



Naturland

Naturland Standards for Organic Aquaculture

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Preface

Certified organic agriculture, as practised in accordance with the written standards of Naturland - Registered Association for Organic Agriculture, has become an established concept. A comparison of the first draft of the "Standards for Organic Agriculture" passed in 1982 after the association was founded with the currently valid version will reveal two aspects of this modern form of land cultivation: on the one hand its dynamism and potential for development and on the other its stability and consistency.

The development of standards and their implementation are the core mission of any certified association for organic agriculture. Standards have to be proven to be workable. They have to adapt to changing conditions and extended to cover new areas. The growth of Naturland and its organisations since the association's establishment is a reflection of the success of its work and confirms that this form of cultivation has gained wide acceptance among farmers, food producers and consumers.

Standards for specific areas

The Naturland standards existed long before the EU passed its first legal regulations on organic agriculture. Even today the consistent development of our standards provides major impetus; they incorporate ideas that are taken seriously by the legislators.

As they stand today, Naturland's standards are not limited solely to the specific method of cultivation described in detail in its standards on plant production and animal husbandry. For some years now, standards have been developed to cover many specific areas which require special guidelines, such as horticulture and viticulture, bee-keeping, harvesting of wild grown products, and aquaculture. In the same measure that the standards have evolved to cover various forms of cultivation, they also incorporate the next stage - the processing of this produce. The production and processing of food produce, such as bread and bakery products, milk and dairy products, beer and meat, etc. are described in specific standards for different categories of food produces.

Whilst foodstuffs are the original sphere of interests, standards have also been drawn up to cover other areas of cultivation, such as organic forestry and timber processing.

Adherence to the elementary principles

To ensure that Naturland's standards develop consistently, it is essential that the fundamental principles of organic agriculture are adhered to. It is also crucial to withstand hasty and short-lived trends and any temptation to sacrifice elementary principles for the sake of immediate success. Standards can only provide a framework, since organic agriculture cannot function on the basis of mere regulations. It is realised by consensus on a common aim. Nevertheless, exact and binding rules are necessary in practice, whilst leaving enough flexibility for adaptation to the particular requirements of each agricultural operation.

The experts - farmers, consumers, processors and scientists - who contribute to the development of Naturland's standards have always offered new solutions to the problems posed. The framework of Naturland's standards is dictated by the core fundamental principles of certified organic agriculture: the obligation to treat the elementary basics of our lives with prudence and responsibility. A common starting-point, sustained management, the active protection of nature and the climate, safekeeping and preservation of the soil, air and water and the protection of the consumers are at the heart of all Naturland's standards.

Naturland's standards - basis for certification

Standards will only endure and make a lasting impact if they can be clearly monitored and be put into consistent practice. Any decisions involved have to be seen to be made impartially and on neutral, unbiased terms. This is guaranteed by calling on the services of independent and autonomous committees - standards committee, inspection body and certification committee - as well as by the composition of the committees - consisting of diverse interest groups such as scientists, agriculturists and consumers. Independent inspection procedures and the consistent application of Naturland's standards form the basis of the production of high quality products cultivated in a balance with nature and the environment. This quality is visibly documented by the Naturland® logo.

Naturland's quality management - national and international

The Naturland association is a member of the international umbrella organisation IFOAM, which issues binding standards in the fields of both production and processing. The accreditation by IFOAM confirms that Naturland's standards and certification procedure fulfil the requirements of IFOAM

For producers, processors and consumers, the accreditation by IFOAM is proof of an international level of quality management, reliability concerning the certification of organically grown produce, from its cultivation to the finished product. In 1997 Naturland was the first German certification organisation for organic agriculture to complete the IFOAM accreditation programme successfully, and to receive accreditation by IFOAM. In 1998 Naturland also received accreditation according to the European norm DIN EN 45011/ISO 65.

Scope of application of the standards

These standards relate to the species of fish, crustaceans and molluscs cited in the Special Part (III), which are cultivated under the conditions described therein (culture system, geographical or climatic conditions).

I. Contracts and certification procedure

1. Prerequisites for granting the producer contract

Prior to the conclusion of a producer contract, the association must be given the opportunity to acquire comprehensive information on the external and internal conditions of the aquaculture operation making the application.

This enterprise is obliged to provide any information necessary to assess the conversion conditions. This includes particularly the method of farming that has been practised to date (type and numbers of stocking, use of mineral fertilizers, hygienic measures etc.), the economic situation of the farm and the prevailing environmental conditions (information regarding the sources of water in the bordering areas and regarding the neighbouring ecosystems, sources of possible threats such as e.g. industrial plants). If possible causes of contamination with dubious or harmful substances are detected, analyses have to be carried out prior to the conclusion of a producer contract.

These analyses may show that a producer contract is only possible under specific conditions or not at all. A comprehensive description of all the water bodies and of the production and storage sites has to be made.

2. Producer contract

On signing the producer contract, the producer commits himself to adhering to Naturland standards and to extending the conversion to all areas of the enterprise that are managed or farmed under his responsibility (whole farm conversion).

The conclusion of a producer contract is possible at any time of year.

The conclusion of a producer contract does not entitle the producer to the use of the association's logo. A separate license contract has to be concluded for this.

3. Standards

These standards are obligatory for all producers that have concluded a producer contract with Naturland e. V. (registered association). If single regulations or parts of these standards should not be applicable under different climatic conditions, the Naturland standard committee has to draft an amendment or addition to the standards which has to be passed by the assembly of delegates. Naturland's certification committee is entitled to allow a producer contractor to diverge from Naturland's standards in specific points, where the exception is justified, and for a limited period of time, provided that the general management of the farming operation according to Naturland's standards is not adversely affected.

