

Naturland

NATURLAND STANDARDS

ORGANIC AQUACULTURE

Version 05/2019

Summary of Naturland's Standards

Part A. General regulations governing production

- I. Contracts and certification procedures
- II. General (management) regulations resp. other predominant provisions
- III. Social responsibility

Part B. Regulations for the individual branches of production

- I. Plant production
- II. Livestock production
- III. Market gardening
- IV. Cultivation of shoots and germ buds
- V. Mushroom cultivation
- VI. Cultivation of ornamental plants, herbaceous perennials, shrubs, Christmas trees
- VII. Fruit cultivation
- VIII. Viniculture
- IX. Permanent tropical plantations
- X. Wild grown products
- XI. Beekeeping
- XII. Aquaculture
- XIII. Organic forest management
- XIV. Insect breeding

Appendices production

Part C. General processing standards

- I. Goals
- II. Area of application
- III. Contracts
- IV. Inspection and certification
- V. Product identification/labelling
- VI. General regulations and other predominant (production) provisions
- VII. Social responsibility

Part D. Processing standards for specific groups of products

- I. Processing standards for meat and meat products
- II. Processing standards for milk and dairy products
- III. Processing standards for bread and bakery products
- IV. Processing standards for cereals, cereal products and noodles
- V. Processing standards for feed
- VI. Processing standards for aquaculture products and products from sustainable capture fishery
- VII. Processing standards for breweries
- VIII. Processing standards for vegetables and fruit as well as spices and herbs
- IX. Processing standards for the production of wine, semi-sparkling wine, sparkling wine, fruit wine, wine vinegar, cleared concentrated grape must/sweet reserve, liqueur wine and spirits
- X. Processing standards for edible fats and oils
- XI. Processing standards for yeast, yeast products as well as leaven and natural fermentation starter
- XII. Processing standards for microalgae and microalgae products for human consumption
- XIII. Processing standards for textiles
- XIV. Processing standards for cosmetic products
- XV. Processing standards for pet food
- XVI. Processing standards for production and provision of food and beverages in communal catering establishments
- XVII. Processing standards for transport and slaughtering
- XVIII. Processing standards for confectionery products and sweeteners

Appendices processing

Table of contents

Preface	6
Scope of application of the standards	7
Part A. General regulations	7
<u>I. Contracts and certification procedure</u>	7
1. Prerequisites for granting the producer contract	7
2. Producer contract	7
3. Standards	7
4. Conversion	8
5. Changes in the farming system	8
6. Documentation and inspection	8
7. Certification	9
8. Labelling and marketing	9
<u>II. General (management) regulations resp. other predominant provisions</u>	10
1. Sustainable management	10
2. Quality assurance	10
3. Non-employment of GMO and GMO derivatives	10
4. Non-use of nanomaterials	10
5. Storage	11
6. The sale of purchased merchandise	11
7. Purchase of means of production and equipment	11
8. Exchange of farming equipment between different agricultural operating systems (certified organic/conventional)	11
9. Use of foil and fleeces, nets and technical mulching materials	11
10. Biogas plants	12
<u>III. Social responsibility</u>	13
1. Human rights	13
2. Freedom to accept or reject employment	13
3. Freedom of association, access to trade unions	13
4. Equal treatment and opportunities	13
5. Children's rights	13
6. Health and safety	13
7. Employment conditions	13
Part B. Regulations governing organic aquaculture	15
<u>I. Principles of Management</u>	15
1. Selection of site, interaction with surrounding ecosystems	15
2. Species and origin of stock	15
3. Breeding, hatchery management	16
4. Design of holding systems, water quality, stocking density	16
5. Health and Hygiene	16
6. Oxygen Supply	17
7. Organic Fertilising	17
8. Feeding	17
9. Transport, slaughtering and processing	18
10. Smoking	19
<u>II. Supplementary regulations for the pond culture of carp (<i>Cyprinus carpio</i>) and its accompanying species (e.g. tench <i>Tinca</i>, pike <i>Esox</i>, the Cyprinidae species) in ponds</u>	20
1. Close-to-nature design of the ponds	20
2. Construction of ponds, quality of water	20
3. Stocking density and feed	20
4. Health and Hygiene	20
5. Organic Fertilising	21

