



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 and the processing of the resulting products: 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 and appreciation 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. This also implies tolerance, the respectful treatment of one's fellow human beings and the acceptance of social responsibility.

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

For producers, processors and consumers, certification by Naturland stands for a reliable quality management system, for the dependability of the organically grown produce, from its cultivation to the finished product.

Naturland e.V is a member of the international umbrella organisation IFOAM, which issues binding standards in the fields of production as well as processing.

Naturland was the first German certification organisation for organic agriculture to complete the independent IFOAM accreditation programme successfully, and to receive accreditation by IFOAM in 1997.

In 1998 Naturland furthermore received accreditation according to European standard 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 B, which are cultivated under the conditions described therein (culture system, geographical or climatic conditions).

Part A. General regulations

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 sufficient information on the external and internal conditions of the operation.

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 stock, use of mineral fertilisers, hygienic measures etc.), the economic situation of the farm and the prevailing environmental conditions (information regarding the bodies of water in the bordering areas and regarding the neighbouring ecosystems, sources of possible threats such as 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. Naturland is entitled to ask for the production of an environmental audit before certification.

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 principle of the manager's unit is to be applied, i.e. one and the same farm manager must not manage a conventional and an organically operated farm at the same time¹.

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 standards 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 standards committee 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 overriding state legislation and ordinances shall, however, remain unaffected by these standards. The requirements of directives (EC) No 834/2007 and No 889/2008 (EU directive on organic agriculture) have to be observed.

4. Conversion

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

¹ manager's unit: composed of manager and farming unit. The manager is the natural person or legal entity running a farm independently and responsibly (farm manager). The farming unit is a clearly marked managing sphere on which distinctly separate records are kept for inspection and documentation.

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 standards 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 structural changes possibly becoming necessary, the type and numbers of stock and the feeding schedule as well as the hygienic measures intended 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.

5. Changes in the farming system

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

If the same species is cultivated both in an area already converted and on other(s), still in the conversion phase, then attention has to be paid to appropriate physical demarcation and separate identification of the production units. Switching between organic and conventional farming method is prohibited.

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 some distance away) shall be reported to Naturland. Regarding product flow (e.g. additional purchases of feed as well as the sale of farm products), likewise, records shall be kept in accordance with Naturland's standards. Furthermore, a farm diary shall be kept (e.g. on 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 authorised by Naturland shall monitor adherence to the standards. They shall be provided with unrestricted access and scrutinising opportunities into all the relevant areas of the farm. Upon request, all the documents relating to the managing of the farming operation as well as any other relevant information shall be made available.

All stages of the value chain have to be recorded when the farm is inspected, although, in the case of co-operatives, for example, individual areas can be organised to conform with the internal control system (ICS). Where third parties operate on behalf of the producer (e.g. treatment, storage, processing, transport), the processor must take steps (such as the conclusion of a sub-contracting agreement) to ensure that the standards are applied and that adherence to them can be monitored by Naturland.

Moreover, the farm and Naturland together determine the following conditions which have to be complied with:

- a list of the contaminants and noxious substances (from both anthropogenic and natural sources) that are relevant to the region and the type of production)
- the frequency of and processes used in the analysis of these pollutants (with reference to the water, sediment, feed and products)
- alert values of max. 50% of the critical German legal level², at which Naturland must be notified
- threshold values leading to the exclusion of the product from marketing (as a rule the German legal critical values²).

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. It is standard practice for complaints in connection with matters within Naturland's sphere of responsibility to be addressed to Naturland's head offices in Gräfelting, Germany.

² If corresponding critical values are not available, reference should be made those of WHO or other professional bodies.

8. Approval

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

As a 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 gradual implementation, must be completed within 5 years at the latest.

A further prerequisite for the approval of a farm is proof of sufficient knowledge and skills in the field of organic aquaculture. The staff has to be instructed on the basic tenets of organic aquaculture. Appropriate measures have to be defined in the conversion plan.

There must be at least one person responsible who is familiar with the contents of these standards and who can be contacted easily at any time from the farm.

9. Labelling and marketing

The labelling of products enables the trader legally responsible for the product to be identified.

The provisions of regulations (EC) 834/2007 and 889/2008, as far as they apply to the EU Community logo and the declaration of origin (place where the aquaculture products were produced) are to be observed.

The producer is only allowed to label products with reference to Naturland if a licence agreement has been concluded for the products in question.

