

BIO Stiftung Schweiz Weststrasse 51 CH-8570 Weinfelden  
Fon +41 (0) 71 626 0 626 Fax +41 (0) 71 626 0 623  
info@biostiftung.ch www.biostiftung.ch



BIO Stiftung Schweiz Weststrasse 51 CH-8570 Weinfelden

# AquaGAP Standard for Good Aquaculture Practices

Version 0, 31.12.2008



The programme and further information on the AquaGAP Standard are published on [www.aquagap.net](http://www.aquagap.net).

Comments and suggestions about the contents of this document can be sent by email to [info@aquagap.net](mailto:info@aquagap.net). The standard is open for public consultation until February 28th 2009.

#### Standard holding body

© Copyright: Bio-Stiftung, Weststrasse 51, 8570 Weinfelden, Switzerland, Tel: +41 (0) 71 626 0 626, Fax: +41 (0) 71 626 0 623, [www.imo.ch](http://www.imo.ch). Contact [info@bio-stiftung.ch](mailto:info@bio-stiftung.ch) or [info@aquagap.ch](mailto:info@aquagap.ch)  
This Standard was developed by the Institute for Marketecology (IMO), [www.imo.ch](http://www.imo.ch).

## CONTENTS

<b>0</b>	<b>History and introduction</b> .....	<b>4</b>
0.1	SCOPE OF ACTIVITY .....	4
0.2	CHANGES TO FARM OPERATIONS AND/OR PROCESSING PROCEDURES .....	4
0.3	ACCESS TO INFORMATION .....	4
<b>1</b>	<b>QUALITY ASSURANCE</b> .....	<b>5</b>
1.1	OTHER STANDARDS OR PROGRAMS IMPLEMENTED .....	5
1.2	STAKEHOLDER .....	5
1.3	MANAGING COMPLIANCE WITH STANDARDS AND LEGISLATION .....	5
1.4	SELF EVALUATION .....	6
<b>2</b>	<b>SITES AND FACILITIES – MANAGEMENT AND MAINTENANCE</b> .....	<b>6</b>
2.1	SITE SELECTION .....	6
2.2	IDENTIFICATION OF AQUACULTURE AREA.....	6
2.3	SITE ENTRY .....	6
2.4	RECEPTION AND DISPATCH OF GOODS.....	7
2.5	HANDLING OF DRUGS AND CHEMICALS .....	7
2.6	FACILITY PEST CONTROL .....	8
2.7	WATER MANAGEMENT .....	8
2.8	EQUIPMENT AND MACHINERY.....	10
<b>3</b>	<b>AQUACULTURE LIFE STOCK – MANAGEMENT AND HUSBANDRY</b> .....	<b>11</b>
3.1	SOURCE AND QUALITY OF JUVENILE AQUACULTURE STOCK.....	11
3.2	HYGIENE AND HEALTH .....	11
3.3	SOURCE AND QUALITY OF FEED .....	12
3.4	MONITORING GROWTH AND PERFORMANCE .....	13
3.5	HARVEST, TRANSPORT & SLAUGHTERING .....	14
3.6	DRUGS (MEDICATION/TREATMENTS AND VACCINATIONS) .....	14
<b>4</b>	<b>ENVIRONMENT – MANAGEMENT AND CONSERVATION</b> .....	<b>15</b>
4.1	ASSESSMENT OF ENVIRONMENTAL RISKS .....	15
4.2	MONITORING OF ENVIRONMENTAL IMPACTS .....	15
4.3	ENERGY AND WATER EFFICIENCY .....	16
4.4	WILDLIFE AND CONSERVATION .....	16
<b>5</b>	<b>Recording system</b> .....	<b>18</b>
5.1	CHECK ON PLAUSIBILITY OF PRODUCT FLOW .....	18
5.2	TRACEABILITY .....	18
<b>6</b>	<b>Staff</b> .....	<b>18</b>
6.1	OCCUPATIONAL HEALTH AND SAFETY POLICY .....	18
6.2	STAFF TRAINING .....	18
6.3	SOCIAL RESPONSABILITIES .....	19
<b>7</b>	<b>POST HARVEST HANDLING, PROCESSING AND MARKETING</b> .....	<b>19</b>
7.1	PROCESSING PROCEDURES AND PRODUCT HANDLING .....	19
7.2	FOOD SAFETY .....	20
<b>8</b>	<b>ICS (Internal control system)</b> .....	<b>21</b>

## AquaGAP – Standard for Good Aquaculture Practices

### A. Application of this standard - Species

This standard has been designed to be applied in a generic way. In other words, it applies to all farming/processing methods and species worldwide. If required, species specific guidelines are provided in annexes. Any guidelines given in the species specific section override the equivalent section in the generic part of this standard. Where there is no species specific annex, this standard applies to all seafood from culture (not capture fisheries). Where the term fish is used in this standard, it applies to all seafood families.

### B. Requirements versus recommendation

The term “shall” (category A or B in the checklists) signifies requirements. Where the requirement only needs to be met within the first three years after first certification, the term shall is used together with an explanatory note. The term should (category C in the checklist) signifies a recommendation, which, depending on the nature of the hatchery/farm/processing procedures, may turn into a requirement.

### C. Auditing and certification

Audits are to be carried out annually by a certification body approved by the standard owner. Initial audit shall be announced in order to ensure presence of the farm manager, all units are accessible and can be visited, the processing unit is running and harvesting/live transport/slaughtering can be verified. Where feasible, annual update assessments thereafter shall be unannounced. Auditors are obliged to use the checklists provided by the standard owner. Existing certifications shall be acknowledged where they meet the requirements of this standard (e.g. ISO 22'000, IFS, BRC), in order to reduce further auditing requirements.