6. Transport, slaughtering	21
<u>III. Supplementary regulations for the culture of Salmonidae (e.g. trout <i>Trutta</i>, <i>Oncorhynchus</i>, salmon <i>Salmo</i> and charr <i>Salvelinus sp.</i>) and Coregonidae (whitefish <i>Coregonus</i>) in ponds and net cages</u>	22
1. Site selection	22
2. Prevention of water pollution, natural design of the ponds	22
3. Stocking density	22
4. Health and hygiene	23
5. Feeding	23
6. Transport, slaughtering	23
<u>IV. Supplementary regulations for the marine culture of mussels (e.g. <i>Mytilus edulis</i>) on ropes and frames</u>	24
1. Site selection, interactions with the surrounding ecosystems	24
2. Type and origin of stock	24
3. Culture systems	24
4. Processing	24
<u>V. Supplementary regulations for the pond culture of shrimps (e.g. <i>Litopenaeus vannamei</i>, <i>Penaeus monodon</i>, <i>Macrobrachium rosenbergii</i>)</u>	25
1. Site selection, protection of mangroves	25
2. Protection of ecosystems – farm area and surrounding	25
3. Species and origin of stock	26
4. Hatchery management	26
5. Pond design, water quality, stocking density	26
6. Health and hygiene	27
7. Fertilising of ponds	27
8. Feeding	27
9. Harvesting and processing	27
<u>VI. Supplementary regulations for the culture of tropical freshwater fishes (e.g. milkfish <i>Chanos chanos</i>, tilapia <i>Oreochromis sp.</i>, Siamese catfish <i>Pangasius sp.</i>) in ponds and net cages</u>	29
1. Site selection	29
2. Water pollution control, natural design of ponds	29
3. Special provisions for the design of tilapia-pond farms	30
4. Stocking density	30
5. Health and hygiene	30
6. Feed	30
<u>VII. Supplementary regulations for the culture of <i>Perciformes</i> (perch-like), <i>Carangiformes</i> (jack-like) and <i>Gadiformes</i> (cod-like) fish species in marine net cages</u>	31
1. Site selection	31
2. Prevention of water pollution	31
3. Stocking density	31
4. Health and hygiene	31
5. Transport, slaughtering	31
<u>VIII. Supplementary regulations for the cultivation and collection of marine macroalgae (<i>Chlorophyceae</i>, <i>Phaeophyceae</i>, <i>Rhodophyceae</i>)</u>	32
1. Selection of site, interaction with surrounding ecosystems	32
2. Cultivation	32
3. Collection of wild seaweed	32
4. Post harvest	33
<u>IX. Supplementary regulations for the cultivation of microalgae for human consumption (e.g. <i>Spirulina</i>, <i>Chlorella</i>)</u>	34
1. Cultivation systems	34
2. Requirements for the culture media	34
3. Waste water quality	34
4. Quality assurance	34
5. Cleaning and disinfection	34

Appendices aquaculture:	35
Appendix 1: Requirements regarding fishmeal/-oil used as feed	35
Appendix 2: Wild grown algae species currently excluded from organic certification:	35
Appendix 3: Permissible cleaning and disinfection substances	35

Preface

Introduction

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 be adapted to changing conditions and be 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 has been accredited to the international norm ISO/IEC 17065 since 1998. This accreditation confirms that certification is performed to defined norms.

Scope of application of the standards

These standards relate to the species of animals and algae cited in the Special Part B, which are cultivated or (for macroalgae) collected under the conditions described therein (culture system, geographical or climatic conditions). For species of animals and algae not cited in the Special Part B, the General Farming Principles (B. I) in conjunction with the respectively existing farming system (B; II. - IX.) apply.

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 produced or tests 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 the year.

The conclusion of a producer contract does not entitle the producer to the use of the association's logo. A separate licence 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 assembly of delegates 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 (Appendix to the producer contract).

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.

¹ Manager's unit: composed of manager and farming unit. The manager is the natural person 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.

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 official start of management in accordance with these standards is marked by the provable last management measure not permitted by the standards.

The following conversion periods for aquaculture production units shall apply for the following types of aquaculture facilities including the existing aquaculture animals and algae:

- a) For facilities that cannot be drained, cleaned and disinfected, a conversion period of 24 months;
- b) For facilities that have been drained, or fallowed, a conversion period of 12 months;
- c) For facilities that have been drained, cleaned and disinfected a conversion period of six months;
- d) For macroalgae a general conversion period of six months;
- e) For open water facilities including those farming bivalve molluscs, a three month conversion period.

