



# ENVIRONMENTAL JUSTICE FOUNDATION

## Draft Protocol for Sustainable Shrimp<sup>a</sup> Production.

Environmental Justice Foundation Internal Report, October 2003.

The aim of this protocol is to provide a framework for national and international efforts to ensure that future shrimp production is sustainable, ecologically sound and socially equitable. The protocol should be applied in a manner consistent with relevant rules of national and international law, including the obligations of states to international agreements to which they are party, and in light of all relevant declarations and international agreements. These include, but are not limited to, the United Nations Convention on the Law of the Sea, 1982; the Convention on Biological Diversity, 1992; the Ramsar Convention (The Convention on Wetlands of International Importance especially as Waterfowl Habitat), 1971; The Universal Declaration of Human Rights; the Rio Declaration on Environment and Development, 1992, and Agenda 21 adopted by the United Nations Conference on Environment and Development (UNCED); and the FAO Code of Conduct for Responsible Fisheries. The protocol also notes the commitment made by governments at the 2002 Johannesburg World Summit on Sustainable Development to 'maintain and restore depleted fish stocks by 2015'.

As it stands, this document is a work in progress, intended to stimulate discussion and debate on the issues surrounding shrimp production and bring some of the environmental and social concerns to the fore. The draft aims to draw together many of the key criteria from existing codes of conduct as well as the findings from two years of research, during which time EJF has been working closely with grassroots organisations working in shrimp producing countries. Input from all of the groups who have been working on this at the local, national and international level has been invaluable. Additionally, the protocol aims to give full consideration to social issues associated with shrimp production, recognising the vital importance of protecting the rights of local stakeholders in shrimp producing areas. EJF would be most grateful for any feedback on this draft.

## General Principles

1.1 Standards addressing environmental and social conditions should be central to any shrimp production system. All parties (including governments of producer and consumer countries, all individuals and companies engaged in shrimp production, multi-lateral institutions, bilateral aid agencies and international organisations, research institutions, importers, retailers and consumers) should be committed to the transformation of shrimp production (both through

aquaculture and capture fisheries) into an activity which is socially equitable, economically viable and ecologically compatible with the principles of sustainable development<sup>2,5,b</sup>.

1.2 The precautionary principle must be applied to every step in the development of shrimp production systems<sup>3,15,2</sup>. Shrimp production should not adversely affect, in the short, medium or long term, the biotic or abiotic environment or the communities dependent on them<sup>4,3</sup>. All users of living resources should conserve aquatic<sup>1</sup> and

<sup>a</sup> For the purposes of this document, the words shrimp and prawn are used interchangeably.

<sup>b</sup> Defined by the UN Food and Agriculture organisation as "Development that conserves land, water, plant and genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable".

terrestrial ecosystems. All critical habitats such as wetlands, mangroves and other ecologically sensitive areas<sup>3</sup>, including, reefs, lagoons, nursery and spawning areas<sup>1</sup>, rivers, inlets, bays, estuaries, swamps, marshes and tidelands<sup>2</sup> should be protected and rehabilitated as far as possible; wetland areas should be conserved and protected through a joint management system with local communities<sup>4</sup>. All parties must support a transition from the use of destructive technologies or practices to more responsible practices to ensure the long-term survival and health of ecosystems and the viability of sustainable human activities dependent on those systems<sup>5,2</sup>; this should be done in accordance with all appropriate regulations and on the basis of best scientific judgement.

- 1.3 Governments must establish, maintain and develop an appropriate (and transparent) legal and administrative framework, which facilitates the development of responsible shrimp production<sup>1</sup>, *a*) including appropriate environmental laws with provisions for independent environmental impact assessment<sup>4</sup> and *b*) encouraging rehabilitation of degraded or abandoned ponds<sup>15</sup>. All companies and individuals involved in shrimp farming should collaborate with national, regional and local governments in the development of policies, regulations, and procedures to achieve environmental, economic and social sustainability of shrimp production<sup>6</sup>. The use of environmental and social impact assessments prior to operation development and the regular and continuous monitoring of environmental and social impacts of shrimp production must be supported<sup>3</sup> and financed by the industry.
- 1.4 Governments must provide frameworks for adequate regional planning / siting; ensure use of environmentally friendly designs; ensure use of appropriate technologies (production and waste management); avoid crowding through appropriate siting (dispersed sites / discharges); provide for reduced vulnerability to disease emergence and spread through density and water quality controls; limit use of chemicals and therapeutic agents; provide mechanisms for periodic environmental audits of activity; and provide frameworks for restoration, mitigation and compensation.

- 1.5 The involvement of local stakeholders (those directly or indirectly affected) at all stages of project implementation is vital (including policy formulation and implementation<sup>1</sup>, and in planning of protocols and codes of conduct<sup>13</sup>). All shrimp production must be carried out in a manner which is compatible with the social, cultural and economic interests of coastal communities<sup>3</sup>.
- 1.6 The central role of land rights must be recognised. Where possible, shrimp production should be centred around community based natural resource management within a framework of an integrated coastal zone management plan; there should be real and effective participation of all stakeholders in the management of coastal resources<sup>4,2,3</sup>.
- 1.7 The rights of local communities, particularly those involved in subsistence, small-scale and artisanal fisheries and agriculture, to a secure and just livelihood must be protected<sup>1</sup>. Shrimp production must not block or interfere with access to traditional fishing grounds or resources (including forest resources or agricultural land). Agriculture operations should not encroach on lands that are a common heritage and subject to customary use (commons).
- 1.8 The human rights, including resource rights, of all people affected by shrimp production must be respected in accordance with all relevant national laws and international treaties<sup>15</sup>. Alleged human rights violations must be investigated by competent authorities and processed in accordance with the civil, administrative and judicial responsibilities of the country concerned and in compliance with the laws, treaties and international agreements to which such countries are parties<sup>15</sup>.
- 1.9 Establishing a chain of custody for the shrimp that are to be exported and all components (for example, fishmeal or other feeds used in production) is an important part of any sustainable shrimp production, and efforts must be made to improve the sustainability of shrimp production at all stages of the chain, from breeding of larvae or capture of shrimp to processing of the end-product.

- 1.10 Recognising the paramount importance of local communities, fishers and shrimp farmers, and of understanding the conservation and management of the natural resources on which they depend, all parties (in particular governments of producer countries, the shrimp industry, donor and aid agencies and non-governmental organisations) should promote awareness of responsible shrimp production through education and training<sup>1</sup>. The potential benefits of cooperatives for small-scale shrimp farmers should be recognised and mechanisms for supporting such cooperatives should be encouraged.
- 1.11 The use of trade related instruments and mechanisms (such as fines for pollution, pollutant taxes, commodity taxes, performance bonds or a trust fund for restoration of abandoned farms) should be explored to ensure that the 'polluter pays principle' is applied, and to encourage better practice within the industry,
- 1.12 The practices in all new developments should be consistent with the objectives outlined in this protocol and there should be progressive adoption and implementation of the protocol in existing production systems.
- 2.2 Shrimp aquaculture operations should reduce their environmental and social impacts<sup>8,18,19,29</sup> through the use of breeding programmes and hatchery produced fry; species selection; improved site selection, pond design and farm management; controlled use of inputs; treatment and careful discharge of effluents; and conservation of water resources.
- 2.3 The site location and method of management of shrimp farms and processing operations must not adversely affect the surrounding ecosystems<sup>10</sup> (terrestrial or aquatic), or wild populations of the same or other species in the area<sup>9</sup>.
- 2.4 Shrimp farming systems should be designed and managed to promote good health and minimal stress for the stock<sup>3,9</sup>.
- 2.5 Ensuring the health and safety of workers and those living in the locality of shrimp farming operations, as well as of consumers, must be a priority at all stages of the shrimp production chain.

