Cage and pen culture
- Pond culture
- Mollusc culture
- Seaweed culture
- Post harvest

Better Management Practice for Local Government Units

This report attempts to prepare better management guidelines for Local Government Units for planning, zoning and siting aquaculture development as well as management, monitoring and control of aquaculture with emphasis on mitigating environmental impact. These BMPs cover both cages and pens in marine, brackish and freshwaters. It does not adequately cover invertebrates, seaweeds, invertebrates, nor (substantially) prawn/shrimp culture. Additional BMPs need to be developed for these other culture systems.

Environmental considerations

With increasing aquaculture production, there is a need to consider the environmental consequences in the planning and licensing of aquaculture. The goal should be sustainable production within aquaculture carrying capacity.

Sustainable production

Within increasing development of aquaculture there are increasing impacts to the environment. The environment is able to assimilate certain impacts such as organic sedimentation or dissolved nutrients but if the impact is greater than the assimilative capacity, then there is a build up impact and eventually will pass a threshold where there are consequences such as fish kills.

Carrying capacity

There needs to be a carrying capacity developed and validated for aquaculture in the different aquatic types (fresh, brackish, marine) for the Philippines. This estimation needs to take into consideration the inputs by aquaculture and by other human activities. The planning and management of aquaculture should adhere to a maximum production below the estimated carrying capacity.

Ecosystem management approach

Planning of aquaculture development should take the aquatic ecosystems approach where aquaculture is planned for the aquatic ecosystem as a whole rather than for individual zones within an ecosystem.

Co-management

Although the management of aquaculture is undertaken by individual bordering LGUs, they should consider co-management of the whole ecosystem with other LGUs that border the same ecosystem.

Guiding principles to ensure continued growth of aquaculture within sustainable coastal development

Planning Principles

- Efficient use of land and sea resources
- Avoid conflicts with other coastal users
- Coordinated water basin planning
- Provide livelihoods
- In harmony with the environment (Ecosystem based management)
- Minimise impact to sensitive habitats
- Avoid zoning in protected areas
- Avoid blocking navigation routes and narrow entrances (preventing flushing)

Planning zones for aquaculture

Planning of aquaculture development should take the aquatic ecosystems approach where aquaculture is planned for the aquatic ecosystem as a whole rather than for individual zones within an ecosystem.

Although the management of aquaculture is undertaken by individual bordering LGUs, they should consider co-management of the whole ecosystem (or water body) with other LGUs that border the same ecosystem.

Planning and siting BMPs

It is clear from substantial worldwide experience that inappropriate and unplanned siting of farms has resulted in production failures, environmental degradation, land use conflicts and social injustice. Thus, it is imperative that, during establishment of farms, due consideration is given to the environment, ecologically sensitive habitats, other land use in the vicinity, and the sustainability of the shrimp farming operations themselves.

Locate farms according to national planning and legal frameworks in environmentally suitable locations, making efficient use of land and water resources and in ways that conserve biodiversity, ecologically sensitive habitats and ecosystem functions, recognizing other land uses, and that other people and species depend upon these same ecosystems.

Correct and appropriate planning and siting is essential for a sustainable and economically successful production.

Planning and siting BMPs

Principles

- Environmentally suitable areas
- Water supply sufficient and suitable for aquaculture
- Minimise impact to sensitive habitats
- Long-term sustainability
- Avoid conflicts with other coastal users
- Avoid navigational routes
- Avoid sites with fluctuating water quality
- Integrated with local community

Legal

As a general requirement, farms shall comply with local and national laws and environmental regulations and provide current documentation that demonstrates equal rights for land use, water use, construction and operation and farms shall not deny local communities access to public mangrove areas, fishing grounds and public resources.

Potential sites for aquaculture shall be thoroughly evaluated in accordance with DA BFAR Fisheries Administrative Order No. 214, s.2001: Code of Practice for Aquaculture, Sec.2.