The animals or products may only be marketed with reference to "Naturland" or the Naturland trademark, as originating from certified organic aquaculture, if they fulfil the following conditions: 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), then where stock has to be purchased from conventional suppliers the organisms must have been kept and fed for at least 2/3 of their lives in accordance with the Naturland standards.

II. General (management) regulations resp. other predominant provisions

1. Storage

Storage under special conditions (controlled atmosphere, temperature control, humidity regulation and drying of the stored goods) is permitted. The application of chemical storage-protection agents is prohibited. Only storage measures that exclude the contamination of the harvest with harmful substances are permitted. This also applies to the materials and detergents used (ref. the regulations of Part C. General Processing Standards III 7., where they apply to pest control). Radioactive irradiation are prohibited.

If there are products of different certification statuses on the farm, they have to be stored clearly and separately. Substances which are prohibited by these standards and contravene the conversion status in question may no longer be stored on the farm (ref. also Part C. General Processing Standards III 5. Storage, Bottling, Bagging and Transport).

2. The sale of purchased merchandise

The sale of purchased products for direct marketing, e.g. on market stalls, is possible. Regional products should be preferred wherever possible. Separate bookkeeping for all the purchased merchandise has to be done. The labelling of the products must be unequivocal with respect to their origin and method of production. Farm products and bought products have to be declared separately.

Conventional merchandise may only be sold if there is proof that equivalent organic or sustainably produced products are not available. These products have to be clearly labelled as "conventionally produced".

It is not permissible to offer one and the same product from organic and conventional cultivation or fishery at the same time.

3. Purchase of means of production and equipment

Special attention has to be paid to the ecological impact of production means and equipment. Preference is to be given to substances on a natural basis (e.g. oils, fats). Auxiliary materials of rainforest timber are prohibited. Care should be taken to save energy.

4. Exchange of farming equipment between different agricultural operating systems (certified organic/conventional)

The exchange of machinery and equipment (e.g. in machinery co-operations) between certified organic fisheries and conventional operations is possible. Machines and equipment that are also utilised by conventional fisheries must be cleaned thoroughly in the case of contamination with substances that do not comply with Naturland's standards before being used on a Naturland operation.

5. Use of foil and fleeces, nets and technical mulching materials

Decomposable matters are to be striven for, e.g. cotton, flax mats, mulching paper or organic foil, as far as these allow a reasonable organic cultivation.

For protected structure coverings like plastic mulches, fleeces, insect netting and silage wrapping, only products based on polyethylene (PE) and polypropylene (PP) or other polycarbonates are allowed. These shall be removed after use and shall not be burned on the farmland. The use of polyvinyl chloride (PVC) based products is prohibited. Recycling is recommended.

Materials that are on the farm already and do not comply with these conditions may be used up during the conversion period.

6. Non-employment of GMO and GMO derivatives

Genetically modified organisms (GMO) and their derivatives are incompatible with cultivation according to Naturland's standards. All products must be made without the employment of genetically modified organisms (GMO) and/or GMO derivatives. A "GMO derivative" is any material which is produced from or by GMOs but does not contain GMOs. "Employment of GMO and GMO derivatives" means their employment as foodstuffs, food ingredients (including additives and flavourings), processing aids (including extraction solvents), fodder, compound fodder, feed materials, feed additives, processing aids for fodder, certain products used in animal nutrition, pesticides, fertilisers, soil improvement agents, seeds, vegetative reproduction materials and animals. The non-use of GMOs and/or GMO derivatives applies directly to the whole enterprise.

The unintentional contamination of organic aquaculture products by genetically engineered organisms may also have an influence on the certification status.

Any statements on genetic engineering which are made in connection with the standards (e.g. on the packaging) are limited to the phrase “No GMOs used”.

7. Non-use of nanomaterials

By “nanomaterials”, Naturland means: substances which have been consciously and deliberately designed, technically manufactured or produced by human inducement (anthropogenic) with the intention of obtaining very specific characteristics (e. g. shape, surface properties or chemical properties) at the nanoscale (approx. 1 – 300 nm in at least one dimension) such as only possible at the nanoscale. Particles with larger diameters may come under this definition in cases where there is evidence of effects specific to the nanoscale at this size.

