

MCS Aquaculture Policy and Position Paper

December 2013



Aquaculture

Policy Statement

Introduction

The Marine Conservation Society (MCS) was established in 1983 with the aim of protecting the marine environment for wildlife and future generations. MCS is the only national environmental charity working exclusively on the range of issues affecting the marine environment.

The MCS Aquaculture and Fisheries programme aims to promote ecologically-sustainable aquaculture and fisheries to protect fish stocks, livelihoods and marine life.

Its main objectives are to:

- Support and influence the ability of aquaculture to contribute to food security by providing sustainable seafood for future generations
- Increase the sustainability of fisheries and their products
- To remove from sale in the UK the most at-risk fish species
- To ensure the practical and sustainable management of wild fisheries within the framework of an ecosystems-based approach

MCS is of the opinion that:

- Aquaculture has an essential role to play in supplying the growing global demand for fish.
- Aquaculture production must ensure it does not adversely impact upon the health and diversity of the marine environment upon which it relies to function.
- The finite supply of nutritionally valuable marine proteins and oils needs to be both sustainably managed and used responsibly to ensure the long-term availability of their supply, and to ensure the maximum amount of species possible benefit from their use.
- Due to aquaculture's growing importance it is critical that any negative impacts of industry are fully understood and minimised.

SUMMARY OF OUR POLICY, 'ASKS' and ACTIONS

Our position and policy on key issues:

1. Aquaculture Expansion and Resource Use

- MCS believes that aquaculture can *only* fully contribute to future food security by ensuring it does not deplete marine resources or adversely impact local habitats and species.
- MCS believes that any further expansion of aquaculture should only take place within an effective and enforced regulatory system, including a robust planning framework, and that incorporates requirements for identifying environmental carrying capacity and ensuring the health and integrity of the aquatic environment.
- The ecologically sustainable management of resources that ensures their long term future, in particular those used for feed, should be achieved before any further expansion of aquaculture is considered.

2. Feed resources

- MCS believes that, ultimately, all feed fisheries should be certified against a robust, third party sustainability standard that incorporates criteria for low trophic species, such as provided by the Marine Stewardship Council (MSC)¹
- Working towards that end point (2.1) all feed should be independently certified as using responsibly sourced marine proteins and oils, such as provided by the International Fishmeal and Fish Oil Responsible Supply standard (IFFO RS)².
- MCS encourages progress towards the IFFO RS certification via the IFFO Improvers Programme and other Aquaculture and Fisheries Improvement Projects provided they are independent, credible, time bound and documented.
- MCS believes that the ideal feed composition used in aquaculture feeds would include a combination of fully utilized by-products (from fish processing); certified sustainably managed marine proteins and oils (where required) which are supplemented from a range of non-marine raw materials such as land animal proteins, vegetable proteins and oils, algae oil and other emerging ingredients.
- MCS believes that for aquaculture production to fully contribute to future food security it should result in a net fish protein gain for all farmed species.
- To achieve point 2.5 above the amount of whole wet fish used to make feed for farmed fish production needs to be less, weight for weight, than the amount of fish produced. This is already the case for many species such as tilapia and carp.

¹ <http://www.msc.org/about-us/program-improvements/msc-assessment-of-low-trophic-level-fisheries>

² <http://www.iffonet.net/default.asp?contentID=636>

Regulations and Production Standards

- The three pillars of sustainable development³ – environmental, economic and social should be given equal weighting and form the basis of all regulations that apply to aquaculture.
- Regulations and policies that apply to aquaculture should be based on sound science; where this is not available, then the precautionary principle⁴ should be applied and research should be prioritised based on a risk based assessment.
- MCS believes that for aquaculture facilities to demonstrate their responsible production practices, they should be certified against a credible, third party audited production standard that includes robust environmental criteria, such as provided by the Aquaculture Stewardship Council (ASC)⁵ for example.

3. Cumulative Effects and Planning

- It is essential to understand, not only the impacts of a single production unit within an area, but the cumulative effects of multiple production units within a distinct water body. This should be a primary area of research and form the basis of all aquaculture future development.
- A robust planning process should be used to identify suitable sites for aquaculture to ensure best production conditions; identify areas of least potential impact, and integrate aquaculture with other users of the environment.
- Planning processes should identify those production sites that are unsuitable for aquaculture and result in relocation of existing production units out of that area into more appropriate sites.

4. Biodiversity Impacts

- It is essential to fully understand the impacts of aquaculture on surrounding biodiversity in order to not only mitigate such impacts, but to incorporate information such as sensitivity mapping into the planning process.
- In areas of important/vulnerable habitats and species (such as maerl beds⁶) there should be a presumption against aquaculture development, which should be incorporated into the local planning process.
- An Environmental Impact Assessment should be undertaken as part of the planning process before the development of any new site or unit.

