Coalition Clean Baltic
FOR PROTECTION OF THE BALTIC SEA ENVIRONMENT

# *Coalition Clean Baltic (CCB) position paper on principles and requirements for Sustainable Aquaculture in the Baltic Sea Region*

## Summary


- CCB considers open cage systems laden with too many environmental problems and risks and does not consider such operations as a sustainable option in the Baltic Sea, nor do they represent Best Available Technology (BAT) for fish production in seawater.
- Land based re-circular aquaculture systems should be the main focus of future developments on the Baltic Region.
- Selection of species used must be based on principles of risk management in relation to genetic risks, needs for medicine, chemicals, type of feed needed (herbivore/carnivore/omnivore) and risks related to the spreading of diseases and parasites and escapees. In closed systems, new species and non-native species is of limited concern.
- Increases in aquaculture production of carnivorous fish increase the pressure of wild fish stocks and this link must be cut, alternative fish must be used and new feed must be in place before production can sustainably increase.
- All aquaculture installations, also small-sized, must always have an environmental permit before the activity start, preceded by an environmental impact assessments process.
- Operational permits given for aquaculture production must contain e.g. elements of self-control, type and content in used feed and species selections.
- Permit for aquaculture operations shall include regulations on: Requirements/goals for zero escapes for all aquaculture species; monitoring programs for escapees (e.g. in cooperation with other installations and institutions); requirements to withdraw the permit if evidence of multiple escapees due to negligence or poor handling.
- Public financial support, subsidies, shall not be used to support operation of aquaculture. Public money should only be used for measures and programs for technical development, innovations and research to alleviate problems caused by aquaculture and BAT should always be in focus.

## Introduction

About every second fish we eat comes from aquaculture, and it is one of the fastest growing food sectors globally. In Europe, aquaculture accounts for about one fifth of the total fish production. The growth of the aquaculture sector is likely to continue, increasing the need to secure a development of sustainable aquaculture.

The European Commission has declared that it is set to stimulate an increased aquaculture to fill out the gap between demand and supply of fish in the EU. This will be implemented in the framework of the new Common Fisheries Policy. The production should be environmentally, socially and economically sustainable.[1] Member States are currently developing national aquaculture strategies and this paper can be used as input to those strategies both nationally but also to form a Baltic regional approach to aquaculture.

The Commission has identified four priority areas to unlock the potential of EU aquaculture:

- a reduction of administrative burdens
- improved access to space and water
- increased competitiveness
- better exploitation of the competitive advantages deriving from high quality, health and environmental standards.

The focus on increasing, improving and aiding aquaculture is not unproblematic and there are several risks involved, especially in the semi-enclosed Baltic Sea. Here, eutrophication is already a problem and unless increased aquaculture activities follow a set of strict rules the problem will increase. Ambitions from Member States and the Commission are clearly focusing on increased production; and in OECD/FAO publication "Agricultural outlook 2011-2020", expect at least a 35% increase in production by 2020.

Aquaculture has a bad environmental reputation and there is good reason for that since sea based aquaculture farms has been known to harm the surrounding environment by excessive leakage of nutrient, escapees and by spreading of diseases, parasites, medicines and alien species. The problem of aquaculture is however not just a local problem as overfishing of fish stocks for aquaculture feed is taking place on a global scale. To rely on imported fish from aquaculture outside the European Union is problematic and in fact irresponsible as production may act under less strict environmental policies and results in long transportation of fresh food. However this cannot be used as a valid argument to support and allow thoughtless operations in the EU.

[1] European Commission, COM (2013) 229

## Defining sustainable aquaculture for the Baltic region

Sustainable aquaculture should apply to environmental, economical, and fish and human welfare aspects, and always with methods that prevent negative impact on the environment. The best available technology (BAT) that already exists today is a big improvement compared to older open cage systems, and new technology such as land based closed systems must be the first choice for new facilities. Aquaculture in the Baltic region must address and meet the demands and challenges listed in this paper to be sustainable. There are active farms in some places in the Baltic region that already do. Aquaculture activities must always be in line with the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) not to undermine the possibility of reaching Good Environmental Status, or threaten the Common Fisheries Policy (CFP) goal to of Maximum Sustainable Yield (MSY) for all stocks. Current aquaculture labeling schemes such as Aquaculture Stewardship Council (ASC) are not considered mature enough by CCB and there is currently no organic or other label that considers land based closed systems as the best choice.

