

# Planning for sustainable growth in the English Aquaculture Industry

Produced by the England Aquaculture Plan Consultation Group

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# Ministerial Foreword

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## **Richard Benyon**

*Parliamentary Under-Secretary for Natural Environment and Fisheries*

I am very pleased to be able to publish this consultation on behalf of the English Aquaculture Plan Consultation Group. This Group has seen representatives from the Aquaculture Industry, retail, academia and Civil Society come together to articulate what is required to achieve sustainable growth in the English Industry. I have been particularly impressed with the way the different representatives have come together in a collaborative partnership to develop this consultation and to start to develop the English Aquaculture Plan, which responses from this consultation will feed into.

The UK Government considers that aquaculture has a vital role to play in meeting the needs of consumers for a sustainable supply of fish and seafood (including freshwater fish). The Government are keen to encourage the development of efficient, competitive and sustainable aquaculture industries, while protecting the health status and conservation of UK farmed, wild migratory and freshwater fish, and shellfish. We want to enable the industry to fully develop its potential to become an efficient, competitive and sustainable provider of high quality seafood.

As part of this, I strongly welcome this consultation. It sets out a vision for sustainable long term growth, and identifies the key contribution increased aquaculture production could make as we address the very significant challenges of improving food security and health in a sustainable way. The consultation includes the Group's assessment of the strategic need for increased aquaculture production, and identifies a number of barriers and constraints that are likely to be restricting the development of the industry in England.

I do hope you will take the time to respond to the questions. Your responses will be used by the Group as they develop their English Aquaculture Plan. That Plan will be a very significant step in the development of a sustainable English Aquaculture Industry, providing a roadmap for sustainable development of this exciting sector to provide increasing volumes of sustainable high quality seafood.

I would like to express my thanks to the members of the Consultation Group, who during this work have demonstrated the highest level of professionalism, commitment and energy, combined with a determined passion to enable their industry to grow sustainably.

A handwritten signature in blue ink that reads "Richard Benyon." The signature is written in a cursive style.

**Richard Benyon**

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## Summary

<b>Topic of this consultation</b>	This consultation seeks to inform the aquaculture industry and Government of potential drivers and restraints when planning for the sustainable growth of aquaculture in England.
<b>Purpose</b>	This consultation document is intended for policy makers and a wide range of individuals and organisations with an informed opinion on aquaculture. These include aquaculture businesses and trade associations, the retail sector, academic research institutes, government and regulatory agencies and environmental NGOs. We would encourage you to respond to ensure that this consultation captures the views and attitudes of this wide ranging stakeholder group.
<b>Scope</b>	This consultation document has been targeted at people or organisations who the English Aquaculture Plan Consultation Group believes can provide an informed opinion on aquaculture and its future development in England. This document asks for your views on our assessment of the future demand for increased seafood products, and hence aquaculture output, our conclusions on the constraints and barriers to expansion and development, and our recommendations to address these.
<b>Geographical scope</b>	This consultation covers the aquaculture industry in England only – though views are sought from across the UK. The experiences from those involved in aquaculture in other devolved nations are very welcome.
<b>Duration</b>	Eight Weeks
<b>Body Responsible</b>	English Aquaculture Consultation Group in conjunction with the Department for Environment, Food and Rural Affairs (Defra).

## Introduction

### Planning for sustainable growth in the English Aquaculture Industry

*“Global production of fish from aquaculture has grown substantially in the past decade, reaching 52.5 million tonnes in 2008, compared with 32.4 million tonnes in 2000. Aquaculture continues to be the fastest-growing animal food producing sector and currently accounts for nearly half (45.6 percent) of the world’s food fish consumption, compared with 33.8 percent in 2000. With stagnating global capture fishery production and an increasing population, aquaculture is perceived as having the greatest potential to produce more fish in the future to meet the growing demand for safe and quality aquatic food. According to FAO, it is estimated that by 2012 more than 50 percent of global food fish consumption will originate from aquaculture”.*

*Food and Agriculture Organisation FAO ‘World Aquaculture 2010’ Executive Summary<sup>1</sup>*

This consultation document sets out a number of recommendations to support the sustainable development of the English aquaculture industry. It has been developed by the English Aquaculture Plan Consultation Group undertaken as a partnership between a broad group of aquaculture industry stakeholders, government agencies, NGO’s and regulators. The Group was drawn from volunteers who responded to an open call to participate in a workshop on the English aquaculture industry. The work was facilitated and supported by Defra staff, but this consultation is being driven and undertaken by the English Aquaculture Plan Consultation Group to inform the development of an English Aquaculture Plan, to be in place by spring 2012.

The English Aquaculture Plan Consultation Group has, during a series of workshops and through the work of individual subgroups, looked at the comparatively poor performance of the English aquaculture industry in recent times, identified barriers to growth, and has suggested possible solutions to support the development of the industry in the context of food security and sustainable development agendas. During this process it has been agreed that for the purposes of this consultation we will focus on the issues relating to aquaculture production for food, but will also look more broadly when developing the full plan and implementing the recommendations to ensure that the wider aquaculture industry can also benefit from any changes introduced.

This consultation document has been targeted at people or organisations that the English Aquaculture Plan Consultation Group believe can provide an informed opinion on aquaculture and its future development in England. This document asks for your views on our assessment of the future demand for increased seafood products, and hence aquaculture output, our conclusions on the constraints and barriers to expansion and development, and our recommendations to address these.

**Responses to this consultation are welcomed and encouraged from all interested parties across the UK, not just those working in the Aquaculture or food industry.**

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<sup>1</sup> <http://www.fao.org/docrep/014/ba0132e/ba0132e.pdf>

## Department for Environment, Food and Rural Affairs

Membership of the English Aquaculture Consultation Group:

### **Makeup of the English Aquaculture Consultation Group**

- British Marine Finfish Association
- British Trout Association
- Centre for Environment, Fisheries and Aquaculture Science (Cefas)
- Department for Environment, Food and Rural Affairs (Defra)
- Fin fish Aquaculture Stakeholders
- Food Certification International
- Local Government Association
- Offshore Shellfish Technology Stakeholders
- Sea Fish Industry Authority (Seafish)
- Shellfish Association of Great Britain
- Soil Association
- Ornamental Aquatic Trade Association
- UK Retail Sector and Supermarkets
- University of Plymouth
- WWF-Scotland