Particles accidentally generated at the nanoscale, which can occur in the course of traditional processing methods (such as, for example, homogenisation, grinding, foaming, freezing) or as natural environmental elements (e. g. volcanic or airborne particles) or in foodstuffs (e. g. monosaccharides, amino acids or fatty acids) at the nanoscale are excluded from this definition.

The environmental effects on nanomaterials and their impact on human beings are so far not sufficiently known. For this reason products grown and processed and certified by Naturland must be manufactured without using anthropogenic nanomaterials. This includes packaging which contains nanomaterials.

8. Biogas plants

Generating energy by fermenting biomass can be an important component of future energy supply within the context of renewable energy as a whole, besides wind, water, solar and geothermal energy and combustion of organic materials like wood.

Biogas plants in the organic farm combine the production of regenerative energy in a sustainable manner with the production of high-quality and healthy food, because they mainly use waste materials, allow varied crop rotations and are very energy-efficient. Plant capacity and use should be in reasonable relation to the area of operation, so that the principle aim, food production, is guaranteed.

Sensible waste heat utilisation and very high overall efficiency are to be aimed at, to achieve greatest energy efficiency.

8.1. Biogas plants on Naturland farms

Biogas plants on Naturland farms are run basically with ecologically generated fermentation materials. Vegetable material from conventional production³, which serves as fermentation material to operate the power plant, is limited to max. 30% as of 1st August, 2012. The objective is to reduce this percentage to zero by 2020 at the latest. Fermentation materials of conventional origin must comply with appendix 1 of Naturland standards on production (permissible purchased fertilisers and soil improvement agents).

Where fermentation materials of more than 0.5 DU/ha/year are used for the operation of the biogas plant, then the delivery of any amount of fermentation substrate supplied which exceeds this value must be documented.

If it is necessary to co-operate with other agricultural operations to operate a biogas plant in order to acquire the necessary amounts of fermentation materials, preference should be given to organic farms.

8.2. Co-operation of Naturland farms with other biogas plants

If it is possible to co-operate with a biogas plant on a local organic farm, this shall take precedence over co-operation with a conventionally run plant.

Where a Naturland farm co-operates with a conventional biogas plant, it is only possible to take back digestate if the original matter came from the Naturland farm (e.g. clover grass). In addition, the conditions stipulated in appendix 1 of Naturland standards on production (permissible fertilisers and soil improvement agents) or B.I.1 (humus management and fertilisation), in particular the maximum amounts allowed, are to be observed⁴.

³ Clover grass resp. grass free of mineral fertilizers and synthetic chemical pesticides is a permissible exception.

⁴ Digestate may only be taken back upon application to and in compliance with Naturland’s regulations. Digestate from biogas plants which are run solely on conventional fermented matter or on genetically modified organisms from aggregates or on liquid manure and poultry dung from conventional animal husbandry, is prohibited. Until the end of

9. Quality assurance

Production in terms of these standards should allow for organic produce of high sensory quality and safety in regard to health. To avoid contamination with prohibited substances or means which might impair the organic quality, appropriate measures shall be taken. In particular, the operation must show from its procedures that possible environmental pollutants are monitored by suitable analytical methods and that prompt and comprehensive measures are taken in cases where limits are exceeded.

Where reasonable suspicion exists that the product quality is substantially impaired through contamination, Naturland should be informed. Naturland may require an analysis to be undertaken to detect the level of contamination and contamination sources and follow up on the case. Appropriate action has to be taken on complaints related to the compliance with Naturland certification requirements that are directed to the operation by third parties. Records shall be kept of the complaint and corrective action taken.

2012 it is permissible to take back the equivalent of fermentation materials supplied with an additional margin of 30%; until the end of 2016 max. 15% of the nutrient equivalent can be taken back; by the end of 2017, the maximum amount taken back shall be the same as the nutrient equivalent supplied.

III. Social responsibility

The holistic claim of Naturland standards also includes the social treatment of the people who work and live on the farms.

1. Human rights

The basic rights of the people living and working on Naturland operations are respected. They must comply at the minimum with the local legal requirements, respectively the human rights listed in the UN Conventions, the International Labour Organisation Conventions and Recommendations (ILO)⁵, and the UN conventions on children's rights⁶, should these be more comprehensive.

A product created under conditions violating basic human rights or under gross violation of social justice can not be traded as a product certified by Naturland.

2. Forced labour

The operations commit themselves to rejecting forced labour and any type of involuntary work. The operation shall not retain any part of the workers' salaries, benefits, property, or documents in order to force workers to remain on the farm.