Potential sites for aquaculture shall be thoroughly evaluated by BFAR in consultation with DENR, LGUs, and NFARMC to ensure that ecological and social conditions are sustained and protected.

Planning and siting BMPs (Seabased)

These planning and siting BPPs relate to seabased cages and pens.

The following practices shall ensure that the sites selected are appropriate for aquaculture farms:

- Obey land use and other planning laws and coastal management plans.

- Farms should conform with licensing and permitting requirements
- Navigation channels and routes should be avoided
- Fish spawning and nursery areas as well as established fishing zones should be avoided
- **Installations should be within the defined zones for pens and cages.**

Sustainability

- Farms should be sited in good location and with sufficient clean water
 - Water depth ideally between 15 and 30 m
 - Water current – average should be between 5 and 20cm/s but max speed should not be over 100 cm/s
 - Wave height not more than 2 meters
- **Water should be of good quality (high or adequate dissolved oxygen, stable pH, and low turbidity, and absence of pollution).**
- Farms should be located in areas away from sources of domestic, industrial and agricultural pollution or risks (rivers, flooding, storm waves, biofouling)
- Sites should be located close to infrastructure (Jetties, waste disposal), services (training, extension) and markets (livefish, cold chain)
- **Bottom mud should be firm to allow pen framework to be driven 500 mm deep into substrate for better support.**

Environmental

- Farms should be sited in harmony with the ecosystem (away from sensitive habitats) and surroundings and not conflict with other users of the coastal area
- Do not locate new farms in areas that have already reached carrying capacity for aquaculture.
- Retain buffer zones and habitat corridors between farms and other users and habitats.

The following other factors should be considered:

- Accessibility to market;
- Availability of fast and good transport facilities for marketing of aquaculture products;
- Availability of seeds for stocking/farming;
- Availability of manpower;
- Availability of ice and cold storage facilities;
- Availability of supplementary feeds, fertilizers and other required inputs;
- Availability of construction materials;
- Access to credit; and
- Peace and order condition in the locality.

Other

- The currents in channels should not be restricted due to excessive number of nets cages, pens and especially fyke nets)
- There should be a minimum distances between farms and between zones
- Additional area should be allocated to allow for cages to be moved to a new area within the zone so that the sediments can recover.

Planning and siting BMPs (Landbased)

These planning and siting BMPs relate to land based hatcheries and nursery ponds.

Principles

- Build new hatcheries and nursery ponds farms above the inter-tidal zone.
- No net loss of mangroves or other sensitive wetland habitats.
- Do not hatcheries or ponds farms on sandy soils or other areas where seepage or discharge of salt water may affect agricultural land or freshwater supplies.
- Retain buffer zones and habitat corridors between farms and other users and habitats.
- Obey land use and other planning laws and coastal management plans.
- Improve existing farms in inter-tidal and mangrove areas through mangrove restoration, retiring unproductive ponds and increasing productivity of remaining farm areas above the inter-tidal zone.

Legal

- Farms should conform with licensing and permitting requirements
- Farms should be sited in harmony with other users of the coastal area

Sustainability

- Farms should be sited in good location and with access to sufficient clean water (fresh and saltwater)
- Farms should be located in areas away from sources of domestic, industrial and agricultural pollution or risks (rivers, flooding, storm waves, biofouling)
- Sites should be located close to infrastructure (electricity, roads and freshwater), services (training, extension) and markets (livefish, cold chain)
- **Farms should not be established close to other farms as this** may result in local pollution, disease transmission from other hatcheries, either by direct contact or through effluent discharges.

Environmental

- Farms should be sited in harmony with the ecosystem (away from sensitive habitats) and surroundings and not conflict with other users of the coastal area
- Pond construction should not be located in supratidal areas to avoid salination of soils and groundwater

Other

- Self monitoring validated by Authorities

Siting farms within zones BMPs

Within increasing development of aquaculture there are increasing impacts to the environment. The environment is able to assimilate certain impacts such as organic sedimentation or dissolved nutrients but if the impact is greater than the assimilative capacity, then there is a build up impact and eventually will pass a threshold where there are consequences such as fish kills.