### D. Guiding documents for the implementation of this standard

The following documents can be received from the standard holder in preparation for the audit:

- AquaGAP Training manual
- AquaGAP Checklists and Operator Profile
- Training Manual on ICS (internal control systems)

### E. Principles

Some criteria and performance metrics are verified by process and are therefore only of a descriptive nature, where possible however, measurable metric-based indicators are used. This standard is a work in progress and as science develops and more experience has been collected, further metric-based indicators will be specified on a species specific and culture method specific level. For the moment, the aim is to improve aquaculture practices and bring more sustainable seafood products to the market. Existing lack of knowledge for specific species/culture methods shall not impede the development of such sustainable products.

This standard focuses on the following five principles:

- Principle I      Environmental issues
- Principle II     Social issues
- Principle III    Animal health and welfare
- Principle IV    Product quality, food safety
- Principle V     Good management practices

## AquaGAP Standard

### **0 HISTORY AND INTRODUCTION**

---

#### **0.1 SCOPE OF ACTIVITY**

The scope of activity needs to be defined prior to the audit. All units involved in the production of seafood (e.g. hatchery, grow-out farm, feed mill, processing plant/export, importing company) need to be audited according to these standards or hold a certification which has been benchmarked with these standards.

Compliance with these standards shall be audited by an auditing body approved by the standard holder. First year audits shall be carried out announced, from then onwards, where feasible but at a minimum once every three years, shall be carried out unannounced. Audits shall be carried out together with the responsible farm managers/staff and not for example solely with sales managers. The same auditor shall not audit the same operator for more than 3 consecutive years. Auditors must comply with the minimum experience and education requirements (in aquaculture sciences and auditing techniques) defined by the standard holder.

#### **0.2 CHANGES TO FARM OPERATIONS AND/OR PROCESSING PROCEDURES**

The certified operator or operator under assessment shall submit a description of all operations/procedures. This shall be done in the form of the operator profile provided by the certification body. All information in the operator profile must reflect the current situation. Therefore, the operator profile shall be resubmitted whenever certification relevant changes are to occur. Such changes typically include:

- Changes in land ownership or leasing agreement
- Changes in suppliers
- Changes of farm inputs (e.g. chemicals, drugs, feed, fish stock)
- Changes in assortment/recipes
- Changes in activities (e.g. stunning procedures, filleting)
- Changes in the management

The operator profile shall at all times be complete, up to date, include the whole operation, all equipment and all activities (reference to the internal quality manual is a good alternative). From the operator profile it shall be very clear what the scope of certification is.

#### **0.3 ACCESS TO INFORMATION**

All information required to verify compliance with the standards must be made available by the operator. Therefore, all documentation (e.g. original book keeping, farm diaries, veterinary reports) must be kept for 3 years. Open information, documentation and unrestricted access for the auditor to all premises must be guaranteed by the operator.

## 1 QUALITY ASSURANCE

---

### 1.1 OTHER STANDARDS OR PROGRAMS IMPLEMENTED

#### Operator certification

All existing certifications of the operator, which are equivalent to this standard or part of this standard will be considered. For example, if the operator has certification covering social responsibility or food safety according to an equivalent standard by an acknowledged control/certification body, the respective part of this standard can be excluded from the assessment and the overall audit time can be reduced.

#### Supplier certification

According to section 2.4 reception and dispatch of goods, all incoming products shall comply with the AquaGAP standard and accompanying documentation verifying this status shall be kept on site. A system shall be in place to assure all suppliers and their products are certified according to the delivery documents.

### 1.2 STAKEHOLDER

Communication with stakeholders shall be used in order to recognize and resolve any conflicts of interest. Typical stakeholders include users of the same resources, neighboring farms and villages, NGOs, government agencies etc.

All operators are obliged to demonstrate awareness of stakeholders. All stakeholders shall be identified and if relevant informed by the operator on the assessment/certification procedure (e.g. by local advert or oral communication). This shall occur at the latest 30 days prior to the official audit. Stakeholders must be given the contact details of the control body carrying out the assessment. An information leaflet can be provided by the certification body.

In this sense, all internal and external complaints of all nature and implementation of the respective corrective measures shall be logged in order to improve management practices.

### 1.3 MANAGING COMPLIANCE WITH STANDARDS AND LEGISLATION

A prerequisite for certification is the full adherence of the operator to all local, national and regional regulation, with all required licenses being in place and valid, with no pending issues to be resolved with respective authorities. A full list of required licenses shall be supplied to the certification body upon request.

The operator to be certified shall have evidence that land rights are clear and the operator owns or leases the production area.

Where government bodies do not provide the know-how, regulation or monitoring to comply with this standard (e.g. waste treatment, ground water use, assimilative capacity of farm site), the required assessment/monitoring shall be provided for by the operator applying for certification or through a subcontracted company (e.g. company specialised in environmental impact studies).

All operators shall identify a qualified staff responsible for the implementation and maintenance of compliance with this standard. The operator should have an appropriate quality manual defining internal procedures and responsibilities in order to maintain compliance with all relevant regulation.

## 1.4 SELF EVALUATION

It is recommended that companies carry out a full internal self evaluation at least once per production cycle, in order to assess the structure, functioning and coverage of the existing quality assurance, as well as compliance with this standard. A practical guide to such assessments can be the AquaGAP operator profile. The outcome of such assessments and any shortcomings should be documented and necessary corrective measures implemented accordingly. In this sense, the operator should continuously strive to improve management practices.

## 2 SITES AND FACILITIES – MANAGEMENT AND MAINTENANCE

---

### 2.1 SITE SELECTION

As a prerequisite to certification, the operator shall be located in a well suited area. For example, it is not the aim of this standard to compensate for bad site selection by regular treatment of prevailing disease or constant chemical treatment to compensate for bad quality water. In this sense, an environmental impact assessment should define the feasibility of farming practices and assimilative capacity (potential loading) of the local environment.