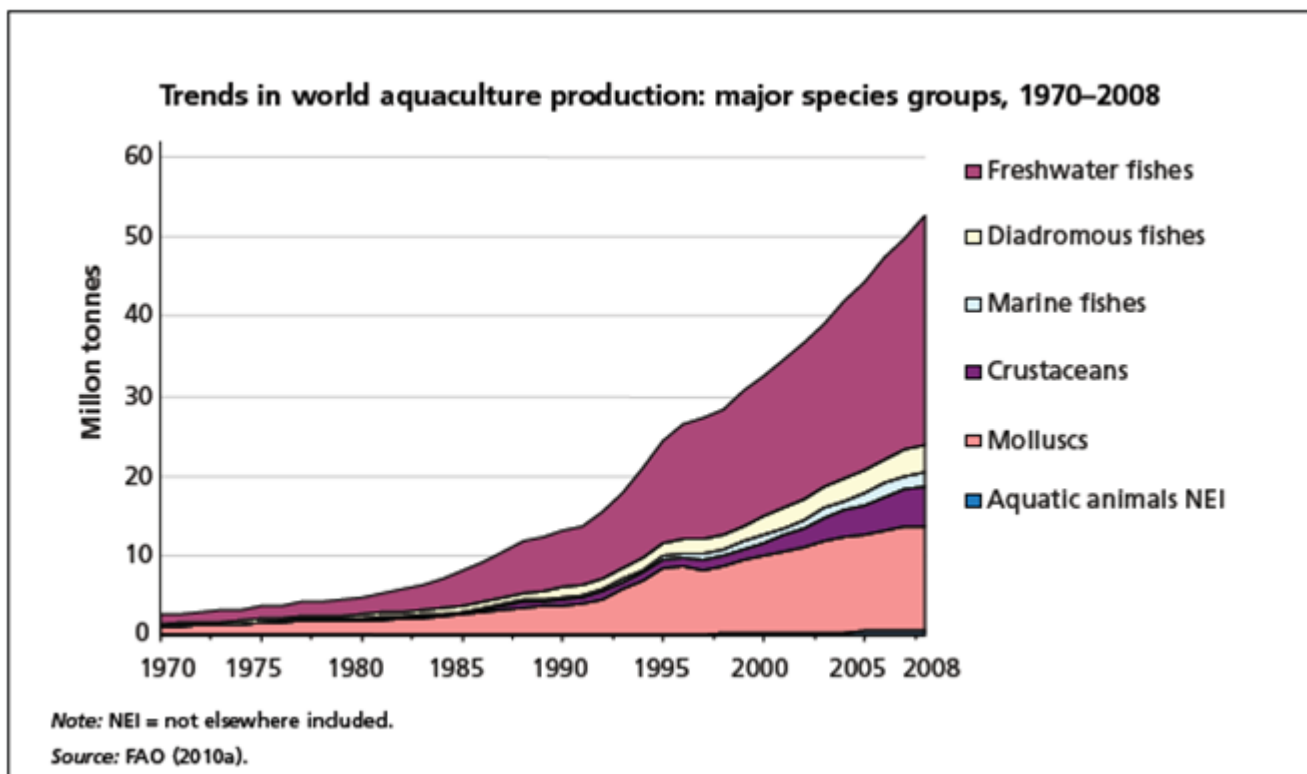
## Setting the Scene:

### The Current Position and Need for Expansion

With wild fisheries production unlikely to increase significantly in the future, aquaculture represents by far the largest growing contribution to the global production of aquatic food. The majority of wild fisheries in the world are currently near or above sustainable exploitation limits. In parallel, global consumption of fish as food has doubled in the period of 1973-2003.

Projections of fish supply and demand to 2020 confirm that per capita consumption of fish as food is expected to rise with demand outstripping supply<sup>2</sup>. According to the FAO, most of this demand is expected to be met by aquaculture<sup>3</sup>.

Figure 1



Globally, there are four key issues that will affect food security in the immediate future:

1. Climate change: more extreme weather events/reduction in land available for agriculture
2. Population growth: increased demand for food, a global phenomena, with less opportunity to increase production
3. Increasing affluence: an increasing demand/competition, for high protein meat products and high value food products
4. Global financial security: reduced economic growth, risk of trade barriers reducing access to a affordable, reliable supply of food

<sup>2</sup> International Food Policy Institute 2003: <http://www.ifpri.org/sites/default/files/publications/pr15.pdf>

<sup>3</sup> <http://www.fao.org/docrep/013/i1820e/i1820e00.htm>



The consequences of these issues are clear:

- Competition for terrestrial food growing space
- Loss of arable land due to climate change and urbanisation
- Increased demand for arable land for biofuel and feed production for animals
- Climatic changes affecting what food can be grown or caught
- Need for increased food production whilst ensuring environmental and ecosystem protection
- Competition for freshwater & clean water resources
- Need to reduce greenhouse gas (GHG) emissions
- Increased global demand and buying power for meat and fish
- Threat of trade barriers and subsidies increasing the price of food and limiting supply

Sustainable Aquaculture can provide food with:

- No requirement for arable land
- Minimal freshwater requirements compared to other animals
- Better food conversion (than other livestock) requiring much less feed per unit of production
- Low GHG emissions or GHG sequestration in the case of shellfish and algae
- An ecosystem approach that limits/reduces/manages environmental threats
- A steady/reliable supply of protein across the value food chain

**Domestic sustainable Aquaculture therefore has the potential to make a significant contribution to future global food security.**

The need for development is already being considered at national government and EU level. The latest proposals for reform of the Common Fisheries Policy<sup>4</sup> provide added impetus for the development of the English Aquaculture industry. Key elements of current proposals<sup>5</sup> are that:

- Non-binding Union Strategic Guidelines on common priorities and targets for the development of aquaculture activities shall be established by the Commission by 2013;
- Member States shall establish a multiannual national strategic plan for the development of aquaculture activities on their territory by 2014. The plan shall include the Member State's objectives and the measures to achieve them.

These proposals support the EU Commissions proposals as set out in their report, 'Building a sustainable future for aquaculture: A new impetus for the strategy for the sustainable development of European aquaculture'<sup>6</sup>.

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<sup>4</sup> <http://ec.europa.eu/fisheries/reform/>

<sup>5</sup> In particular Article 43

<sup>6</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0162:FIN:EN:PDF>

## Department for Environment, Food and Rural Affairs

An Environment, Food and Rural Affairs (EFRA) Committee report<sup>7</sup> in 2008-09 recommended that Defra and the devolved Administrations should produce a study evaluating the potential of sustainable aquaculture off the shores of the UK. The Government response was published in October 2009<sup>8</sup> and it noted:

*“...the Government recognises that aquaculture has an important part to play in meeting the needs of UK consumers for a sustainable supply of fish and seafood...”*

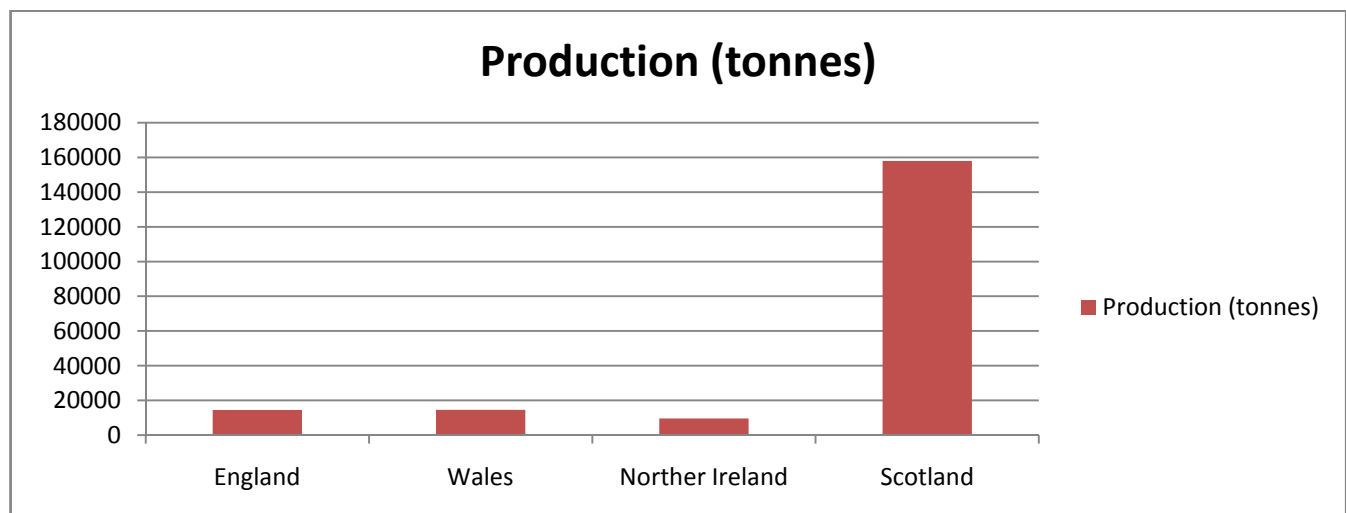
*and that “...in the coming decades aquaculture could become the greatest source of increased fish and shellfish production required to bridge the gap between the diminishing supply from wild resources and significantly increased demand for secure food for UK consumers”.*

The above, coupled with the latest proposals for reform of the Common Fisheries Policy provide added impetus for the development of an English Aquaculture Plan to encourage development of the industry. In order to develop sufficient capacity to meet this demand the industry will need to tackle current outstanding technical issues and will also need to develop new and innovative methods for future large scale expansion. More importantly, industry and Government should work jointly to address the issues in a serious and constructive way.