## Farmed Shrimp

### General Principles

- 2.1 Sustainable natural and / or traditional shrimp aquaculture which includes an emphasis on the carrying capacity of the environment as well as the real and effective participation of all groups that benefit from coastal resources (particularly the local communities) must be encouraged<sup>4</sup>. It is recommended that the general principles of organic aquaculture should be applied / promoted as far as possible<sup>c</sup>, and farms should also be encouraged to adopt 'ethically traded' and Fair Trade standards.
- 3.1 Management of shrimp must take into account the welfare of the stock, and should be based on the following principles (recommended by the Soil Association): freedom from malnutrition; freedom from thermal and physical discomfort; freedom from injury and disease; freedom from fear and distress; and freedom from unnecessary restrictions of behaviour<sup>9</sup>.
- 3.2 Management practices must ensure a low stress environment and allow stock as far as possible to act according to their basic behavioural patterns<sup>9</sup>. All handling of stock must be carried out with the aim of minimising stress<sup>9</sup>. Movement of growing shrimp between holdings (excluding post-larvae from rearing facilities) should not be allowed (minimising stress can also aid health / survival and thus increase productivity of operations)<sup>9</sup>.

<sup>c</sup> Basic characteristics of organic production include: the production of shrimp free from artificial ingredients and with minimal contamination, using production methods that use natural ingredients and minimise the use of external resources; management procedures that ensure minimal effect on the local environment; promotion of health and welfare of shrimp by minimising stress, reducing the incidence of disease and nurturing the vitality of shrimp through meeting their physiological and behavioural needs; management to a high standard to minimise the need for veterinary intervention; the prohibition of pesticides; and the encouragement of the use of local resources and services. In addition to the established principles for organic production (defined by the International Federation of Organic Agricultural Movements), organic aquaculture also includes the following principles: the development of a valuable and sustainable aquatic ecosystem; the healthy use and proper care of water, water resources and all life therein; and the maintenance or enhancement of water quality<sup>9</sup>.

- 3.3 Water quality (such as temperature, pH, salinity, oxygen, ammonium and nitrate concentrations, turbidity, flow rates, etc.) should conform to the natural requirements of the shrimp species and should be monitored and recorded regularly.
- 3.4 Shrimp should be starved for no longer than 24 hours before harvest<sup>9</sup>. Following harvest, transport and slaughtering must be carried out in a way that is as fast and considerate as possible to avoid any unnecessary suffering of the shrimp<sup>9,10</sup> (see 8.1, 8.4).

## Stocking ponds

### Species selection

- 4.1.1 Appropriate policies about import, quarantine and distribution of non-indigenous species based on the precautionary principle must be followed, and must be developed where they are not already in place<sup>13,14</sup>.
- 4.1.2 Where possible, only native species should be stocked<sup>3,10</sup>; stocking of non-native species should be prohibited in tidal areas and other areas prone to flooding<sup>15</sup>.
- 4.1.3 Where non-native species have already been introduced, the risk of escape must be recognised and minimized<sup>9,10</sup> (though it should be recognised that in practice this may be difficult<sup>13</sup>). To reduce the risk of spreading disease through transfer of non-native species, strict guidelines for disease inspection and quarantine should be enforced<sup>13,d</sup>.
- 4.1.4 Genetically modified organisms should not be used<sup>3,2,9,10</sup>; nor should polyploid<sup>9,10</sup> or 'all female' stocks<sup>9</sup>.

### Stocking ponds

- 4.2.1 Farmers should receive advice on appropriate stocking densities and times. Stocking rates

should not be excessive<sup>6</sup>, and should be dependent on the carrying capacity of the system, rather than simply pond size<sup>6</sup>.

- 4.2.2 Only fit and healthy juveniles should be transported and used to stock ponds<sup>6,10</sup>. Survival can be improved through preparing the pond to ensure adequate availability of natural food, by properly acclimating post-larvae before stocking, and by avoiding stress through appropriate handling and transportation techniques<sup>6</sup>. Transportation must avoid unnecessary stress to the shrimp (including consideration of oxygen and carbon dioxide levels, temperature and pH)<sup>10</sup>.
- 4.2.3 The use of less-intensive, traditional aquaculture systems should be encouraged wherever possible. Crop diversification (such as polyculture with tilapia, seabass, crabs, etc.; shrimp-tilapia-ducks, or different shrimp species<sup>10</sup>) should be encouraged and supported. Polyculture can lead to more effective utilisation of available resources<sup>10</sup>.

### Obtaining stock

- 4.3.1 The use of local stock (broodstock, nauplii, post-larvae, etc.) obtained from the geographical region of the aquaculture operation is preferable. Where this is not possible, appropriate regulations for procedures of import and export of stock must be formulated and enforced.
- 4.3.2 The use of stock obtained through controlled reproduction (domestication) is preferred; all shrimp aquaculture operations should aim to become fully independent from wild-caught post-larvae or broodstock<sup>10</sup>.
- 4.3.3 Sites that rely on wild seed by natural inundation of the ponds or capture of wild broodstock must ensure that the capturing process is carried out with due regard to welfare and must not adversely affect the sustainability of wild populations of the target or other species<sup>9</sup>.

<sup>d</sup> Viz. (i) FAO. 1997. *Aquaculture Development*. FAO Technical Guidelines for Responsible Fisheries 5, Food and Agriculture Organisation of the United Nations. (ii) FAO/NACA. 2000. Asia regional technical guidelines on health management for the responsible movement of live aquatic animals and the Beijing consensus and implementation strategy. *FAO Fisheries Technical Paper 402*. Rome, 53pp.

<sup>e</sup> Naturland recommend no more than 20 animals/m<sup>2</sup> for organic ponds [at harvest]<sup>10</sup>; the Soil Association recommend stocking density must not exceed 50g/m<sup>2</sup> for extensive aquaculture, and 250g/m<sup>2</sup> for semi-intensive<sup>9</sup>.

## Wild-caught shrimp fry

- 4.4.1 Collection of larvae must not adversely affect the survival or diversity of other species<sup>2,3</sup>, or of shrimp stock species.
- 4.4.2 Spatial and temporal regulations and gear restrictions to reduce the negative environmental impacts of wild-fry collection must be formulated and enforced<sup>7,13</sup>. These should include bans on fry catching in ecologically sensitive areas (such as migration routes) and seasonal bans in other locations. Restrictions on the use of destructive fishing gears and promotion of improved catch methods should also be mandatory<sup>7</sup>. Screening methods should be used to separate bycatch and return it to the water as quickly as possible<sup>6</sup>.
- 4.4.3 Enforcement of such regulations should be promoted through awareness building and community based management, and through application of the regulations to all intermediaries in shrimp fry marketing chains<sup>7</sup>. Shrimp fry collectors should receive education and equipment to encourage better practice, and should receive training and education to improve the survival rates of shrimp fry that are caught and marketed<sup>7</sup>.
- 4.4.4 In areas where wild shrimp fry collections are allowed to continue, scope for the introduction of licensing systems should be explored<sup>7</sup>.
- 4.4.5 Recognising the large numbers of (largely marginal and vulnerable) people employed by the fry-collecting sector of the industry, restrictions and bans must be tied to specific aid and / or alternative livelihood programmes which should be introduced prior to the introduction of restrictions / bans; these should be focused primarily at women and children and be specific to the areas in which bans are enforced<sup>8</sup>.
- 4.4.6 Control of harvest of wild shrimp fry, broodstock and adult shrimp for consumption should be considered in coordinated national fisheries management plans<sup>5</sup>.

## Hatchery-produced shrimp fry

- 4.4.7 Hatchery-produced shrimp fry should be required to be used and promoted where possible<sup>6</sup>.
- 4.5.1 In many countries, there is a need for rationalisation, improved coordination and dissemination of information among shrimp hatcheries. This should be supported, and the scope for licensing and / or certification of hatcheries explored.
- 4.5.2 Use of measures to enrich the larval environment (e.g., providing substrates) and to increase the productivity of hatchery / nursery ponds (for example, through culture of feed organisms) are recommended<sup>9,10</sup>. A substantial proportion of larvae feed should be live<sup>f</sup>.