³ <http://sd.defra.gov.uk/documents/mainstreaming-sustainable-development.pdf>

⁴ European Commission. Rome.

http://europa.eu/legislation_summaries/consumers/consumer_safety/l32042_en.htm

⁵ <http://www.asc-aqua.org/>

⁶ Hall-Spencer, J, Whitwe,N, Gillespie, E. Gillham, K & Foggo, A. 2006. Impact of fish farms on maerl beds in strong tidal areas. Marine Ecology Press.

Pollution

- MCS believes that it is essential to identify, monitor and mitigate all forms of production generated pollutants.
- MCS believes that alternative and continuous methods of reducing the environmental impact of such farm generated aquatic pollutants should be explored.
- MCS believes that only non-toxic antifoulants⁷ should be used on aquatic production sites.
- MCS believes parasites such as sea lice should be controlled by a range of management and control measures including, but not limited to, robust planning measures; biological control; fallowing and site rotation rather than reliance on chemical treatments.
- MCS believes that aquaculture production sites should minimise/remediate benthic impacts and nutrient discharge by the development of a system of integrated multi-trophic aquaculture⁸ as part of a suite of measures.

SUMMARY OF ASKS AND ACTIONS

MCS ASKS:

- 1) MCS is asking **European and UK governments** to:
 - a. Ensure sustainable development principles are enshrined in all key legislation that applies to or affects aquaculture, such as the Common Fisheries Policy⁹ and other key environmental legislation, including the Marine Strategy Framework Directive (MSFD)¹⁰, European Maritime and Fisheries Fund (EMFF)¹¹, Habitats and Birds Directives¹² and the Water Framework Directive¹³, which will affect the future sustainability of our seas.
 - b. That the need for economic and social sustainability is balanced with the need for ecological sustainability, recognising that the aquaculture industry relies on a healthy environment to support production.

⁷ A. Katranitsas, J. Castritsi-Catharios, G. Persoone. The effects of a copper-based antifouling paint on mortality and enzymatic activity of a non-target marine organism. *Marine Pollution Bulletin* 46 (2003) 1491–1494

⁸ Integrated mariculture – a global review. FAO Technical Paper 529. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Rome, 2009

⁹ <http://ec.europa.eu/fisheries/reform/>

¹⁰ <http://ec.europa.eu/environment/water/marine/ges.htm>

¹¹ http://ec.europa.eu/fisheries/reform/emff/index_en.htm

¹² <http://ec.europa.eu/environment/nature/legislation/habitatsdirective/>

¹³ <http://ec.europa.eu/environment/water/water-framework/>

- c. Encourage and support *only* environmentally responsible aquaculture that provides a net fish protein gain and therefore be a significant contributor to future food security.
- d. Ensure that UK legislation prioritises the maintenance and restoration of ecosystems and habitats in which aquaculture operates.
- e. Identify aquaculture knowledge gaps and prioritise research to fill them, based on risk assessments.

2) MCS hopes that the **Aquaculture Industry** will:

- a. Farm to credible, third party audited production standards that comply with the FAO Technical Guidelines on Aquaculture Certification¹⁴, and that address and minimise issues of environmental and ecological concern.
- b. Engage openly and constructively with NGO's in developing and participating in schemes and dialogue which will benefit the future of aquaculture and the environment
- c. Remain actively engaged in commercial trials of innovative solutions to address on-going challenges in aquaculture production.
- d. Seek and engage in improvement partnerships to address key concerns, such as responsible feed manufacture in Asian production.

3) MCS is asking **Standard Developers** to:

- a. Consult with and include a wide range of stakeholders, including NGO's when developing standards.
- b. To include a wide range of stakeholders, including NGO's when updating/revising standards.
- c. To incorporate robust environmental criteria in all standards relating to aquaculture production.
- d. To conform to ISEAL¹⁵ or ISO65¹⁶ standards for standard development.
- e. To comply with the FAO Technical Guidelines for Aquaculture Certification¹⁰.

¹⁴ FAO Technical Guidelines on Aquaculture Certification. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. Rome
2011ftp://ftp.fao.org/Fi/DOCUMENT/aquaculture/TGAC/guidelines/Aquaculture%20Certification%20GuidelinesAft
erCOFI4-03-11_E.pdf

¹⁵ <http://www.isealliance.org/>

¹⁶ http://www.iso.org/iso/catalogue_detail.htm?csnumber=26796

- 4) MCS is asking **Retailers** (fishmongers and supermarkets etc.) and **Restaurateurs** to:
- a. Clearly label all seafood products making it clear **what** is being sold. For retailers, this would mean including the scientific name of the species to remove ambiguity where generic common names are used, e.g. prawn. Also **where and how** it was farmed, by including details of the more specific area and method of farming, such as extensive pond culture in Thailand (currently there is only the requirement to state that the species is farmed, although often the country of origin is included). For restaurateurs, requesting this information when buying from your supplier will not only help to identify the best sustainable choice but will also allow the information to be passed onto diners if requested.
 - b. Make sure that they have a seafood sourcing policy and that it reflects the most sustainable options available. This information can be accessed on www.fishonline.org.
- 5) MCS is asking **Consumers** to:
- a. Refer to the MCS Good Fish Guide and the more comprehensive Fishonline to help make the most sustainable choices when buying seafood.
 - b. Diversify their tastes by not just relying on the most popular top five species such as farmed salmon and warmwater prawns, but introduce different fish into their diets.