### 2.2 IDENTIFICATION OF AQUACULTURE AREA

Each operator undergoing assessment must provide the certification body with an up to date map of all production sites including all relevant details such as

- date
- description of units shown on map (e.g. stores, tanks, treatment ponds, canals)
- exact location and number/name of cages/tanks/ponds
- all major sources of potential contamination
- natural currents affecting the aquaculture system and water flow within the unit.

### 2.3 SITE ENTRY

Depending on the local situation and the operator's risk assessment *4.1 assessment of environmental risks*, physical barriers should restrict access to the aquaculture holding areas. If this is deemed necessary, it shall be assured that the farm area can easily be circumnavigated, alternatively, a designated passage shall be made available to the public. Access to local natural resources shall be guaranteed to maintain local traditions. It is further recommended but not required, that local habitants are allowed access to collect natural resources (e.g. fruit, herbs and algae around the banks or from sedimentation ponds).

All visitors of the actual farming area (not authorized local habitants) shall be recorded in a visitor's book stating at a minimum the following:

- Date and time of entry
- Name, signature and company
- Reason for visit
- Recent contact with other aquaculture hatcheries/farms

General health and hygiene practices shall be adhered to by all visitors *3.2 hygiene and health*.

The visual impact of the farm shall be reduced and efforts made to blend in to the natural surroundings. This can be achieved by planting ecologically valuable or appealing plants (e.g. lemon grass, fruit trees). The farm itself as well as the surroundings shall be kept tidy. This includes for example all banks to canals/sedimentation ponds, woodland, land storage sites for

offshore cages. The littering with for example used pet or glass bottles, polystyrene boxes, old nets and feed bags shall be cleared by the operator and a tidy site maintained. It is recommended to use designated litter boxes, which are maintained by the operator and can facilitate the situation, as well as induce separation of different wastes and recycling.

## 2.4 RECEPTION AND DISPATCH OF GOODS

During reception and dispatch of goods (e.g. feed, aquatic stock, medication), the quality and their approval status shall be verified and recorded (usually in the form of a checklist). This includes the verification of accompanying documentation.

## 2.5 HANDLING OF DRUGS AND CHEMICALS

This includes detergents, disinfectants, fuels, lubricants, fertilizers, liming materials, paints, insecticides, herbicides, parasiticides, algicides, anesthetics, medication/treatments, vaccinations etc., and any other agent that may be hazardous (e.g. flammable, toxic, irritant) to staff, the environment or to aquaculture stock. All chemicals and drugs shall be handled (use, mixing, storage) in a way that reduces the risk of environmental or health impact and according to label instructions and national regulation.

### Storage

All chemicals shall be stored in a designated area, with access limited to responsible staff. The store must only contain agents in compliance with these standards. All containers shall be according to label instruction (e.g. chilled, blackened, only glass) and are labeled correctly at all times, even if refilled from larger containers.

For toxic liquids, operators shall assure that secondary measures can contain 100% of the chemical in the event of a leak. For powders, operators shall assure that they are stored in sealed and well ventilated stores for the event of flooding.

### Prevention of impacts from chemical use

Emergency procedures shall be available for all applicable emergencies defined in the risk assessment *4.1 assessment of environmental risks*. Emergency procedures shall describe what to do and who to contact in the case of an emergency (e.g. fire, oil leak).

All staff shall be trained on first appointment and continuously thereafter in order to be knowledgeable on internal emergency procedures. Where applicable, warning signs shall indicate to staff and visitors where special precaution is required (e.g. flammable store, slippery surfaces).

### Disposal

Waste shall actively be disposed of in an appropriate manner. This shall occur according to label instruction and national regulation. Depending on the nature of the waste, appropriate disposal may include the following:

- Burning, incineration
- Burial, landfill
- Composting
- Disposal by subcontracted competent authority/company

## 2.6 FACILITY PEST CONTROL

The operator shall evaluate the risk of pest infestation and take any applicable measures to minimize the risk. The type of potential pests must be evaluated and defined together with precautionary measures to be taken. Precautionary measures may include but are not limited to the following (for predators see *4.4 wildlife and conservation*):

- No littering of site
- No open or broken feed bags
- No feed remaining on floor in store, around tanks, on feeding platform etc
- Feed bags kept off floor and placed on pallets
- Closed and sealed stores (no gaps under doors)
- Fish carcasses removed daily and put in designated area (e.g. composting, removed by external company)
- Domestic sewage treatment

If precautionary measures are not sufficient, measures to control pest occurrence must be installed. Pest control may include but is not limited to the following:

- Mechanical traps for rodents
- Light traps for insects

No toxins shall be used for pest control that are banned in the country or may cause a hazard to feed, the culture stock, the environment or staff working on the farm. All chemicals used for pest control must be handled according *2.5 handling of drugs and chemicals*.

## 2.7 WATER MANAGEMENT

The water quality shall be maintained in good condition throughout the cycle and shall conform to the requirements of the species in question (temperature, salinity, pH, DO). Ideal parameters shall be given in the operator profile. Water quality shall be monitored at least once a month on intake and outlet (e.g. temperature, pH, salinity, DO/BOD, ammonium and nitrate concentrations).

The hatchery/farm shall have environmental/biological parameters as a guideline for the receiving waters. These guidelines shall be provided by the competent authority (site or water discharge licence) or by a subcontracted environmental impact assessment evaluating the environmental assimilative capacity. Every operator shall be able to demonstrate compliance with the consent conditions to discharge.

Water holding or pre-treatment is recommended if incoming water may have received untreated human waste or manure.

Water effluents shall be monitored when feed, fertilizers and any other inputs other than aquaculture stock are added to the water.