Only the latest version of the standards as passed by the standard commission is valid. Naturland will inform the contractual producers of any changes. If the standards are changed, a deadline can be set for the implementation of these changes.

Violations of the standards will be prosecuted according to the sanction catalogue (producer contract Appendix IV).

The validity of the overriding State Legislations and Ordinances shall, however, remain unaffected by these standards.

4. Conversion

During conversion to organic agriculture, the manager introduces management practises in accordance with the principles of organic agriculture throughout the entire operation.

The conversion of the entire farm must occur under economically acceptable basic conditions. It can therefore take place gradually to cover ever-greater areas of the farmland cultivated in accordance with the standards. However, the time span for conversion set down in section I.9 of these standard has to be complied with. Where conversion is carried out gradually, it is imperative for the areas under various stages of conversion to be clearly and explicitly delineated. Simultaneous production of products belonging to different stages of certification that cannot be clearly differentiated is not permissible.

In a conversion plan to be worked out, in particular, all those constructional/design/structural changes possibly becoming necessary, the type and numbers of stocking and the feeding schedule as well as the intended hygienic measures shall be documented.

Naturland can demand the submission of the latest water and sediment analyses.

It is possible to commence conversion at any time of the year.

The requirements of the regulation (EEC) 2092/91 (EU regulation on Organic Farming) and the subsequent amendments have to be observed.

5. Changes in the farming system

If new areas are introduced into farming operation either by way of purchase or on lease, then the animals kept on that area have to comply with the usual conversion period (see I.9 of these standards).

If the same species is cultivated as well on an area already converted as on other(s), still in the conversion phase, then attention has to be paid to a physical demarcation and separate identification of the production units. Any switching between organic and conventional farming method is not permitted.

6. Documentation and inspection

The currently valid details (i.e. type and size of the stock, large-scale transport of stock, e.g. to net cages located apart) shall be reported to Naturland. Regarding the product flow (e.g. additional purchases of feed as well as sales of farm products), likewise, record notes shall be kept in accordance with the Naturland standards. Furthermore, a farm diary shall be cultivated (e.g. regarding the incidence of diseases, mortality rates, implementation of special hygienic measures such as dewatering, liming etc.). An obligation for an immediate reporting shall exist in respect of all such factors that can negatively affect the quality of the products (e.g. contamination of water sources, occurrence of toxic algae blooms or „red tides“).

Previously announced (at least once a year) and unannounced visits and inspections by personnel authorized by Naturland shall monitor the adherence to the standards. They shall be provided with unrestricted access and scrutinizing opportunities into all the relevant areas of the farm. Upon their request, all the documents relating to the managing of the farming operation as also all kinds of relevant information shall be made available.

7. Certification

The Naturland certification committee confirms that the producer is adhering to the standards with the annual certification letter. If the producer violates current standards, the penalties listed in the catalogue of sanctions, which is part of the producer contract, can be imposed.

8. Approval

Certification of the enterprise documents the successful conclusion of the conversion period and will be granted by the Naturland certification commission.

As minimum time span for conversion of the whole farm until certification basically at least the duration of one production cycle of the organisms cultivated here is required. The official start of management in accordance with these standards is marked by the provable last management measure not permitted by the standards.

No minimum duration is specified for the conversion if the organisms cultivated are exposed to the natural current and water conditions in open waters (e.g. in net cages).

The conversion of the entire farming operation, in the case of step-wise implementation, must be completed within 5 years at the latest.

9. Labelling and marketing

The producer is only allowed to label products with reference to Naturland if a licence agreement has been concluded for the products in question. In addition, the following deadlines and conversion periods must be adhered to.

The animals or products recovered from them may be marketed with reference to "Naturland" or the Naturland Trademark, as originating from **certified organic aquaculture**, if the former had been cultivated in conformity with the standards for at least 2/3rds of their lives.

In case conventionally produced products (e.g. under direct marketing) are offered as additional product lines, then their conventional origin must be distinctly identified. One and the same product cannot be simultaneously offered as originating from organic farming on the one hand and as from conventional production method on the other.

II. Principles of Management

1. Selection of site, interaction with surrounding ecosystems

1.1. By selection of site and the method of management of the farm, the surrounding ecosystems shall not be adversely affected. In particular, negative impact caused by effluents as well as by escape of animals shall be prevented by adopting suitable preventive measures.

In the case of installation of new farms or amplification of already existing, natural vegetation shall not be damaged in a lasting way. This has to be respected, in particular, if the type of vegetation has to be classified, at regional or international level, as rare or endangered (e.g. reed areas in Middle Europe; rain forest, mangrove).

1.2. Through appropriate design and management of the farm areas it shall be ensured that the water bodies inside the operation retain their ecological functions depending on the respective geographical conditions (e.g. breeding ground for amphibians and water insects, resting place for migratory birds, migration routes for fish). For this purpose, in particular, adequately large areas showing natural vegetation (e.g. water reeds, higher aquatic plants or helophytes) shall be protected or re-planted by the enterprise.

1.3. While protecting the farm areas from predatory birds and other animal species, measures not harming the animals physically shall be preferred (e.g. nets, raptor dummies).

2. Species and origin of stock

2.1. As stock for organic production, species naturally occurring in the region shall be preferred. In particular, possibility for co-operation with regional breeding/conservation programs should be examined (e.g. autochthon strains of Atlantic salmon, Adriatic trout species).