At present, aquaculture production in England stands at around 10,000 tonnes of fish and shellfish per annum. The majority of this output is accounted for by long established trout, mussel and oyster farms, with a small proportion provided by more recently established carp and tilapia farms. In a UK context, this level of production is less than 10% of that of Scotland's output and for its size, is significantly lower than that of Wales and Northern Ireland. It is also well below the levels of production found in the majority of other European maritime nations. For reasons that are not clear, England has fallen well behind most other countries in the development of its aquaculture industry.

### Figure 2:

**UK Aquaculture Production 2009** (Excluding coarse and ornamental fish production) *Cefas: Shellfish and Fin Fish News*



<sup>7</sup> [House of Commons Environment, Food and Rural Affairs Committee. Securing food supplies up to 2050: the challenges faced by the UK. Fourth Report of Session 2008–09](#)

<sup>8</sup> [House of Commons Environment, Food and Rural Affairs Committee. Securing food supplies up to 2050: Government Response to the Committee's Fourth Report of Session 2008–09. Third Special Report of Session 2008–09](#)

## Department for Environment, Food and Rural Affairs

A detailed account of the current state of English aquaculture is included in **Annex I**.

The low level of aquaculture development in England is perhaps partly a reflection of the ready access we have previously had to cheap supplies of seafood from our own capture fisheries and from imports. This is a situation that will change significantly in the next few decades owing to population growth, changing global dietary habits, economic pressures, climatic and environmental changes at home and elsewhere in the world<sup>9</sup>. Net exports from the developing world are projected to continue through 2020, though at a lower level than presently. This is mainly because of rising domestic demand within developing countries for fish because of population growth, income growth, and urbanization<sup>10</sup>. The changing market conditions for the import and export of fish will be a key driver in the development of aquaculture in England.

This consultation outlines the direction of travel we expect the English Aquaculture Plan will take. Once fully developed, the plan will outline an aquaculture industry that will meet the demand for seafood created by the need for greater food security, better public health, improved environmental sustainability and increased economic activity. These needs have previously been detailed in the Government publications: “Fisheries 2027”<sup>11</sup> and the UK Governments Foresight report ‘The Future of Food and Farming’, and they cannot be met by capture fisheries or the existing aquaculture industry.

If the English aquaculture industry was to capture just 1% of the global market for aquaculture products, it would need to be producing (based on 2008 figures), 525,000 tonnes of fish and shellfish a year, generating almost £1bn in revenue.

**By spring 2012 the English Aquaculture Plan will outline a roadmap setting out how aquaculture in England can develop.**

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<sup>9</sup> Hall, S.J., A. Delaporte, M. J. Phillips, M. Beveridge and M. O’Keefe. 2011. Blue Frontiers: Managing the environmental Costs of Aquaculture. The WorldFish Center, Penang, Malaysia.

<sup>10</sup> Delgado, C.; Wada, N.; Rosegrant, M.W.; Meijer, S.; Ahmed, M. 2003. The future of fish: issues and trends to 2020. IFPRI Issue Brief 15. Washington, D.C. (USA): IFPRI

<sup>11</sup> Defra Fisheries 2027 Report: <http://archive.defra.gov.uk/foodfarm/fisheries/documents/fisheries2027vision.pdf>

## The Food Security Driver

The 1996 World Food Summit described food security as existing:

***“....when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life”***

The development of the English Aquaculture Plan is taking place against a background of increasing uncertainty over the security of the global seafood supply – including that of the UK. The seafood consumed in the UK at present comes approximately 20% from domestic supplies and 80% from imports. Few of these supplies are robust in the long term and all are subject to increasing demand from the growing purchasing power of expanding economies in the developing world – globally there is less fish, but increasing demand.

Commonly, the concept of food security is defined as including both physical and economic access to food that meets people's dietary needs as well as their food preferences. In essence, what this means is having food on the plate today and confidence that there will be food on the plate tomorrow, next week, next month and in the years to come.

So why is food security so important now? A series of ecological, economic and manmade factors have combined to make food security one of the preeminent challenges facing humankind<sup>12</sup>:

- **Increasing population**

The world population is projected to rise from about 6.7 billion in 2009 to 9.2 billion by 2050. The majority of this growth will take place in urban areas of the developing world.

**Of existing EU member states, the UK will have the largest population of around 77 million by 2050.**

- **Changing diets**

As people become more affluent they tend to eat a more varied diet, including more meat, which in turn takes more energy and cereal to produce.

- **Fuel costs**

The fuel price increases of recent years have driven up the price of storing and distributing food.

- **Climate change**

A warming planet will affect food production in complex ways; climate change forecasts predict increased incidence of droughts and floods across some regions affecting agricultural output and leading to a loss in agricultural land. Traditional staples may no longer be able to grow in some areas requiring a rapid adaptation in food production methods.

- **Limited fresh water and arable land**

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<sup>12</sup> UK Food Security Assessment: Detailed Analysis: <http://archive.defra.gov.uk/foodfarm/food/pdf/food-assess100105.pdf>

## Department for Environment, Food and Rural Affairs

Limited fresh water and arable land will constrain agricultural growth, while growing affluence in developing countries will add to the challenge as people eat more meat or turn food crops into biofuel.

Global landings from capture fisheries have been stagnant at around 89–93 million tonnes for the last 20 years and it is unlikely that this can increase significantly in future. However, total global fish production has continued to rise, amounting to about 142 million tonnes in 2008. The balance is made up by production from aquaculture, which now amounts to 52.5 million tonnes, accounting for almost 46 per cent of all fish for human consumption (Fig 4).

The Government Office for Science Foresight report ‘The Future of Food and Farming’<sup>13</sup> notes that demand for fish “*is expected to increase substantially, at least in line with other protein foods, and particularly in parts of east and south Asia. The majority of this extra demand will need to be met by further expansion of aquaculture*”. The report is very positive about the role of aquaculture in assisting food security and notes that “*global productivity in aquaculture could, with limited changes to inputs, be raised by around 40%*”.

Defra’s UK Food Security Assessment<sup>14</sup> alludes to the role for aquaculture in meeting food security: “*The growth in consumption of fish and seafood against the backdrop of over-fishing suggests a greater role for aquaculture in meeting future demand and ensuring the future security and sustainability of global fish stocks*”.

