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Codes Of Practice

One of GAA's primary efforts is to establish standards of good practice for responsible aquaculture. To that end, the Alliance published **"Codes of Practice for Responsible Shrimp Farming."** This technical guide, available in sections below or as a complete printed manual, is a significant part of GAA's Responsible Aquaculture Program. NEW! **New Code:** Food Safety.

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[PART I. CODES OF PRACTICE]
[PART II. REVIEW OF RESPONSIBLE SHRIMP FARMING]

Prepared by Dr. Claude Boyd and other members of the GAA Technical Committee, the 10 codes contained in Part I of the guide (see below) are intended to assist in the development of national or regional codes, as well as to provide direction for individual shrimp farm operators. In its Review of Responsible Shrimp Farming, Part II of "Codes of Practice for Responsible Shrimp Farming" reviews shrimp production technology and farming techniques that address both sustainability and efficiency. Visit these pages for a general overview of the industry and its relationship to the environment.

Part I: Individual Codes of Practice

- NEW! Food Safety
- Mangroves
- Site Evaluation
- Design and Construction
- Feeds and Feed Use
- Shrimp Health Management
- Therapeutic Agents and Other Chemicals
- General Pond Operations
- Effluents and Solid Wastes
- Community and Employee Relations

The Codes of Practice were created as flexible guidelines for the formulation of site-specific systems of responsible shrimp production. Implementation methods will vary based on individual farm methods, goals and local conditions. As technology advances, some management practices will likely require revision.

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FOOD SAFETY

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PURPOSE

The purpose of this Code is to address food safety concerns that can arise from the presence of pathogenic bacteria, chemical contaminants (herbicides, pesticides, heavy metals), and aquaculture drugs (chloramphenicol, nitrofurans) in aquaculture products. The focus is on preventing these contaminants in preference to treating for them. Adherence to the other Codes of Practice helps to minimize the incidence of contamination, yet additional steps should be taken.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and specifically asserts that:

- Shrimp farmers who adhere to the Code will rely on good management and responsible pond operations to prevent, eliminate, or reduce contamination by chemicals, drugs, and pathogens that pose human health concerns.
- Monitoring, controlling, and record keeping for these contaminants should conform to acceptable protocols.

MANAGEMENT PRACTICES

Adherents to the Code should strive to produce contaminant-free products for consumers through responsible pond operations and Best Aquaculture Practices that prevent, eliminate, or appropriately reduce levels of chemicals, drugs, and pathogens that pose human health concerns. The following practices should be used to achieve this goal:

1. All waste materials should be disposed of in a sanitary way.
2. In evaluating the suitability of a site for aquaculture, include testing for any chemicals, drugs, and pathogens that might pose a human health risk and are likely to occur at the site.
3. Avoid the potential for septic runoff from humans or other animals, as well as any indication of frequent use of pesticides, herbicides, and drugs; and past contamination with fuel oil or any other chemical contaminants.
4. Feed should not contain chemical or microbial contaminants. Feeding of uncooked organisms or any nutrient source derived from uncooked organisms is discouraged.
5. The shrimp industry and individual producers should work with regional governments to prepare lists of pathogens, drugs, and chemical contaminants that pose existing or potential human health concerns and take effective measures to control these risks.
6. When using any chemical products at or near shrimp-farming sites, shrimp farmers should be attentive to the information on product labels that regards human health concerns.
7. Managers should routinely evaluate procedures for feeding, fertilizing, and the use of chemicals and drugs to continually minimize human health concerns that may result from consumption of their aquaculture products.
8. Approved antibiotics, drugs, or other chemicals (such as sodium meta-bisulfite) should be used only when necessary to control identified disease problems.
9. Shrimp producers should frequently communicate with shrimp processors to obtain current information about antibiotics, drugs, and other chemicals that are regulated in shrimp-importing nations.
10. Records should be generated and maintained to demonstrate adherence to the practices mentioned above and control the hazards involved.