MCS Actions:

In order to make continuous progress towards achieving these asks, MCS will continue to work with as many stakeholders as possible.

1. MCS will seek to ensure that robust environmental criteria are included in both UK and European policies that apply to aquaculture, policies including, but not limited to, the Common Fisheries Policy.
2. MCS will seek to ensure that robust environmental criteria are included in retailer seafood sourcing policies. (Please see MCS Seafood Sourcing Policy at <http://www.mcsuk.org/downloads/fisheries/MCS%20Sustainable%20Fish%20Sourcing%20Policy.pdf>)
3. MCS will seek to ensure that retailers and others in the seafood supply chain source from the most sustainable supply of farmed fish possible, whilst supporting and encouraging other producers to improve. This may include, but not be limited to, supporting Aquaculture and Fisheries Improvement Projects, supporting industry research or encouraging innovation such as the

development of alternative, non-marine feed ingredients for partial substitution in farmed feed diets.

4. MCS will support and encourage the certification of all feed fisheries to the International Fishmeal and Fish Oil Responsible Supply Standard (IFFO RS). We will do this through our own involvement with the standard governance and application and via advocacy of the standard in the supply chain. We will also encourage entrance to the IFFO RS via the IFFO Improvers Programme and other Fisheries Improvement Projects.
5. MCS will encourage feed fisheries to then progress towards achieving certification to the Marine Stewardship Council (MSC) sustainability standard for low trophic species or equivalent.
6. MCS will work to ensure that robust criteria for environmental stewardship and sustainable resource use are included in global aquaculture production standards.
7. MCS will work to raise public awareness of the importance of choosing sustainable farmed fish, as well inform the public about aquaculture in general.

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1 Purpose

The purpose of this Aquaculture Policy and Position Statement, hereto referred to as “policy paper”, is to provide MCS opinion on the key issues related to the environmental and ecological impacts of aquaculture (all marine and freshwater farming methods and finfish and shellfish species). This is a broad and complex subject, and as such this policy paper is limited to key issues and the most critical impacts relating to farmed species **available** in the UK.

The blue box at the beginning of this policy paper contains a summary of our policy, ‘asks’ and ‘actions’; the rest of this document provides the evidence, discussion and reasoning behind these, to provide further detail and explanation of these points.

This policy paper continues our theme of evidence-based policy work, campaigning and dissemination of information relating to the environmental impacts of human activities on our seas and coastline, using publicly available documents and data. Wherever possible, references have been used from robust sources.

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Here at MCS we strive to ensure all our communications are as accurate and objective as possible. However, if you identify any errors or omissions within this policy paper we would be grateful if you could bring them to our attention. Please contact MCS by either calling us on 0131 226 3113 or by emailing us at dawn.purchase@mcsuk.org Please remember to quote the version number and date of issue of this document when you contact us.

2. Background information on aquaculture

Seafood is one of the healthiest and most popular sources of animal protein worldwide. Approximately half of the seafood we eat is from wild capture fisheries; the other half comes from aquaculture¹⁷. Aquaculture or fish farming is defined as the farming of aquatic species – such as salmon, prawns, mussels and trout.

In 2012, global aquaculture produced 60MT¹⁷ of seafood with a value of \$119 billion. It is a diverse industry, comprising the culture of over 600 species in 190 countries, using a range of production systems and environments, both freshwater and marine. 60% of global aquaculture takes place in China; over half of aquaculture occurs in freshwater and the most popular farmed fish by volume is carp¹⁷.

Aquaculture is the fastest growing food production sector, growing at 7%¹⁷ per annum on average globally. This growth will continue as the demand for fish rises, a demand driven by a number of factors – an increasing consumption of fish per person in global terms (from 11.5 kg in the 1970's to over 18 kg in 2010),¹⁷ increasing demand for fish as human population numbers continue to grow (by about 200,000 people per day¹⁸) and the inability of wild capture fisheries to increase to meet the rising demand¹⁷.

Aquaculture has enormous potential to contribute to future food security, as well as provide economic sustainability to rural areas and developing countries. Because of this demand for aquaculture production to increase now, more than ever, it is critical to ensure that any negative impacts of aquaculture on the environment are fully understood and minimised.

In the UK, Scotland dominates the production of farmed marine finfish, in 2010 producing: 154,164 tonnes of Atlantic salmon; 5,319 tonnes of Rainbow Trout and 193 tonnes of other species such as cod, Arctic char and brown trout, with a value of about £540 million¹⁹. English and Welsh aquaculture produces about 8,000²⁰ tonnes of finfish, predominantly Rainbow trout. The UK also has a thriving shellfish farming industry producing a range of species including mussels, oysters and clams with a total volume of 31.5 tonnes and a value of about £25.5 million²¹.