## Broodstock collection and farm-reared stock

- 4.6.1 Broodstock collection methods must be considered, as collection of wild broodstock to supply hatcheries is associated with very high rates of bycatch and the post-larvae produced are often of poor quality. There is an urgent need for improved methods of harvesting brood shrimp. Existing methods are often devastating and must be phased out, and funds must be made available for the development and adoption of improved methods.
- 4.6.2 Use of farm-raised broodstock is preferable, and should be encouraged wherever possible. Applied research into techniques for rearing farm-raised broodstock should be supported.
- 4.6.3 Reproduction should take place in a natural manner, without the use of chemicals or hormones, and in a low stress environment<sup>9</sup>. Only mild, non-mutilating methods for obtaining larvae should be used<sup>9,10</sup>.
- 4.6.4 Eye cauterisation to stimulate maturation in female shrimp should not be practiced.
- 4.6.5 Development of production units' own breeding programmes are recommended<sup>9</sup>.

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<sup>f</sup> The Soil Association recommends 75%<sup>9</sup>.

## Site Selection and Planning

### Site Selection – environmental considerations

- 5.1.1 One of the most common reasons for failure of shrimp aquaculture farms or for adverse environmental impacts is the inappropriate location of farms<sup>11</sup>.
- 5.1.2 The location of shrimp farms and processing operations must not adversely affect the surrounding ecosystems<sup>10</sup> (terrestrial or aquatic), agricultural lands, other shrimp farms or wild populations of the same or other species in the area<sup>9</sup>.
- 5.1.3 Aquaculture farms should be prohibited in mangroves, wetlands<sup>6,13,14</sup> or other ecologically sensitive areas (including areas such as migration routes and nesting grounds, or protected areas such as parks and refuges<sup>6,9</sup>). Farms should also not be permitted in areas where it is impractical to correct site-related problems such as highly-acidic, organic or permeable soils<sup>6</sup>. There should be no net conversion of critical coastal ecosystems<sup>15</sup> (see 5.4.1).
- 5.1.4 Shrimp production facilities should not divert essential water flows from critical ecosystems<sup>15</sup>, and any measure carried out by a farm which is likely to influence adjacent mangrove or other critical ecosystems (such as through increased sedimentation<sup>12</sup>) must be considered<sup>10</sup>.
- 5.1.5 In the case of new operations or expansion of existing operations, natural vegetation should not be damaged in a lasting way<sup>10</sup>.
- 5.1.6 Shrimp farms should not be encouraged on productive farmland (or land traditionally used as common land or open-access land) (though in some cases integrated shrimp farming may potentially be beneficial for local communities; for further discussion on this please see EJJF's report on the environmental impacts of shrimp farming<sup>18</sup>). Wholesale conversion of agricultural or cultivatable land for aquaculture should not be permitted<sup>2,3</sup>.

### Site Selection – social considerations

- 5.2.1 Farms must not block traditional user access to resources such as forests, fishing grounds or grazing lands, fresh water, or other critical resources upon which local people depend for survival<sup>15</sup>. Where necessary, designated access routes across farms should be provided<sup>12</sup>.
- 5.2.2 Land reform, centred around community based natural resource management, is key to improved equitability and sustainability of the industry. All decision-making regarding such processes as a) leases and rentals of public land or b) licensing and permits should be transparent, and the terms of all leases respected; in particular, agricultural lands to be converted to shrimp ponds must not be acquired by coercion<sup>15</sup>.
- 5.2.3 Shrimp farmers must have clear title or right to their property or other current legal land concessions<sup>6</sup>, and must have current documentation that demonstrates legal rights to land use, water use, construction and operation<sup>12</sup>.
- 5.2.4 Governments must ensure that local stakeholders receive appropriate consideration especially regarding issues such as communal resources<sup>15</sup>. Existing laws and regulations that protect the interests of communities living in the coastal zone must be enforced<sup>13</sup>. Where laws and regulations are ambiguous, contradictory or inadequate, governments should seek to clarify tenure systems and management control over coastal resources through comprehensive coastal zone planning<sup>13</sup>, which should be centred around community based natural resource management.

### Site Selection – planning and monitoring

- 5.3.1 Governments should be encouraged to develop and enforce clear demarcations and land zoning for shrimp cultivation to minimise environmental degradation and social conflict, following extensive surveys of the geographical and ecological features of the coastal zone to identify areas that would be appropriate for shrimp farming.
- 5.3.2 Prior to construction of any new operations, a comprehensive site evaluation should be conducted to determine if site characteristics are

suitable for the construction and sustainable operation of a shrimp farm. Such an evaluation should include determination of the availability and quality of water, climatic conditions, tidal patterns, freshwater flow (including flood levels and frequency), terrain, vegetative cover, soil characteristics, and other related factors<sup>6,13,14,g</sup>.

- 5.3.3 Additionally, local communities should be surveyed to determine demography, resource use patterns, etc. Initiatives capable of mitigating potential negative social impacts should be considered. It should also be determined if any areas within the site are of significant archaeological, historical or cultural importance, and methods for their preservation should be considered<sup>6</sup>.
- 5.3.4 Local communities and civil society organisations should be consulted throughout the planning and monitoring process. Results of all consultations should be made public.
- 5.3.5 For all operations (farms, processing factories, etc.) over a certain size, an independent environmental impact assessment must be carried out.
- 5.3.6 Environmental Impact Assessment should provide data collected from both inside and outside the ponds, and should provide sufficient data to monitor the individual and collective impacts of the industry and to allow effective monitoring of the impact of aquaculture projects over time<sup>15</sup>. The scope for sector EIA, incorporating a social impact assessment, should be considered<sup>16</sup> particularly where there are numerous small farms. EIA must include all of the information required in a proper site evaluation, together with a detailed description of the entire ecosystem and the proposed project, identification of potential negative environmental impacts and other hazards, a full risk assessment, a mitigation plan for the negative consequences of site development, a description of the monitoring program<sup>13,14</sup>, and it must address all elements of integrated coastal zone management. There must also be assignment of legal liabilities for environmental damage and provisions for environmental monitoring

and reporting<sup>16</sup>. Integration of the site evaluation and farm layout / design for shrimp aquaculture projects into the EIA will allow assessment of the technical and economic feasibility of operating a sustainable project on a particular site<sup>13,14</sup>.

- 5.3.7 Farms already in operation must continue with ongoing environmental assessments to recognise and mitigate any possible negative impacts on mangrove and other ecologically important ecosystems<sup>6</sup>. This should include the restoration via hydrologic restoration of any abandoned or disused shrimp ponds in the vicinity of the existing operational farm<sup>23,24</sup>.
- 5.3.8 The possibility of funds / grants for small-scale farmers to carry out EIA should be explored.

#### Site Rehabilitation

- 5.4.1 Every effort must be made to ensure that natural vegetation in degraded and abandoned aquaculture sites is rehabilitated, and the individuals or companies responsible must bear the cost of this rehabilitation<sup>3</sup>.
- 5.4.2 The shrimp aquaculture industry should assume all civil, legal (and corporate) responsibilities for the socio-ecological damages caused by the industry's installations, operations and productions; the burden of proof that no damage has been done should rest with the industry<sup>2</sup>. Every shrimp aquaculture operation should have in place a rehabilitation plan for the restoration of the site back to its former condition after shrimp aquaculture ceases and funds for this restoration should be set aside before operations begin. Where local communities have been affected by the loss of user rights, or where impacts on agricultural land can be shown to be a result of shrimp farming operations, compensation must be covered by the industry.
- 5.4.3 It must be recognised that mangrove restoration is a second-rate alternative to mangrove protection and many attempts fail due to poor design<sup>25,26,27</sup>. Any successful mangrove restoration

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g The Soil Association requires that a detailed environmental management plan be developed, which must establish and define environmental loadings of the unit, appropriate controls or reductions of these loadings, initiatives for positive environmental management / enhancement, measures to prevent escapes and contingency plans to minimise the impact should escapes occur, and provision for monitoring the implementation of the plan<sup>9</sup>. For shrimp farms specifically, they require that the development of a new site must be preceded by an environmental survey to establish biodiversity and conservation value; any such development must not lead to the permanent loss of natural vegetation<sup>9</sup>.

project will take many years to achieve levels of biodiversity and functional equivalency to that of mature forests often lost to pond construction.