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

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.8 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 Gräfelfing, Germany.

8. 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.

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

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

1. Sustainable management

Organic agriculture is particularly committed to sustainable management. This includes the respectful treatment of nature and the environment, the sustainable use of natural resources, the acceptance of social responsibility and the maintenance of economic performance.

The benefits derived from natural ecosystems and their economic performance must be maintained. Damage to ecosystems should be kept to a minimum.

Biodiversity is to be maintained and fostered on farms to the best of the farmer's ability.

Energy should be used as efficiently as possible and renewable energy resources should be used for preference.

Water is a valuable natural commodity, the protection and sustainable use of which are of crucial importance. Natural water resources are to be used careful and in a sustainable manner.

Wherever waste is unavoidable, it should be disposed of in an eco-friendly manner or recycled. Organic residues should be re-used and preferably composted.

Preference is to be given to procuring raw materials and goods from suppliers in close proximity.

2. 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.

3. Non-employment of GMO and GMO derivatives

Genetically modified organisms (GMOs) and their derivatives are incompatible with organic production. Products produced according to the Naturland standards must therefore be manufactured throughout the whole of their production and value chain without the use of genetically modified organisms (GMOs) and GMO derivatives³.

The definitions given under sec. 2 of Directive 2001/18/EC of the European Parliament and of the Council, and the exclusion criteria for genetic engineering of the eco-regulations Council Regulation (EC) No. 834/2007 and Commission Regulation (EC) No. 889/2008 apply.

Even the unintentional contamination of products certified by Naturland with genetically modified organisms may also lead to certification being denied.

4. 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

³ A "GMO derivative" is any substance produced from or by means of GMOs but not containing any GMOs itself. "The use of GMOs and GMO derivatives" means their use as a foodstuff, an ingredient of foodstuffs (including additives and flavouring), processing additives (including extraction solvents), animal feed, compound feed, the raw materials of animal feed, fodder additives, processing additives for animal feed, certain products for animal feed, pesticides, fertilisers, soil ameliorators, seed, vegetative propagation material and animals. For the purposes of these standards, the following definitions apply: 1. organism: any biological unit capable of reproduction or passing on genetic material. 2. genetically modified organism (GMO): an organism, the genetic material of which has been modified in such a way as is not possible in a natural manner by cross-breeding and/or natural recombination.

(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 the application of anthropogenic nanomaterials. Nanomaterials should also be avoided in packaging. They are only permissible if the nanomaterials are firmly integrated in the packaging material. Nanomaterials in layers or coatings which are in direct contact with products certified to the Naturland standards must not be used.

5. 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 VI. 11, where they apply to pest control). Radioactive irradiations are prohibited.

If there are products of different certification statuses on the farm, they have to be stored clearly separated. 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 VI 9. Storage, Bottling, Bagging and Transport).

6. 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.

7. 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.

8. 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 aquacultures and conventional operations is possible. Machines and equipment that are also utilised by conventional aquacultures 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.

9. 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.

10. 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.

10.1 Biogas plants on Naturland farms

Biogas plants on Naturland farms are run basically with ecologically generated fermentation materials. Vegetable material from conventional production⁴, which serves as fermentation material to operate the power plant, is limited to max. 30%. Fermentation materials of conventional origin must comply with appendix 1 of Naturland standards on production (permissible purchased fertilisers and soil improvement agents). If certain conventionally produced substrate components are to be found on the farm at the same time as animal feed in organic quality, then the components from conventional sources must either be denatured (e. g. by adding slurry or manure, covering them with such materials, or similar measures) or be unmistakably identifiable (e. g. dyeing with food colouring, or similar measures). Naturland must be informed of the method chosen beforehand.

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.

10.2 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 observed⁵.

⁴ Clover grass resp. grass free of mineral fertilisers and synthetic chemical pesticides is a permissible exception.

⁵ 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. It is permissible to take back the equivalent of fermentation materials supplied with an additional margin of 15%.

III. Social responsibility

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

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)⁶, the UN conventions on children's rights⁷ and the United Nations Declaration on the Rights of Indigenous Peoples⁸, should these be more comprehensive.

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

2. Freedom to accept or reject employment

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 operation.