3. Freedom of association, access to trade unions

All workers have a right to freedom of association and collective bargaining, and are at liberty to exercise this right.

No one shall be discriminated against because of his or her membership in a trade union.

4. Equal treatment and opportunities

No discrimination on the basis of race, creed, sex, political opinion or membership shall be tolerated. All workers, irrespective of their sex, skin colour or religion receive the same pay and have the same opportunities for work of the same nature and same degree of responsibility.

5. Child labour

No children may be employed on farms. Children may work on the farms of their own families or a neighbouring farm provided that:

- the work is not hazardous and endangers neither the health nor the safety of the children
- the work jeopardises neither the educational nor the moral, social or physical development of the children
- the children are supervised by adults while working or have been given permission by a parent or legal guardian

6. Health and safety

All workers, employees and their families shall have access to drinking water, food, accommodation and basic medical care.

The employer is responsible for safety and health at the workplace. If necessary, this implies instructing workers about safety at work. Operations with more than 10 workers have to draw up a policy on safety at work.

7. Employment conditions

Workers for the purpose of these standards are, besides the permanent workers, also seasonal workers and sub-contracted workers.

All operations commit themselves to meeting the following requirements⁷.

⁵ <http://www.ilo.org/ilolex/english/convdisp1.htm>

⁶ <http://www.unhchr.ch/html/menu3/b/k2crc.htm>

⁷ Naturland may determine that in any one country the legal control of employment conditions and the opportunities for further education offered publicly suffices to ensure compliance with these standards.

7.1. Contracts

All workers receive a written contract of employment describing the basic conditions of employment.⁸ Working conditions and contracts have to be documented by the employer to be verified at any time. The employment contract shall at least define the following: job description, scope and limits of the job, and type as well as amount of remuneration. The employment conditions of all workers have at least to comply with the respective higher of the requirements of national regulations and ILO standards.

7.2. Equal treatment

The different kinds of employment shall in no case result in the unequal treatment of any workers: all workers are considered to enjoy the same rights and working conditions including social benefits and other privileges for work of the same nature and same degree of responsibility (see III.4).

7.3. Wages

Workers shall be paid at least the official national minimum wage or the relevant industry standard when employed in processing operations. Workers shall be paid in cash, or in any other manner of their choice.

7.4. Payment in kind

If they so choose, workers may receive part of their wage in kind for services such as housing, food or others offered by the operation. The value attributed to such deductions shall be fair and reasonable. Compulsive deductions from the minimum wage for such services are not permitted.

7.5. Working hours

To permit flexibility and overtime in the peak season (e. g. harvest), an annual limit of working hours or a mutual agreement on overtime requirements in the peak period (for a maximum 6 weeks) is necessary. Such an agreement has to be in line with current national labour legislation and ILO Convention C184.

7.6. Social benefits

The employer ensures basic coverage for maternity, sickness and retirement. Operations with more than 10 workers need to make a policy on wages and social security available to all workers.

7.7. Further education

The unit offers its employees the possibility of further education and professional training.

⁸ Legally binding contracts (in this particular case not necessarily in writing) are required even for workers not registered. Furthermore they have to be informed of their rights.

Part B. Regulations governing organic aquaculture

I. 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. marsh areas in Middle Europe; rain forest, mangroves).

1.2. The farmer shall reach an agreement with the representatives of neighbouring local and regional authorities to ensure free access to the natural water courses surrounding the farm for fishermen and other interested parties. Recommended examples are fenced-in paths or the issue of permits. Whatever the case, the legal regulations have to be complied with.

1.3. 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, tall aquatic plants) shall be protected or re-planted by the enterprise.

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

1.5. Preference is to be given to the use of renewable energy resources and re-cycle materials. Waste is to be kept to a minimum. Developments in these areas have to be recorded each year.

1.6. The farm produces a sustainability plan which includes the measures described under B.I.1.5. and the requirements concerning environmental and nature protection in B.I – VII.

2. Species and origin of stock

2.1. As stock, 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. autochthonous 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 livestock) must be prevented.

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 food chains in the water courses).

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.

2.4. Feral larvae of fish and crustacean are only allowed for stocking if there is a passive inflow when the ponds or other aquaculture constructions are refilled. Mussel larvae are also allowed for stocking if they have settled on substrate which has been specially introduced for this purpose.