¹⁷ FAO State of World Fisheries and Aquaculture. 2012

¹⁸ <http://www.worldometers.info/world-population/>

¹⁹ Marine Scotland Aquaculture Facts and Figures <http://www.scotland.gov.uk/Topics/marine/Fish-Shellfish/FactsandFigures>

²⁰ CEFAS .Finfish News. No 11. Summer/Autumn 2011

²¹ CEFAS. Shellfish News No: 33. Spring/Summer 2012

Management of the aquaculture industry in Europe is variable across countries, with European regulations being “broad brush” across species and sectors. There is a similar situation elsewhere in the world, with varying degrees of regulation and enforcement dependent on country of production.

The overarching regulation that applies to European aquaculture and fishing industries is the Common Fisheries Policy (CFP)²², which is currently under reform, due for completion in 2014. Its primary aquaculture focus seems to be to encourage, support and promote the development of aquaculture in Europe to equal the 7% ²³growth experienced elsewhere around the globe. The persistent pursuit of industry growth is a concern for MCS, as we seek reassurance that the three pillars of sustainable development (environmental, social and economic) are applied in equal measure. In achieving the environmental principle of sustainable development we believe the following is required: an ecologically sustainable resource base; a robust planning system to restore and maintain ecosystem health; and dedicated National Aquaculture Development Plans that enshrine environmental sustainable development principles as well as social and economic ones.

More detailed, specific regulations occur at a National level and vary from country to country. In an effort to standardise production practices in an arena of variable regulations independent production standards were developed and are now widely adopted. These are developed by either standard setting bodies, for example the Aquaculture Stewardship Council (ASC)²⁴ and Global Aquaculture Alliance (GAA),²⁵ or by retailers who may have a certain sourcing requirement or ethos. In Scotland, the Code of Good Practice for Scottish Finfish Aquaculture²⁶ is a widely adopted industry production standard that covers over 95% by volume of finfish aquaculture in Scotland. MCS wants to encourage the continued development and revision of these standards to reflect emerging best environmental practice and innovative developments. As an example, as more feed fisheries become certified as responsible and ultimately sustainable, MCS would like to see all standards insisting upon certified feed as a minimum requirement.

MCS believes responsible management, incorporating environmental considerations, is integral to a robust and transparent policy framework, which in

²² <http://ec.europa.eu/fisheries/reform/>

²³ FAO State of World Fisheries and Aquaculture.2012.

²⁴ <http://www.asc-aqua.org/>

²⁵ <http://www.gaalliance.org/>

²⁶ <http://www.thecodeofgoodpractice.co.uk/>

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itself is essential to underpin an environmentally responsible Global fish farming industry.

As with all food production systems aquaculture is not without its impacts, but MCS believes the negative impacts on habitats, species, water quality and the wider ecosystem can be minimised by responsible operators farming to robust production standards in an effective and enforced policy structure, supported by the use of sustainable resources and development of innovative practices. We believe that by operating responsibly to produce a sustainable product, a balance can be achieved between the development and diversification of the aquaculture industry and the maintenance of marine ecosystem integrity and health.

3 Key Issues and Policy Overview

Aquaculture Expansion and Resource Use

Wild capture fisheries are at their maximum capacity, yet the demand for seafood continues to rise, driven by increased consumption and population growth, which has been predicted by the United Nations to reach around 9 billion people by 2050²⁷, 2 billion more people than today (2013). Aquaculture is rapidly expanding to meet this increased seafood requirement without first ensuring the sustainable management of the resources on which it relies, for example fresh water, suitable sites and in particular feed-fish.

Our Policy

- MCS believes that aquaculture can *only* contribute to future food security by ensuring it does not deplete marine resources or adversely impact local habitats and species.
- MCS believes that any further expansion of aquaculture should only take place within an effective and enforced regulatory system, including a robust planning framework, and that incorporates requirements for identifying environmental carrying capacity and ensuring the health and integrity of the aquatic environment.
- The ecologically sustainable management of resources that ensures their long term future, in particular those used for feed, should be achieved before any further expansion of aquaculture is considered.

Feed resources

Growth in aquaculture is dependent on natural resources, such as freshwater, space and proteins and oils to provide feeds. The production of, and subsequent consumption of feeds that rely upon marine proteins and oils, is a crosscutting issue across species of global concern as aquaculture continues to expand²⁸. One of the primary areas of current critical concern regarding feed fish management and feed production is with many of the Asian countries supplying the UK with popular farmed species, such as warm water prawn and pangasius (Basa). The increasing demand on aquaculture to fill the “the fish gap”, combined with the static nature of wild capture fisheries to supply fish for marine proteins and oils for feed production, drives the increasing necessity of feed fisheries to be managed responsibly and increasingly sustainably. Within Europe there is currently some discussion about the use of discarded fish arising from the reformed Common Fisheries Policy discard

²⁷ Department of Economics and Social Affairs. United Nations. New York
<http://www.un.org/esa/population/publications/longrange2/WorldPop2300final.pdf>

²⁸ Giovanni M. Turchini¹, Bente E. Torstensen² and Wing-Keong Ng. Fish oil replacement in finfish nutrition. Reviews in Aquaculture (2009) 1, 10–57

ban being used for fishmeal and fish oil production. This complex issues is discussed more fully in the separate MCS Discards Policy Paper.