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. Children's rights

No children shall be employed on operations. 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, health and hygiene at the workplace. If necessary, this implies holding training courses for employees to raise their awareness of any dangers at their workplace and of the contents of hygiene standards. Operations with more than 10 workers have to draw up a policy on safety at work and make these available to all employees.

7. Employment conditions

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

⁶ <http://www.ilo.org/declaration/lang--en/index.htm>

⁷ <http://www.ohchr.org/en/professionalinterest/pages/crc.aspx>

⁸ http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

All operations commit themselves to meeting the following requirements⁹.

7.1 Contracts

All workers receive a written contract of employment describing the basic conditions of employment.¹⁰ 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 currently applicable or the relevant industry standard in processing operations or the wages approved on the basis of collective bargaining, whichever is the higher. 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 is necessary. Such an agreement has to be in line with current national labour legislation and negotiated agreements.

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.

⁹ 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.

¹⁰ 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 risk-based measures. These measures must be stipulated in the management plan and require Naturland's approval. 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 – VIII.

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.) has to be reared on the farm itself or purchased from farms that are certified by Naturland or meet certification standards approved as equivalent by Naturland. Insofar as this is not possible (the farm manager has to give notice and proof of non-availability) and, therefore, stock has to be purchased from conventional suppliers*, the following conditions shall apply:
 - Genetically manipulated (transgenic) organisms or those obtained by means of polyploidization or gynogenesis may not be stocked.
 - The organisms must have been kept and fed for at least two thirds of their lives in accordance with the Naturland standards before marketing with reference to Naturland is allowed.

* The EU regulation governing organic aquaculture is being revised and currently there are differences between it and this part of the Naturland standards. This is to be taken into account when the products in question are to be advertised as "organically produced" in the area in which the EU regulation is applicable (ref. Naturland's memo "Organic Aquaculture").

- 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.-VII.) apply correspondingly.

- 3.2** As an exception to the regulations for grow-out B. I.-VII., 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.-VII. may be exceeded.

The use of ozone and ultraviolet light is only permissible in rearing and young stock stations and where no aquaculture stock is present.

- 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 there is sufficient evidence that artificial illumination is necessary, then the simulated day length shall not exceed 16 hours, unless longer periods are required to induce reproductive effects (e. g. to prevent cod from spawning and salmon from smolting).

- 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

* The EU regulation governing organic aquaculture is being revised and currently there are differences between it and this part of the Naturland standards. This is to be taken into account when the products in question are to be advertised as "organically produced" in the area in which the EU regulation is applicable (ref. Naturland's memo "Organic Aquaculture").

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 as per Appendix 3 of these standards
- use of naturally occurring, not residue-building organic compounds as per Appendix 3 of these standards
- use of naturally occurring vegetable substances (in particular Labiatae and Allium species); further 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

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 stuff of vegetable origin must be produced in accordance with Naturland standards¹¹.

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".

¹¹ Naturland's processing standards, as detailed under the heading "Feed", apply.

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. II. (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 1).
- 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 Phaffia yeast or microorganisms)¹³ 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. Upon approval by Naturland, natural antioxidants (e. g. tocopherol) may be added to the feed.

9. Transport, slaughtering and processing

Catching, 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). The equipment used (e. g. landing nets, tanks, chutes) must be free of any risk of injury (e. g. because of rough surfaces).

A reporting protocol for slaughter which governs the proceedings adopted in connection with catching, sorting, caging, stunning and killing in detail¹⁴ is to be submitted prior to initial certification for Naturland's approval and must be regularly brought up to date. It must include the following details:

- responsibilities
- proof of expertise of those carrying out the procedures
- the timing of all processes and the place where they are performed, from catch to slaughter
- equipment and substances used
- stunning (e. g. type of procedure, type of facility, setting and maintenance of apparatuses)
- monitoring of success of stunning
- measures to be taken in the case of unsuccessful stunning, repeat stunning
- kill (e. g. cutting line)
- environmentally sound disposal of slaughtering waste.

9.1 Live fish must be supplied with enough oxygen during transport and when kept in cages. A transport density of 1 kg of fish per 8 litres of water may not be exceeded. The transport duration is maximum 10 hrs.¹⁵

9.2 Slaughtering of fishes shall be carried out by means of incision of gills or immediate evisceration. Prior to this, fishes have to be stunned (by means of concussion, electrocution and, if need be, by natural plant anaesthetics, tropical and subtropical fish and invertebrates also by using ice, provided that it is not otherwise specified for certain species in the Special Part).