The risk of escaping or introduction of species not naturally occurring in the region in open waters (e.g. by marketing as live-stocks) shall be prevented from.

2.2. Where suitable, polyculture shall be preferred. Polyculture either shall lead to direct benefit for the species cultivated (e.g. wrasse for elimination of ectoparasites in salmon cages) or to more effective utilisation of the available resources (e.g. by building up of food chains).

2.3. The stock (eggs or hatchlings, fries etc.) shall originate from enterprises run organically. Insofar as this is not possible (obligation of indication and providing proof by the farm manager) and, therefore, stock has to be purchased from conventional suppliers, the following conditions shall apply:

- Genetically manipulated (transgenic) organisms or obtained by means of polyploidization or gynogenesis are excluded from being stocked.
- The organisms must have been kept and fed at least for 2/3 of their lives in accordance with the Naturland standards before marketing with reference to Naturland is allowed.

3. Breeding, hatchery management

3.1. Concerning hatchery management, the respective provisions for grow-out operations (II., III.) apply correspondingly.

3.2. The objective is the natural reproduction or spawn recovery. The use of hormones, even from the same species, is not allowed.

If due to extreme climatic and weather conditions no natural spawn recovery can be expected, conventional measures can be resorted to following the submission of an application. The stock obtained by such measures, is not allowed to be labelled as organic.

4. Design of holding systems, water quality, stocking density

4.1. The husbandry conditions must enable the animal to behave in a way natural to the species; this refers, in particular, to behavioural needs regarding movement, resting and feeding as well as social and reproduction habits. The husbandry systems shall be designed keeping all this in view, e.g. in respect of stocking density, soil, shelter, shade and flow conditions.

The water quality (e.g. temperature, pH, salinity, oxygen, ammonium and nitrate concentrations) must conform to the natural requirements of the species in question.

If artificial illumination is provably necessary, then the simulated day length shall not exceed 16 hours.

4.2. For construction and management measures only materials and substances shall be used that provably are not causing any injurious effects on the organisms or the environment.

5. Health and Hygiene

5.1. The health of the organisms is, primarily, to be ensured by adopting preventive measures (e.g. optimised husbandry, rearing, feeding). Natural curative methods (see also 5.2.) shall be preferred in case of a disease.

Use of conventional medicine is only permitted in vertebrates and after detailed diagnosis and remedial prescription by a veterinarian. In this case, at least twice the legally prescribed waiting period must be observed. Use of conventional medicine is not permitted in invertebrate organisms (e.g. molluscs, crustaceans).

Routine and prophylactic treatment with chemo-synthetic drugs as well as hormones is not permitted. All regulatory and statutory regulations shall be fulfilled.

The stock shall be regularly inspected with respect to its status of health. Dead organisms shall be immediately removed out of the holding system.

5.2. Permitted treatments, also as prophylaxis or routine (within the frame of statutory regulations):

- use of natural physical methods (in particular drying out, freezing out)
- use of not residue-building, inorganic compounds (e.g. hydrogen peroxide H₂O₂, common salt NaCl, lime CaCO₃, quicklime CaO).
- use of naturally occurring, not residue-building organic compounds (e.g. per-acetic acid, citric acid, formic acid, alcohol)
- use of naturally occurring vegetable substances (in particular Labiatae and *Allium* species; further *Ryania speciosa*, *Derris eliptica*, Neem/*Azadirachta indica*, oil emulsions on the basis of paraffin oils and/or vegetable oils, *Bacillus thuringensis*). For using pyrethrins (no synthetic pyrethroids) as well as *Quassia amara* an application shall be submitted to Naturland
- use of homeopathic products
- use of stone powder

If any substance or measure conforms to the criteria above-mentioned but does not find mention by its actual name in these standards, Naturland shall be consulted before its application.

6. Oxygen Supply

The basis for aquaculture operation shall form the natural, physical conditions of the water body (available input-water, flow-situation, temperature, water-chemistry). Measures of aeration must not be used to raise the density above the permitted level.

7. Organic Fertilising

7.1. The actual production of the cultivated water bodies may be augmented by application of organic material as fertiliser in specific quantities and compositions (see III. Supplementary standards on specific culture systems and species).

The fertiliser used must originate, insofar as is available, from certified organic farming operations.

In case the fertilisers cannot be obtained from certified organic farming operations (obligation of indication and providing proof by the farm manager) then the use of conventionally produced organic fertilisers (in the form of solid manure, hay or compost), preferably from extensive farming operations will have to be applied for with Naturland.

7.2. Such farming methods are recommended which, in a suitable way, allow to combine aquaculture with other forms of animal husbandry (e.g. water fowl, pigs) or crop plantations (e.g. rice, water hyacinths *Eichhornia*).

8. Feeding

8.1. For certain culture systems an upper limit for the application quantity feed/area can be determined (see III. Supplementary regulations for specific farming systems and animal species).

8.2. Type, quantity and composition of feed must take into account the natural feeding methods of the concerned animal species. The activity level and the condition of the animals mainly give indications in this respect (e.g. corpulence factor, fat tissue).

8.3. All the feed stuffs must be produced in accordance with Naturland standards, or in any case at least in accordance with the IFOAM¹-Basic Standards. If in a certain country there is not sufficient availability of feed stuff from certified organic origin (obligation of indication and providing proof by the farm manager), feed stuff from traditional, extensive agriculture or from wild collection can be permitted, if this specific origin as well as general requirements (particularly 8.4., 8.7.) is safeguarded by suitable control systems.