### Water loading/contamination

This refers to effluents from land based systems as well as inputs into surrounding waters of net cages. Besides the actual chemical composition of the water, sediment loading / total suspended solids can also impact on the environment and should therefore also be monitored. In order to reduce sediment loading, dykes shall be kept in good condition, ponds shall be drained carefully and slowly. It is recommended to use sedimentation ponds or partial barriers at outlet points to retain sludge.

In order to monitor potential impacts of the farming activity on the environment, the chemical composition of the effluents for ponds/tanks shall be monitored and nutrient loading calculated, and the chemical composition of water within the net cages shall be monitored and nutrient loading calculated. The chemical composition of pond sludge and the benthic biodiversity and sediment quality shall be monitored for cage systems (including redox potentials).

Monitoring of water quality shall include the following parameters:

- Temperature
- pH
- DO
- Total ammonia nitrogen
- Soluble phosphorus
- BOD<sub>5</sub>
- TSS

A sampling plan and sampling procedures shall be documented and shall be verified during external audit. Alternatively, sampling can be carried out by a certified laboratory. The sampling plan/procedure shall include information on the following:

- Location of sample taking (e.g. exit point of farm, 1m below surface)
- Time of day (e.g. morning ~6am, second sampling at midday)
- Frequency (e.g. weekly or monthly)
- Number of samples per farm/outlet (e.g. all outlets)
- Status of farm during sampling (e.g. harvesting, fallowing, prior to feeding)
- Handling of sample (e.g. sealed bottle, no air, placed on ice, light exposure prevented)

### Calculation of nutrient/variable loading/index from ponds/tanks

Load of variable (kg/yr) =  
farm discharge in m<sup>3</sup>/year x annual concentration of variable (mg/L and g/m<sup>3</sup>) x 10<sup>-3</sup> kg/g

Load index (kg variable/ton) =  
annual load of variable (kg/yr) / annual production (ton/yr)

### Calculation of load impacts from open water cage systems

N load (kg/yr) = [kg total feed x (feed %N/100)] - [kg fish harvested x (feed %N/100)]

N load index (kg/yr) = (N load (kg/yr))/Production (t/yr)

If exact values for N in feed is not available, the % of protein/6.25 can be used.  
The same shall be calculated for P load and P load index.

### Limits

In general, water quality shall not be decreased by more than 10% and not to less than the values given in table 1. If the quality of incoming water exceeds these values potential environmental impacts shall be monitored and discussed with the certification body. It shall be assessed whether individual parameters may exceed incoming values by 10% or whether the location of the farm does not allow for sustainable farming. In addition, suspended solids in the effluents shall diffuse within minutes when entering the receiving water.

The calculated values for nutrient loading/index are currently used to monitor improvement over the years during certification. Metric values will be set when more scientific data is available.

Table 1. Requirement for effluent water quality

Variable	Limit (units) Prior to certification	Limit (units) Within first three years of certification	Frequency of sampling
Temperature	No signs of temperature stress	Natural range of species	monthly
pH	6-9.5 (depending on species)	6-9 (depending on species)	monthly
DO	≥ 4 mg/L	≥ 5 mg/L	monthly
Total ammonia nitrogen	< 5 (mg/L)	< 3 (mg/L)	monthly
Soluble phosphorus	< 0.5 (mg/L)	< 0.3 (mg/L)	monthly
BCOD <sub>5</sub>	< 50 (mg/L)	< 30 (mg/L)	quarterly
TSS	< 100 (mg/L)	< 50 (mg/L)	quarterly

## 2.8 EQUIPMENT AND MACHINERY

All equipment and machinery used shall be serviced regularly and in such a manner, so as to reduce the impact on the environment. For example, fuel and oil leaks shall be prevented.

The operator shall ensure that equipment and machinery containing fuels/oils are kept well above the high water mark. Similarly, toxic paints/preservatives and other toxic chemical compounds shall not come into contact with aquaculture stock/water.

All boats and containers used to transport fish or aquaculture feed shall be maintained clean. Where equipment is shared between sites/farms, staff and equipment/vehicles shall be disinfected prior to use/bringing on site to reduce the transfer of disease.

Where nets are cleaned mechanically while installed, the operator shall assure that organic matter does not accumulate on the seabed. Farms situated in high energy environments shall only use robust gear designed for local conditions.

The use of copper-based antifoulants is prohibited.

### 3 AQUACULTURE LIFE STOCK – MANAGEMENT AND HUSBANDRY

---

#### 3.1 SOURCE AND QUALITY OF JUVENILE AQUACULTURE STOCK

Juvenile stock (smolts/fry/PL) shall be of good quality. A plan shall be available how to source certified stock within three years of first certification of the grow-out farm. Good juvenile stock shall adhere to the following:

- Disease free stock (health certificates)
- Good management practices in hatchery (emphasis on strong juveniles rather than high numbers)
- Stock raised for the grow-out conditions (no transfer into totally different environments)
- Nurseries used where applicable
- Controlled transport

The following is prohibited:

- Use of genetically modified species
- Use of wild caught brood stock with the exception of black tiger shrimp
- Use of wild caught smolts/fry/PL
- Use of non-native species with no history of safe production in the area

Where there is an existing industry of a non-native species, there shall be strict escape prevention and there shall be no evidence of any impact on the local ecosystem.

For all stock received, the respective quality shall be indicated on the accompanying documentation.

#### 3.2 HYGIENE AND HEALTH

##### Hygiene

In order to minimise the transfer of disease, shoe disinfection/change, hand wash and disinfection points shall be installed and utilised on entry to areas where food safety or fish health may be at risk (not applicable for extensive farming).

For large farms, staff shall have access to toilets, eating facilities and potable water. A cleaning protocol including cleaning agents shall be implemented and cleaning activities recorded. No human waste or untreated animal manure shall enter the aquaculture system. Disposal of waste (including morts) shall be conducted adequately *2.5 handling of drugs and chemicals / 2.6 facility pest control*.