Our Policy

- MCS believes that ultimately all feed fisheries should be certified against a robust, third party sustainability standard that incorporates criteria for low trophic species, such as provided by the Marine Stewardship Council (MSC).
- Working towards that end point, as an interim step in the process all feed should be independently certified as using responsibly sourced marine proteins and oils, as provided by the International Fishmeal and Fish Oil Responsible Supply Standard (IFFO RS).
- We encourage progress towards achieving the IFFO RS certification via the IFFO Improvers Programme and other Aquaculture and Fisheries Improvement Projects provided they are independent, credible, time bound and documented.
- MCS believes that the ideal feed composition for carnivorous fish would include a combination of fully utilized by-products (from fish processing); certified sustainably managed marine proteins and oils which are supplemented with a range of non-marine raw materials such as algae oil, vegetable proteins and oils, processed animal proteins (PAP's) and innovative emerging ingredients.
- MCS believes that for aquaculture production to truly contribute to future food security it should result in a net fish protein gain.
- MCS wishes to see that the amount of fish used in feed is less than the amount of fish produced. This is already the case for many species such as tilapia and carp²⁹.

Regulation and Production Standards.

Aquaculture regulations, enforcement and production standards vary greatly between production countries, species and farming methods. The enforcement of robust regulations and adoption of rigorous production standards can mitigate many of the adverse effects associated with aquaculture production such as impacts on surrounding habitats and species; escapes; disease outbreaks; resource use and compromised fish health and welfare.

Our Policy

- The three pillars of sustainable development – environmental, economic and social should be given equal weighting and form the basis of all regulations that apply to aquaculture.

²⁹ FAO SOFIA 2012.

- Regulations and policies that apply to aquaculture should be based on sound science; where this is not available then the precautionary principle should be applied and research should be prioritised based on risk assessment.
- MCS believes that for aquaculture facilities to demonstrate their responsible production practices they should be certified against a credible, third party audited production standard that includes robust environmental criteria, such as provided by the Aquaculture Stewardship Council (ASC).

Cumulative Effects and Planning

Without adequate planning it is impossible to ascertain the cumulative environmental effects of aquaculture production facilities in a given area, or to determine the carrying capacity of the surrounding environment to support production. Planning is also essential to determine the most suitable sites for aquaculture to ensure best production conditions, identify areas of least potential impact, and integrate aquaculture with other users of the environment.

Our Policy.

- MCS believes it is essential to understand not only the impacts of a single production unit within an area, but the cumulative effects of multiple production units within a distinct water body. This should be a primary area of research and underpin all aquaculture future development.
- MCS believes that a robust planning process should be used to identify suitable sites for aquaculture to identify areas of least potential impact; ensure best production condition and integrate aquaculture with other users of the environment.
- Planning processes should identify those production sites that are unsuitable for aquaculture and result in relocation of existing production units out of that area into more appropriate sites.

Biodiversity Impacts

The construction and operation of aquaculture facilities can have an adverse impact on the surrounding environment³⁰. This can include habitat destruction or disturbance and/or impacts on other species.

Our Policy

- It is essential to fully understand the impacts of aquaculture on surrounding biodiversity in order to not only mitigate such impacts but to incorporate information such as sensitivity mapping into the planning process.

³⁰ Guidance on Aquaculture and Natura 2000. Sustainable aquaculture activities in the context of the Natura 2000 Network. European Commission. 2012.

- In areas of important/vulnerable habitats and species (such as maerl beds³¹), there should be a presumption against aquaculture development which should be incorporated into the local planning process. Such areas should be designated aquaculture free zones.
- An Environmental Impact Assessment³² should be undertaken as part of the planning process before the development of any new site or unit.

Pollution

The unregulated or misuse of chemicals and therapeutants³³ combined with water pollution from nutrients and benthic impacts from faeces and uneaten feed is a key concern within global aquaculture production.

Our Policy

- MCS believes that it is essential to identify, monitor and mitigate all forms of production generated pollutants.
- MCS believes that alternative and continuous methods of reducing the environmental impact of farm generated aquatic pollutants should be explored.
- MCS believes that only non-toxic antifoulants should be used on aquatic production sites.
- MCS believes parasites such as sea lice should be controlled by a range of management and control measures including, but not limited to, biological control; fallowing and site rotation rather than sole reliance on chemical treatments.
- MCS believes that aquaculture production sites should minimise/remediate benthic impacts and nutrient discharge by the development of a system of integrated multi-trophic aquaculture as part of a suite of measures.