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.

¹² Species feeding exclusively or predominantly on other animals

¹³ Its use must be limited to the degree of pigmentation found in the natural state. Shrimp shells from conventional aquaculture are not permissible.

¹⁴ Guidelines for a reporting protocol for slaughter are available from Naturland upon request.

¹⁵ 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.

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”¹⁶, 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.

¹⁶ „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 spawners and their hatchlings for breeding purposes and the post-harvest maintenance of fishes (up to a maximum of 8 weeks) are such containers 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 carp¹⁷. Other species of fish (e.g. other cyprinoids, predatory fishes) are not subjected to any limitations in stocking density. In the case of crayfish (*Astacus astacus*, *Pacifastacus leniusculus*) the following maximum stocking densities are to be observed: For small-sized crayfish (< 20 mm): 100 crayfish per m². For medium-sized crayfish (20 - 50 mm): 30 crayfish per m². For adult crayfish (> 50 mm): 10 crayfish per m², provided that adequate hiding places are available. Shelters etc. may be included when calculating the area to be complied with. When farm *Pacifastacus leniusculus* in particular, precautionary measures must be taken and the legal requirements complied with in order to prevent the crayfish plague being transmitted to crayfish living in their natural environment.

3.3 Fish meal and fish oil is not permitted in the feed.

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) and hydrated lime (Ca(OH)₂) are 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.*

¹⁷ 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).

* The EU regulation governing organic aquaculture is being revised and currently there are differences between it and this part of the Naturland standards. This is to be taken into account when the products in question are to be advertised as "organically produced" in the area in which the EU regulation is applicable (ref. Naturland's memo "Organic Aquaculture").

Part B; 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

5. Organic Fertilising

Organic fertiliser may be applied to the pond to the extent of max. 0.25 DE/ha (20 kg N/ha). Numbers of waterfowl cultured on the fishponds shall be appropriately taken into this calculation.

6. Transport, slaughtering

As maximum transport density: C_3 : 1 kg/2 l, C_1 : 1 kg/4 l are set.

It is recommended that carp be stunned using a combination of electrical stunning followed by a blow to the head.

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) shall not become deteriorated 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 measures¹⁸, half of these carried out during the period of draining out or cleaning of the pond.

The sea bottom below the net cages shall 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 intensity¹⁹.

2.3 If water is tapped for a pond farm from a stream, then at least 50% 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 the interconnected area farmed, 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 entirely with gravel. The biological functions of the bottom and the walls must be ensured. 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. Stocking density

Stocking density of salmon (*Salmo*) shall not exceed 10 kg fish/m³. The maximum stocking density of brook trout (*Salvelinus fontinalis*) and whitefish (*Coregonus*) is 15 kg/m³.

¹⁸ 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.

¹⁹ Measurement of BOD5-value or KMnO4 consumption

Part B; 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

The maximum stocking density of trout (*Oncorhynchus*, *Trutta*) and arctic charr (*Salvelinus alpinus*) is 20 kg/m³. The prerequisite is adherence to measures adopted to prevent deterioration of water quality (in line with standard 2000/60/EC European Water Framework Directive) and minimum oxygen saturation of 7 mg/l and a minimum water inflow of 3 litres per second per tonne of fish.

Where salmonids are kept in net cages, the maximum stocking density is 10 kg/m³.

In no case shall the animals display any injuries (e.g. to their 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.

4.4 Exceptions to the limitation imposed under B.I.5.1. are made for national regulations governing the treatment of salmon lice.

5. Feeding

5.1 Salmonids 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.

5.2 Histidine produced by natural fermentation is permissible as an ingredient of the feed ration of salmonids in cases where an insufficient quantity of histidine cannot be guaranteed in the other types of feed allowed (ref. B.I.8) in order to fulfil the physiological nutrient requirements of the fish and to prevent the formation of cataracts (clouding of the lens).

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*) 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)²⁰. 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 shall 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.

²⁰ 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 have been established in former mangrove area, may only be converted to organic aquaculture according to Naturland standards if they were established prior to 1.1.1995 (or possibly an earlier date depending on legislation) and the former mangrove area is less than 50% of total farm area.