**Figure 3:**

<b>World capture fisheries and aquaculture production and consumption</b>			
	2008	2009 (estimate)	2010 (forecast)
	<i>(Million tonnes)</i>		
<b>Total production<sup>1</sup></b>	<b>142.3</b>	<b>145.1</b>	<b>147.0</b>
Capture fisheries	89.7	90.0	89.8
Aquaculture	52.5	55.1	57.2
<b>Total utilization</b>	<b>142.3</b>	<b>145.1</b>	<b>147.0</b>
Food	115.1	117.8	119.5
Feed	20.2	20.1	20.1
Other uses	7.0	7.2	7.4
<b>Aquaculture’s contribution (%)</b>			
To total production	36.9	37.9	38.9
To food fish	45.6	46.8	47.9
<b>Per capita food fish consumption (kg/year)</b>	<b>17.1</b>	<b>17.2</b>	<b>17.3</b>
From capture fisheries	9.3	9.2	9.0
From aquaculture	7.8	8.1	8.3

*Notes: In The State of World Fisheries and Aquaculture 2008 (FAO, 2009a), world aquaculture production, excluding aquatic plants, was reported to be 51.7 million tonnes in 2006, which included originally reported production by China. In 2009, FAO adjusted downward the aquaculture production statistics for 1997–2006 for China, and consequently the world total production was lowered. The adjustment was made according to the results communicated to FAO in 2008 by Chinese authorities following the Second National Agriculture Census carried out by China in 2007 for its national statistical data (including fisheries and aquaculture sectors) for 2006.*

*Source: FAO (2010a, 2010b).*

<sup>13</sup> The Future of Food and Farming: Challenges and choices for global sustainability: <http://www.bis.gov.uk/assets/bispartners/foresight/docs/food-and-farming/11-547-future-of-food-and-farming-summary.pdf>

<sup>14</sup> Defra UK Food Security Assessment: Detailed Analysis: <http://archive.defra.gov.uk/foodfarm/food/pdf/food-assess100105.pdf>

## The Population Health Driver

Seafood contains a range of nutrients and is a good source of omega-3 fatty acids. Omega-3s from seafood have widely acknowledged benefits for cardiovascular health. The Department of Health<sup>15</sup> recommends that we eat at least 2 portions of fish per week, one of which should be oily, but current UK consumption of fish and shellfish falls significantly short of this guideline. No matter how carefully and sustainably the wild fish stocks under our control are managed, they will never provide increases in production of the magnitude that are needed to meet the target of 2 portions per week per person.

The FAO 2010 “State of the World Fisheries and Aquaculture” report<sup>16</sup> notes “*with the known wide range of benefits from seafood consumption, it is pertinent to consider whether increased production is possible*”. This is echoed in England; Defra’s Fisheries 2027 report “A long-term vision for sustainable fisheries” recommends that fish should be a readily available and valued source of protein by 2027.

**A strategy of increasing global food security, sustainability and per capita seafood consumption for a growing population is simply not possible without a very significant increase in aquaculture production.**

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<sup>15</sup> <http://www.nhs.uk/Livewell/Goodfood/Pages/fish-shellfish.aspx>

<sup>16</sup> FAO State of the World Fisheries and Aquaculture 2010 Report: <http://www.fao.org/docrep/013/i1820e/i1820e.pdf>

## Improved environmental sustainability

*“...we want a thriving, competitive UK food sector to continue to play its part in keeping us food secure. It should produce as much food as possible, as long as that is driven by demand for our food, and that increases in production are achieved as sustainably as possible.”*

*(UK Food Security Assessment 2009<sup>17</sup>)*

Underpinning the aquaculture development strategy must be a firm commitment to further build the environmental sustainability and integrity of the sector. Aquaculture is one of a handful of natural resource industries that can offer truly environmentally sustainable economic growth. Not only is aquaculture based on renewable resources, it depends for its existence on pristine water quality and therefore it has a stewardship role in assisting to protect England's aquatic environments.

Aquaculture provides a means of producing consistently good quality, highly nutritious, good value for money seafood, whilst helping to maintain the long-term sustainability of wild caught fisheries. Whether it is fish or shellfish being farmed the method will depend on the species and location. All forms of aquaculture are subject to stringent environmental legislation. They are inspected both by local government agencies and by the auditors from their customers/or the certification companies to constantly maintain and improve assessment and management practices.

There are environmental impacts, but these are minimised by undertaking impact studies when the farms are established, and ensuring that the farms do not create long-term damage to the environment. The effect of a fish farm will be monitored and controlled in a similar way to land animal farms. As well as being efficient users of feeds, fish and shellfish farming can demonstrate lower carbon and freshwater footprints than most other forms of animal production. The production of bivalve molluscs (clams, oysters, and mussels) can provide positive environmental impacts. These farms do little to disturb the ecosystem and they can even improve water quality – because molluscs work as filters. Because of their three dimensional structure, they form habitats for other bottom dwelling organisms, adding to the biodiversity of the marine environment.

The European Community Biodiversity Strategy was adopted in 1998. In 2001, this was followed by the production of Biodiversity Action Plans for fisheries, agriculture, economic cooperation and development and conservation of natural resources. These sectoral Action Plans define concrete actions and measures to meet the objectives defined in the strategy, and specify measurable targets. The fisheries Biodiversity Action Plan recommends avoiding aquaculture practices that may affect habitat conservation.

**Aquaculture can make a contribution to growing demand for fish, as set out above, without needing to compromise environmental integrity.**

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<sup>17</sup> <http://archive.defra.gov.uk/foodfarm/food/security/>

## Increased Socio-Economic Activity

In aquaculture, capacity development is being underpinned by a number of central themes such as the ecosystem approach, the sustainable livelihoods approach, poverty assessment and issues of governance.

The socio-economic benefits would include increased economic growth through employment (both direct and indirect), regeneration schemes and enhancement of product processing and distribution resulting in an improved local economy. This income generation is often in remote rural locations where there is little alternative employment opportunity or opportunity for economic diversification. Product diversification could help alleviate economic risks and stabilize potential price fluctuations and buffer costs associated with seasonal and climate associated variations in sea food availability.

These factors may form an important base for human capacity development through the aquaculture model, providing job security, promotion of well-being and a sense of collective responsibility and ownership.

The range of activities at sea and associated activities on the coast and inland contribute substantially to the UK economy and quality of life. There will therefore be a presumption in favour of sustainable development in the planning system. Specifically, activities in the marine area provide significant social and economic benefits and can drive economic growth, provide opportunities for investment and generate export and tax revenues. They also provide opportunities for employment, both in long established industries such as fishing, marine transport and port related storage and processing; as well as new and developing industries such as the renewable energy sector and associated offshore electricity generation and transmission.

This employment provides wider and longer term benefits for both national and local economies. The further development of marine aquaculture will derive benefits from the existing marine sector as well as the new industries and will further enhance socio-economic value in the marine sector.

**In addition to providing employment in what are often rural areas, aquaculture can contribute to economic development, infrastructure development and technical development at local, regional, national and international levels.**

### **The English Aquaculture Plan Consultation Group believes that English aquaculture:**

- Has the potential to be greater in scale and value than the wild fishery sector
- Can assist England, and beyond, in meeting the challenges posed by global food security and assist with healthy eating objectives
- Has the capacity to deliver environmental benefits that cannot be guaranteed by other sources of food production
- Has the potential for socio-economic benefits driven by a sustainable growth of the industry



## Illustrative Examples

The figures used in these examples are estimates for potential UK domestic aquaculture production, derived from using current nutritional guidelines, existing UK consumption estimates, UK fishery statistics and the aspirations set out in Fisheries 2027.