##### Fish health and welfare

In order to maintain fish in good health and increase the welfare of the animals, stress shall be reduced where possible.

In order to reduce stress, the following measures shall be taken:

- maintain stocking densities at levels, where no sign of stress are evident
- maintain good water quality and appropriate parameters (e.g. chemical composition)
- avoid abrupt changes (e.g. salinity, temperature)
- avoid disturbance (e.g. handling/grading, visitors, light/shading)
- use suitable feeding methods (e.g. slow feeding over larger surface area)
- appropriate net mesh size for the size of fish (e.g. gilling of small fish/preventing injuries of fish and allowing through flow of water).
- where animal welfare is dependent upon automatic systems, the systems shall be equipped with alarms/secondary power system in case of failure

- reduce duration of pre-harvest fasting and crowding (e.g. max 2hours crowding)
- perform any live transport under suitable conditions (e.g. max 10hours, adequate chemical composition of water, limited stocking densities)
- limit any time out of water (e.g. max some seconds)
- anaesthetize animals prior to slaughtering

Aquaculture stock shall at all times be treated and handled in such a way as to protect them from pain, stress, injury and disease. For adequate treatment and handling, staff shall be well trained. In this sense, staff shall continuously observe the swimming and feeding behaviour, the quality/damage of fins/antennae, as well as the general growth performance in order to be aware of any signs of stress (during grow-out as well as transport). Any signs of stress shall be recorded in the farm diary. Individual fish suffering ill health or injury shall receive immediate treatment or shall be removed and humanely anaesthetized. All aquaculture enterprises shall have a named veterinary surgeon. Veterinary visits shall be scheduled at a minimum annually and whenever required.

### 3.3 SOURCE AND QUALITY OF FEED

Only compound feed shall be used from an ISO 9001 certified feed mill, where feed specifications are available. The use of for example pro-biotics, compost and algae is recommended. Synthetic fertilizers are prohibited.

In order to maintain a high quality product, high quality feed shall be used. Continuous dialogue with feed companies is required, in order to improve the quality of feed used. In this sense, companies are obliged to work towards sustainable and quality feed sources.

Within 3 years of first certification, feed for the grow-out stage at the farm level must be sourced from a certified supplier, complying with the following points:

- Feed shall not contain fats or protein of species the feed is destined for
- Species specific feed
- Routine analysis for mycotoxins
- The animal protein sources are from certified sustainable fisheries, from certified aquaculture, from processing waste (e.g. trimmings) or from alternative sustainable sources such as marine worms
- All vegetable ingredients are from confirmed GMO-free sources
- All vegetable ingredients are from confirmed sources applying good management practices (e.g. not from recent monocultures grown on previous rainforest lands)
- No bycatch added
- No synthetic pigments added

These standards should also apply to feed used in the hatcheries.

Feed shall be handled and stored in a safe, clean and dry manner and away from any sources of potential contamination and pests such as insects and rodents *2.6 facility pest control*.

#### Feed traceability

Feed delivery documents, invoices, any certifications and farm diary information on feeding and feed stocks shall be kept *3.4 monitoring growth and performance*.

### 3.4 MONITORING GROWTH AND PERFORMANCE

A record system shall be in place providing a permanent documentation of each generation/cycle. The data recorded shall include origin and initial numbers stocked, type and quantity of feed used, occurrence of disease, any treatments applied, reason and number of mortalities and final numbers harvested. The data shall allow the calculation and tracing of FCR, stocking densities and stock movement.

#### FCR

The feed conversion ratio shall be calculated for every generation and the results shall be interpreted and used to improve management practices.

Feed conversion ratio (FCR) = (annual feed used) / (fish harvested)

Black tiger shrimp and pangasius shall reduce the FCR within the first three years of certification to below 2, for tilapia and catfish it shall be reduced to below 0.5 and for all other species it shall be reduced to below 1.3.

#### Fish in: fish out ratio

In order to evaluate the sustainability of the production, FFER (fish in: fish out ratios) shall be calculated. Only fishmeal and fishoil directly received from wild capture or aquaculture need to be included in the calculation (e.g. no processing trimmings). Calculations shall follow the following procedure:

- Determine tons fishmeal in feed per year
- Convert fishmeal to pelagic equivalent (fishmeal/0.225)
- Determine tons of fishoil in feed per year
- Convert fishoil to pelagic equivalent (fishoil/0.05)
- Sum up total pelagic equivalent (fishmeal+fishoil)

FFER = total pelagic equivalent per year / total production per year

All information required to calculate the FFER shall be available during the initial audit and can be calculated together with the auditor. The calculation of FFER shall be carried out by the operator prior to all follow-up audits.

#### FFER limits

The calculated values for FFER are currently used to monitor improvement over the years during certification. Metric values will be set when more scientific data is available. For the moment, all operators shall achieve an FFER below 4 within three years of certification.

#### Stocking densities

Stocking densities shall be at a level so as not to impact on water quality or fish health/welfare. Under standard conditions, stocking densities in ponds/cages/tanks shall not exceed 15kg/m<sup>3</sup>, in recirculation tanks shall not exceed 30kg/ m<sup>3</sup>. Where health reports and physical examination show no signs of stress due to stocking densities, levels can be increased up to a maximum of 20 kg/m<sup>3</sup> and 40 kg/m<sup>3</sup>, respectively. For flatfish, this can be further increased if not all of the surface area of the bottom/trays is used by the fish.

With each harvest a traceability sheet shall be provided, indicating the quality/history of the fish. Prior to every stocking, a harvest estimation for the following cycle shall be made.