The former mangrove area of the farm area shall be reforested to at least 50% with mangroves during a period of maximum 5 years upon conclusion of the producer contract. The reforestation is part of the conversion plan, and the progress made in the measures undertaken is checked annually by Naturland. The harvest of the area in question is not permitted to be labelled and marketed as an organic product according to Naturland standards, until Naturland has confirmed the successful completion of reforestation. Exceptions to these rules may be granted in the light of particular geographic or historical conditions for extensive mangrove aquaculture systems. A pre-condition for certification is in any case that the applicable legal regulations governing land use, reforestation etc. were also complied with in the past.

2. Protection of ecosystems – farm area and surrounding

2.1 The water quality of source water shall 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). 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 farm²¹.

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.

²¹ 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.

- 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.

- 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. saponine).

The use of synthesised herbicides and pesticides (with the exception of substances listed in I. 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 used²².

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.

- 3.4** Stocking with larvae obtained through eyestalk ablation/ligation (or comparable physical interventions) in parent shrimp is not permitted.

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** 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

²² Available in Ecuador since 10/02

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.

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 microorganisms 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 ratio²³.

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 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

²³ 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.

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.

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 shall 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 shall 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.

* The EU regulation governing organic aquaculture is being revised and currently there are differences between it and this part of the Naturland standards. This is to be taken into account when the products in question are to be advertised as "organically produced" in the area in which the EU regulation is applicable (ref. Naturland's memo "Organic Aquaculture").

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

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 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 ponds and net cages (pens, enclosures), this being the upper limit.

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*.

* The EU regulation governing organic aquaculture is being revised and currently there are differences between it and this part of the Naturland standards. This is to be taken into account when the products in question are to be advertised as "organically produced" in the area in which the EU regulation is applicable (ref. Naturland's memo "Organic Aquaculture").

VII. Supplementary regulations for the culture of *Perciformes* (perch-like), *Carangiformes* (jack-like) and *Gadiformes* (cod-like) fish species 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 shall 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 measures²⁶. The sea bottom below the net cages shall 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 *Perciformes*, *Carangiformes* and *Gadiformes*, the stocking density shall not exceed 10 kg fish/m³.

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.

* The EU regulation governing organic aquaculture is being revised and currently there are differences between it and this part of the Naturland standards. This is to be taken into account when the products in question are to be advertised as "organically produced" in the area in which the EU regulation is applicable (ref. Naturland's memo "Organic Aquaculture").

²⁶ 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.

VIII. Supplementary regulations for the cultivation and collection of marine macroalgae (*Chlorophyceae*, *Phaeophyceae*, *Rhodophyceae*)

1. Selection of site, interaction with surrounding ecosystems

- 1.1 Seaweed beds form an important habitat for invertebrates and fishes. All management measures esp. during harvest shall be directed towards protecting and supporting this special habitat.
- 1.2 Algae in accordance with these standards shall grow only in locations that are not subject to any radioactive, chemical or bacteriological contamination or to any pollutants that would compromise the organic nature of the products. Potential contamination sources may include nuclear power plants, sewage discharge, waste disposals, important harbours, coastal industry and intensive agriculture in the zone of influence, conventional aquaculture sites, etc.
- 1.3 Macroalgae can be regarded as indicator organisms. Therefore, their microbiological and chemical status reflects water quality. The growing areas have to be of high ecological quality (class 1 or 2) as defined by the Water Framework Directive (WFD) 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. In regions, where WFD 2000/60 is not implemented, the scope of water quality monitoring has to be equivalent to that laid down in WFD 2000/60. This equivalency has to be approved by Naturland.
- 1.4 All operations are required to provide a detailed sustainable management plan, based on an environmental assessment. This plan shall in particular identify and evaluate the impacts of the once-off biomass on target and non-target species as well as on local macroalgae biodiversity. The biology and life cycles of the main seaweeds harvested have to be considered. The plan has to list potential environmental effects of the operation and provide a list of measures to be taken to minimise negative impacts on the surrounding aquatic and terrestrial environments. It has to be approved by Naturland.