Additionally, feed from animal origin in limited amount and defined quality (s. 8.5.) is permitted.

8.4. Feed from genetically altered organisms or their products is not permitted.

8.5. If feed ingredients of animal origin (particularly fish meal/oil) have to be used for the culture of carnivorous² species with higher protein requirements, the following basic principles shall be respected:

- The percentage of animal components in feed shall, as far as possible, be decreased or replaced by vegetable products. Provisional maximum values are set in Part III (Supplementary Regulations for specific farming systems and animal species)
- Feed shall not be obtained from conventionally reared terrestrial animals (mammals, birds).
- In order to work towards a responsible utilization of wild fish stocks, special standard requirements are set on the origin of fish meal/oil (see Appendix 1.a).

8.6. In order to cover the special needs of certain species of animals, addition of vitamins and minerals to the feed is permitted. Similarly, feeding of natural pigments (e.g. in the form of shrimp shells or *Phaffia* yeast) is permitted.

8.7. Synthetic antibiotic and growth-enhancing substances as well as other synthetic feed additives (e.g. synthetic amino acids, chemo-synthetic pigments) are not permitted.

9. Transport, Slaughtering and Processing

9.1. Transport und slaughtering must be done in a way as fast and considerate as possible in order to avoid any unnecessary suffering of the animals. The method of proceeding and the materials used has to be in any case oriented towards the needs of the respective animal species (e.g. sensitivity to higher temperature or to stress).

¹ IFOAM International Federation of Organic Agriculture Movements (WebPage: www.ifoam.org)

² Species feeding exclusively or predominantly on other animals

Slaughtering of fishes shall be carried out by means of incision of gills or immediate evisceration. Prior to this, fishes shall be anaesthetized by means of concussion, electrocution, carbon dioxide and, if need be, by natural plant anaesthetics).

9.2. Maintenance of the cold chain from the point of slaughtering up to the sales point must be strictly observed, in order to prevent any deterioration in the product quality.

In the case of processed products, only products and additives in accordance with Naturland standards shall be used. General Processing Standards of Naturland shall be complied with.

9.3. The cleaning of factory rooms, devices and machines must ensure a perfect hygiene along with an as high as possible ecofriendliness. Mechano-physical processes shall be preferred to chemical processes. Regarding the cleaning and disinfection agents used, a separate book of records shall be kept.

The wastewater from the slaughtering and processing plants must be subjected to appropriate purification process.

10. Smoking

Customary smoking techniques are permitted. Only hardwood and spices shall be subjected to glowing. The glowing temperature shall not exceed, on an average, 500°C (max. 650°C). The smoke conduction shall be such that a cooling of the smoke takes place, and any entry of substances (fat, protein, drip fluid) from the material to be smoked into the glowing zone is avoided.

“Black smoking”, the use of so-called “Katenrauch”³, the use of chemically treated types, resin-rich or toxic wood and liquid smoke preparations as well as the technique of salting by injection are prohibited.

11. Social aspects

11.1. The respective provisions of “Naturland Standards” apply. Additionally, there are specific issues to be observed in aquaculture operations:

11.2. The staff shall be trained regarding the basic principles of organic aquaculture. The timetable for this measure shall be defined in the conversion plan.

At least one responsible person familiar with the contents of these standards shall permanently be in easy reach of the farm.

11.3. The operator of the farm has responsibility as well for the housing and living conditions of employees living permanently or temporarily on the farm area. The IFOAM Social Standards shall apply as basic requirements.

The respective regulations concerning industrial law shall be adhered to.

11.4. In accordance with the representatives of the neighbouring municipalities/regional authorities, the farm operator shall ensure free access for fishermen and other interested persons to open waters adjoining the farm area. Therefore, installation of fenced gateways or issuing of transit passes is recommended.

In any case the legal regulations shall be adhered to.

³ „Katenrauch“: smoking process using smoke from the household fireplace with the product to be smoked hanging from the roof

III. Supplementary regulations for specific farming systems and animal species

The general standards according to I. 1-9 and II. 1-10 shall be complied with. For specific species and farming systems, the following standards shall apply additionally:

A. Pond Culture of carp (*Cyprinus carpio*) and its accompanying species

1. Close-to-nature design of the ponds (see II. 1.)

On average, at least 30% of embankment line shall represent the natural biotope structure to at least 2 m depth in the form of a helophytic zone, reed and/or overhanging trees/shrubs.

2. Species and origin of stock (see II. 2.)

The stock (spawn, breed-stock, fingerlings etc.) may be purchased from organic farms only. Insofar as this is not possible (obligation of indication and providing proof by the farm manager), the stock may be purchased from conventionally managed farms (see I.9., II.2.3.).

3. Breeding (see II. 3)

4. Construction of ponds, quality of water, stocking density (see II. 4.)

4.1. The inflowing water shall reveal none or only slight contamination of anthropogenic origin (e.g. heavy metals) as well as not or only slightly be influenced by sewage water (guideline: BOD₅ < 6 mg). The pH-value shall be between pH 6,0 and 9,0.

The submission of analyses (sediment-mixture analysis, residue analysis of fish tissue) may be demanded by Naturland. This holds good especially if there exists a suspicion about contamination with heavy metals or toxic organic compounds (e.g. chlorinated hydrocarbons), pesticides or radioactivity etc.