- 5.4.4 Where farms have already been developed in mangrove areas, restoration must be encouraged. Restoration of other adjacent abandoned or disused ponds, or other damaged mangrove areas must be required. Farms in such areas should restore, as a minimum, an area equivalent to that lost to farm development. In addition, farms should retain a certain percentage of their land as mangrove area. Reforestation should be carried out according to best scientific knowledge<sup>24,27,28</sup>, and with the involvement of local stakeholders<sup>19</sup>. Shrimp farms sited in illegally cleared mangrove areas should provide immediate funds for restoration and should compensate local communities for losses<sup>6</sup>.
- 5.4.5 The conversion of areas that did not formerly support mangroves (such as mudflats and seagrass meadows) to mangroves, by planting, is not a recommended practice<sup>25</sup>. Mangrove afforestation must not adversely affect or occur in such ecosystems, which are ecologically valuable in their own right.
- 5.4.6 Mangrove reforestation should reflect original species composition and density, rather than be single-species plantations.

## Pond design

- 6.1 Pond design must be site-specific<sup>6</sup>, and should encourage the development of a diverse ecosystem that will supply the stock with food, shelter and a clean environment and also serve as a refuge for wildlife<sup>9</sup>.
- 6.2 Ponds must be appropriately designed and managed to ensure that the water bodies inside the

operation<sup>10</sup>, (and the coastal ecosystems in which they are located) retain their ecological functions; for this purpose in particular, adequately large areas with natural vegetation must be protected or planted by the enterprise<sup>10</sup>.

Infrastructure and access roads should not alter natural water flows, cause salinisation of adjacent land or water, or impound flood water<sup>6</sup>.

- 6.3 Ponds should be designed to reduce sedimentation through erosion<sup>7</sup> and methods for reducing seepage through pond bottoms should be included where possible<sup>6</sup> (for example, through covering pond bottoms that contain a high percentage of sand and little clay with less-permeable soils or plastic liners<sup>12</sup>)<sup>j</sup>.
- 6.4 Shrimp farming systems should be designed with the consideration of the shrimp stock's welfare in view (see 3) – such as in respect of stocking density, soil, shelter, shade and flow of conditions, etc.<sup>9,10</sup>, and pond design must include measures to provide and maintain an adequate supply of high quality of water at all times<sup>9</sup>.
- 6.5 Pond design and management should minimise the risk of spread of disease between farm stocks and from farm stocks to natural stocks<sup>6</sup>, and should minimise the risk of pollution of the surrounding environment. Design should include separate canals (and water bodies) for influent and effluent<sup>6,15</sup>, and where appropriate should include settling ponds or canals and / or natural or artificial wetlands to treat effluent<sup>15</sup>. Sediment traps and basins should be incorporated into design where suspended solid concentrations are expected to be high in effluent<sup>6</sup>. Water inlets and outlets should be screened to prevent release of cultured stock, and to prevent entrance of predators (see 7.3.1 / 7.3.2). Water inlets should be a sufficient distance from sources of pollution<sup>15</sup>.

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*h* Naturland's organic standards require that former mangrove area in the property of a shrimp farm must be reforested to at least 50% during a period of no more than five years<sup>10</sup>; this should be extended to all shrimp farms that cover former mangrove area. The GAA states that the shrimp aquaculture industry should work in concert with governments to develop sound regulations to enhance the conservation of mangroves including regulations regarding restoration of mangrove areas in abandoned farms<sup>6</sup>, and should promote measures to ensure the continued livelihood of local communities dependent upon mangrove resources<sup>6</sup>.

*i* Please see, for example, ISA Net's Draft Guidelines for Sustainable Shrimp Aquaculture<sup>15</sup>.

*j* The Aquaculture Certification Council suggest that vegetative barriers of salt-sensitive plant species around farms may serve as early-warning systems to detect movement of salt into adjacent areas<sup>12</sup>.

- 6.6 Water exchange should be reduced as far as possible (see 7.3.9). Pump intakes should be screened, vegetative buffers provided around pump stations, and containments installed to prevent fuel spills<sup>6</sup>.
- 6.7 At least 50% of the total dyke area around ponds should have natural plant cover in areas where natural vegetation once grew<sup>9,10</sup>. This state should be reached during a maximum five-year period<sup>10</sup>.
- 6.8 A proportion of the farm's area should be managed as wildlife zones where native plants and animals are able to live without undue disturbance<sup>9,k</sup>.
- 6.9 Establishment and maintenance of buffer zones and habitat corridors should be undertaken where possible<sup>6</sup>.
- 6.10 Where shrimp farms have already been established in mangrove areas, integrated mangrove-shrimp farming systems should be used (see 4.2.3); research into the best design for these systems should be supported<sup>19</sup>. Where farmland has already been converted to create shrimp ponds, rotational rice-shrimp farming (or salt-shrimp farming) should be encouraged, where relevant<sup>8</sup>.
- 6.11 As stated above, the use of less-intensive, traditional aquaculture systems should be encouraged wherever possible. Crop diversification (such as polyculture with tilapia, seabass, crabs etc.; shrimp-tilapia-ducks, or different shrimp species<sup>10</sup>) should be encouraged and supported.
- 6.12 Materials used in pond construction or management must not negatively affect the shrimp or the environment<sup>9,10</sup>.
- 6.13 Permanent heating, aeration or oxygenation should be avoided<sup>10</sup>. Where aerators are used, they should be positioned and operated to minimise erosion and creation of sediment mounds<sup>6</sup>.

## Shrimp Farm Management

Management strategies that maintain and (where possible) enhance ecological diversity and maintain and enhance local wildlife should be adopted; management must be in accordance with the wildlife and conservation status of the area<sup>9</sup>.

### Shrimp Health Management

- 7.1 Emphasis should be put on improved health through improved husbandry, controlled origin of larvae, monitoring of water quality and ecological conditions in the ponds<sup>10</sup>; shrimp health management should be holistic, with a focus on disease prevention<sup>6</sup>.

### Shrimp Health Management – Chemicals and antibiotics

- 7.1.1 Routine and prophylactic treatment with chemico-synthetic drugs, antibiotics or hormones should not be permitted<sup>10</sup>. Use of natural and herbal remedies<sup>9,10,l</sup> and practices (such as the use of salt baths / flushes to prevent parasite build up) should be encouraged<sup>9</sup>.
- 7.1.2 Governments, (working with the shrimp farming industry<sup>6</sup> and research institutes) should approve lists of drugs and chemicals for use in shrimp aquaculture, which should include the approved use of each product, methods of application (including concentrations), withdrawal time, and pre-harvest time<sup>13,14</sup>, and enforce (and formulate if not present) regulations regarding the use of these chemicals. (See GESAMP, 1997<sup>17</sup>). Governments (and where appropriate, aided by industry and civil society) should also collect accurate data on usage of chemicals, encourage collaboration between manufacturers, suppliers and users of chemicals, and provide regular training and / or expert advice to farmers with regards to use to reduce potential impacts and ensure worker safety<sup>18</sup>.
- 7.1.3 All chemicals must be used, stored and disposed of in a safe and responsible manner; careful records of all application and effect must be kept<sup>6,18</sup>. Manufacturers should be required to provide labels with the composition of chemical products, permissible uses, methods of application, environmental hazards and restrictions,

k The Soil Association recommends 10%<sup>9</sup>.

l Please see Naturland and Soil Association standards for organic aquaculture.

storage, disposal and environmental and human safety precautions<sup>6,13,14</sup>. All labelling and any data sheets must be provided in the principal local languages<sup>18</sup>. Possibilities such as *a*) blacklists and certification systems for chemical manufacturers / suppliers, and *b*) farmer co-operatives to increase buying power, should be explored and encouraged<sup>17</sup>.