³¹ Hall-Spencer, J , Whitwe,N, Gillespie, E. Gillham, K & Foggo, A. 2006. Impact of fish farms on maerl beds in strong tidal areas. Marine Ecology Press.

³² Environmental Impact Assessment (Scotland) Regulations 1999 (SSI 1999/1)

³³ Dr. Les Burrige, Fisheries and Oceans Canada, Dr. Judith Weis, Rutgers University, Dr. Felipe Cabello, New York Medical College, Dr. Jaime Pizarro, University of Santiago, Katherine Bostick, WWF. Chemical Inputs from Salmon Aquaculture. WWF Dialogues. 2007

4 Key Issues Detail

Expansion and Resource Use

Wild capture fisheries are at their maximum capacity with 57.4% being fully exploited and 29.9% overexploited³⁴, yet the demand for seafood continues to rise, driven by increased consumption and population growth. Aquaculture is rapidly expanding to meet this increased seafood requirement; it is the fastest growing food producing sector, with a growth of 7% per annum. This growth is however dependent on natural resources, such as fresh water, space and proteins and oils to provide feeds.

Feed resources

The production of, and subsequent consumption of feed, is a crosscutting issue of global concern as aquaculture continues to expand. The most popular farmed species in the UK are salmon and warmwater prawn, with a combined retail sales value in 2012 of nearly £1 million³⁵, comprising two of the top five seafood choices. Both of these species and many other popular species such as trout, seabass and Pangasius rely on wild capture fisheries to provide the marine protein and oils for their feed. 15 million tonnes³⁴ of wild capture fish were utilised for fishmeal and fish oil production in 2010.

This increasing demand on aquaculture to fill the “fish gap”, combined with the static nature of wild capture fisheries to supply fish for feed, and our most popular seafood choices being farmed fish that rely on marine ingredients for their feed, all drive the necessity for feed fisheries to be managed responsibly and increasingly sustainably.

MCS would like to see, as a starting point, all feed manufacturers sourcing from International Fishmeal and Fish Oil Organisation certified Responsible Supply (IFFO RS). Whilst we appreciate that in Asian production this is a long-term goal, we would however encourage progress towards this certification via the IFFO Improvers Programme and other initiatives, such as being undertaken by FAO and partner organisations³⁶. From this platform of responsible supply we would like to see all feed fisheries work towards and achieve sustainability, via certification to a fisheries standards that includes criteria for low trophic species such as provided by the Marine Stewardship Council (MSC).

In many Asian countries that supply the UK with popular farmed species such as warmwater prawn and pangasius, there is a serious concern regarding feed

³⁴ FAO. The State of World Fisheries and Aquaculture 2012.

³⁵ Seafish. <http://www.seafish.org/media/market-data>

³⁶ FAO. <http://www.fao.org/fishery/topic/16920/en>

sourcing. Fish used to make feed are caught in multi-species pelagic trawls with no technical or fisheries management measures in place to ensure their long-term sustainability. This mixed catch includes unidentified species and juveniles; there is currently no way to ascertain the environmental impact of their removal³⁶.

Closer to home the story is more encouraging, with the majority of fisheries supplying feed requirements for aquaculture being responsibly managed. However, this responsible management does not incorporate an ecosystem based approach to fisheries management that takes into consideration the effect on the wider ecosystem of large numbers of small pelagic fish that occupy the base of the food chain. There is currently some discussion about the use of discarded fish arising from the reformed Common Fisheries Policy discard ban being used for fishmeal and fish oil. This complex issue is discussed more fully in the separate MCS Discards Policy Paper.

To reflect the urgent nature of this issue, feed composition, its use and management of raw materials is a primary area of work within the MCS Aquaculture programme. We aim to promote the inclusion of sustainably managed marine proteins and oils in feed at a level that delivers health benefits for both fish and consumers alike, however this must be at a level that recognises those fisheries that provide these precious marine ingredients have a role to play in the natural environment and are a finite resource.

With wild capture fisheries at their limit of exploitation there is an increasing need to augment their use with alternative, non-marine ingredients. We feel the ideal feed composition would comprise of a combination of fully utilized by-products (from fish processing); sustainably managed marine proteins and oils supplemented by a range of non-marine raw materials such as blood meal, vegetable proteins and oils, algae oil and other emerging ingredients.

Regulations and Production Standards.

The regulations, enforcement and standards of production vary greatly between production countries, species and methods. The development and enforcement of robust regulations and adoption of independent, third party audited and rigorous production standards can prevent many of the adverse effects associated with aquaculture production, such as escapes, disease outbreaks, pollution, resource use, habitat damage and compromised fish welfare.

The adoption of independent production standards, in particular those with a consumer facing label at point of sale, such as Aquaculture Stewardship Council (ASC) or organic certification, is essential in guiding consumers to making the best, most environmentally responsible choice when buying farmed seafood.