It is expressly recommended to conclude an agreement with the immediate neighbours employing conventional farming methods (also paying attention to inflowing water) a management plan of the boundaries being compatible to organic farming. Any special prevailing conditions (e.g. sewage treatment plant at the inlet) must be clarified with Naturland.

4.2. The culture of fishes in artificial containers (polyester, concrete etc.) is not permitted. Only for the short term stay of hatchlings for the initial/starter feeding phase and the post-harvest maintenance of fishes up to a maximum of 8 weeks such containers are permitted.

4.3. The stocking density shall not exceed the state, that at least a 50% of fish yield is attained via the natural feed availability. Only when feed is administered for augmenting the protein content (see Appendix 1.b) as well as peas and beans, the following upper limits are set for stocking density of the fish species of main commercial interest:

| Carp/ha: | | Tench/ha: |
|----------|----|-----------|
| 3.000 C1 | or | 7.000 T1 |
| 600 C2 | or | 2.500 T2 |
| | or | 1.500 T3 |

With regard to stocking density of the tench, these figures shall be subtracted from those for the carps⁴. Other species of fish (e.g. other cyprinoids, predatory fishes) as well as crayfish are not subjected to any limitations in stock strength.

⁴ By division of carp stocking numbers by the following values: (Number $T_1 = C_1/0,6$; $T_2 = C_2/0,25$; $T_3 = C_2/0,4$) respectively by multiplication with (Number T_1 to $C_1 \Rightarrow$ factor 1,6; T_2 to $C_2 \Rightarrow$ factor 4; T_3 to $C_2 \Rightarrow$ factor 2,5).

5. Health and Hygiene (see II. 5.)

The ponds shall be re-filled at latest until March/April (Mid-Europe). Breeding ponds may also be re-filled later in the year.

If hygienic measures (e.g. for controlling leeches) are necessary, then quick lime is permitted to be applied on to the humid pond bottom (max. 200 kg/ha). Its application into the pond (max. 150 kg/ha) for the purposes of pH-stabilization and for precipitating of suspended organic matter is permitted in critical weather situations.

6. Oxygen Supply (see II. 6.)

Continuous aeration or the use of liquid oxygen for augmenting the stocking densities is not permitted.

7. Organic Fertilising (see II. 7.)

In order to control plankton growth, organic fertiliser in the form of solid dung, hay or comparable substances may be applied to the pond to the extent of max. 0.5 DE/ha (40 kg N/ha). Numbers of waterfowl cultured on the fishponds shall be appropriately taken into this calculation.

The organic fertiliser shall originate from certified organic sources. If the latter is not available within the procuring range of the farm, then, after consultation with Naturland, solid dung from conventionally run farms (permitted is cattle, sheep, goat and horse dung from conventional sources) may be used.

8. Feeding (see II. 8.)

8.1. Base for the fish growth shall be the pond auto-production, so that at least 50 % of the growth is achieved through natural feed availability in the pond (except for the rearing of fingerlings/C1; see 8.2.). In order to ensure an optimised utilisation of the protein-rich pond feed, supplementary feeding is permitted.

8.2. During rearing of fingerlings (restricted to the first summer) and for improving condition during the early life stages (e.g. C1/C2), fishmeal to a limited extent, and of a defined quality (see II.8.5.), may be used as a feed ingredient.

The conditional feeding is restricted to early spring (over a period of max. two weeks), and to autumn (max. 3 weeks). The farm operator shall document this measure in detail.

9. Transport, Slaughtering (see II. 9.)

As maximum transport-density: C₃: 1 kg/2 l, C₁: 1 kg/4 l. are set.

B. Culture of trout, salmon and other salmonids in ponds and net cages

1. Site selection (see II. 1.)

For culture of fish in marine net cages, water quality must be classified as I; in the case of fish being reared in ponds, the inlet water must exhibit at least water quality II.

Carrying out of additional analyses (e.g. sediment-mixture analysis, residue analysis of fish tissue) may be ordered by Naturland. This holds good, particularly, if there are suspicions about anthropogenous contamination.

2. Prevention of water pollution, natural design of the ponds (see II. 1.)

2.1. The water quality of source water bodies (in the case of pond farms) or the surrounding lake or sea regions (in the case of net cages) should not become significantly deteriorated (standard value < 10% of the parameters determined, see footer below) due to the farming operation. This shall be secured by sedimentation ponds and/or filtering plants dimensioned adequately. Settled particulate organic matter (products of metabolism, feed residues) shall be removed and brought to adequate re-usage (e.g. as fertiliser in agriculture).

The proper functioning of these installations shall be proved by at least quarterly analysis measures⁵, half of these carried out during the period of draining out or cleaning of the pond.

The sea bottom below the net cages should be regularly inspected for organic deposits caused by excrements and feed residues.

Installation of so-called "lift-up" systems is recommended for net cages in order to facilitate the removal of feed residues.

2.2. The outflow of nutrients from the farm shall be kept as low as possible. Therefore, it is recommended to determine the feed conversion ratio (FCR) and to compare it with values given in literature. Insufficient feed conversion is an indicator for increased nutrient discharge and can give indications about inadequate feeding regime (e.g. quantity, feeding schedule).

At least once a year the level of nutrient load in discharge water shall be measured during the regular operative intensity⁶.

2.3. If water is tapped for a pond farm from a stream, then at least 25% of the average low water level shall remain in the source stream bed.

If there are dams constructed in the farm area, they shall be passable for migrating fishes. New constructions shall take this requirement into account.

2.4. In pond farms, on at least 5% of production area, the natural vegetation shall be allowed to develop undisturbed (as a refuge for native animal species).