3. Breeding, hatchery management

3.1. Concerning hatchery management, the respective provisions for grow-out operations (ref. B. I.-VI.) apply correspondingly.

3.2 As an exception to the regulations for grow-out B I.-VI., artificial containers (tanks, channels, etc.) may be used in hatcheries, also in closed buildings. Nevertheless, the husbandry conditions must take the specific needs of each species into account as far as possible (e.g. by providing hiding places).

Tempering of the water, if required for breeding, is also permitted.

For rearing larvae and young fish (maximum 1/3 of the whole life cycle) the stocking densities in B II.-VI. may be exceeded.

3.3. 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 hours⁹.

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 (ref. 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. After the application of conventional substances, proof must be given of freedom from residue in the form of appropriate analysis before marketing the goods. If more than three treatments in the total life cycle or two treatments per year are applied with conventional medication or antiparasitic agents, the affected animals may not be sold with reference to Naturland. In Part B II. – VII further limitations are prescribed as necessary.

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

5.2. Permitted treatments, also as prophylactics or routine (within the framework 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, sodium hypochlorite NaOCl)
- 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 rotenone from *Derris spp.*, *Lonchocarpus spp.* or *Terphrosia spp.*, preparations of *Azadirachta indica* (neem), oil emulsions (free of synthetic chemical insecticides) on the basis of paraffin oils, mineral oils and vegetable oils, preparations of viruses, fungi and bacteria (e. g. *Bacillus thuringensis*), pyrethrum extracts from *Chrysanthemum cinerariaefolium* (synthetic pyrethroids and synergists are prohibited) and quassia from *Quassia amara*.
- use of homeopathic products
- use of stone powder

⁹ During the sensitive phase, the artificial day may be lengthened to up to 24 hours only for the purpose of preventing cod (*Gadus morhua*) from spawning in the net cages (risk of genetic interactions of farm fish with wild fish). This rule is limited up to 31st December, 2010.

The use of any substance must be approved of by Naturland, especially for the purpose of eliminating conflicts with the principles of nature conservation and animal welfare which could occur by their use.

6. Oxygen Supply

The basis for aquaculture operation shall form the natural, physical conditions of the water body (affluent volume, current profile, temperature, water chemistry). Measures of aeration must not be used to raise the density above the permitted level.

7. Organic Fertilising

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

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

Where 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 aquaculture to be combined 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 (ref. B. 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 standards¹⁰, or in any case at least in accordance with the IFOAM¹¹-Basic Standards. If feed from organic agriculture is not available in sufficient quantity or in a satisfactory quality in a certain region (farm to supply proof of this), an application can be made to use up to max. 10% of the daily ration in the form of vegetable feed from conventional agriculture, being:

- cereals
- soya beans
- manioc

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

Supplements and additives in animal feed are dealt with in Naturland's processing standards, under the heading "Feed".

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 carnivorous¹² species with higher protein requirements, the following basic principles shall be respected:

- The animal components in feed shall, where acceptable for nutritional physiological reasons, be replaced by vegetable products. Where feed is used which is not produced in the course of the farm's aquatic food chains, the proportion of animal components in the feed shall be lower than 100%. Provisional maximum values are set in Part B (Supplementary Regulations for specific farming systems and animal species)
- Feed shall not be obtained from conventionally reared terrestrial or aquatic animals.
- In order to work towards a responsible utilisation of wild fish stocks, special standard requirements are set on the origin of fish meal/oil (ref. Appendix).

¹⁰ Naturland's processing standards, as detailed under the heading "Feed", apply.

¹¹ IFOAM International Federation of Organic Agriculture Movements (web page: www.ifoam.org)

¹² Species feeding exclusively or predominantly on other animals

- Fish meal made from a certain species must not be used as feed for the same species.

8.6. Feeding of natural pigments (e.g. in the form of shrimp shells or Phaffia yeast) is permitted. This must be limited to the degree of pigmentation found under natural circumstances.

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. Upon approval by Naturland, natural antioxidants (e.g. tocopherol) may be added to the feed.

9. Transport, slaughtering and processing

Transport and slaughtering must be done as quickly and humanely as possible in order to spare the animals unnecessary suffering. The method of proceeding and the materials used have in any case to be oriented towards the needs of the respective species (e.g. sensitivity to higher temperature or to stress).