### 3.5 HARVEST, TRANSPORT & SLAUGHTERING

Harvesting, transport and slaughtering shall be carried out in consideration of the environment (e.g. sediment release, escapes), fish welfare (e.g. stress, physical damage, suffocation) and product quality (e.g. clean harvest bins, blood spotting, immediate cooling after slaughtering). Environmental, fish welfare and product quality requirements are additionally covered in the respective chapters.

#### Harvest

Harvesting shall be carried out as quickly as possible with a maximum of 2 hours pre-harvest crowding. During harvest, fish shall not be out of the water for more than several seconds (less than one minute).

#### Transport

Transport shall always be carried out in cleaned and disinfected bins/trucks. If fish have already been killed, they shall immediately be placed on ice to reduce flesh temperature to  $< 5^{\circ}\text{C}$ , until reaching the processing plant.

In the case of live transport, temperatures and chemical composition of the water, duration of transport as well as mortalities and physical condition upon arrival shall be documented.

#### Slaughtering

Fish which are not stunned/slaughtered shall be placed on ice (e.g. shrimp). The ice shall be made from potable water sources. For small warm water fish, animals shall be placed into ice slurry for immediate stunning and killing. The ice slurry shall be mixed and temperatures monitored. Fish shall not be left to suffocate or left partially stunned in warmed water. For every unit of fish there shall be one unit of ice/ice-water. For larger and cold water fish, animals must be stunned by  $\text{CO}_2$ , mechanical or electrical stunning. Stunning shall be monitored for its effectiveness. Directly after stunning, fish shall be bled. All waste blood water shall be collected and treated prior to disposal.

### 3.6 DRUGS (MEDICATION/TREATMENTS AND VACCINATIONS)

All certified companies shall demonstrate clear efforts to minimize the occurrence of disease and use of drugs and chemicals. Such efforts shall be based on the operator specific risk assessment and shall include, but not be limited to, the following:

- Select healthy PL/fry/smolts for stocking *3.1 source and quality of juvenile aquaculture stock*
- Avoid stress during grow-out *3.2. hygiene and health*
- avoid disease transfer from other stock/farms *3.2. hygiene and health*
  - regularly remove mortalities
  - restrict access to farms by visitors
  - if required use hand wash and disinfectant points
  - limit/treat water inflow into ponds/tanks
- monitor fish for the occurrence of disease

Besides the disease prevention measures described above, all companies shall hold a list of

- drugs (chemicals) used at the farm
- nationally approved chemicals (usually provided by governmental fisheries agencies)

All treatments (e.g. medication, baths, vaccinations) shall be recorded (date, agent, dose, reason for use, vet recommendation, residue time). Medicines shall only be applied after a prescription by a veterinarian and only for cases where there is an identified health problem. Records of veterinary prescriptions shall be kept.

The following treatments are prohibited:

- drugs and chemicals banned for use in food production such as chloramphenicol and nitrofurantoin antibiotics)
- drugs and chemicals banned in the country of import
- malachite green, crystal violet, tributyltin compounds
- hormones used on grow-out fish as growth promoters or for sex reversal
- antibiotics used as growth promoters or for preventative treatment
- antibiotics, to which there is plausible suspicion or evidence of build up of resistance

Prior to marketing, an independent ISO 17025 (or equivalent, i.e. GLP) accredited laboratory shall perform regular sample tests for the use of prohibited substances. It is permissible for this to be part of a national residue surveillance and control programme undertaken by the relevant competent authority.

Besides prohibited drug use, a residue limit has been set for a number of drugs. In order to prove compliance, application and harvest time shall be carefully calculated and residue testing shall be carried out *7.2 food safety*.

## **4 ENVIRONMENT – MANAGEMENT AND CONSERVATION**

---

### **4.1 ASSESSMENT OF ENVIRONMENTAL RISKS**

One of the main aims of this standard is for certified companies to assess any external risk to their compliance with this standard as well as any risk farming/processing practices poses to the environment. In this sense, an environmental risk assessment shall be carried out by all companies applying for certification prior to the audit. The risk assessment should take into account prior use of the land. An example risk assessment, typical risks and template documentation is given in the AquaGAP training manual.

According to the applicable risks, monitoring shall be planned and implemented.

### **4.2 MONITORING OF ENVIRONMENTAL IMPACTS**

For all risks, regular monitoring shall take place. For example, if feeding is used in open water net cages, there is a risk of accumulation of organic matter on the seabed. Therefore, regular seabed monitoring (biodiversity, sediment quality) shall be carried out below the cages and along a transect (up to 500m), with pictures and sand sample analysis backing the monitoring, as applicable.

### 4.3 ENERGY AND WATER EFFICIENCY

Besides the overall reduction in energy use, the use of non-renewable energy resources must be continuously reduced. If the technology is available in the country, 50% of the energy used at the hatchery and farm level must be sourced from renewable resources within 3 years of first certification.

The use of water resources shall be carried out in an efficient way. Water shall not be exchanged excessively to reduce efforts in water management or to improve effluent values. Besides refilling due to evaporation loss, during each grow-out cycle, less than 100% of the pond/tank water shall be exchanged. Where tanks are used, treatment and recirculation is recommended and effluent treatment is required. Where ponds are used, as a minimum, a decantation pond is required. For farms using a decantation pond, 100% of the volume of the decantation pond may additionally be exchanged on average once per month. Volumes of water use/exchange shall be recorded. For farms not using fertilizers or food and no form of medication/drugs, the use of seawater is not restricted. For farms not using fertilizers or food and no form of medication/drugs, the use of river water shall be recorded and reduced where possible (allowance for rain retention shall be provided for). Rain water shall be retained and used during the dry season, where applicable. Refilling due to evaporation loss is only permitted where dyke height allows for refilling by rain water.

In order to conserve the use of water, where feasible (when harvesting is carried out by fishing rather than through draining ponds, water quality is good, sedimentation is low and no disease has occurred), ponds should not be emptied after every cycle.