2.5. Inlet and outlet of the farm shall be protected from invasion by wild fishes as well as from stock escaping. Net cages shall be secured by means of firm anchoring, strong net walls and a type of construction taking into account the prevailing conditions against damage and related escaping of stocks.

2.6. The grow-out of fish in artificial tanks (glass-fibre, polyester etc.) is not permitted. The grow-out in ponds with concrete walls is only permitted if the bottom of the pond is made out of natural substrate, or covered with gravel. The biological functions of the bottom and the walls must be ensured (see II.1., II.4.). If need be re-building measures are to be defined in the conversion plan.

Culture in tanks is permitted only for limited periods in juvenile stages (e.g. egg to fingerling or smolt).

3. Species and the origin of the stock (see II. 2.)

As stock, where possible, species naturally occurring in the region and local strains shall be chosen. Initiatives such as e.g. species conservation programs shall be supported.

⁵ Monitoring and evaluation of macro-zoobenthos (e.g. in accordance to the index of saprobiontic succession) or measurement of single parameters (ammonia, nitrate, nitrite, phosphate) at the outlet respectively in the immediate surrounding of the net cages, compared with values from reference points above the effluent respectively outside the vicinity of the net cages.

⁶ Measurement of BOD₅-value or KMnO₄ consumption

4. Stocking density and oxygen supply (see II. 4., II. 6.)

4.1. The stocking density depends on the natural oxygen absorption of the water body.

4.2. Stocking density shall not exceed 10 kg fish/m³. In the case of justified applications (e.g. if there is no further grading after initial stocking) Naturland can set this limit as an average value on the entire grow-out phase. In no case, the animals shall display any injuries (e.g. of the fins) indicating too high stocking densities.

5. Health and Hygiene (see II. 5.)

5.1. It is recommended to conclude a health maintenance contract with a professional veterinary institution (e.g. veterinary health service).

5.2. For controlling sea lice in marine net cages, stocking with wrasse as "cleaner fishes" is recommended.

5.3. For the protection of net cages against growth of algae and colonisation by invertebrates, environment-friendly methods shall be employed. Use of chemical "anti-fouling" agents is prohibited.

6. Feeding (see II. 8.)

Wild trout and salmon feed exclusively on other animals. Thus, for their adequate culture, a feeding regime with fishes respectively feed prepared out of fishes is inevitable. As an objective remains, nevertheless, to decrease the percentage of fishmeal/-oil in the feed composition as far as possible.

7. Feed-additives (see II. 8.)

8. Transport, Slaughtering (see II. 9.)

Live fishes must be provided with adequate oxygen during their transport.

A transport density of 1 kg of fish to 8 litres of water shall not be exceeded. Water exchange with water of the same temperature shall be done after a maximum of 6 hrs of transport duration. A transport duration of 10 hrs shall not be exceeded.

C. Marine culture of mussels (Blue mussel *Mytilus edulis* and others)

1. Site selection, interactions with the surrounding ecosystems (see II. 1.)

1.1. Mussels have to be regarded as indicator organisms. Therefore, their microbiological and chemical status reflects water quality.

Water quality shall be class 1 (A)⁷. Water quality shall be determined at least monthly by an independent institution. Results have to be documented continually

1.2. The mussel cultivation must be subjected to maximum possible turnover of water from the open sea. Mussel culture in immediate proximity to shore or close to nutrient-rich inflows is not permitted.

1.3. Mussel cultures managed according to these standards form an important habitat for plants, invertebrates and fishes. All management measures esp. during harvest shall be directed towards protecting and supporting this special habitat.

2. Type and origin of stock (see II. 2.)

The seeds are collected from wild stocks. It shall be secured, that collecting activities will not cause lasting damage to the ecosystem.

- The collecting area shall be identifiable. Therefore, it has to be clearly identified by maps, site plans etc..
- Collecting activities shall be documented and traceable to the respective collecting area (time of collection, quantity of seed collected, name of the collector(s) etc.)
- Collection shall not exceed the sustainable quantity in a given area

3. Culture Systems (see II.4.)

3.1. To assure that while lifting the culture units for control purposes or for harvesting no damage is done to the sea bottom settling fauna and flora, the mussels shall be cultured in/on nets or ropes that are anchored firmly on the sea bottom and kept in a vertical position by floats.

Therefore, it is not allowed to cultivate mussels loose on the sea bottom and to harvest them by dredging.

3.2. Nets or ropes shall be appropriate for reuse as far as possible. After use they shall be decomposed or recycled.

4. Processing (see II. 9.)

For treatment of water for depuration/purification purposes only mechanical means (filters) and/or UV light is allowed.

Use of chemicals (e.g. chloride) is prohibited.

Waste water from processing plants shall be cleaned by adequate measures.

In processing, only raw materials and ingredients in accordance to Naturland Standards shall be used. The Naturland General Processing Standards have to be observed.

⁷ The number of faec. *Escherichia coli* in mussel tissue is regarded as a valid measure for water quality in marine mussel culture (Class 1(A): ≤ 3 faec. *E.coli* counts/g tissue).

D. Pond culture of shrimps (Western White Shrimp *Litopenaeus vannamei* and others)

1. Site selection, protection of mangrove (see II.1.)

1.1. Mangrove plant communities have to be protected. Mangroves are considered as extremely important ecosystems that, at the same time, are worldwide endangered due to human activities.

Therefore, it is not permitted to remove or damage mangrove forest for purposes of construction or expansion of shrimp farms.