9.1. Live fish must be supplied with enough oxygen during transport. A transport density of 1 kg of fish per 8 litres of water may not be exceeded. The transport duration is maximum 10 hrs.¹³

9.2. Slaughtering of fishes shall be carried out by means of incision of gills or immediate evisceration. Prior to this, fishes shall be anaesthetised by means of concussion, electrocution, carbon dioxide and, if need be, by natural plant anaesthetics, tropical and subtropical fish and invertebrates also by using ice).

9.3. 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.

9.4. 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 untreated indigenous 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”¹⁴, 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.

¹³ If the transport takes place in a “wellboat” especially constructed for the transport of fish, the transport duration can be extended to maximum 72 hrs.

¹⁴ „Katenrauch“: smoking process using smoke from the household fireplace with the product to be smoked hanging from the roof

II. Supplementary regulations for the pond culture of carp (*Cyprinus carpio*) and its accompanying species (e.g. tench *Tinca*, pike *Esox*, the Cyprinidae species) in ponds

1. Close-to-nature design of the ponds

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. Construction of ponds, quality of water

2.1 The inflowing water shall reveal none or only slight contamination of anthropogenic origin. The pH-value shall be between pH 6.0 and 9.0.

It is explicitly recommended to conclude an agreement with the immediate neighbours employing conventional farming methods (also paying attention to inflowing water) to establish a management plan of the boundaries compatible to organic farming.

2.2 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.

3. Stocking density and feed

3.1 The stocking density shall not exceed the state, that at least a 50% of fish yield is attained via the natural feed availability. Only in the case that protein-rich feed (e.g. peas and beans) is administered, the following limits apply for stocking densities (for the 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

3.2 With regard to stocking density of tench, these figures shall be subtracted from those for carp¹⁵. Other species of fish (e.g. other cyprinoids, predatory fishes) as well as crayfish are not subjected to any limitations in stocking density.

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

The conditioning 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.

4. Health and Hygiene

The ponds shall be re-filled at latest by 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 (CaO) 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-stabilisation and for precipitating of suspended organic matter is permitted in critical weather situations.

5. Organic Fertilising

Organic fertiliser 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.

6. Transport, slaughtering

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

¹⁵ By division of carp stocking numbers by the following values: (Number T₁=C₁/0.6; T₂=C₂/0.25; T₃ = C₂/0.4) respectively by multiplication with (Number T₁ to C₁ =>factor 1.6; T₂ to C₂ =>factor 4; T₃ to C₂ =>factor 2.5).

III. Supplementary regulations for the culture of Salmonidae (e.g. trout *Trutta*, *Oncorhynchus*, salmon *Salmo* and charr *Salvelinus* sp.) and Coregonidae (whitefish *Coregonus*) in ponds and net cages

1. Site selection

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.

2. Prevention of water pollution, natural design of the ponds

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 footnote) 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 measures¹⁶, 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 release of nutrients by the farm shall be kept as low as possible. Therefore, it is recommended to determine the feed conversion ratio 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 regimes (e.g. quantity, feeding schedule).

At least once a year the level of nutrient load in the discharge water shall be measured during the regular operative intensity¹⁷.

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 (e.g. glass-fibre, polyester) 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. If need be rebuilding 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. Stocking density

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 shall the animals display any injuries (e.g. to their fins) indicating too high stocking densities.

¹⁶ Monitoring and evaluation of macro-zoobenthos (e.g. in accordance with the index of saprobiontic succession) or measurement of single parameters (ammonia, nitrate, nitrite, phosphate) at the outlet resp. in the immediate vicinity of the net cages, compared with values from reference points above the effluent resp. outside the vicinity of the net cages.

¹⁷ Measurement of BOD₅-value or KMnO₄ consumption

4. Health and hygiene

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

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

4.3. 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.

5. Feeding

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

6. Transport, slaughtering

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.

IV. Supplementary regulations for the marine culture of mussels (e.g. *Mytilus edulis*) and macroalgae on ropes and frames

1. Site selection, interactions with the surrounding ecosystems

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)¹⁸. 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

2.1. If seeds are collected from wild stocks, care should be taken 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.

2.2. Mussel larvae are allowed for stocking if they have settled on substrate which has been especially introduced for this purpose.

3. Culture systems

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

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

Use of chemicals (e.g. chlorine compounds) is prohibited.

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

¹⁸ 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).