2. Cultivation

- 2.1 If plantlets are collected from wild stocks, the regulations under article 3 apply: "Collection of wild seaweed"
- 2.2 Fertilising is only allowed in tank based facilities. Fertilisers used have to comply with the requirements in the "Regulations governing organic aquaculture", part B.I.7. Chemo-synthetic fertilisers and fertilisers of animal origin are not allowed. Mineral nutrients and trace elements have to be from naturally occurring sources with known composition (e. g. stone meal). In tank based facilities where such external nutrient sources are used, the nutrient level in the effluent water shall be at most the same than the inflowing water.
The use of antibiotics and other chemo-synthetic substances is prohibited.
- 2.3 For the protection of ropes and other equipment used for growing seaweed against growth of algae and colonisation by invertebrates, environment-friendly methods shall be employed. Use of chemical "anti-fouling" agents is prohibited.
- 2.4 Culture density (growth of biomass for harvest estimation) of the algae culture shall be recorded.
- 2.5 Nets, ropes, floats, poles (no depletion of forest stands, destruction of mangroves) etc. used for growing seaweed shall be appropriate for reuse as far as possible. After use they shall be decomposed or recycled. In any case, they shall not be left on the beach or in tidal areas after use.

3. Collection of wild seaweed

3.1 Definition

"Wild seaweed" is defined in analogy with "wild grown products" (refer to "Naturland Standards on Production; Part B.X.1.):

"Wild grown products" are defined as products that have grown without or with low influence of the operator gathering the products. The harvest has to be planned and carried out applying a sustainable system that is ecofriendly and socially acceptable.

This means in detail:

- The plants must not be cultivated, i.e. any measures to enhance or protect growth shall not be taken, or kept on a very low level.
- In their location the plants have to be found naturally.

The human interference consists mainly of the harvest (gathering) of these wild grown products or in measures taken to protect their natural growth potential.

Due to their extremely fragile nature resp. long growing conditions or potential habitat damage due to harvesting activities etc. the harvest of certain seaweed species (see Appendix 2) cannot be considered as sustainable according to the current state of knowledge. These species are therefore excluded from certification.

3.2 Requirements

3.2.1 The harvesting areas have to be clearly identified and adequately mapped, indicating each harvesting site.

3.2.2 All legal aspects regarding land ownership, harvesting rights etc. have to be clarified and documented. The individual harvesting rights have to be arranged and defined clearly within the collection area.

3.2.3 Before the start of each collecting season, the maximum amount to be harvested has to be defined annually. For this, the following information has to be available:

- A yearly biomass estimation of the algae before harvesting season.
- Regular monitoring and documentation of changes of algae stocks for size, density, colour, composition and regeneration.

3.2.4 In case of evident reduction of seaweed biomass resp. other impacts on the stock, appropriate counteractions have to be taken (e.g. reduction of harvest biomass; fallowing of harvest area).

3.2.5 If the harvesting area is used by a group of harvesters, the Naturland requirements for an ICS (Internal Control System) apply (see Naturland document "Minimum Requirements of an Internal Control System (ICS) for Smallholder Grower Groups").

3.2.6 Harvesting methods shall minimize damage to seaweed and substrate. Only selective harvesting methods shall be applied. Manual harvesting methods are to be preferred. Motorized harvesting techniques are only allowed, if they demonstrably do not have a negative impact on the marine ecosystem.

3.2.7 Wild harvested seaweeds shall be harvested in a manner that safeguards continued reproduction of the algae. Collectors shall not remove the entire algae, but have to leave the necessary plant elements required for the plant to re-grow on its own.

4. Post harvest

Seaweed shall be processed as soon as possible after harvest. All processing steps as well as storage etc. shall be aimed at conserving the quality of the algae at its best.

The use of direct flames for drying seaweed is prohibited. Seaweed shall not be situated in the combustion chamber, but have to be dried via a heat exchanging device that prevents direct contact with flames or harmful smoke/gases.

For flushing of the algae, seawater of appropriate quality is to be preferred to save drinking water.

For the algae products, an analytical protocol according to article A.I.6 has to be followed.

IX. Supplementary regulations for the cultivation of microalgae for human consumption (e.g. *Spirulina*, *Chlorella*)

1. Cultivation systems

The area of application of this standard covers the cultivation of microalgae (e.g. *Spirulina*, *Chlorella*) in artificial open and closed facilities (concrete, fibreglass etc.)

2. Requirements for the culture media

Only those vegetable ingredients of agricultural production are permissible which meet the certification requirements of the list of priorities shown in Naturland's standards (see Part C. VI. 4.1).