As European aquaculture develops and expands under the auspices of the reformed Common Fisheries Policy, MCS would like to see the EU quality label for aquaculture, as suggested by EU Fisheries Commission rapporteur Mr Milana³⁷, developed and incorporate criteria for defining environmental sustainability. We would then support the development and use of an EU wide consumer facing label on packaging to promote these products and thus encourage the development of the market for responsibly produced, environmentally sustainable European farmed fish.

Cumulative Effects and Planning

MCS is not opposed to the development of European aquaculture *provided* it follows *all* sustainable development principles; occurs within a robust planning framework; uses a sustainable resource base and expansion does not occur at the expense or detriment of coastal or marine environments. We also believe that current farms that are sited inappropriately, and as such are having a negative environmental effect, should be relocated to more suitable areas identified using a strategic environmental assessment and/or National planning process.

Ensuring that environmental protection and recovery is central to aquaculture management is an essential requirement for the Scottish, UK and European governments to enable the delivery of international commitments under the OSPAR³⁸ convention, the World Summit on Sustainable Development³⁹, and the Marine Strategy Framework Directive (MSFD)⁴⁰. The MSFD demands a strategic approach to the conservation of marine ecosystems, including achieving Good Environmental Status for our seas by 2020, and addressing all human activities, including aquaculture, that have an impact on the marine environment.

It is also essential for compliance with the Water Framework Directive (WFD)⁴¹ as transposed by the Water Environment and Water Services (Scotland) Act 2003 (the WEWS Act) which requires that all inland and coastal waters out to 3 nautical miles achieve Good Ecological Status by 2015.

Without adequate planning it is impossible to ascertain the cumulative environmental effects of aquaculture production facilities in a given area, or to determine the carrying capacity of the surrounding environment to support production. Planning is also essential to determine the most suitable sites for aquaculture to ensure best production conditions, identify areas of least impact and

³⁷ Milana, G. Draft Report on a new impetus for the strategy for the sustainable development of European aquaculture. (2009/2107(INI)). 2010

³⁸ [http://www.ospar.org/content/content.asp?menu=014812000000_000000_000000](http://www.ospar.org/content/content.asp?menu=01481200000000_000000_000000)

³⁹ <http://www.uncsd2012.org/isfd.html>

⁴⁰ European Commission. Marine Strategy Framework Directive.
<http://ec.europa.eu/environment/water/marine/ges.htm>

⁴¹ European Commission. Water Framework Directive. <http://ec.europa.eu/environment/water/waterframework/>. Accessed July 2013

integrate aquaculture with other users of the environment. This planning should be translated into Local Development Plans as stated in the 2010 Scottish Government report "*Delivering Planning Reform for Aquaculture*"⁴².

Biodiversity Impacts

The construction and operation of aquaculture facilities can have an adverse impact on the surrounding environment. This can include habitat destruction or disturbance and/or impacts on other species^{43 44}.

Historically critical, sensitive habitats such as mangroves have been destroyed to make way for the construction of ponds for the production of warmwater prawns⁴⁵. This practice has been significantly reduced and many prawn operators now have mangrove restoration targets as part of their operations. MCS believes that responsible producers should incorporate such practices where required to demonstrate responsible environmental stewardship. It is essential that sensitive habitats be identified as part of the planning process for all aquaculture producers, not just prawn farmers, and such a planning process should incorporate environmental impact assessments.

Other species can also be affected by aquaculture production from either interaction in the form of parasite and disease transfer; escapes leading to interbreeding and genetic dilution⁴⁶ as well as the introduction of non-native species and lethal control of predators⁴⁷. It is essential that these impacts are minimised in the first instance by the appropriate siting of production systems within an effective planning framework. Where this has been achieved as far as possible, other mitigation measures then need to be employed. Measures including but not limited to: farm management measures to reduce parasite and disease outbreaks; farming to a technical standard for production equipment to prevent escapes and the use of a range of non-lethal control measures.

Pollution

If improperly managed the production of many aquaculture species can have adverse impacts on the surrounding environment; nutrients such as nitrogen and

⁴² Delivering planning reform for aquaculture. Scottish Government. 2010

⁴³ Beveridge, M.CM. Institute of Aquaculture. University of Stirling. Stirling. Scotland

⁴⁴ Mukul, S. 2007. Biodiversity and Sustainable Development in Bangladesh: An overview of present status, management problems and future prospects. Department of Forestry and Environmental Services.

⁴⁵ FAO Fisheries Department. State of World Aquaculture. 2006. Rome.

⁴⁶ Thorstad, E. Fleming, I. McGinnity, P. Soto, D. Wennevik, V & Whoriskey, F. 2008. Incidence and impacts of escaped farmed Atlantic salmon *Salmo salar* in nature. Report from the Technical Working Group on Escapes of the Salmon Aquaculture Dialogue.