7.1.4 No World Health Organisation Class IA, IB pesticides should be used. WHO Class II chemicals should be avoided.

7.1.5 The goal for all shrimp farming operations should be that no antibiotics are used<sup>9,10,m</sup>.

7.1.6 The use of toxic and bioaccumulative compounds should be prohibited<sup>3</sup>. Use of strong chemical treatments can be hazardous for workers and local communities and may stress shrimp and should not be employed<sup>6</sup>.

7.1.7 Cleaning and disinfecting regimes must not adversely affect the surrounding environment or the water downstream<sup>9</sup>. Chlorine should not be used as a disinfectant in shrimp ponds<sup>15</sup>. Copper-based or other toxic anti-foulants must not be used<sup>9</sup>.

7.1.8 Careful records must be kept of all chemical and drug applications, including: date, compound used, dose, reasons for use, and the harvest date for the treated ponds<sup>12</sup>.

#### Shrimp Health Management – Management practices and pond design

7.2.1 Pond design and management practices should be designed to minimise the spread of disease between farm stocks and from farm stocks to natural stocks<sup>6</sup> (e.g., through appropriate water management systems, separate influent and effluent channels and donor / receiver water bodies; screening of water inlets and outlets to prevent release of culture species, etc). (See 6.5.)

7.2.2 Dead shrimp must be immediately removed from the ponds<sup>10</sup>, and must be disposed of in a hygienic way to ensure there is no threat of disease spreading to farmed or wild stock, or contamination of any watercourses<sup>9</sup>, e.g., by bagging and burning.

7.2.3 When disease occurs in a pond, transfer of shrimp, equipment or water to other ponds should be avoided<sup>6</sup>. For mild infectious diseases with potential to spread within a farm, ponds should be quarantined and the condition treated according to best practice; for serious infectious diseases that may spread widely, ponds should be isolated, remaining shrimp should be net-harvested, and the pond disinfected without discharging the water<sup>6</sup>.

7.2.4 Following harvest, the bottom of ponds should be given sufficient time to dry in strong sunlight<sup>9</sup>, and waterfowl should be able to forage on the drying bottom (and act to fertilise the ponds). Additional measures (such as ploughing, cultures, etc.,) should be considered after several production cycles<sup>10</sup>.

7.2.5 The health status of the shrimp should be monitored and documented regularly<sup>6,10</sup>; special efforts should be made to detect correlation between management measures, manifestation of viral diseases, reasons for mortalities, individual growth and yields / biomass development<sup>10,n</sup>.

7.2.6 The establishment and funding of a veterinary service to improve health and help stop spread of disease should be considered.

#### Protection from predation

7.3.1 Measures taken to protect shrimp from birds and other predators must not be harmful to these animals<sup>10</sup>. To find an ecologically and economically effective management system of protection, foraging predators, estimated harvest losses and types of preventative measures should be documented<sup>10</sup>.

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*m* It should be noted that, in addition to serious concerns about the risks of development of resistant bacteria, issues of human health and impacts on the wider environment, use of antibiotics in shrimp aquaculture is often entirely inappropriate, with many shrimp farmers using antibiotics against viral disease (please see EJF's report on the environmental impacts of shrimp farming<sup>18</sup>).

*n* The Soil Association requires the development of a health plan<sup>7</sup> and, for systems other than those that are extensive, require that a comprehensive health monitoring programme be regularly carried out, with the following parameters measured: external, internal and microbiology of stock, water sampling for phytoplankton and zooplankton assessment, sampling for redox potential and depth of anaerobic layer<sup>9</sup>.

- 7.3.2 Unwanted fish should only be regulated by mechanical / physical means<sup>9</sup> or by the application of natural, herbal ichthyocides; the use of synthesised herbicides and pesticides should not be permitted<sup>10</sup>. Where use is necessary, this should comply with regulations (see 7.1.2). Pond water inlets and outlets should be screened to prevent entrance of predators or competitors, or release of culture species<sup>6</sup> (see 6.5).
- 7.3.3 Raising of ducks on ponds should be encouraged for protection against predators (as they can expel intruding birds from their breeding territories)<sup>10</sup> and for the benefit of local communities (for example through income generation through poultry rearing).
- 7.3.4 Native animals around farms must be protected<sup>10</sup>.

#### Water use and effluents

- 7.4.1 The use of freshwater in shrimp aquaculture operations must be regulated with due regard to the ecological costs or impacts on the watersheds and basins where they are located, the need for freshwater supplies for human consumption, and the supply of water for other activities<sup>2</sup>.
- 7.4.2 Governments should develop and enforce regulations on water use<sup>13</sup>. Groundwater should not be used, particularly where it is important for agriculture or drinking<sup>3</sup>. Freshwater should not be used in brackish or marine shrimp aquaculture ponds<sup>3,6,15</sup>.
- 7.4.3 Salinisation of freshwater supplies, including groundwater and reservoirs, and of surrounding land, in particular agricultural land, must not be permitted<sup>2</sup>. Brackish water or effluent must not be discharged into freshwater bodies or onto agricultural land<sup>6,13,14,15</sup>.
- 7.4.4 Discharged water should be of equal or better quality than the intake water<sup>15</sup>, and there should be no significant impact of effluents from farms on surrounding ecosystems or other aquaculture operations. Discharged wastewater must not exceed the assimilative capacity of receiving waters<sup>15</sup>. Adequate measures should be taken to minimise the outflow of nutrients and / or natural waters<sup>6</sup>.
- 7.4.5 Pond design should include separate canals for influent and effluent<sup>6</sup>, and where appropriate should include settling ponds or canals, ponds with filter-feeding bivalves and / or natural or artificial wetlands to treat effluents<sup>15</sup>. Sediment traps and basins should be incorporated into design where suspended solid concentrations are expected to be high in effluents<sup>6</sup> (see 6.5).
- 7.4.6 The quality of effluent water should, where possible, be monitored before discharge. Proper collection and analysis of effluent samples (for example as described by the Aquaculture Certification Council) is essential<sup>12,o</sup>.
- 7.4.7 The pollution of surrounding waters or land from excessive discharge of organic<sup>3</sup> and inorganic<sup>2</sup> wastes should be prohibited. Release of toxic or otherwise harmful substances (including diseased shrimp) in the ponds, channels or banks must not be permitted<sup>10</sup>. Where any potentially toxic or bio-accumulative chemicals have been used, waters should not be discharged until compounds have naturally decomposed to non-toxic form<sup>6</sup>.
- 7.4.8 There should be (independent) monitoring of the effects of shrimp operations on surrounding land and water sources where possible (including monitoring of pH levels, salinity, mineral content, reductions in productivity of land, etc). If

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<sup>o</sup> Naturland require that ammonia, biological oxygen demand, dissolved oxygen, phosphate and suspended solids must be monitored and documented on a monthly basis, especially during harvesting<sup>10</sup>. Sediments from farms should be contained<sup>12</sup>, and organic sediments must be removed on a regular basis and be appropriately utilised<sup>10</sup>. The Soil Association requires that the following parameters are monitored both upstream and downstream of operations – water temperature, ammonia / nitrogen, biological oxygen demand, suspended solids, phosphate / nutrient levels, dissolved oxygen, pH, salinity, volume of discharge, chlorophyll, turbidity – and requires that the amounts of water pumped and stored are recorded<sup>9</sup>. The Aquaculture Certification Council require, and provide details for calculation of, an annual water use index and annual load indices for total suspended solids, soluble phosphorus, total ammonia nitrogen and five-day biochemical oxygen demand<sup>12</sup>. Boyd *et al.*, (2001 and 2002) state that discharge permits with water quality and / or water volume criteria that require monitoring at regular intervals to demonstrate compliance may be suitable for large operations<sup>13,14</sup>. However, where there are many smaller farms they suggest that the most effective system may be the use of general discharge permits that require farmers to implement a set of specified operational better management practices (BMPs) with minimal basic monitoring requirements<sup>13</sup>. (Though they note that Colombia has adopted what appears to be an effective regulation that requires that effluent must be of equal or better quality [based on dissolved oxygen and suspended solids] than the intake water; polluters are charged a fee for effluents of inferior quality<sup>13,14</sup>.)

there are indications of adverse effects, adequate preventative measures (such as construction of drainage channels, plantation of salt-resistant, high growing grasses, etc.,) must be taken<sup>10</sup>.