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MANGROVES

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PURPOSE

The Code is designed to foster greater environmental awareness within the shrimp farming industry to assure continued protection of mangrove forests from potentially adverse impacts of coastal aquaculture. Recognizing the multitude of different conditions impacting mangroves in different countries and regional locations, this Code is to be interpreted as a flexible set of criteria to be used to assist any and all interested parties in formulating codes, regulations, and principles for protecting mangrove forests.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" by encouraging the following:

- The shrimp aquaculture industry will promote responsible and sustainable development and management practices ensuring the preservation of mangroves and the sustainability of shrimp aquaculture.
- The shrimp aquaculture industry will promote alternative development programs aimed at protecting mangroves while benefiting local communities in mangrove areas.
- Producers shall adhere to national and local regulations applicable to mangroves and to shrimp farming.

MANAGEMENT PRACTICES

It shall be the objective of all adherents to this Code to not harm mangrove ecosystems, and whenever possible, to preserve and even enhance the biodiversity of these ecosystems. The following practices will ensure the protection of mangrove ecosystems:

1. New shrimp farms should not be developed within mangrove ecosystems.
2. Realizing that some mangrove must be removed for canals when new shrimp farms are sited behind mangroves, a reforestation commitment of no net loss of mangroves shall be initiated.
3. Farms already in operation will continue ongoing environmental assessments to recognize and mitigate any possible negative impacts on mangrove ecosystems.
4. All non-organic and solid waste materials should be disposed of in an environmentally responsible manner, and waste water and sediments shall be discharged in manners not detrimental to mangroves.
5. The shrimp aquaculture industry pledges to work in concert with governments to develop sound regulations to enhance the conservation of mangroves including regulations regarding restoration of mangrove areas when old farms located in former mangroves are decommissioned.
6. The shrimp aquaculture industry will promote measures to ensure the continued livelihood of local communities that depend upon mangrove resources.

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SITE EVALUATION

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PURPOSE

The Code is designed to promote site evaluation as a means to ensure that new shrimp-farming projects are harmoniously integrated into local environmental and social settings. Site evaluation can identify limitations that influence the suitability of a site for farm construction and operation, reveal the possibilities of negative environmental and social impacts, and allow estimates of technical and financial requirements for mitigation of unfavorable conditions. Recognizing that enormous variation in environmental and social conditions exists from site to site, this Code presents adaptable guidelines to assist any and all parties interested in making site evaluations for shrimp farms.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and promotes the following:

- Use of site evaluation to avoid siting farms where significant technical, environmental, and social problems are likely.
- Prevention of significant negative enviromental and social impacts through use of site evaluation findings in planning mitigation methods. A proper site evaluation will provide most of the information required to produce an environmental impact assessment (EIA).

MANAGEMENT PRACTICES

All adherents to the Code shall thoroughly evaluate potential sites for shrimp farms to assure that local ecological and social conditions are protected and even enhanced. The following practices will ensure that appropriate sites are selected for shrimp farms:

1. Evaluate hydrologic features including tidal patterns, freshwater influences and flood levels, offshore currents, and existing water uses.
2. Determine water quality characteristics of coastal waters in the vicinity of the site.
3. Ascertain the suitability of topography, soil, and ecosystem for siting and construction of ponds.
4. Make sure that previous site use has not resulted in contamination of water or soils.
5. Acquire long-term climatological records to determine the likelihood of drastic events such as flood, droughts, or severe storms that could negatively impact the project.
6. Survey the existing flora and fauna with particular concern for effects of the project on ecologically sensitive areas such as migration routes and nesting grounds or protected areas such as parks and refuges.
7. Document regulatory requirements for the site, and consider alternatives for compliance with regulations.
8. Consider alternatives to mitigate potential negative environmental impacts and to alleviate conditions not conducive to shrimp farm construction and operations.
9. Survey local communities to determine demography, resource use patterns, availability of work force, and compatibility with project goals.
10. Consider alternatives to mitigate potential negative social impacts.
11. Determine if any areas within the site are of significant archeological or historical importance and consider methods for their preservation.