### *What is the problem*

In the Baltic, more or less all stakeholders and scientists acknowledge the major environmental problems connected to aquaculture, and several research projects have been set up so address or solve some of them.[2]

Major challenges and problems are:

- Loss of nutrients, disbursement of organic matter and the resulting local impacts
- The feed used and pressure on wild fish stocks
- Leakage of chemicals and pharmaceuticals
- Spreading of diseases and parasites
- Spreading of alien species and genetic information to wild relatives
- Animal welfare

### *Economic support via public money*

Economic viability without dependence of subsidies is highly relevant and must be a prerequisite for any public support given to individual companies. The EU is at risk of creating a new subsidies driven industry dependent on public support. CCB considers that public money should not be used as continuous operational support and never as a base for calculating future profits. Support could be given to technical development, innovations and research to alleviate problems caused by aquaculture. Monitoring programs set up to control aquaculture production (escapes, disease etc) may only in part be paid for by public money, but the polluter pays principle must be the basis.

### *Differences between open and re-circulating systems*

Aquaculture in land based re-circular and controlled systems has many advantages to systems with open cages. One of the most important one when it comes to the Baltic is the ability to significantly reduce nutrient losses from the farms. Also the problems with discharge of chemicals, risk of escapes and spread of parasites and diseases can be better controlled in ponds, land based systems or re-circulatory aquaculture systems (RAS). Considering these problems and the already too high nutrient

[2] See for example the Aquabest project http://www.aquabestproject.eu and Aquafima project: http://www.aquafima.eu

loads in the Baltic Sea, CCB can only consider an increase in feed-driven aquaculture in the Baltic Sea region in land based re-circular systems as being sustainable. For species that do not need added feed, such as carp, mussels and algae, such limitations do not exist, nor does many of the finfish problems listed above. The problem of finding suitable locations is also alleviated if land based systems are used, especially new land based systems that are almost completely closed.

## Location and permits

As the Baltic Sea drainage basin has a major eutrophication problem and alarming increases of anoxic bottom areas, the general approach must be that no new aquaculture installations in the Baltic Sea or affecting the Baltic Sea, should be allowed if they further intensify the problems. Renewed licenses should meet the following standards:

1. All aquaculture installations, also small-sized, must always have an environmental permit before the activity start.

2. Thorough environmental impact assessments (EIA) with links to WFD and MSFD (incl. water environmental status, nutrient-balanced performance, risk of spreading non-indigenous species, risk of genetic pollution of native species etc.) are key requirements for a mandatory permission process.

3. Operational permits should always contain a monitoring program, including self-monitoring requirement covering nutrients, escapes, chemicals etc.

4. Spatial planning and the Strategic Environmental Assessments (SEA) are essential for aquaculture location and permits. Especially relevant are responsibilities for member states to monitor effects of national aquaculture plans and transboundary consultations under the SEA Directive.

5. Permits should include set limits of chemical and nutrient loads to the environment (according to environmental water quality standards and Water Framework Directive requirements) with direct legal force, meaning that if loads are exceeded, operation must halt.[3]

6. Production permits should set requirements on the content of the feed to be used. In the Baltic Sea catchment, fish protein/fat in feed should be locally sourced to reduce unnecessary transports and to increase possibility to fully control origin of aquaculture feed.

7. A harmonized system of monitoring impacts of aquaculture established and decided upon, by e.g. HELCOM, should be in place in the Baltic region. The use of Environmental DNA monitoring[4] (where DNA-analyses from water sampling can give info on up-stream/neighboring fish species/genetics) should be a mainstreamed tool to control escapes of farmed fish to the wild.

[3] Such legally binding requirements are in force in operations in Sweden, in Jämtland County, Vattudals Fisk. Land and Environmental Court Östersund, Sweden, environmental case M-2139-11.

[4] Environmental DNA is a cost effective method of monitoring large areas for the presence of alien or native species via water sample testing and should be used in lake and river systems, but is also applicable in marine areas. For example, detection upstream a aquaculture farm can be evidence of escaped fish: http://pubs.usgs.gov/fs/2012/3146/

8. Evidence of escapes from finfish aquaculture to the wild must be linked to actions such as temporary halting, or if frequent incidents occur, stopping production.

9. No feed driven fish aquaculture can be allowed in protected areas (e.g. Natura 2000) or in areas of importance to fish reproduction (Recovery Areas, art. 8 in CFP Basic Regulation).