V. Supplementary regulations for the pond culture of shrimps (e.g. *Litopenaeus vannamei*, *Penaeus monodon*, *Macrobrachium rosenbergii*)

1. Site selection, protection of mangroves

1.1. Mangrove plant communities have to be protected. Mangroves are considered as extremely important ecosystems that, at the same time, are endangered world-wide by 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.¹⁹

A pre-condition, however, is that in any case the relevant legal requirements for land use, reforestation etc. have been observed.²⁰

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 an organic product according to Naturland standards, until Naturland's 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

2.1. Effluent water quality (ammonia, dissolved oxygen, biological oxygen demand, 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. 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 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 on 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. dunes, desert) 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, wild cats, migrating water birds) shall be protected as indicators for an intact environment.

¹⁹ Under specific geographical or historical conditions exceptions can be made for extensive „mangrove aquaculture systems“.

²⁰ 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 ichthyocides (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. This applies 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

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. shrimps – tilapia – ducks) or by separate production of different shrimp species.

3.2. If available, stock from certified organic origin has to be used ²¹.

If stock from non-organic origin is used, the respective timetable has to be complied with.

Collecting wild shrimp larvae is prohibited.

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

3.3. Feral larvae of fish and crustacean are only allowed for stocking if there is a passive inflow when the ponds or other aquaculture constructions are refilled. Mussel larvae are also allowed for stocking if they have settled on substrate which has been especially introduced for this purpose.

4. Hatchery management

4.1 Also in hatchery management, the use of antibiotics, chemotherapeutics and comparable substances is prohibited.

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 the principles of organic agriculture. 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 (principally 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 brood stock 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

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

5.2. 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 consumption.

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

²¹ Available in Ecuador since 10/02

5.3. As provisional maximum for stocking density shall be set 15 post larvae/m².

Shrimp biomass in the ponds shall not exceed 1600 kg/ha.

Calculation of feed conversion ratio serves as an additional indicator for maintaining a permissible stocking density (ref. 8.1.).

6. Health and hygiene

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.

6.2. Health status of animals shall be monitored and documented on a regular basis.

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. Waterfowl shall be allowed to forage on the drying bottom for remaining fish and invertebrates.

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

7. Fertilising of ponds

Supplementary doses 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.

8. Feeding

8.1. Efforts shall be made towards reducing the total doses of external feed, 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 ratio²².

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%²³ for fishmeal/-oil content and 30% 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

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.

9.3. 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.

²² For moderately eutrophic water bodies (e.g. lower courses of rivers, estuaries) it holds true that a feed conversion ratio of 0.8 should not be exceeded.

²³ For shrimp companies who were certified after the enforcement of the EU regulation 710/2009 on 1.7.2010 fish meal is allowed in the feed only up to an amount of 10%.

VI. Supplementary regulations for the culture of tropical freshwater fishes (e.g. milkfish *Chanos chanos*, tilapia *Oreochromis sp.*, Siamese catfish *Pangasius sp.*) in ponds and net cages

1. Site selection

Where the fish are cultivated in ponds, the inflowing water must be at least of grade II quality.

2. Water pollution control, natural design of ponds

2.1. The water quality of source water should not become significantly deteriorated (standard value <10% of the parameters determined, see footnote) 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 measures²⁴, half of these carried out during the period of draining out or cleaning of the pond.

The bottom of the ponds 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 release of nutrients by the farm shall be kept as low as possible. Therefore, it is recommended to determine the feed conversion ratio 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 regimes (e.g. quantity, feeding schedule).

At least once a year the level of nutrient load in the discharge water shall be measured during the regular operative intensity²⁵.

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 (e.g. glass-fibre, polyester) 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. If need be rebuilding 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). For the purpose of conditioning for transport or slaughtering it is permitted to keep the fish in artificial tanks for two weeks maximum. The maximum density allowed during conditioning is the same as for the transport of the relevant species. Feeding during the conditioning period is not permitted.

3. Special provisions for the design of tilapia-pond farms

3.1. The natural feeding behaviour of the tilapia which typically feed on plankton or periphyton should be promoted by suitable pond management (fertilisation, water exchange) or a special pond design (e.g. by

²⁴ Monitoring and evaluation of macro-zoobenthos (e.g. in accordance with the index of saprobiontic succession) or measurement of single parameters (ammonia, nitrate, nitrite, phosphate) at the outlet resp. in the immediate vicinity of the net cages, compared with values from reference points above the effluent resp. outside the vicinity of the net cages.