Any measure carried out by the farm or on the farm's demand likely to influence adjacent mangrove forest (e.g. construction of pathways and channels to the farm area) shall be announced to and approved by Naturland.

1.2. Farms (here: independent, coherent production units), which in parts occupy former mangrove area, can be converted to Organic Aquaculture according to Naturland standards if the former mangrove area does not exceed 50% of total farm area.⁸

Pre-condition, however, is that in any case the relevant legal requirements for land use, reforestation etc. have been observed.⁹

The former mangrove area in property of the farm shall be reforested to at least 50% during a period of maximum 5 years. The harvest of this area is not permitted to be labelled and marketed as Organic product according to Naturland standards, until the Naturland Certification Committee has confirmed the successful completion of reforestation.

Furthermore, the yearly progress in reforestation activities as laid down in the conversion plan shall be confirmed by the Certification Committee.

2. Protection of ecosystems – farm area and surrounding (see II.1.)

2.1. Effluent water quality (ammonia, biological oxygen demand, dissolved oxygen, phosphate, suspended solids) has to be monitored and documented on an at least monthly base by the farm.

2.2. Adequate measures must be taken to minimise the outflow of nutrients and/or suspended solids, especially during harvesting (see 9.1.). Organic sediments shall be removed on a regular base from the channels and brought to appropriate utilisation (e.g. as fertiliser in agricultural units).

2.3. Adjacent agricultural areas shall not be influenced negatively neither by saline water filtering from the ponds nor by scattered salt dust.

If there are indications for adverse effects (e.g. yellowing of plants at the borders) adequate preventive measures (e.g. construction of drainage channels, plantation of salt-resistant, high-growing grasses, e.g. *Setifer zizanioides*) must be taken.

2.4. In order to stabilise/enhance the ecological system and the natural dynamics on the farm area, at least 50% of total dyke surface shall be covered by plants. This state shall be reached during a period of maximum 3 years.

Recommended plant species are e.g. Leguminosae-trees (e.g. *Algorrobo*), aloe and others for the tops of the dykes, mangrove species, semi-aquatic herbs and floating grasses for the lower parts of the slopes.

Farms situated in areas originally free from vegetation (e.g. desert, dunes) are excluded from this requirement.

2.5. In order to find an ecologically adequate and economically effective management against predatory birds, documentation on foraging predators, estimated harvest losses and type of preventive measures shall be kept.

It is recommended to raise ducks in the ponds, expelling intruding birds from their breeding territories.

Native animals (e.g. ant-eaters, iguanas, migrating water birds, wild cats) shall be protected as indicators for a sane environment.

⁸ Under specific geographical or historical conditions exceptions can be made for extensive „Mangrove Aquaculture Systems“.

⁹ Ecuador: protection of mangrove since 1994 (D.G. 1907.94)

2.6. Unwanted fish in the ponds shall only be regulated by mechanical means (e.g. seining) or by application of natural, herbal ichtyocides (e.g. *Barbasco*, saponine).

The use of synthesised herbicides and pesticides (with the exception of substances listed in II.5.2.) on the farm area is not allowed.

2.7. Release of toxic or otherwise harmful substances in the ponds, the channels or the banks shall be prevented from. This refers especially to installation and management of pumping stations (e.g. oil spoilage), harvesting technique as well as the overall hygienic conditions on the farm.

3. Species and origin of stock (see II. 2.)

3.1. Species naturally occurring in the region shall be preferred as stock. If other species are kept, ecological harmlessness of this measures must be proved (e.g. by relevant scientific studies).

Diversification in the species cultivated is recommended. This can be achieved either by polyculture systems (e.g. shrimp–tilapia–ducks) or by separate production of different shrimp species.

3.2. If available, stock from certified organic origin has to be used ¹⁰.

If stock from non-organic origin is used, the respective timetable has to be completed (see II.2.3.).

It is the declared objective to get fully independent from wild-caught post-larvae (PL) or brood stock, and to use only stocks obtained through reproduction in captivity (“closed cycle”).

From 2004-12-31 on, only stock from reproduction in captivity shall be used.

4. Hatchery management (in particular, see II.1., 3., 5., 7., 8.)

4.1. Also in hatchery management, the use of antibiotics, chemotherapeutics and comparable substances is prohibited (s. III D 6.1).

4.2. Alimentation of parent stock and larvae as well as culture of feed organisms (algae, *Artemia salina*, rotifers) in the hatcheries is carried out according to principles given under III D 7. und 8.. Administration of untreated seafood (e.g. fish, worms, mussels) as a protein supplement for parent stock is permitted. Measures that enrich the larval environment (e.g. by providing special substrates) and increase the productivity of the rearing tanks/nursery ponds (culture of feed organisms) are recommended.

4.3. Physical manipulations of the animals for obtaining eggs resp. larvae are principally prohibited. If dealing with species that, at present, provably cannot be reproduced without such manipulations (in first order Black Tiger Shrimp/*Penaeus monodon*), the hatchery must run a program dedicated to achieve natural reproduction. This program consists as a general rule in keeping a part of parent stock (benchmark: 10% of total stock) at low stocking density for giving the opportunity for natural mating. Subsequently, the offspring of this program is systematically propagated, and re-introduced in this program’s population.

4.4. Also within culture of broodstock and larvae as well as feed organisms in the hatchery, technical measures for aeration, artificial lighting and heating shall be decreased as much as possible.