From these it was possible to derive indicative production tonnage estimates that illustrate the need and scale of possible future increases in aquaculture production. To enable us to make an assessment we have identified the key strategic drivers as:

- ensure seafood supplies to the UK come from sustainable and environmentally responsible sources
- meeting FSA advice that our diet should include two portions of fish a week

The consultation group have also considered reducing reliance on imports, and suggest replacing 50% of current imports with domestic aquaculture products.

These figures illustrate the size of the 'seafood gap' and how the growth of aquaculture in England (and the wider UK) could help fill this gap. However we are fully aware any growth will be influenced by other practicalities, such as the production envelope of UK waters and social aspects such as community capabilities, jobs and relationships, all of which will need to be considered.

### Question 1

Can you identify any other drivers, both at a national and international level that will require increased seafood production through aquaculture in England?

FSA advice is that our diet should include two portions of fish a week. To achieve this, around a million tonnes of fish a year is required – how can aquaculture in England realistically contribute to stimulating and meeting increasing demand for fish?

### Detailed example: The requirement for meeting demand in the UK

Total UK seafood consumption in 2009 was 519,000 tonnes (MMO<sup>18</sup>), of this, imported seafood currently accounts for around 80% (415,200 tonnes).<sup>19</sup>

If we were to replace 50% of these imports through domestic aquaculture, annual aquaculture production would need to increase by 207,600 tonnes. If this increase reflected current eating habits (75% made up by fish and 25% by shellfish), this means aquaculture producing:

- **155,700 tonnes of fish per**
- **51,900 tonnes of shellfish per year\***

\* The true figure for shellfish is likely to be close to double this as the majority of shellfish imports arrive pre-processed.

In addition to this, the proportion of current seafood landings in the UK that is considered to come from unsustainable sources is estimated at 26%. If we were to replace this through aquaculture we would need to produce:

- **69,000 tonnes of fish**
- **23,000 tonnes of shellfish**

Finally, demand in the UK currently falls short of the FSA recommended two portions of seafood per person a week. If this advice was met by UK consumers, around **1,000,000 tonnes of seafood**<sup>20</sup> would be required, which would see seafood consumption almost double in the UK.

<sup>18</sup> Marine Management Organisation: <http://marinemanagement.org.uk/fisheries/statistics/annual.htm>

<sup>19</sup> The majority of the exports were mackerel, herring, salmon, cod, scallops and nephrops. The majority of imports were cod, haddock, salmon, shrimp and tuna (MMO).

<sup>20</sup> This is based on NHS advice of a portion size of 140gms (71,000,000 (population) x 140gms (portion size) x 2 (portions) x 52 (weeks) = 1,033,000 tonnes). If waste from processing is taken into account (a ratio of around 2:1 for fish, 4:1 for shellfish), this would mean the UK needing 1.5 million tonnes of fish and 1 million tonnes of shellfish to meet demand.

## Barriers and Constraints Currently Affecting the Development of Aquaculture in England

Developing an English aquaculture industry that is several orders of magnitude greater than current levels is seen by the English Aquaculture Plan Consultation Group as being technically feasible with existing technologies, or easily foreseeable with developments and advances in those technologies. However, creating that scale of increase within current market conditions and regulatory controls is seen as near impossible.

The English Aquaculture Plan Consultation Group has identified a number of barriers and constraints that are currently preventing the development and expansion of the aquaculture industry. These constraints are varied and range from access to finance to the public perception of seafood and their lack of willingness to try novel species. The tables below present a distillation of the key barriers and constraints identified by the group into key themes which will influence the development of the Plan.

To summarise, those key barriers are:

- Access to investment finance;
- Technological challenges;
- Environmental quality issues;
- Environmental management regulations and planning;
- Poor consumer understanding/perceptions;
- Market competition with imported seafood products

Theme	Examples of Barriers and Constraints
<b>Access to investment finance</b>	<p>The aquaculture industry is unable to take advantage of market opportunities due to difficulties in accessing investment finance resulting from such barriers as:</p> <ul style="list-style-type: none"> <li>• Poor investment profile / high risk ranking</li> <li>• Low investor confidence</li> <li>• Lack of good data on industry performance</li> <li>• Lack of security of tenure (e.g. Several Regulating Orders)</li> <li>• Lack of current profit margins within certain sections of the industry which therefore limits resources for investment into R&amp;D</li> </ul>

Question 2
<p>Access to investment finance, resulting from such barriers as high risk ranking and lack of security of tenure, is currently affecting the development and expansion of the aquaculture industry.</p> <p>Can you provide details of any other investment barriers?</p> <p>Do you have comments on how these problems can best be mitigated?</p>

Theme	Examples of Barriers and Constraints
<p><b>Technological Challenges</b></p>	<p>The aquaculture industry faces a variety of technological challenges and there are a series of barriers preventing them being met:</p> <ul style="list-style-type: none"> <li>• Disease issues and lack of availability of treatments/management options</li> <li>• Any issues relating to farmed animal welfare, end product quality and safety (e.g. controlling maturation in farmed stock, harvest technology, presence of Norovirus in farmed shellfish)</li> <li>• Lack of innovation and trials of novel species</li> <li>• Lack of inter-sector technology transfer</li> <li>• Insufficient applied innovation research funding</li> <li>• Lack of aquaculture research and development capacity and expertise (in the UK)</li> <li>• Formulated diets for finfish (reducing reliance on wild fish in feeds)</li> <li>• Education of retailers</li> <li>• Production of juvenile fish for on-growing</li> </ul>

**Question 3**

Do you agree with the English Aquaculture Plan Consultation Groups assessment of the scope of technological challenges currently acting as barriers to expansion and development?

Can you provide details of any other technological barriers?

Do you have comments on how these problems can best be mitigated?

Theme	Examples of Barriers and Constraints
<b>Environmental Quality</b>	<p>Aquaculture developments require good quality environments in terms of water quality and ecological function. These factors result in a number of barriers to the development or expansion of aquaculture:</p> <ul style="list-style-type: none"> <li>• Poor water quality in some inshore areas,</li> <li>• Many shellfisheries near to densely populated urban areas which pose more challenges to improve</li> <li>• Diffuse pollution and or eutrophication</li> <li>• Need to establish stringent standards under the Water Framework Directive to achieve a high level of protection for aquaculture waters.</li> <li>• Cost of waste water improvements increasing water bills to householders and industry</li> </ul>

**Question 4**

Do you agree that access to waters of the required quality is a fundamental constraint to current and future aquaculture production?

Can you provide details of any other environmental quality barriers?

Do you have comments on how these problems can best be mitigated?

Theme	Examples of Barriers and Constraints
<p><b>Environmental Management Regulations and Planning</b></p>	<p>Terrestrial and marine aquaculture developments require access to suitable sites for development. The consenting process for both is perceived to be a barrier to development, particularly for small enterprises. Key issues include:</p> <ul style="list-style-type: none"> <li>• Complex and potentially expensive consenting processes (terrestrial planning permission/obtaining marine consents particularly within protected sites)</li> <li>• An absence of strategic terrestrial planning acknowledging the role that aquaculture has in addressing food security issues</li> <li>• Overly-precautionary Marine Protected Areas protection</li> </ul>

**Question 5**

Do you agree with the general principal that the terrestrial planning application and marine consent processes along with environmental assessments could be streamlined in order to remove time and cost barriers currently constraining aquaculture development?

Can you provide details of any other environmental management regulation or planning barriers?

Do you have comments on how these problems can best be mitigated?