## Alternative fish feed to reduce pressure on wild fish

The fish feed needed for aquaculture is a key issue, perhaps the most difficult one. To use wild fish for aquaculture, fish that could be used for direct human consumption, is poor use of resources. Fish-components in aquaculture feed should never out-compete the direct use of fish as food resource. Using such wild fish for producing feed is unacceptable.

Alternative fat and protein sources are already available and big improvements have been made past 15 years. However, plans to increase aquaculture production in the EU will even with the best feed available today cause an increased pressure on wild fish stocks. Delinking aquaculture and the feed used from dependency on wild fish is of utmost importance. The industry chain from fisheries, via feed producers to aquaculture plants must show that this delinking is continuously taking place in practice to be sustainable. It is therefore reasonable to commit to this change and pushing feed development from a few showcase examples to mainstream by connecting aquaculture production permits to feed content and by that clearly show the origin and the content of the feed.

Requirements to use only Baltic fish feed in Baltic aquaculture have very little chance of limiting nutrient loading to the Baltic Sea. The fishery and feed producers are utilizing the resource at maximum today and most of the nutrients in the catches are either already used in the Baltic catchment or exported outside, for example to Norwegian salmon farms. If more of the fish feed was used locally it only means that imports of nutrients go down, but the total load on the Baltic will of course not change. Import of even more nutrient-rich feed for Baltic aquaculture from other sea areas would bring "new" nutrient loading to the Baltic Sea, and this is unacceptable and unnecessary. The only valid reason to use only Baltic fish in feed is that the fishery is controlled and is based on scientific assessments. However as long as all stocks are not fished at MSY, this resource too is unsustainable!

New fishery regulations now require all the formerly discarded fish to be landed, the so called landing obligation. This unwanted catch and the potential to sell it for fish meal/oil production must not become an option to accept unsustainable fisheries with unacceptable high bycatch levels. Focus must remain on reducing bycatch at sea and not on how to utilize is when it is landed.

Unless it is mandatory to use the best and alternative feed, these new and potentially sustainable feeds will remain good ideas and desktop products.

1. Alternative feed components such as insects, mussels, microbial meal etc must be developed and also utilized in all feed used. The use of plant-based feeds should also be maximized and be produced from sustainable agriculture.

2. Fish waste from fishing vessels and fish-processing is a good product that should be used for fish-aquaculture fodder.

3. Any wild fish used for production of fish feed for aquaculture must come from fish stocks that are harvested sustainably, at least according to MSY, and not in conflict with ecosystem considerations under the Marine Strategy Framework Directive and the CFP.

4. Fisheries targeting stocks without a fishing quota and without scientific stock assessments, with the main purpose to use such fish as raw materials for fish fodder production cannot be accepted. All sources must be traceable.

5. Landed bycatch, formerly discarded fish in Baltic fisheries should not be used for Baltic fish-feed production if this counteracts the pressure to minimize unwanted catch in Baltic fisheries.

6. Input to fish feed production must never threaten food resources for people living in areas where fishing for wild fish occurs.

7. Fish and fish waste used for fodder production must guarantee low content of toxic substances in the fodder product.

8. No GMOs should be used in fish feed.

## Chemicals and nutrients

Both nutrients and use of chemicals and pharmaceuticals represent problems that can be greatly reduced depending on choice of aquaculture system. A basic principle must be that nutrient loads (eutrophication) and pollution shall not increase. Compensatory measures in the Baltic Sea have proven to be very expensive and have questionable results. Proposed compensatory methods for nutrient load include farming of algae or shellfish or establishment of land based wetlands for nutrient removal and all such measures must be fully covered by the producer and not depend on public money.

The need for antibiotics has been reduced greatly in the aquaculture industry already and the use of antibiotics should be stopped in open-cage systems. Chemicals used for cleaning, disinfecting and anti-fouling must be used with great care. A list of acceptable substances should be developed and used in the Baltic region based on chemicals with documented effects that are biodegradable, have low persistence and toxicity and are not bioaccumulative. The use of chemicals in industries, recreational boating etc is something modern society has worked hard to reduce or remove, and we cannot have a growing aquaculture adding to the problem.

*Open cage systems in lakes and rivers*

1. Open cage systems cannot be accepted in Baltic Sea and its sub-basins.

2. Nutrient load discharges from existing aquaculture shall always require full compensation measures, corresponding to a proven equal reduction from other nutrient sources in the same geographical catchment area or Baltic Sea sub basin.