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DESIGN AND CONSTRUCTION

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PURPOSE

The Code is intended to promote environmental protection through proper shrimp farm design and good construction methods. Good site selection and incorporation of mitigative features in the farm design are the best ways to avoid problems related to flood levels, storms, erosion, seepage, water intake and discharge points, and encroachment on mangroves and wetlands. Planning of clearing and earth moving activities can prevent or greatly limit ecological damage during farm construction. Recognizing that a site-specific approach to design and construction is necessary, the Code provides basic design and construction criteria for environmentally responsible shrimp farms.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and it promotes:

- Use of design features and good construction methods to overcome site limitations and to prevent or mitigate potential negative environmental and social impacts.
- Adoption of successfully proven and accepted design and construction procedures.

MANAGEMENT PRACTICES

Adherents to the Code shall strive to design and construct shrimp farms in a responsible manner to protect the environment and coastal communities. The following practices can afford this protection:

1. Farms should not be built on ecologically sensitive mangrove areas or other wetlands and in places where it is impractical to correct site-related problems such as highly-acidic, organic, or permeable soils.
2. Comply with all environmental impact assessment (EIA) procedures before initiating construction and abide by EIA restriction during construction.
3. Embankments should be designed to prevent erosion, and where practical, methods for reducing seepage through pond bottoms should be included.
4. Ponds should have separate intake and outlet structures to permit control of filling and draining.
5. Inlet and discharge canals should be separate so that water supply and effluent are not mixed.
6. Storms and flood levels should be considered in earthwork design.
7. Infrastructure and access roads should not necessarily alter natural water flows, cause salinization of adjacent land or water, or impound flood water.
8. Canals should be designed to prevent excessive water velocity and scouring.
9. Water intake point(s) should provide a sufficient volume of high quality water available.
10. Pump intakes should be screened, vegetative buffers provided around pump stations, and containments installed to prevent fuel spills.
11. Where possible, vegetative buffer zones, riparian vegetation, and habitat corridors should be maintained, and vegetative cover provided on exposed earthwork.
12. Sediment traps and basins should be incorporated in the design where suspended solid concentrations are expected to be high in effluents.
13. Outfalls should be designed to prevent erosion and avoid discharge of effluents into stagnant water.
14. Disturb as little area as possible during construction.
15. Erosion should be controlled during construction.
16. Cut and fill construction techniques are preferable, and earthwork should be compacted.

17. Degraded areas such as unused soil piles, barrow pits, and uncontrolled refuse dumps should not be created.

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FEEDS AND FEED USE

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PURPOSE

The Code is designed to improve the efficiency of supplemental feeds and feed management in shrimp farming and to minimize the waste load in ponds. Feeding is a standard practice in shrimp production, because it permits higher production than can be achieved from natural pond productivity. Recognizing that feed is expensive, it should be used wisely to reduce production costs. However, using good feeds and feeding practices also are important steps towards reducing waste loads in pond effluents. Guidelines presented in this Code can be used by feed manufacturers and shrimp producers to improve feeds and feeding practices.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and promotes awareness of two major issues:

- Shrimp feed should be made from high quality ingredients by good manufacturing techniques and stored properly.
- Feed should be used conservatively to ensure efficient conversion to shrimp flesh and minimize waste and expense.

MANAGEMENT PRACTICES

Those supporting the Code shall strive to improve feed quality and feeding with the goal of optimizing the conversion of feed to shrimp and reducing the amount of waste entering ponds. This goal can be achieved through the following practices:

1. Feed ingredients should not contain excessive pesticides, chemical contaminants, microbial toxins, or other adulterating substances.
2. Pellet binders and suitable manufacturing techniques should be used to provide a water-stable pellet.
3. Manufacturing processes should provide adequate vitamin and nutrient concentrations in feed.
4. Feed should be purchased fresh and not stored for more than a few months.
5. Feed should be stored in cool, dry areas to prevent mold and other contamination. Do not use contaminated feed.
6. Feed management practices should be implemented to assure the shrimp consume the maximum amount of supplemental feed and not leave excess amounts decomposing in the pond attributing to poor water quality.
7. Feeding rates should be determined from standard feed curves and adjusted for shrimp biomass, appetite, and pond conditions. Feed trays can be used to monitor feeding and prevent under- or overfeeding.
8. The most efficient supplemental feeding can be obtained by distributing the feed several times through the day and night, widely distributing it throughout the pond, either by manual or mechanical dispersement or use of feed trays.
9. Appropriate feed curves commensurate with shrimp biomass and appetite should be utilized on a site specific, species specific basis and with the recommendation of shrimp feed specialists.
10. Medicated feed should be used only if necessary for the control of a specific diagnosis of disease.
11. Feeding of uncooked organisms such as fish and invertebrates should be discouraged, because they can carry disease and foul pond waters.
12. Research to reduce the level of fish and other marine meals in shrimp feed should be encouraged.
13. Pond managers should keep careful records of daily feed application rates so that