- 7.4.9 To reduce water use and pollution of the surrounding environment, water exchange should be kept to a minimum<sup>6,10,15</sup>. Pumping should be limited to high tide<sup>10</sup>, and the supply of water should not require excessive use of external energy for pumping<sup>9</sup>. The need to exchange water can be reduced by appropriate stocking densities, feeding and pond management<sup>15,p</sup>.
- 7.4.10 Drainage of ponds should be carried out carefully, or barriers used, to reduce quantities of organic sediment flowing into channels, to minimise re-suspension of sediments and to prevent excessive water velocities<sup>6,10</sup>; communication with regards to timing of drainage between farmers in the same area should be encouraged. The status of pond sediments should be analysed and documented to optimise management measures<sup>10</sup>.
- 7.4.11 Organic material may be used as fertiliser (specific quantities and compositions<sup>q</sup>)<sup>10</sup> but quantity of fertilisers should be limited by effluent water quality<sup>9,10</sup>. Fertilisation should stop one week before harvest<sup>9</sup>. Likewise, pre-harvest limits for other inputs of known environmental / health concern (e.g., pesticides) should be introduced.
- 7.4.12 Sanitary facilities for disposal of human wastes should be provided at hatcheries, farms and processing plants<sup>6</sup>. Septic runoff from humans and animals must be excluded from shrimp ponds<sup>12</sup>.

7.4.13 All farm wastes should be disposed of in responsible and environmentally sound methods<sup>6</sup>.

#### Feeding

- 7.5.1 Ponds should be designed to ensure that natural foraging behaviour of shrimp is supported (such as by providing substrates enlarging the surface suitable for growth of benthic algae / diatoms as dominant feed sources<sup>10</sup>). External feeds should be reduced as far as possible, and natural feed production increased (phyto-, zooplankton)<sup>6,9,10</sup>.
- 7.5.2 The development and use of alternative feeds that reduce the need for feeds based on fish products (such as those from oilseeds, microbial proteins, etc.,) should be supported<sup>6,18</sup>. Animal components should be reduced and replaced by vegetable products where possible<sup>10</sup>. The use of fish products (and particularly those that could be used for human consumption) must be discouraged<sup>15,r</sup>.
- 7.5.3 Fishmeal or other processed ingredients from the same family as the stock or from terrestrial animals must not be used<sup>9</sup>. Feed from uncooked organisms (such as fish, crustaceans) should be discouraged due to the threat of disease<sup>6</sup>.
- 7.5.4 Feed from genetically altered organisms or their products should not be used<sup>9,10</sup>.
- 7.5.5 For freshwater shrimp production, the use of snails (e.g., *Pila globosa*) as feed should be discouraged.
- 7.5.6 Feeding of synthetic antibiotic and growth-enhancing substances or other synthetic feed

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p The Soil Association recommends that the average water exchange during the whole production cycle must not exceed 5%<sup>9</sup>. They also require that the amount of fuel used by pumping equipment must equally be recorded, and that the quantity of water pumped onto and that leaving the unit must be recorded to build up a water budget for the whole shrimp farm<sup>9</sup>. ISA Net recommend that closed or re-circulating systems should be adopted where possible, and that overall water usage should be reduced to no more than 2.5-5% in intensive and semi-intensive systems<sup>15</sup>.

q Please see Naturland and Soil Association standards for organic aquaculture.

r Where fishmeal / fishoil is used, Naturland suggest provisional maximum levels of fishmeal content of compound feed (20% for fishmeal / oil content and 25% for total protein)<sup>10</sup>. Any fishmeal used should also originate from trimmings of fish that are processed for human consumption; should originate from the regions of fishery management that have the goal of fish stock conservation and preservation (as outlined in the FAO CCRF), and should not originate from dedicated fish-meal harvesting operations; and where possible should originate from the same geographic region as the aquaculture operation is located<sup>10</sup>. The Soil Association require that a minimum of 50% of feed ingredients that are from aquatic origin must be derived from the by-products of wild fish that are caught for human consumption, and that the balance not derived from such by-product must be derived from wild marine resources that have been independently certified as sustainable by an approved certification body<sup>9</sup>.

additives (such as synthetic amino acids, colouring agents) should not be allowed<sup>9,10,s</sup>.

7.5.7 Governments should require manufacturers to display approximate composition of feed on feedbags, and there should be government regulation of composition of feed<sup>13,14,t</sup>. In terms of chemicals, there should be full labelling, including instructions for appropriate use, in the principal local languages. Schemes such as blacklists or certification of feed manufacturers / suppliers, and farmer co-operatives should be explored (see 7.13).

7.5.8 Feeding practices must keep food wastage to a minimum<sup>9</sup> and feeds must be selected to reduce pollution<sup>15</sup>. Practices such as feeding small amounts often, use of feeding nets and trays and even distribution of feed should be used<sup>6,10,19,15</sup>. Feeds should be water-stable<sup>6</sup>, should be of an appropriate size and with appropriate nutrients for the age of shrimp, and should have high palatability<sup>15</sup>. Where excess food remains in the pond, the operator must be able to take corrective action quickly to reduce sediment build-up and pollution<sup>9</sup>.

7.5.9 Feed intake should be carefully monitored and documented<sup>6</sup>, and the feed conversion ratio calculated<sup>10</sup>. Data on energy consumption / area should be carefully recorded<sup>10</sup>.

7.5.10 Farmers should receive education on appropriate feeds and feeding regimes (including monitoring of feed intake to reduce organic pollution).

7.5.11 Feed should be purchased fresh and kept for no more than a few months; it should be stored in cool dry areas, and contaminated feed should not be used<sup>6</sup>.

## Harvest, transport and processing

8.1 Shrimp should be starved for no longer than 24 hours before harvest<sup>9</sup> (see 3.4).

8.2 Treatment with natural, plant based additives for neutralisation of aromas (e.g., caused by blue-green algae) should be permitted<sup>10</sup>.

8.3 Transport and slaughtering must be carried out in a way that is as fast and considerate as possible to avoid any unnecessary suffering by the shrimp<sup>9,10</sup>. Shrimp should be slaughtered in a way that renders them instantly insensible immediately after they are taken from the water<sup>9</sup>. Shrimp must not be slaughtered through suffocation or exsanguinations without stunning<sup>9</sup> (see 3.4).

8.4 The cold chain from the point of slaughtering up to the sales point must be strictly controlled in order to prevent any deterioration in product quality<sup>10</sup>.

8.5 The cleaning of operating rooms as well as the implements and machines must ensure good hygiene along with highest possible environmental awareness. Mechanical and physical processes are preferred to chemical processes<sup>10</sup>.

8.6 Wastewater from slaughtering and processing plants must be subjected to appropriate purification process<sup>10</sup>.

8.7 Shrimp heads and other processing residues / trimmings should be reused, though direct feeding to same species must not be allowed<sup>10</sup>.

8.8 Sodium metabisulphite (to stop the discolouration of shell post-harvest) should not be used<sup>9</sup>.

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s The Soil Association also prohibit the use of appetite stimulants, feedstuffs derived by solvent extraction, synthetic binders, high energy diets (more than 28% oil) aimed at enhancing production, *Phaffia* yeast and shrimp shell, and restrict the feeding of antioxidants and preservatives<sup>9</sup>.

t Please see Naturland and Soil Association standards for organic aquaculture.