Theme	Examples of Barriers and Constraints
<p><b>Poor Consumer Understanding/Perceptions</b></p>	<p>Market research and qualitative consumer focus group activity demonstrates many positive messages relating to seafood consumption. However, recent work also suggests a lack of consumer understanding and awareness of aquaculture and seafood cultivation. Specifically, work carried out across the UK as part of the “Better Marketing and Improved Image” work stream of <i>A Fresh Start, The Strategic Framework for Scottish Aquaculture</i><sup>21</sup> indicates that knowledge gaps and misperceptions include:</p> <ul style="list-style-type: none"> <li>• The meaning of the term “aquaculture”</li> <li>• Lack of awareness of the variety of husbandry methods and species cultivated</li> <li>• Mis-information on impact of aquaculture from negative media coverage</li> <li>• Lack of interest/understanding in the potential for development of aquaculture to address the seafood gap</li> <li>• Limited public understanding of shellfish</li> <li>• Lack of consumer confidence in what to do with seafood product</li> </ul>

**Question 6**

Do you agree that limited public understanding of aquaculture requires addressing to facilitate future market development and social acceptance?

Can you provide details of any other consumer understanding/perception barriers?

Do you have comments on how these problems can best be mitigated?

What steps do you feel need to be taken to address public understanding and acceptance of aquaculture to facilitate future market development and further acceptance of cultivated seafood products?

<sup>21</sup> See [http://www.seafish.org/media/522912/crd\\_aquaculture\\_attitudesandperceptions.pdf](http://www.seafish.org/media/522912/crd_aquaculture_attitudesandperceptions.pdf) for further details

Theme	Examples of Barriers and Constraints
<b>Global Trade and Aquaculture Products</b>	Cheap imports; Competitive disadvantage (production costs); Global sourcing policies. At present, English aquaculture production appears not cost-competitive compared to other seafood production areas, globally.

**Question 7**

How do you see that situation changing, and in the short term how can English aquaculture develop to compete within the seafood market?

**Question 8**

Are you aware of any other barriers that hinder the development of aquaculture in England?  
Please provide details of your experiences with any barriers you have encountered.

## Opportunities for Change

The English Aquaculture Plan Consultation Group has developed a series of overarching and sector-specific recommendations that aim to address the constraints and barriers to the English aquaculture industry, achieving the necessary increase in production output to address food security and health issues.

### Legislative and regulatory constraints

In order to encourage a rapidly developing and evolving industry there will need to be some review and adjustment to various legislative constraints that are currently hindering expansion of the aquaculture industry, but which do not appear to hinder other industries to the same extent, such as agriculture, capture fisheries, manufacturing or the waste water industry. Cefas, on behalf of Defra, has recently undertaken a study into the regulatory burdens affecting the industry. That work is currently being finalised, and the results will inform the English Aquaculture Plan.

The English Aquaculture Plan is timely in that there are opportunities presented by the marine planning provisions within the Marine and Coastal Access Act, as well as opportunities for expanding production alongside renewable energy and the production of marine biofuels. However, expansion must be sustainable and in line with environmental commitments and EU legislation. There are existing legal obligations under UK and EU legislation which must be complied with and built into any development plans for aquaculture. Also the “Water for Life<sup>22</sup>” White Paper, published in early Dec 2011, re-confirms Defra’s commitment to a catchment based approach to tackling water quality issues, as well as a range of other concerns about water abstraction and the high cost of water bills in the South West of England. This offers new opportunities for promoting aquaculture and tackling water quality issues.

A complex regulatory system has evolved in order to minimise negative effects, but in some areas this has also become unnecessarily inhibitive to expansion and development of the industry without contributing effectively to environmental protection.

There are also a number of legal obligations for fish and shellfish farmers emanating from the European Union such as the Water Framework Directive, Marine Strategy Framework Directive, Habitats Directive, Birds Directive, and Aquatic Animal Health Directive most of which have now been transposed into UK law. This provides a mass of regulation which is very complicated for fish and shellfish farmers to interpret and manage. Increased levels of practical guidance are needed so that these regulations can be understood and acted upon.

Above all, the Aquaculture Plan should ensure that an expanding industry continues to be a ‘good neighbour’ and one that any community would be happy to have in its midst.

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<sup>22</sup> <http://www.defra.gov.uk/environment/quality/water/legislation/whitepaper>



## Research and Development, Guidance and Information

To meet the aim of achieving sustainable development of the English Aquaculture industry, a high standard of supporting science and technical guidance for the optimal management of existing activities will be required. It is anticipated that industry innovation will also be a key part of the process. The challenge associated with this is to ensure that the necessary research and technological development infrastructures are coordinated, and there are some examples of how this has been done elsewhere, with input from government and multiple stakeholders, such as the Scottish Aquaculture Research Forum (SARF). With budgets under increasing pressure, coordination, partnership working and providing added-value to supporting science and technology through the development of collaborations and consortia has never been more important. Clearly, it is also important that there is a system of joined up research and exchange of ideas between the devolved administrations. The facilitation of information exchange should be a top priority.

Industry itself is likely to continue to invest in technical development programmes to support improvements in production efficiencies, and within the public sector there are supporting mechanisms such as the Technology Strategy Board (TSB) that will help facilitate this work. There will also remain a need for government to critically assess the requirement for supporting science in some key areas that would be unlikely to be funded by industry, but which relate to the public good, such as environmental resource management, animal health and welfare, and food safety. In order to be successful, Government and other research funding bodies such as the Biotechnology and Biological Sciences Research Council, National Environment Research Council, will need to provide an appropriate level of investment for science supporting the industry's development, and it is clear that this allocation needs to be well-managed and strongly aligned with a developing industry in England.

Research expertise and associated infrastructures are already in place in England (principally within academic institutions and Cefas), but these would benefit from operating within a defined English strategic framework, possibly in coordination with a proposed new English Aquaculture body.

Technical issues are unlikely to act as long-term barriers to developing the industry and for the Plan to succeed there needs to be political support, and an “enabling” legislative framework, combined with investment in research and development to allow the sector to realise its potential as a significant contributor to food security in the UK.

## Access to Finance

In order to enable expansion the aquaculture industry needs to be able to reinvest its own profits and attract long term investment. For this to happen, the industry needs to be able to demonstrate that it is a long term prospect, with security of tenure and expanding markets e.g. leases or Several Orders need to be guaranteed for their full term with a presumption of renewal and be hereditary and transferable. They will then become a securable asset with a recognised value and can be used as loan collateral. Initial de-risking of investment of aquaculture through the establishment of loan guarantee schemes, clarifying eligibility for the Enterprise Finance Guarantee and by provision of tax incentives (for example, allowing producers to offset income against industry self insurance schemes), has been identified as vital to attract investment. Once the industry is recognised as being an established, profitable enterprise with quantifiable risks, with a mature, proportionate and well-designed regulatory regime, and given strategic

policy support by Government then access to finance through reinvestment, bank loans and private finance will become more readily available.

## Industry Promotion

To significantly increase its market share, the English aquaculture industry will need to be diverse in terms of cultured species, culture methods and cultivation environments. There will also be wide variations in business models and scale of production. However, what all facets of the industry share is a degree of ignorance of its activities shown by consumers, legislators and commentators. Formation of an industry promotional body is seen as a vital link between the industry and outside observers to ensure that accurate and relevant information is available for the rational development of the industry. The key tasks of the promotional body will be:

- To promote development of the English aquaculture industry
- To promote consumption of its products
- To develop wider understanding of English aquaculture
- To provide an information hub within the industry
- To provide a contact point for government and media
- To work in partnership with Government to fully develop the English Aquaculture Plan.