feed conversion ratio (FCR) can be assessed. Reductions in FCR through careful feeding will improve production efficiency and reduce waste loads.

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SHRIMP HEALTH MANAGEMENT

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PURPOSE

The purpose of this Code is to promote shrimp health management as a holistic activity in which the focus is on disease prevention instead of disease treatment. Authorities on shrimp health management recognize that stress reduction through better handling, reasonable stocking densities, good nutrition, and optimal environmental conditions in ponds can prevent most infectious and non-infectious diseases. Treatment should be undertaken only when a specific disease has been diagnosed. Also, effective measures must be taken to minimize the spread of diseases between farm stocks and from farm stocks to natural stocks. This Code provides adaptable guidelines that should provide effective management of shrimp health.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and advances three basic premises as follows:

- Many disease problems can be prevented through stress management.
- Disease treatments should be made only after a clear diagnosis of the causative factors.
- Spread of disease should be minimized by reasonable regulation of importations of broodstock and larvae and by isolation and disinfection of affected ponds.

MANAGEMENT PRACTICES

Adherents to the Code shall adopt the principles of good shrimp health management to reduce the incidence of diseases and to protect natural fisheries. The following practices should be used to achieve these goals:

1. Shrimp farming associations should work with governments to formulate and enforce regulations to include quarantine procedures for importations and exportations of broodstock, nauplii, and postlarvae.
2. Healthy postlarvae should be used for stocking ponds. Survival of postlarvae should then be optimized by preparing the pond to ensure adequate availability of natural food, by properly acclimating postlarvae before stocking, and by avoiding stress by using appropriate handling and transportation techniques.
3. Good water quality and bottom soil management should be used. Stocking rates should not be excessive and high quality feed and good feeding practices should be used.
4. Strong chemical treatments that can stress shrimp should not be employed.
5. Shrimp should be routinely monitored for disease, and a definite diagnosis obtained for any observed shrimp health problem.
6. For non-infectious diseases related to pond conditions, carry out the best option for disease treatment or for correcting pond conditions.
7. For mild infectious diseases with potential to spread within a farm, quarantine the pond and carry out the best option for disease treatment.
8. For serious infectious diseases that may spread widely, isolate the pond, net harvest remaining shrimp, and disinfect the pond without discharging any water.
9. Dispose of dead, diseased shrimp in a sanitary manner that will discourage the spread of disease.
10. When disease occurs in a pond, avoid transfer of shrimp, equipment, or water to other ponds.
11. Drug, antibiotic, and other chemical treatments should be done in accordance with recommended practices and comply with all national and international regulations.

12. The shrimp industry should work with governments to develop certification programs for disease diagnosis laboratories and pathologists.
13. Each country or geographical area should develop its own pond dry-out, and biosecurity strategy.

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THERAPEUTIC AGENTS AND OTHER CHEMICALS

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PURPOSE

The Code is intended to foster greater awareness within the shrimp industry of the proper use of certain potentially toxic or bioaccumulative compounds in shrimp production. Careful control over the use of therapeutants and other chemicals in production will assure that farm-reared shrimp are less likely than wild-caught shrimp to contain residues of pollutants or contaminants. Environmental benefits also will accrue from responsible chemical use. This Code contains flexible criteria that will allow prudent use of certain drugs, antibiotics, and other chemicals in production without endangering food safety or threatening the environment.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and promotes three basic objectives:

- The shrimp farming industry in each nation should work with governmental and international agencies to develop lists of approved feed additives, pesticides, drugs, antibiotics, and other chemicals and to specify approved uses for each compound.
- Shrimp farmers who adhere to the Code will rely on good management to prevent water quality and disease problems and chemicals should be used only when necessary.
- Chemical should be used in ponds only after an accurate diagnosis of the situation, and treatments should conform to acceptable protocol.