# Trawled Shrimp

*NOTE: This section is incomplete and still in preparation.*

- 8.9 Shrimp trawling must be carried out in such a manner and with gear designed to minimise: (a) waste, (b) capture of non-target species (both shrimp and non-shrimp species), (c) impacts on associated or dependent species<sup>1</sup>, and (d) impacts on the benthic environment.
- 8.10 Every effort should be made to ensure that documentation on shrimp trawling operations, retained catch of shrimp and non-shrimp species and discards, and information required for stock assessment is collected and forwarded systematically to relevant management bodies. As far as possible, programmes (such as observer and inspection schemes) that promote compliance with regulations / standards should be promoted<sup>1</sup>.
- 8.11 The adoption of appropriate technology (taking into account economic conditions) for the best use and care of the retained catch must be promoted<sup>1</sup>.
- 8.12 Government and industry must encourage the development and implementation of technologies and operational methods that reduce discards. The use of shrimp trawling practices that lead to the discarding of catch should be discouraged and the use of gear and practices that increase survival rates of shrimp and fish should be promoted<sup>1</sup>.
- 8.13 Assessments of habitat disturbance must be carried out prior to the introduction of new shrimp trawling fisheries or the introduction of new methods and operations to an area<sup>1</sup>.
- 8.14 Research on the environmental and social impacts of shrimp trawling, in particular, on the impact of trawling on biodiversity and coastal fishing communities must be promoted<sup>1</sup>.
- 8.15 Governments / policy must require that shrimp trawling gear, methods and practices are sufficiently selective so as to minimize catch of non-target species and impacts on associated or dependent species; the intent of related regula-

tions must not be circumvented by technical devices. In this regard, fishers should cooperate in the development of selective gear and methods. Governments and industry must ensure that information on new developments and requirements is made available to all fishers<sup>1</sup>.

- 8.16 Governments and relevant institutions should collaborate in developing standard methodologies for research into shrimp trawling gear selectivity, shrimp trawling methods and strategies; international cooperation with respect to such research programmes, the dissemination of their results, along with the transfer of technology, must be encouraged<sup>1</sup>.
- 8.17 Governments should introduce and enforce laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), and should adopt relevant standards and guidelines which would include provisions for the reduction of dangerous substances in exhaust gas emissions<sup>1</sup>.

## Shrimp Production – Social considerations

### Labour standards

#### General

- 9.1.1 Shrimp operations should employ local workers to the fullest extent possible<sup>6</sup>. The scope for introducing regulations regarding the minimum percentage of employees that must be local should be explored.
- 9.1.2 Working conditions must adhere to national and international laws and regulations and should conform to relevant International Labour Organisation (ILO) standards (even Conventions not ratified by shrimp producing nations should be adhered to). Labour standards must be extended to women and children in all shrimp producing countries.
- 9.1.3 In accordance with the ILO Labour Inspection Convention, 1947 and Labour Inspection

(Agriculture) Convention, 1969, there must be regular inspection (in which women must take part) of all shrimp operations.

- 9.1.4 Workers, without distinction, must have the right to join or form trade unions of their own choosing and to bargain collectively.
- 9.1.5 Social security systems must be extended (or created) for seasonal, part-time and temporary work.
- 9.1.6 All employers must pay employees, as a floor wage, wages and benefits which comply with national minimum wages (or national industry wages and benefits) or wages which provide for essential needs and establish a dignified living wage for workers and their families, whichever is the higher.
- 9.1.7 All workers must be provided with written and understandable information about their employment conditions in respect to wages before they enter employment and about the particulars of their wages for the pay period concerned each time that they are paid<sup>20</sup>.
- 9.1.8 Hourly and / or quota-based wage employees must (i) not be required to work more than the lesser of (a) 48 hours per week or (b) the limits on regular hours allowed by national law, and (ii) be entitled to at least one day off in every seven day period, as well as holidays and vacations. They must receive a number of breaks (specified in advance) per day of work<sup>20</sup>.
- 9.1.9 All overtime hours must be worked voluntarily by employees, and should not exceed 12 hours per week. In addition to their compensation for regular hours of work, hourly and / or quota-based wage employees shall be compensated for overtime hours at a premium rate.
- 9.1.10 There must not be any use of forced prison labour, indentured labour, bonded labour or other forced labour.
- 9.1.11 All employers must provide a safe and healthy working environment to prevent accidents and injury to health arising out of, linked with, or

occurring in the course of work or as a result of the operation of facilities. All workers (present, new and reassigned) must receive regular and recorded health and safety training.

Compensation must be paid to any worker who receives injuries at work, and / or there must be provisions for health care for any injuries.

- 9.1.12 Workers must not be exposed to hazards, including chemicals, antibiotics or cleaning agents which may endanger their safety, including their reproductive health, and must receive proper instruction and regular training where any chemicals are to be used.
- 9.1.13 No person must be subjected to any discrimination in employment, including hiring, salary, benefits, advancement, discipline, termination or retirement, on the basis of gender, race, religion, age, disability, sexual orientation, nationality, political opinion, or social or ethnic origin.
- 9.1.14 Every employee must be treated with dignity and respect. No employee should be subject to any physical, sexual, psychological, or verbal harassment or abuse, or any other form of intimidation<sup>20</sup>.

#### Child Labour

- 9.2.1 There should be no recruitment of child labour, and where children are employed, employment must comply with national and international laws and conventions and with ILO conventions and recommendations (such as ILO Convention No 59 Concerning Minimum Age for Admission to Employment in Industry, ILO Convention No 138 Concerning Minimum Age for Admission to Employment, and the United Nations Convention of the Rights of the Child).
- 9.2.2 A recommendation accompanying the ILO 'Worst Forms Of Child Labour Convention, 1999' defines hazardous work as 'work which exposes children to physical, psychological or sexual abuse ... work underwater ... work in unhealthy environments which may expose children to hazardous substances, temperature ... and work under particularly difficult conditions such as long hours, during the night or where a child is confined to the premises of the employers.' The

recommendation urges ratifying states to declare the worst forms of child labour criminal offences and to impose penal sanctions on those who perpetrate them. It should be recognised that a 1995 study undertaken by the Ministry of Labour and Manpower in collaboration with UNICEF identified child labour within shrimp processing factories (processing by hand) in Bangladesh as one of 27 economic activities as hazardous<sup>21</sup>. Children working in any shrimp farming (including fry collection) or processing operations must not be subjected to these conditions.

9.2.3 It must be recognised that the Child Labour Deterrence Act bans the importation to the United States of products that are manufactured or mined in whole or in part by children.

9.2.4 The minimum age for any child working in shrimp production must not be less than the age for completing compulsory schooling, and should not be less than 14 (complying with ILO regulations for less developed countries, not including 'light' work, where the minimum age is 12). For all hazardous work (as some of that in the shrimp industry is), the minimum age should be 18.

9.2.5 Where children or young people under 18 are employed, it should be mandatory for the employer to participate in and contribute to policies and programmes that enable him or her to remain in quality education until no longer a child. Possibilities could include ensuring that for operations over a certain size, education is received on site.

9.2.6 The above should apply to children working at all stages of the shrimp supply chain, including shrimp fry collection.

## Women

9.3.1 All shrimp operations must comply with the standards outlined in the ILO Discrimination Convention, 1958, and the Equal Remuneration Convention.

9.3.2 Women and men workers must have equality of access to employment and training and equal

terms and conditions of employment. Women must receive equal remuneration, including benefits; equal treatment; equal evaluation of the quality of their work; and equal opportunity to fill all positions open to male workers.

9.3.3 Pregnancy tests must not be a condition of employment, nor will they be demanded of employees; workers must not be forced or pressured to use contraception.

9.3.4 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 employment at the same rate of pay and benefits.

9.3.5 All shrimp operations must provide appropriate services and accommodation to women workers in connection with pregnancy.

## Involvement of local communities and protection of human rights

10.1 The human rights, including resource rights, of all people affected by shrimp production must be respected in accordance with all relevant national laws and international treaties<sup>15</sup>, including the Universal Declaration of Human Rights.

### Involvement and respect of all stakeholders

10.1.1 The involvement of local stakeholders in policy formulation and implementation<sup>1</sup>, and in planning of protocols and codes of conduct<sup>13</sup>, is vitally important. All shrimp production must be carried out in a manner that is compatible with the social, cultural and economic interests of coastal communities<sup>3</sup>.