There needs to be a carrying capacity analysis undertaken for the number of farms that a zone is able to sustain in the long term. This estimation needs to take into consideration the inputs by

aquaculture and by other human activities. The planning and management of aquaculture should adhere to a maximum production below the estimated carrying capacity.

Legal

- Farms should conform with licensing and permitting requirements

Sustainability

- The sustainable carrying capacity for fish production should be calculated for zones based on best available science and reliable data
- The number of cages in a zone should be capped to ensure sustainable production
- Fish cages, floating or stationary, should be installed and kept at least one (1) meter **between units with a maximum of 10 in a cluster and at 20 meters between clusters of small cages and 20 meters between large cages to provide water exchange.**
- Fish pens should be spaced 200 meters apart.
- The construction should not damage aquatic life and habitat.
- Site improvement, grow out equipment and structures should be capable of withstanding adverse weather conditions.
- All construction should be completed with a minimal disturbance to the aquatic environment. Construction waste and other deleterious substances should be disposed of properly.

Monitoring of zones – BMPs

Regular and consistent monitoring allows the LGUs to ensure that production is undertaken by legally operated farms, that the environment is not overwhelmed by the nutrient outputs of aquaculture and that production is undertaken in a responsible and sustainable manner.

- Monitoring of the farms is necessary for
 - estimating the aquaculture production from the area
 - checking environmental impact on the sediments and water column to prevent damage to the environment
 - checking that all the farms are licensed
- Part of the revenue from farm permits, licenses, and fees should fund LGU monitoring of the aquatic environment.
- LGUs should monitor the following inside aquaculture zones
 - Cage numbers, quantity of fish per structure, and amount of feeds used.
 - Licences
- LGUs should regularly monitor the following outside aquaculture zones
 - Environmental impact on
 - Sensitive habitats (corals, seagrasses)
 - sediments
 - Water quality is within the DENR water quality criteria
 - Shellfish toxicity

Management of aquaculture zones – LGUs BMPs

Continued management of aquaculture is essential to ensure that there is not irreversible damage to the environment and that the production is sustainable in the long term.

- LGUs should consider the accreditation of feeds and feed manufacturers that have high stability in water and high digestibility of ingredients so that there is minimal nutrient release to the environment.
- LGUs should be also part of the management council of the operators and initiate the conduct of an EIA especially in proposed mariculture zones.
- LGUs should be involved with the environmental monitoring effort together with the the operators
- Provision of sanitation facilities
- Encourage record keeping by the operators
- Promote fallowing
- Encourage and monitor attainment of low food conversion ratios (FCR) by farmers
- Promote the reduction of the amount of feeds used especially during neap tide periods and when dissolved oxygen levels in the farm sites are less than optimum.

Management of aquaculture zones – fish cage and pen operators BMPs

- Operators in zones should form a management council to encourage joint decision making and funding for
 - Undertaking an Environmental Impact Statement for zone
 - Monitoring of impact inside and out side zones
 - Joint purchase of feeds
 - Joint marketing of fish
 - Implementation of Better/best management practices
 - Ensure that all farms in the zones have licences and LGU-issued license plates be prominently displayed
 - Encourage fallowing of sites within the zone
 - Encourage coordinated fish treatment for disease
 - Encourage certification of production

Control of aquaculture development – LGUs BMPs

Without control of aquaculture development, there is a danger that there will be overproduction in the area with the increasing risk of harmful algal blooms and fish kills.

- LGUs should
 - check licenses and remove unlicensed farms
 - Relocate farms from outside zones into the identified zone
 - Inspect feeds from various suppliers. Undertake regular stability tests to ensure use of binders.

Socio-economic issues

- Licensing process should be transparent, equitable, and favour small-scale farmers in protected inshore areas
- Large-scale farmers should be encouraged to be located in more exposed coastal areas