For processing plants and feed mills, the operator shall record water/energy use and evaluate the potential to reduce the use of energy and water. Requirements for processors/feed mills will be added to the standard as soon as more information on potential solutions is available.

All equipment shall be serviced and maintained in good working condition to further reduce the waste of energy and water (e.g. leaking pipes).

### 4.4 WILDLIFE AND CONSERVATION

#### Escapes

Escapes shall be prevented. Efforts shall be made at all stages during production both at the hatcheries as well as the grow-out farms. Preventative measures shall include the following:

- nets shall be changed safely (e.g. second net installed prior to removing first net)
- side walls shall be high enough to prevent fish from jumping out of cage/tank
- Nets shall be checked and repaired several times per week
- In high energy environments, special robust equipment shall be used
- Screens shall be fixed at all inlets and outlets
- The mesh of screens shall be small enough to catch the smallest living stage in culture (eggs/ larval forms/ juveniles/ adults)
- Besides primary screens, a dry-bed gravel/sand filter or secondary screens shall be installed for all effluents

Besides prevention, exact stocking numbers, morts and harvest numbers shall be recorded to verify potential loss of escapes. Any evidence for escape shall be reported to the competent authority and recorded on site.



### Predators

As part of the risk assessment, any endangered species in the surrounding area shall be listed and precautionary measures shall be defined to minimize any risk. In addition, any predators shall be recorded and measures defined how to deter them from harming themselves or the aquaculture stock. Typical deterrent measures may include the following:

- Top nets can reduce the impact of birds (the mesh shall be of an adequate size and the nets shall be tensioned sufficiently to avoid entanglement)
- Scare crows and fake shots can reduce the impact of birds
- Fences around the premises
- Low fences around ponds can impede crabs entering the ponds
- Multiple screens at water intake can reduce the inflow of predator fish into the ponds
- Secondary predator nets can reduce the impact of seals (predator nets shall be tensioned adequately)

Predator prevention shall be carried out in a way so as not to harm the predator or other species. Therefore, the following deterrents are prohibited:

- the use of acoustic deterrent devices (e.g. for seals)
- the use of lead shot
- any device causing the predator to suffer

### Erosion

Erosion and sediment accumulation in ponds and canals shall be reduced as far as possible. Methods used shall include the following:

- At least 50% of total dyke surface shall be covered by plants at the latest within three years of first certification
- Where greening of dykes and banks is difficult, gravel/stone shall be used
- If both planting and the use of gravel is not feasible, plastic lining may be used

### Sediments

Constant dredging of canals shall be reduced as far as possible. If sediments are removed from brackish water ponds, salt- and nutrient-laden sediments shall not be dumped unplanned. Sediments shall be used to repair dykes or spread thinly and used, for example, for vegetable gardens. The growth of vegetation in the surrounding (e.g. rice fields) shall be monitored for indication of salinization of the soil due to seepage of brackish water from the ponds.

### Groundwater

Where accessible, mains/tap water and seawater/rain water shall be used. Only where mains/tap water is not accessible, well water may be used. The use of well water for processing plants and feed plants is prohibited. If well water is used for hatchery or grow-out farms, abstraction volumes and ground water levels shall be monitored and compared with reference values. If groundwater levels are declining or there is evidence of ground subsidence, well water shall no longer be used. It is recommended to have a rainwater store. For the salinity control in grow-out ponds, well water shall not be used.

In order to minimize salinization of surrounding soils and water, saline effluents shall not be discharged into freshwater rivers/canals, and chloride levels shall be monitored in close-by freshwater wells.

### Biodiversity

There should be a key aim to enhance the environment and biodiversity on the farm. Consideration should be given to the conversion of unproductive sites to conservation areas for the encouragement of natural flora and fauna.

## **5 RECORDING SYSTEM**

---

### **5.1 CHECK ON PLAUSIBILITY OF PRODUCT FLOW**

During each annual audit, a sample calculation shall be carried out to verify the feasibility of

- I) feed consumption in a specific time period in relation to growth and performance data
- II) feed bought in and consumed in a specific time period
- III) number of animals stocked and, number of mortalities and quantity harvested in a specific production cycle.

### **5.2 TRACEABILITY**

The final processed product shall always be traceable back to the farm, cage/pond/raceway/tank as well as the broodstock of origin. All processing steps shall be documented and yields recorded. The history of each batch shall be recorded on a traceability sheet, showing for example origin, identification number, date and number of harvest, any treatment and withdrawal period.

## **6 STAFF**

---

### **6.1 OCCUPATIONAL HEALTH AND SAFETY POLICY**

It is recommended to appoint a senior staff representative responsible for the health and safety of all personnel. It shall be assured that staff are not exposed to dust, noise, harmful gasses and other hazardous substances.

Depending on the nature of the work, appropriate protective equipment shall be provided by the operator and staff shall be trained to use these correctly. Protective equipment may include but is not limited to the following:

- Respiratory and eye protection devices (e.g. for staff working with chemical agents)
- Ear protection devices (e.g. for staff working in machine rooms)
- Gloves (e.g. for liming materials)
- Life jackets (e.g. for offshore cage sites)

Similarly, first aid and emergency equipment (e.g. fire extinguishers) and respective contact numbers shall be posted at a prominent place available to all staff. The operator shall assure that any emergency and warning postings are written in a language understandable to all staff.

### **6.2 STAFF TRAINING**

All staff shall be trained on first appointment and continuously thereafter. Training shall include information on all operations on site, first aid, the use of safety equipment, their social rights and duties, as well as any particular task relevant to the responsible staff (e.g. diving operations shall comply with health and safety regulations at all times). Training and any outcome of assessments shall be documented (as a minimum the date, topic and list of participants). For certain topics (e.g. first aid, diving safety) it is recommended to use external training by a competent authority/company.