Formation of an industry promotional body, nominally referred to as 'Aquaculture England', is seen as a vital link between the industry and all other interested parties to ensure that accurate and relevant information is available for the rational development of the industry.

The use of the media to raise the profile of Aquaculture amongst consumers and to illustrate the importance English produced Aquaculture could contribute to the UK production industry should not be underestimated. Both government through Defra and once established Aquaculture England should share responsibility for providing appropriate media outlets with a regular feed of statements and stories on policies and ideas which demonstrate the value of English aquaculture. In addition, English aquaculture will require the support of Defra to raise the profile and defend the interests of English aquaculture internationally and within the EU.

## Recommendations

The tables below present a distillation of recommendations from the English Aquaculture Plan Consultation Group along with short explanations of each. For the purpose of this consultation we would like to receive informed views on these recommendations and suggestions of alternative solutions.

### Promotion, support and research

**Issue:** Limited access to finance to fund aquaculture development

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** Improve access to finance. In order to achieve a significant, sustainable expansion and continued development of the English aquaculture industry at a rate of growth that will not be naturally supported by the current economics, there will need to be a degree of short term support.

We recommend that actions are taken to de-risk investment in aquaculture by:

- Long term tenure and heritability of leases/Several Orders
- Loan guarantee schemes e.g. Enterprise Finance Guarantee Scheme or tax incentives for investment
- Underwriting insurance

General assistance through:

- Strategic policy support for expansion of aquaculture
- Inclusion of English aquaculture products in institutional purchasing
- Funding of generic promotions
- Financial assistance to social and cooperative groups
- Access to rural development programme initiatives
- Funding of industry training facilities
- Inclusion of vessel purchasing in capital grant schemes
- Ensure improved access to successor of European Fisheries Fund (EFF)

#### Question 9

Do you agree that the English aquaculture industry would improve access to finance through these suggestions?

How do you see the suggestions being taken forward by Government/industry?

Do you have any additional suggestions?

## Department for Environment, Food and Rural Affairs

**Issue:** Improving industry representation, communication and provision of information

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** Consideration of developing an industry Inter Branch Organisations / promotional body.

There is currently consideration being given to the best way to how best represent and promote the aquaculture and fisheries sectors. The English aquaculture industry is keen to improve communication and understanding of their sector. At an industry level, companies and trade associations, often through the use of the European Fisheries Fund, have undertaken both generic and targeted promotional activity in addition to ongoing representational activity. National organisations and government departments have undertaken campaigns advocating increased consumption of seafood. At a European level, the reform of the Common Fisheries Policy, which includes aquaculture, along with the reform of the Common Organisation of the Markets, places a heavier emphasis on the future development of Producer Organisations and Inter Branch Organisations. Within the UK, a discussion has recently taken place over the role and future of the Seafish Industry Authority, whilst within devolved nations, different approaches have been taken to the promotion of aquaculture, ranging from industry initiatives to government sponsored projects and events, both across the UK and abroad.

Industry agree that increased activity needs to take place to develop a stronger relationship between the aquaculture sector and third parties and to ensure that accurate and relevant information is provided to assist in the further development of the sector. It is suggested that key tasks which need to be undertaken could include:

- To promote development of the English aquaculture industry
- To promote consumption of aquaculture produce
- To develop wider understanding of English aquaculture
- To provide an information hub within the industry and for the general public
- To provide a contact point for consumers / media

### Question 10

Do you agree that the creation of an industry promotional body 'Aquaculture England' will facilitate the development of the English aquaculture industry?

What other tasks (if any), do you see/would be appropriate for such a body to undertake?

How would you suggest such a body would be funded? (For example - through existing budgets? Levy schemes?).

How best do you feel the English aquaculture sector can achieve improved communication and dissemination of information? What messages and information do the industry need to promote and what activities does the industry need to undertake to achieve this?

## Department for Environment, Food and Rural Affairs

**Issue:** Current lack of coordinated approach to aquaculture technology and training

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** Establish a national technical body responsible for coordinating aquaculture technology and training. This body would provide technical and scientific solutions to existing bottle necks and develop new technologies to enable future growth of industry.

It is envisaged that such a facility would incorporate existing colleges, academic institutions and training schemes / qualifications, both in England and elsewhere in the United Kingdom.

Such a centre would also provide technical and managerial education producing a highly skilled and knowledgeable workforce for the industry.

### Question 11

Do you agree that the creation of a national body responsible for aquaculture technology and training would provide the English aquaculture industry with the appropriate technical and training capacity to meet its current and future needs?

How would you suggest such a body would be funded?

Please highlight existing institutions and initiatives which could be considered under the scope of any such body.

What advantages and disadvantages do you see in having one merged body that covers both promotional and technical work?

## Department for Environment, Food and Rural Affairs

**Issue:** Lack of clarity of Governments role in aquaculture

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** The English Aquaculture Plan Consultation Group believes the Defra family and wider Government can support the development of aquaculture in England, by promoting aquaculture as a solution to wider government issues and identifying opportunities where aquaculture can deliver wider government policy outcomes (e.g. food security, health benefits, economic drivers, etc.).

Furthermore the English Aquaculture Plan Consultation Group believes there is further scope for Defra to raise the profile of English Aquaculture internationally and within the EU. The English Aquaculture Plan Consultation Group also believes that Defra needs to show support by investing in R&D for the developing industry, to a similar level as the investment supporting capture fisheries in England and Wales.

### Question 12

Do you agree this is the type of support that would benefit the industry? Can you suggest any alternative areas where greater support from Defra and its family would further develop the Aquaculture Industry in England?

In addition to providing finance, how else could the Government support the English aquaculture industry?

## Department for Environment, Food and Rural Affairs

**Issue:** Current lack of strategic framework for aquaculture research and development

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** Develop a strategic framework for aquaculture research and development relevant to requirements in England including

- Exploring the possibility of forming an English research cluster.
- Exploring the possibility of establishing a group to consider strategic English Aquaculture Research requirements

The effective development of the English Aquaculture industry will require a high standard of scientific and technical guidance. World class research expertise and facilities already exist in England (in academic institutions and Cefas), but these would benefit from operating within a well-defined strategic framework relevant to the requirements of increased aquaculture production in England.

Any research cluster would not operate in isolation, and would need to address existing centres of aquaculture research and development, both in the UK and globally. Specific reference is made to the Scottish Aquaculture Research Forum and European Aquaculture Technology and Innovation Platform.

The research and development agenda, whilst addressing issues of pure research, will be driven by the requirements for applied research outputs specific to industry requirements and for the development of English aquaculture.

### Question 13

In terms of a strategic research framework, including the formation of an English research cluster and Research Forum, please provide suggestions on:

How best should such a network avoid the duplication of other research and development outputs; and

How the research and development agenda be kept relevant to the applied needs of industry

What sources of funding can you suggest the industry can use to finance additional research and development, and what are your experiences of using them?

What research are you aware of that already exists and would be of use to the aquaculture industry?

What, if any, additional research and development do you think is required to assist with the development of the industry?