²⁵ Measurement of BOD₅-value or KMnO₄ consumption

implementing or increasing structures or substrates which raise the growth surface for benthic algae/diatoms).

3.2. To minimise the energy consumption as well as the nutrient loss of the pond farm, a low water exchange rate should be aimed at.

Data for the energy consumption related to the pond surface must be collected by the operator carefully. These values have to be documented during farm inspection.

4. Stocking density

The stocking density may not exceed 10 kg/m³ in net cages (pens, enclosures), this being the upper limit. In ponds the maximum stocking density is 4 fish per m² or 5 kg/m³ respectively.

If a substantiated application is made, (e. g. if no further sorting out, additions or exchanges are to be made), Naturland may agree to this upper limit being an average figure for the total fattening period. In no case may the fish show evidence of injuries (e.g. to their fins) which would indicate excessive stocking density.

5. Health and hygiene

5.1. The fishes' health has primarily to be ensured by prophylactic methods (e.g. the best management conditions, breeding, feeding). Nature healing methods are to be preferred where diseases do occur.

Conventional medicines may only be applied if prescribed after diagnosis by a veterinary surgeon.

In the case of tropical fish species, treatment with conventional veterinary medicines (e.g. antibiotics etc.) leads to the revocation of Naturland's certification for the affected stock.

5.2. 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.

5.3. At pond farms the pond bottom should be able to dry up after the harvest. Water birds should be allowed access to the pond surface to feed on the remaining fish and invertebrates.

It is recommended to carry out additional measures (e.g. ploughing, intercultures of legumes) after several production cycles.

5.4 For disinfection the pond bottom can be limed. Nevertheless, the maximum amount of lime applied to the pond may not exceed 1000 kg/ha. In addition the liming can have a positive effect on the productivity of the ponds.

6. Feed

The provision upper limit for the fish meal resp. fish oil content in feed has been determined at 20% for *Pangasius* and *Oreochromis*.²⁶

²⁶ For tilapia farms which were certified after the enforcement of the EU regulation 710/2009 on 7/1/2010, fish meal is no longer allowed in the feed.

VII. Supplementary regulations for the culture of species of the families codfishes (*Gadidae*), sea breams (*Sparidae*), sea bass (*Dicentrarchidae*) and croakers/drums (*Sciaenidae*) in marine net cages

1. Site selection

The water quality must be classified as I.

2. Prevention of water pollution

2.1. The water quality of source water bodies or the surrounding sea regions should not become significantly deteriorated (standard value < 10% of the parameters determined, see footnote) 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 measures²⁷.

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 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 regimes (e.g. quantity, feeding schedule).

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.

2.3. The grow-out of fish in artificial tanks (e.g. glass-fibre, polyester) is not permitted. Culture in tanks is permitted only for limited periods in juvenile stages (e.g. egg to fingerling or smolt).

3. Stocking density

In the case of members of the species *Gadidae*, *Sparidae* and *Sciaenidae*, the 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 shall the animals display any injuries (e.g. of the fins) indicating too high stocking densities.

4. Health and hygiene

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

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

4.3. 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.

5. Transport, slaughtering

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.

²⁷ Monitoring and evaluation of macro-zoobenthos (e.g. in accordance with the index of saprobiontic succession) or measurement of single parameters (ammonia, nitrate, nitrite, phosphate) at the outlet resp. in the immediate vicinity of the net cages, compared with values from reference points above the effluent resp. outside the vicinity of the net cages.

Appendices aquaculture:

Appendix 1: Requirements regarding fishmeal/-oil used as feed

All feed originating from wild marine fauna has to be harvested in compliance with internationally established sustainability standards (e. g. FAO Code of Conduct²⁸, ICES²⁹). Wherever possible, this should be confirmed by producing proof of independent certification.

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 (not from conventional aquaculture)
- 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 quality³⁰ and only up to a limited amount (maximum 30% of total fishmeal/-oil, referring to total life-span of fish).

Compliance with these special demands, as well as other requirements which are in general valid for feeds admitted by Naturland, will be confirmed by Naturland by a separate inspection and certification procedure.

²⁸ <http://www.fao.org/fishery/en>

²⁹ <http://www.ices.dk/indexfla.asp>

³⁰ particularly for lowering P-content in order to prevent eutrophication