### **6.3 SOCIAL RESPONSABILITIES**

The operator shall comply with national labor laws and have a copy of these on site. Besides, additional requirements are set to ensure worker's safety and minimum social rights and duties.

#### Forced/child labor

The operator shall guarantee that there is no forced labor or form of corporal punishment. The operator shall guarantee that there is no heavy or risky work carried out by staff younger than 15 years old. Any work carried out by staff younger than 15 shall not be carried out for several hours daily obstructing the child to attend school, sports and playing activities. The operator shall actively pursue any indication of forced or child labor in order to resolve the situation. The operator shall be knowledgeable on the age of all staff.

#### Employment conditions

All permanent staff must hold a written contract. In exceptional circumstances (e.g. in countries where there is no tradition of written contracts and where, from a legal point of view, these have no benefit to the owner), oral agreements shall be sufficient. However, agreements shall be agreed upon and clear to both parties. With casual workers it must be clear for both sides what the working conditions, responsibilities, terms of reference and wages are. Payments shall be carried out regularly. Salaries shall be above the minimum level set by national labor laws and suitable for the type of work carried out. If there is any form of monetary punishment due to failed compliance with the work agreement, this must be clearly set out in the contract/agreement in advance.

The operator shall actively ensure that staff are not exposed to any sort of discrimination by gender, race, religion etc.

The working agreement shall further outline rights and duties of both sides, shall be dated and signed by both parties. Rights and duties shall further regulate issues such as weekly working hours, overtime and payment thereof, basic coverage for retirement, maternity and sick leave, medical and unemployment insurance. All issues must be compliant with local legislation.

The employer shall allow and encourage associative activities and collective bargaining. Further, the operator shall encourage regular meetings with all staff.

#### Living quarters

All staff shall have the choice to live in their own private accommodation or in accommodation provided by the operator, if available. If living quarters are provided on site by the operator, they shall be habitable and have the basic services and facilities.

## **7 POST HARVEST HANDLING, PROCESSING AND MARKETING**

---

### **7.1 PROCESSING PROCEDURES AND PRODUCT HANDLING**

For harvesting, transport and slaughtering, see *3.5 harvesting, transport and slaughtering*.

The processing plant shall assure that these steps are in compliance with this standard, if they fall under their responsibility.

From the moment fish are harvested (if not stunned/slaughtered, e.g. shrimp) or from the moment fish are slaughtered, all seafood shall be put on ice/in ice-slurry to cool as quickly as possible and maintained below 5°C throughout processing (apart from cooking units). Temperatures shall be monitored according to the internal HACCP plan and recorded.

Incoming goods and accompanying documents shall be verified for their quality and compliance with this standard according to internal checklists.

A lot number system shall be used allowing traceability from the incoming batch through each processing step to the final outgoing sales product. During each stage of product receipt, processing and storage, the product shall be identifiable by lot and certified quality. If products are stored for more than several hours or if there is a separate freezing unit, a stock record shall be maintained. All stored products (apart from temporary day storage) shall be labeled appropriately, stating the certified quality and with direct reference to traceability documentation. Traceability documentation shall allow reference to information on the history of the products (feed, treatment, farm, broodstock of origin etc).

The plant shall have a quality manual including a HACCP plan showing the individual steps during processing. For each product there shall be a detailed product specification. For any multi-ingredient product there shall be a recipe, indicating percentage and quality of each ingredient. Multi ingredient products shall only contain aquaculture product certified according to this standard, wild fish certified according to the MSC Fishery or the Naturland Wildfish standard or agricultural products of sustainable sources (benchmarked certification). No processing additives or processing aids (e.g. phosphates) shall be used for AquaGAP products.

Waste such as processing trimmings shall be brought to adequate reuse (e.g fish feed). Where quantities of processing waste are sufficient, feed for animals in the fur industry is not considered as an adequate reuse.

All wastewater shall be treated prior to discharge. All other waste/chemicals/cleaning agents shall be handled according to *2.5 handling of drugs and chemicals*. The quality manual shall contain a section on cleaning including a cleaning plan, a list of approved cleaning agents and methods of use, as well as cleaning protocols to be completed on site during cleaning. All approved cleaning agents shall be for food quality processing. The same shall apply for facility pest management. No pest control shall be used where direct contact to the feed product may occur. A plan and procedure to deter pest shall be included in the quality manual.

## 7.2 FOOD SAFETY

Prior to marketing, each batch of seafood products shall be analysed for non-permitted substances and residue limits according to the US FDA. A list of reference values according to national regulation, additional regulation of the country of export as well as the current US FDA list shall be available on site and compared with analysis results. Analysis shall be carried out by an ISO 17025 certified laboratory or, if involved in a testing ring (where methodologies and accuracy is regularly compared), own laboratories can be used.

Ice shall be manufactured from potable water. Similarly, any transport of ice (e.g. to farms) shall be carried out in clean food quality containers. Water quality reports (e.g. analysis of bacteria, heavy metals) shall be available. All other food additives (e.g. salt) shall be of food grade quality. During processing, staff responsible for the quality of the product shall carry out and record regular quality checks according to the internal HACCP (e.g. temperature, metal detector, organoleptics).

Any glass and sources of potential contamination (e.g. standing water) shall be removed/controlled. All staff working in the processing plant shall be trained on food safety and comply with the hygiene requirements laid down in the quality manual (e.g. hand wash and disinfection, gloves, clothes, black and white zones).

## **8 ICS (INTERNAL CONTROL SYSTEM)**

---

Operators consisting of a number of small farms are encouraged to group together and set up an ICS (internal control system). This increases the quality assurance of the project and transfers a significant amount of external auditing requirements from the certification body to the operator. There are a number of guiding manuals on how to set up an ICS. For further information contact the standard holder.

--- end ---