10.1.2 The central role of land rights in shrimp production, and specifically with regard to shrimp aquaculture, must be recognised. In many countries, land reform centred around community based natural resource management is key to improved equitability and sustainability of the industry. Where possible, shrimp production should be based on community based natural

resource management within a framework of an integrated coastal zone management plan; there should be real and effective participation of all stakeholders of coastal resources<sup>2,3,4</sup>.

- 10.1.3 The rights of local communities, particularly those involved in subsistence, small-scale and artisanal fisheries and agriculture, to a secure and just livelihood must be protected<sup>1</sup>. Shrimp production must not block or interfere with access to traditional resources (including fishing grounds, forest resources, agricultural and grazing lands, freshwater or other critical resources) upon which traditional users depend for survival<sup>15,22</sup>.
- 10.1.4 Governments must ensure that local stakeholders receive appropriate consideration especially as regarding issues such as communal resources<sup>15</sup>. Existing laws and regulations that protect the interests of communities living in the coastal zone must be enforced<sup>13</sup>. Where laws and regulations are ambiguous, contradictory or inadequate, governments should clarify tenure systems and management control over coastal resources through comprehensive coastal zone planning<sup>13</sup>, which should be centred around community based natural resource management.
- 10.1.5 Shrimp farmers must have clear title or right to their property or other current, legal land concessions<sup>6</sup>. All decision making regarding such processes as leases and rentals of public land or licensing and permits should be transparent, and the terms of all leases respected; in particular, agricultural lands to be converted to shrimp ponds must not be acquired by coercion<sup>15</sup>. Lands that have previously been illegally occupied by the shrimp industry should be returned to local communities and restored<sup>5</sup>.
- 10.1.6 Governments should create transparent guidelines and mechanisms that are acceptable to all stakeholders to resolve conflicts arising from the use of resources held in common or to which there are competing claims<sup>15</sup>.
- 10.1.7 Shrimp farm operators should be encouraged to consider setting up schemes whereby local com-

munities can benefit from the farm, such as sharing in by-catch from ponds and supply channels<sup>9</sup>. The potential for the formation of farmer cooperatives for small-scale farmers should be explored and supported.

- 10.1.8 Governments and the industry should actively seek the participation of local community representatives in permitting, regulatory review, and other decision-making processes<sup>6,13</sup>. The shrimp industry must make every effort to meet with local communities to promote a cooperative attitude and interchange in order to avoid and resolve conflicts and misunderstandings<sup>22</sup>.
- 10.1.9 Where possible, funds generated by the industry should be used to fund clean water, health facilities and schooling in shrimp areas.

#### Human Rights

- 10.2.1 Human rights of all people affected by shrimp production must be respected in accordance with all relevant national laws and international treaties<sup>15</sup>, including the Universal Declaration of Human Rights.
- 10.2.2 These must include (though not be limited to) the following: the right to life, liberty and security of person; that no one shall be subjected to arbitrary arrest, detention or exile; that everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence; that no one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation; that no one shall be arbitrarily deprived of his property; that everyone has the right to freedom of peaceful assembly and association; that everyone, without any discrimination, has the right to equal pay for equal work and that everyone has the right to form and join trade unions for the protection of his interests.
- 10.2.3 The high levels of violence and the human rights abuses that have been associated with the development of the shrimp farming industry in some countries must be recognised, and steps

taken to combat these issues. Every effort should be made to introduce transparency into the industry, and to prevent violence or human rights abuse.

10.2.4 All farmers and farm workers (including guards) and factory workers should receive education on labour rights, on the land / access rights and needs of local communities. All new employees should be made aware of their rights and of the rights of traditional users on commencement of employment.

10.2.5 The shrimp industry must act to identify human rights issues, and there should be an independent body to whom complaints can be made / committee that investigates all reported abuse. All workers and local stakeholders must be made aware of this body and procedure for accessing it.

10.2.6 All alleged human rights violations must be investigated by competent, duly authorised authorities and processed in accordance with the civil, administrative and judicial responsibilities of the country concerned and in compliance with the laws, treaties and international agreements to which such countries are parties<sup>15</sup>.

10.2.7 The scope for a fund set up by the industry and / or donors, which civil society groups can access to support legal defence and to bring legal cases where there have been infractions of human rights should be investigated.

## Education

11.1 It should be recognised that it is vitally important that local communities, fishers and shrimp farmers understand the need for conservation and management of the natural resources on which they depend, and the reasons behind the need for improved practices within the industry.

11.2 All parties (in particular governments of producer countries, the shrimp industry, donor and aid agencies and NGOs) should promote awareness of responsible shrimp production through education and training<sup>1</sup>. This should information on

improved technologies, and on better practice (for example advice on chemical use) to reduce impacts and ensure protection of workers and the local community. Demonstration ponds and visual aids (including video) should be an essential component of educational programs<sup>13</sup>.

11.3 All local stakeholders should also receive education to raise environmental awareness, in particular about the importance of wetland, coastal and marine ecosystems (through civil society groups, introduction into school syllabus etc).

## Implementation of the protocol

12.1 Governments should develop and implement effective national policies focusses on shrimp production. However it must be recognised that in a number of countries the governance needed to manage all of the issues associated with shrimp production is lacking; where this is the case, industry and civil society must be encouraged to work together with progressive elements in Government on practical measures to improve the sustainability of the industry.

12.2 The use of environmental and social impact assessments prior to aquaculture development and the regular and continuous monitoring of the environmental and social impacts of aquaculture operations must be encouraged<sup>3</sup>. Permits, licenses and other types of authorizations should be contingent on ongoing monitoring and satisfactory performance<sup>15</sup>. Ideally, monitoring should be by an independent body that is representative of all stakeholders.

12.3 Mechanisms whereby local communities can report on environmental degradation or on human rights abuse should be introduced, and such reports investigated by an independent body. Systems such as monitoring of environmental degradation and human rights abuse by local, regional and international NGOs should also be considered<sup>4</sup>.

12.4 Adoption of better practices could be enhanced through education and awareness raising of

local stakeholders, involvement of industry and stakeholders in design of regulations, policies and industry codes, and through stressing the long-term benefits that will accrue in the form of greater profitability and sustainability<sup>13</sup>.

Improved information exchange and increased investment in facilities to reduce the impacts of shrimp farming operations may also be promoted through the formation of farmer cooperatives, which should be encouraged where possible. Clear evidence that shrimp producers are using codes of conduct could demonstrate the potentially beneficial effects of code implementation<sup>13</sup>.

12.5 The use of trade related instruments and mechanisms (such as performance bonds) to ensure that the 'polluter pays principle' is applied, and to encourage better practice within the industry, should be explored.

12.6 Multilateral development banks, bilateral aid agencies, the FAO and other relevant national and international organizations and institutions should be encouraged not to finance or promote in any way the development of shrimp production practices which are not consistent with the objectives outlined in this protocol<sup>3</sup>. Their support to existing as well as future projects should be conditional upon the (progressive) adherence to this protocol.

12.7 The key role that retailers and brands can play in driving progressive adoption and implementation of this protocol in the supply chain by actively favouring sustainably produced shrimp through their sourcing policies and decisions must be recognised. Retailers and brands should seek to buy from suppliers which are meeting the protocol or from suppliers which can demonstrate progress towards meeting it.

12.8 Consumers should be encouraged to exercise their free choice not to buy shrimp if they have any uncertainties about its origin and method of production until their suppliers can provide satisfactory evidence to guarantee that it has been produced in a manner that does not threaten to degrade the environment or violate the human rights of people living in the areas of production<sup>5</sup>.

12.9 Protocols / codes of conduct should be subject to change as technology and conditions change<sup>13</sup>, and standards and minimum levels of performance should be developed<sup>13</sup>.

12.10 Where the protocol is not being met, there should be a commitment from the industry actors to improvement within a specified and realistic timeframe.

*'Perhaps the most important factor is the involvement of all stakeholders. In addition, successful codes will depend on using the best available scientific knowledge ... promoting the program through education of farmers, insisting on both self-evaluation and third-party verification, informing the public of the program, and maintaining a commitment to continuous improvement.'*

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