MANAGEMENT PRACTICES

Adherents to the Code should strive to produce a wholesome product for consumers through responsible use of drugs, antibiotics, and other chemicals. Use of the following practices will assure this goal:

1. Shrimp health management at hatcheries and farms should focus on disease prevention through good nutrition, sound pond management, and overall stress reduction rather than disease treatment.
2. Where countries have approved lists of chemicals and chemical uses, only approved chemicals should be used in ponds and only for the use approved. Where such lists are not available, the shrimp industry and individual producers should work with governments to prepare such lists.
3. Shrimp farmers should follow information on product labels regarding dosage, withdrawal period, proper use, storage, disposal, and other constraints on the use of a chemical including environmental and human safety precautions.
4. When practical, antibiograms should be used to select the best antibiotic for use in a particular case, and the minimum inhibitory concentration (MIC) should be used.
5. When potentially toxic or bioaccumulative chemicals are used in hatcheries and ponds, waters should not be discharged until compounds have naturally decomposed to non-toxic form.
6. Careful records should be maintained regarding use of chemicals in ponds as suggested by the Hazard Analysis and Critical Control Point (HACCP) method.
7. Store therapeutants in a cool place and in a secure manner where they will be inaccessible to unauthorized personnel, children, and animals, and dispose of unused compounds by methods that prevent environmental contamination.
8. The shrimp-farming industry should work with governments to develop regulations for labelling the content and percentage of active ingredients in all chemicals including liming materials and fertilizers.

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GENERAL POND OPERATIONS

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PURPOSE

The purpose of the Code is to prevent eutrophication, salinization, reductions in biodiversity, and other environmental perturbations by using responsible pond management practices. Experience demonstrates that it is possible to optimize efficiency of shrimp production and be good stewards of the environment at the same time. This Code contains broad guidelines on pond management that can be used to standardize and improve operations for sustainable shrimp farming.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and asserts that:

- Responsible pond operations can protect or even improve environmental quality and enhance sustainability.
- Both profitability and environmental sustainability can be achieved at the same time.

MANAGEMENT PRACTICES

It shall be the objective of adherents to the Code to use pond operation methods that are environmentally responsible while allowing profitable shrimp production. The following practices should be used to promote profitable, yet sustainable shrimp farming:

1. Farms should be encouraged to use hatchery larvae rather than wild-caught larvae.
2. Where wild-caught postlarvae are used, a screening method should be used to separate by-catch and return it to the estuary.
3. Native species should be cultured whenever feasible; however, if non-native species are used, all applicable regulations should be obeyed regarding importation and inspection.
4. Only healthy postlarvae should be used.
5. Good water quality should be maintained by using stocking and feeding rates that do not exceed the assimilative capacity of the culture system and by using high quality feeds and good feeding practices.
6. Water exchange should be reduced as much as possible.
7. Fertilizers, liming materials, and all other chemicals should be used in a responsible manner and only as needed.
8. Good shrimp health management should be used.
9. Aerators should be positioned and operated to minimize erosion and creation of sediment mounds in pond bottoms.
10. Freshwater from wells should not be used in ponds to dilute salinity.
11. Effluents, sediment, and other wastes should be disposed responsibly.
12. Bottom soils should be evaluated periodically between crops and necessary treatments applied to remediate deterioration in soil conditions that occur during culture.
13. Water inlets and outlets to ponds should be screened to prevent entrance of competitors and release of culture species.
14. Predator control methods that do not require destruction of ecologically important species should be used.