3. Open cage systems cannot be accepted in Baltic Sea sub-basins classified with eutrophication problems.

4. Open cage systems can only be allowed in rivers and lakes in Baltic Sea catchment, if ecological water quality criteria, according to Water Framework Directive, are met, and no additional nutrient load will reach lower river catchment and the Baltic Sea. Antibiotics in open cage systems should not be allowed at all.

5. Use of chemicals for anti-fouling, disinfection etc. must be reduced. Only chemicals with known effects and side effects may be used and be subject to changes if new facts arise.

*Land based recirculation systems*

1. The use of antibiotics can be allowed if under strict control in closed systems if no residue is dispersed.

2. Control of nutrients is simpler in closed systems, and monitoring of possible discharge can be controlled. However untreated affluent run off from for example RAS systems is not acceptable.

3. Recirculation systems do normally not require nutrient load compensation, as excess nutrients can be removed via filtration techniques and recycled. Combining aquaculture and agriculture should be supported thus maximizing the resources and improve energy efficiency.

## Species used in aquaculture

Escaped fish (with risk for genetic mixing and competition) cause depletion of the genetic variability of wild stocks and spread of diseases and parasites to the wild are two problems that depending on location and species can be catastrophic. Salmon farming in many parts of the world has led to serious impact on wild salmon and other species. Escaped fish are turning up as spawners in faraway river systems, for example on the Swedish west coast in the river Göta Älv where a genetic study has shown that 40% of all salmons are of unknown origin and most likely are farmed salmon from Norway[5]. Salmon farming in Norway has now set up goals of zero escapes from farms and the Baltic Region must set that as the only acceptable level, even though that figure is impossible in reality.

In the Baltic region, using native Baltic salmon and trout in aquaculture in marine areas is highly inappropriate. There are several and potentially severe risks to the wild stocks, related to genetic pollution of escaped fish and the spreading of parasites and diseases.

The Baltic Sea brackish water ecosystem is sensitive to the introduction of alien species and aquaculture must be based on a zero tolerance of using such potential invasive species. The problem of alien species is potentially amplified by climate change and changes in aquatic species biogeographical range may give way for new species to survive and thrive. Carnivorous fish are predominant in our region but increased focus on herbivores or omnivores is desirable and efforts to increase rearing and market such fish should be welcomed. Closed systems are particularly well suited for using alternative species.

1. Species selection used must be based on principles of risk management in relation to genetic risks, needs for medicine, chemicals, type of feed needed (herbivore/carnivore/omnivore) and risks related to the spreading of diseases, parasites and escapees.

2. Suitable species in open cage operations should have no or low risk of mixing genetically with wild fish present in the ecosystem.

3. The use of genetically modified species or treatments with hormones to sterilize fish etc. is not acceptable.

4. Atlantic/Baltic salmon and sea-trout cannot be accepted in today's open-cage aquaculture system in the Baltic Sea. There are several and potentially severe risks to the wild salmonid stocks, related to genetic pollution of escaped fish and the spreading of parasites and diseases.

[5] Swedish genetic study made by Swedish University of Agricultural Sciences for the County Administrative Board of Västra Götaland in 2011, http://www.lansstyrelsen.se/vastragotaland/SiteCollectionDocuments/Sv/publikationer/2011/2011-50.pdf

5. Requirements/goals must be set to zero escapes for aquaculture species in open cages and dams.

6. Climatic changes must be taken into account both regarding risk management in general, i.e. storm safety etc but also to carefully consider biogeographical changes.

7. Aquaculture in closed re-circulation systems do not have the same problem with escapes, parasites and disease and could therefore potentially farm different species, including native fish stocks or non-native species. However strict control of live fish is needed to preventing releases to wild habitats.

8. Alternative species, omnivores and species requiring less fish input in feed are crucial to sustain growth of the sector.

## Animal welfare aspects

Too high densities in any animal farm is problematic both from the perspective of animal welfare and disease control. The latter is often more or less self-regulating as experienced aquaculture farmers know that quality and growth will be impaired if densities are too high. Common rules to use best available technique when slaughtering fish should be established to keep a level playing field among producers and to secure ethical principles to avoid stress and pain.

1. Transports of all live fish should be minimized.

2. Slaughtering methods should use either percussive or electric stunning. Further research is needed to ensure that the methods are compatible with best practice.

3. Develop recommendations for fish densities to reduce stress and maximize welfare of the reared fish.

4. Transport of fish between farms should be controlled to avoid spread of parasites and disease. There must be both a national and international control of transfer of live fish and eggs.

***References***

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