5. Pond design, water quality, stocking density (see II. 4., II. 6.)

5.1. Efforts shall be made to support the natural foraging behaviour of shrimp, being typical feeders of benthic microorganisms and detritus, by an adequate pond design (e.g. by providing substrates enlarging the surface suitable for growth of benthic algae/diatoms).

5.2. It is not permitted to heat, oxygenate or aerate the ponds permanently. Back-up systems for temporary use under extreme weather conditions are permitted.

5.3. In order to decrease energy consumption as well as nutrient losses by the farm, efforts shall be made towards the lowest possible water exchange rate.

Pumping periods shall be limited to high tide, and unnecessarily protruding (in altitude) pipes shall be avoided, both in order to minimise energy consume.

Data regarding energy consumption/area shall carefully be recorded by the farm operator and recorded during the annual inspection.

¹⁰ In Ecuador available since 10/02

5.4. As provisional maximum for stocking density shall be set 15 post larvae (PL)/m³. Shrimp biomass in the ponds shall not exceed 800 kg/ha during the entire production cycle. Calculation of feed conversion ratio (FCR) serves as an additional indicator for maintaining a permissible stocking density¹¹.

6. Safeguarding health and hygiene in the ponds (see II. 5.)

6.1. Particular stress shall be laid on preventive measures (e.g. controlled origin of larvae, monitoring of water quality and ecological conditions in the ponds). Application/culture of (non-genetically modified) probiotic micro organisms in the ponds is permitted. Measures as listed under II. 5. 2. are permitted.

6.2. Health status of animals shall be monitored and documented on a regular base. Special efforts shall be made to detect correlation between management measures, manifestation of viral diseases, reasons for mortalities, individual growth and yields/biomass development.

6.3. Treatment of shrimp with antibiotics, chemo-therapeutics and comparable substances in the ponds is not permitted.

6.4. After harvest, the pond bottom shall be given enough time to dry. Waterfowls shall be allowed to forage on the drying bottom for remaining fish and invertebrates, fertilising at the same time with their excrements.

Additional measures (e.g. ploughing, intermediate cultures of as e.g. *Salicornia*) shall be considered after several production cycles for recovery of the pond bottom.

7. Fertilising of ponds (see II. 7.)

Supplementary gifts of phosphate (as raw phosphate from natural sources) are permitted. The overall quantity of fertilisers shall be limited in first order by the effluent water quality (s. II. 1., III. 2.1.).

8. Feeding in ponds (see II. 8.)

8.1. Efforts shall be made towards reducing the total amount of external feed gifts, respectively, towards increasing the importance of natural feed production (phyto-, zooplankton) in the ponds. Therefore, careful documentation shall be kept by the farm operator, allowing to calculate the feed conversion ratio (FCR)¹¹.

Additionally, the fishmeal content as well as the total protein content of compound feed shall be reduced as far as possible. As provisional maximum levels shall be set: 20% for fishmeal/-oil content and 25% for total protein.

8.2. Feed intake shall be monitored and documented carefully in order to avoid accumulation of organic sediments by an excess of feed.

Feed application by feeding trays (*comederos*) is recommended.

9. Harvesting and processing (see II. 9.)

9.1. Feeding and fertilising shall be ceased for an adequate period before harvesting. As minimum are set 3 days.

Drainage of ponds shall be carried out as carefully/slowly as possible in order not to release uncontrolled quantities of organic sediment into the channels. Alternatively, a barrier in the channel draining the pond shall be used to retain the sludge.

The status of pond sediments (type, quantity) shall be analysed and documented carefully after harvesting in order to optimise management measures accordingly.

9.2. The use of metabisulfite during harvest procedure or for processing is prohibited.

¹¹ For moderately eutrophic water bodies (e.g. lower courses of rivers, estuaries) holds true that a feed conversion ratio (FCR) of 0,8 should not be exceeded.

9.3. Treatment with natural, plant based additives for neutralisation of undesired aromas (e.g. caused by blue-green algae) is permitted.

9.4. Shrimp heads and other processing residues/trimmings shall be brought towards an adequate re-use. Direct feeding of untreated processing residues to the same species is not permitted due to hygienic reasons.

10. Social aspects (s. II.11.)

E. Culture of tropical freshwater fishes (Siamese catfish *Pangasius sp.*, milkfish *Chanos chanos*, tilapia *Oreochromis sp.*, arapaima *Arapaima gigas* et al.) in ponds and net cages

Tropical freshwater fish are cultivated under the most diverse geographical, ecological and social conditions, in some cases even the same species as well in fresh- as in brackish water, as well in ponds as in net cages (e.g. tilapia).

For this reason, the “Principles of management” (II) and, as appropriate in the respective case, chapters III (Supplementary regulations for specific farming systems and animal species) shall apply.

In the case of justified applications Naturland can agree in higher stocking densities for specific species and culture systems.

Appendix:

Requirements regarding fishmeal/-oil used as feed

Principally, fishmeal/-oil shall originate from the same geographical region as the aquaculture operation is located in.

The following sources are permitted:

- Fishmeal/-oil from fisheries certified independently as sustainable, taking into account as well impact on target species as on by-catch species and the ecosystem
- Fishmeal/-oil from trimmings of fish processed for human consumption
- Fishmeal/-oil from by-catches of captures for human consumption.

The use of fishmeal/-oil from other sources may be applied for the solely purposes of safeguarding quality¹² and only up to a limited amount (maximum 30% of total fishmeal/-oil, referring to total life-span of fish).

¹² *Particularly for lowering of P-content in order to prevent from eutrophication*