⁴⁷ <http://www.scotland.gov.uk/Topics/marine/Licensing/SealLicensing>

phosphorus from feeds and waste can be released into surrounding water bodies, which can lead to reduced water quality, benthic impacts⁴⁸ and eutrophication⁴⁹.

The unregulated, misuse and heavy reliance on chemicals and therapeutants is also a key concern within global aquaculture production⁵⁰.

Farming to recognised independent production standards, that have defined parameters and set limits for the use of chemicals and release of nutrients, should be seen as a minimum requirement of responsible aquaculture. In addition, other measures such as the parallel farming of other species to utilise nutrients integrated multi trophic aquaculture (IMTA), site rotation and extended fallowing periods in open water systems, use of cleaner fish (with due consideration for the management of wild stocks, health and welfare) for biological control of sea lice (see MCS Cleaner Fish Position Paper for more details http://www.mcsuk.org/downloads/fisheries/Cleaner_Fish_Position_Paper.pdf) , and the use of non-toxic net treatments should be employed by those producers wishing to go beyond responsible practice to achieve sustainable aquaculture.

5 Discussion

MCS' position is that environmentally sustainable aquaculture can be achieved without compromising the other two principles of sustainable development, namely social and economic. MCS believes that aquaculture has a role in fulfilling the increasing demand for fish protein for future generations, but its ability to do so does not diminish the need for wild capture fisheries to be managed in an ecosystem based framework to achieve their full potential, in fact the growth of aquaculture is reliant upon it for many farmed species reliant on marine feeds.

Aquaculture has the ability to produce healthy fish protein for an increasing population of seafood consumers, but in doing so the global industry must develop within a robust, enforced and meaningful regulatory framework that has ecosystem health as a core principle, rather than treating the environment as just another sector.

MCS has been at the forefront of promoting sustainable seafood in the UK through the publication of the Good Fish Guide⁵¹ in 2002 and the related website

⁴⁸ Kalantzi, I & Karakassis, I. 2006. Benthic impacts of fish farming: Meta-analysis of community and geochemical data. *Marine Pollution Bulletin*. 52 484-493.

⁴⁹ OSPAR Commission 2000. Nutrient Discharges from Fish Farming in the OSPAR Convention Area.

⁵⁰ Dr. Les Burridge, Fisheries and Oceans Canada, Dr. Judith Weis, Rutgers University, Dr. Felipe Cabello, New York Medical College, Dr. Jaime Pizarro, University of Santiago, Katherine Bostick, WWF. Chemical Inputs from Salmon Aquaculture. WWF Dialogues. 2007

www.fishonline.org in 2004. Fishonline now provides advice on over 150 species of seafood and is updated biannually to take account of the latest scientific information on the health of fish stocks and the latest developments in sustainable aquaculture and fishing practices. MCS aims to continue to work with major supermarkets, suppliers and restaurants to promote responsible fish sourcing practices. ***See the MCS Seafood Sourcing Policy Guidance document for more information.***

6. Conclusion

As with all food production systems, aquaculture is not without its impacts, but MCS believes the negative impacts on the wider ecosystem, biodiversity, habitats, species and water quality can be minimised by responsible operators farming to robust standards and the use and development of innovative practices. We believe that by operating responsibly a balance can be achieved between the development and diversification of the aquaculture industry and the maintenance of marine ecosystem integrity and sustainable resource use.

⁵¹ Clarke B (2002) The Good Fish Guide. Marine Conservation Society

MCS Actions

1. MCS will seek to ensure that robust environmental criteria are included in European policies that apply to aquaculture, policies including, but not limited to, the Common Fisheries Policy.
2. MCS will seek to ensure that robust environmental criteria are incorporated in UK and National policies that apply to aquaculture.
3. MCS will seek to ensure that robust environmental criteria are included in retailer seafood sourcing policies. (Please see MCS Seafood Sourcing Policy at www.fishonline.org).
4. MCS will seek to ensure that retailers and others in the seafood supply chain source from the most sustainable supply of farmed fish possible, whilst supporting and encouraging other producers to improve. This may include, but not be limited to, supporting Aquaculture and Fisheries Improvement Projects, supporting industry research or encouraging innovation such as the development of alternative, non-marine feed ingredients for partial substitution in farmed feed diets.
5. MCS will support and encourage the certification of all feed fisheries to the International Fishmeal and Fish Oil Responsible Supply Standard (IFFO RS). We will do this through our own involvement within the development and application of the Standard and via advocacy of the Standard in the supply chain. We will also encourage entrance to the IFFO RS via the IFFO Improvers Programme and other Fisheries Improvement Projects.
6. MCS will encourage feed fisheries to then progress towards achieving certification to a sustainability standard for low trophic species as defined by the Marine Stewardship Council (MSC).
7. MCS will work to ensure that global production standards for aquaculture address issues of environmental concern by the inclusion of robust criteria for environmental stewardship and sustainable resource use.
8. MCS will work to raise public awareness of the importance of choosing sustainable farmed fish as well inform the public about aquaculture in general.

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