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EFFLUENTS AND SOLID WASTES

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PURPOSE

The Code is designed to increase the awareness of proper waste management within the shrimp farming industry and enhance protection of coastal land and water resources. Recognizing that a number of production activities produce wastes, shrimp producers and processors should formulate systems of waste management for protecting lands and waters in the vicinity of their activities. This Code provides a set of guidelines that can form the framework for responsible waste management that will benefit all coastal resource users including shrimp farming.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and specifically recognizes that:

- The shrimp aquaculture industry should promote responsible methods of effluent and solid waste management to protect environment quality and public health.
- Effluent and solid waste management is a continuous activity, and each member farm should strive to improve waste management procedures and reduce amounts of waste released to the environment.
- In countries where quality and volumes of effluent are not regulated by permits from governmental agencies, adherence to the Code is an alternative way of protecting the environment.

MANAGEMENT PRACTICES

Adherents to the Code should continuously strive to improve waste management. Particular attention should be given to the following practices:

1. Canals and embankments should be maintained to reduce erosion of above water portions.
2. Minimize water exchange to the extent feasible.
3. Use efficient fertilization and feeding practices to promote natural primary productivity while minimizing nutrient inputs.
4. Store and use fuels, feeds, and other products in a responsible manner to avoid accidental spills that could contaminate water. An emergency plan should be made for containing accidental spills.
5. Ponds should be drained in a manner to minimize resuspension of sediment and prevent excessive water velocities in canals and at effluent outfalls.
6. Where feasible, pond effluents should be discharged through a settling basin or mangrove forest.
7. Outfalls should be designed so that no significant impact of effluents on natural waters occurs beyond the mixing zone.
8. Shrimp pond effluents should not be discharged into freshwater areas or onto agricultural land.
9. Sediment from ponds, canals, or settling basins should be put back into areas from which it was eroded, used as earthfill, or disposed in some other environmentally responsible way.
10. Sanitary facilities for disposal of human wastes should be provided at hatcheries, farms, and processing plants.
11. Garbage and other farm wastes should be burned, put in a land fill, or disposed of by other acceptable methods.
12. Shrimp farms, hatcheries, and processing plants should comply with existing

governmental regulations related to effluents and other wastes.

13. Processing plants, and where necessary, shrimp hatcheries should install effluent treatment systems of appropriate type and capacity.
14. Managers should routinely evaluate waste management procedures and continually attempt to improve them.

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COMMUNITY AND EMPLOYEE RELATIONS

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PURPOSE

The purpose of the Code is to foster good relationships among shrimp farm officials, workers, and local communities. Aquaculture can be a powerful stimulus to improving the standard of living in coastal communities by providing jobs and services, contributing to the tax base, improving the physical and social infrastructure, and creating a larger and more diverse and dynamic economy. Recognizing that public relations and employee welfare are complex issues, this Code is intended to provide some general guidelines for enhancing the prospects for harmonious interactions with workers and the local community. Conditions and expectations are highly variable from place to place, so considerable flexibility will be necessary in applying these guidelines.

The Code helps to achieve several of the "Guiding Principles for Responsible Aquaculture" and specifically promotes the following:

- Shrimp farms should employ local workers to the extent possible, provide good working conditions, and wages commensurate with local pay scales.
- Shrimp farms should abide by local laws and regulations regarding the rights of local people to use coastal resources.
- Shrimp farms should be supportive of local communities and engage in community activities.

MANAGEMENT PRACTICES

Shrimp farms range in size from small, family operations to large corporate enterprises. Most of the guidelines given below apply primarily to large shrimp farms:

1. Shrimp farm owners should have clear title or right to their property or other current, legal land concession agreements.
2. Shrimp farm management should schedule meetings with local communities to exchange information. This is particularly important in the planning stages for new farms or expansions.
3. Shrimp farm management should attempt to accommodate traditional uses of coastal resources through a cooperative attitude towards established local interests and environmental stewardship.
4. Shrimp farm management should contribute to community efforts to improve local environmental conditions, public health and safety, and education.
5. Local workers should be employed to the extent possible, and all practical means made to prevent conflicts between local people and workers from outside.
6. Workers should be fairly compensated with respect to local wage scales.
7. Healthy and safe living and working conditions should be provided. Procedures should be established for dealing with illness and accidents, and employers must be responsible for making sure that workers are fully aware of these procedures.
8. Shrimp farm management should have clearly defined and posted security policies.
9. Employees should have a clear understanding of their duties and of company expectations regarding their performance.

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