Besides this, the following regulations apply:

- water of drinking water quality
- table salt, iodised table salt (calcium carbonate (E 170)) is permitted as anti-caking agent
- cultures of micro-organisms, cultivated on organic substrata, if available
- sodium bicarbonate (NaHCO_3) (E 500) to regulate the pH-value and the carbon dioxide (CO_2) content of the nutrient solution
- mineral nutrients and trace elements, preferably from naturally occurring sources with known composition (e. g. stone meal) and only after the approval of Naturland has been granted²⁷

Particularly the following may not be used as culture media

- enzymes
- food additives
- nitrogen and phosphorus from inorganic or fossil sources (e. g. ammonium nitrate, sodium nitrate, rock phosphate (raw), guano)
- products from conventional agricultural origin
- animal products and dung, even of organic agricultural origin

3. Waste water quality

3.1 In the case of land-based facilities, the nutrient content of the wastewater must be proven to be no higher than the nutrient content of the inflowing water. The only exception is for wastewater which is to be disposed off in the communal sewerage system.

3.2 The quality of the wastewater is to be determined regularly (at least once every three months) using suitable analytical methods, and the results have to be recorded in writing.

3.3 Where marine microalgae are produced in saltwater solutions, care must be taken that the salt content of the wastewater does not exceed the salt content of the fresh water extracted.

4. Quality assurance

The quality of the water in the cultivation phase has to be verified by analyses at least once every three months. Special attention is to be paid to monitoring any accumulation of residues.

In the case of algae produce, the analysis protocol set down by Naturland (see Part A; I.6) is to be adhered to.

5. Cleaning and disinfection

All facilities, equipment and materials used in the breeding, selection, establishment of starter cultures and mass propagation of organically grown microalgae are cleaned using mechanical or thermal methods.

If this is not sufficient, those agents may subsequently be used which are listed in Annex 3 under "in the presence as well as in the absence of aquaculture animals".

²⁷ The use of isolated mineral nutrients and trace elements is only permitted in justified cases by way of exception and may not serve to enrich the product deliberately with these nutrients

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 shall be confirmed by producing proof of independent certification.³⁰

The following sources are permitted:

- Products from organic aquaculture
- Fishmeal/-oil from trimmings of wild fish processed for human consumption
- Fishmeal/-oil from by-catches of captures for human consumption in line with corresponding regulations and initiatives.

The use of fishmeal/-oil from other sources may be applied for the solely purposes of safeguarding quality³¹ 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.

Appendix 2: Wild grown algae species currently excluded from organic certification:

- *Lessonia nigrescens* and *Lessonia trabeculata* from the coasts of Chile and Peru
- Threatened kelp forests (*Macrocystis pyrifera*) from S. California coast
- *Lithothamnion* (Maerl) from UK area
- *Durvillaea antarctica* from S. Chile, S. Argentina, S. Australia
- *D. potatorum* from S. Australia
- *Ecklonia maxima* from Atlantic coast of South Africa

Appendix 3: Permissible cleaning and disinfection substances

In the absence of aquaculture animals	In the presence as well as in the absence of aquaculture animals
<ul style="list-style-type: none"> • Ozone (only permissible in rearing/young stock stations and tanks for the post-harvest maintenance of fishes) • Sodium hypochlorite • Calcium hypochlorite • Calcium hydroxide • Calcium oxide • Caustic soda • Alcohol • Potassium permanganate • Tea seed cake of natural camellia seed (use restricted to shrimp production) 	<ul style="list-style-type: none"> • Limestone (calcium carbonate) for pH control • Dolomite for pH correction (use restricted to shrimp production) • Sodium chloride • Hydrogen peroxide • Sodium percarbonate • Organic acids (acetic acid, lactic acid, citric acid) • Humic acid • Peroxyacetic acids • Peracetic acids • Iodophores (only in the presence of eggs)

²⁸ <http://www.fao.org/fishery/en>

²⁹ <http://www.ices.dk>

³⁰ This certification is at all events required for feed made from whole fish caught in the wild.

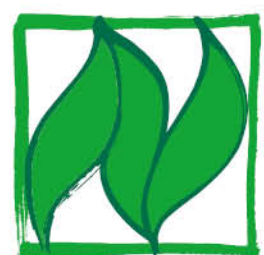
³¹ particularly for lowering P-content in order to prevent eutrophication

Naturland

Association for Organic Agriculture e.V.
Kleinhaderner Weg 1
82166 Gräfelfing | Germany

Tel. +49 (0)89-898082 - 0
Fax +49 (0)89-898082 - 90

naturland@naturland.de
www.naturland.de



Naturland