## Department for Environment, Food and Rural Affairs

**Issue:** Need to improve consumer understanding and perceptions of the aquaculture industry and of its products.

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** Develop an Aquaculture Communications Strategy, owned and developed by English Aquaculture to:

- Promote a strong, clear and consistent message.
- Promote wider awareness of the vital role of Aquaculture in addressing food security issues.
- Highlight the ecological sustainable aspects of an expanding aquaculture industry.
- Promote an evidence-based approach to influence government and public understanding of aquaculture.
- Connect with the public
  - Increasing Public Awareness
    - Demonstrate what and how aquaculture species are cultivated
    - Highlight sustainability aspects
  - Health & Nutrition Benefits
  - Eating Aquaculture Products
    - Recipes, “How to” guides etc.
- Represent sector level interests with government, media, international agencies and other organisations.
- Develop and maintain the English aquaculture portal.
- Provide a one stop shop for aquaculture information.
- Build the capacity within a national body to implement the communications strategy.

### Question 14

Do you agree that the development of an Aquaculture Communications Strategy (owned and developed by Aquaculture England) would improve the wider understanding and perception of the English aquaculture industry and its products?

Do you have any suggestions on how that could be achieved?

What/how do you see existing bodies/funding/organisations assisting in the development and delivery of a communications strategy?



## Department for Environment, Food and Rural Affairs

**Issue:** Market development and promotion

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** The English aquaculture plan, via Aquaculture England and industry associations, can assist in developing the market for English aquaculture through:

- Undertaking a stocktake of existing market research to establish existing knowledge and identify and prioritise areas for future research.
- Consulting on a sector-wide image/brand for English aquaculture based on market research.
- Developing a strategy in partnership with the Department for Business, Innovation and Skills (BIS) to promote English aquaculture sector exports.
- Continuing to seek improvements in access to current markets and to access new markets following on from the market research programme.
- Understanding consumer preferences.

### Question 15

Do you agree with the general principal that market development, within the UK and abroad, will enable and promote growth of the English aquaculture industry and that sufficient support should be provided?

Do you have any suggestions on how the aquaculture industry should develop to meet changing market demands?

**Department for Environment, Food and Rural Affairs**

**Issue:** Access to aquaculture government policy advice and support

**Sector:** Finfish/Shellfish/Novel/All

**Recommendation:** The English Aquaculture Plan Consultation Group has identified that Aquaculture producers may benefit from increased access to and communication with Government on a range of aquaculture issues and policy development.

**Question 16**

Describe the level of advice and support from Government (both local and central) you require on Aquaculture issues and outline your preferences for keeping in touch on policy developments.

Which sections of Government do you have to work with (in terms of regulations, form filling, influencing policy), and to what end?

## Finfish

**Issue:** Planning regulations hindering expansion of aquaculture industry

**Sector:** Terrestrial Fin-fish Farming/Aquaponics

**Recommendation:** Ensure the recent review of planning regulations enables access to land for the aquaculture industry.

In order to encourage a rapidly developing and evolving terrestrial aquaculture industry (open water and recirculation systems) there is an urgent need to ensure aquaculture development benefits from being recognised in appropriate national and local planning documents.

<b>Question 17</b>
Do you have any comments on how planning affects aquaculture development in England?

## Department for Environment, Food and Rural Affairs

**Issue:** Development of technology supporting sustainable development for the industry

**Sector:** Common to all Fin-fish Farming

**Recommendation:** Priority is given to the development of technology supporting sustainable development for the industry. In order to create a more sustainable industry there is a need to support key areas of research and development. Actions in this area should involve:

- Continuing to focus on more strategic use of fish meal and oil from sustainable wild fisheries and the use of trimmings and alternative sources particularly of long chain omega 3 oils
- Supporting the development of vaccines and medicines
- Supporting innovation in recirculation systems technology.
- Investigating the potential for integrated multi-trophic aquaculture (IMTA) to provide economically viable products and reduce waste.
- Investigating the potential for integration of aquaculture with new technologies such as renewable energy and anaerobic digestion.

### Question 18

Do you agree with the priorities relating to research and development identified by the English Aquaculture Plan Consultation Group for finfish and can you suggest others that you regard as important for the industry's sustainable development?

What sources of funding can you suggest the industry can use to finance research and development, and what are your experiences of using them?

What research are you aware of that already exists and would be of use to the aquaculture industry?

## Coastal and offshore aquaculture

**Issue:** Streamlined consents process required to enable expansion of industry

**Sector:** Marine Fin-fish/Shellfish Culture/Offshore aquaculture

**Recommendation:** The development of a streamlined route through assessments to consents is a priority. Significant delays have been experienced in gaining consents resulting from environmental assessments of marine developments in European Marine Sites and Marine Protected Areas. There is a clear need for a more streamlined approach to the consenting process and for it to be applied equally in all English regions.

Development should not be stifled by the 'precautionary principle' when a viable risk-based adaptive management approach provides an alternative means of ensuring statutory level of protection to environmentally protected habitats and species. Defra's Fisheries 2027 report highlights that "*A significant amount of the fish we eat is farmed and the environmental impacts of aquaculture are acceptable.*" Guidance should be issued to Statutory Nature Conservation Bodies (SNCBs) to this effect.

### Question 19

Do you have any comments on the consenting and environmental assessment process for marine aquaculture developments, and any suggestions on how this can be improved?

What is your experience of the 'Precautionary Principle' applied in England, and how/why do you think it should be applied differently in respect of aquaculture?

## Department for Environment, Food and Rural Affairs

**Issue:** Integration of aquaculture in development of Marine Plans required

**Sector:** Marine Fin-fish/Shellfish Culture/Offshore aquaculture

**Recommendation:** The needs of aquaculture should be integral to the development of Marine Plans. If the industry is to develop sufficient offshore production capacity to ensure that the large scale increases that have been identified and met, then significant numbers of farms will need to be established in the offshore zone.

It is vital that the industry is afforded the opportunity to expand from base zero within the Marine Planning and associated consenting process.

There is a need for the aquaculture industry to participate in the development of Marine Plans and that adequate opportunity to engage with the process is provided.

### Question 20

How should the aquaculture industry ensure the future needs of aquaculture are further integrated into the development of Marine Plans?

## Department for Environment, Food and Rural Affairs

**Issue:** Need to address technological challenges facing various sectors within the industry

**Sector:** Offshore Fin-fish and Shellfish culture

**Recommendation:** Research should be focused on key technological challenges facing these sectors. Although offshore shellfish production has been pioneered successfully in Cornwall there is a clear need for further development of equipment and techniques if this sector is to realise its large scale growth potential. Areas of focus include:

- Development of cultivation methods and equipment suitable for exposed and offshore waters
- Development of servicing and harvesting equipment suitable for exposed and offshore waters
- Develop operating systems and protocols for grading, feeding and harvesting, suitable for use in exposed and offshore areas
- Develop power generation suitable for use in exposed and offshore areas

### Question 21

Are there other areas of technological challenges facing these developing sectors?

How should the industry address these challenges, and what sources of funding are available?

## Department for Environment, Food and Rural Affairs

**Issue:** Long-term security needed for further development and expansion of industry

**Sector:** Leases and Several Orders

**Recommendation:** Leases and Several Orders should be de facto permanent, heritable and tradable in order to provide security of tenure. Long-term security of tenure on leases or Several Orders is vital if the aquaculture industry is to be able to reinvest its own profits and attract long term investment. Leases or Several orders need to be de facto permanent, heritable and tradable. They will then become a securable asset with a recognised value and can be used as loan collateral enabling development and expansion.

### Question 22

Do you agree that in order to provide long-term security of tenure essential to enable and attract long-term investment, leases or Several Orders should be de facto permanent, heritable and tradable?

### Question 23

Are there any further comments you wish to make or evidence you wish to present on this consultation?

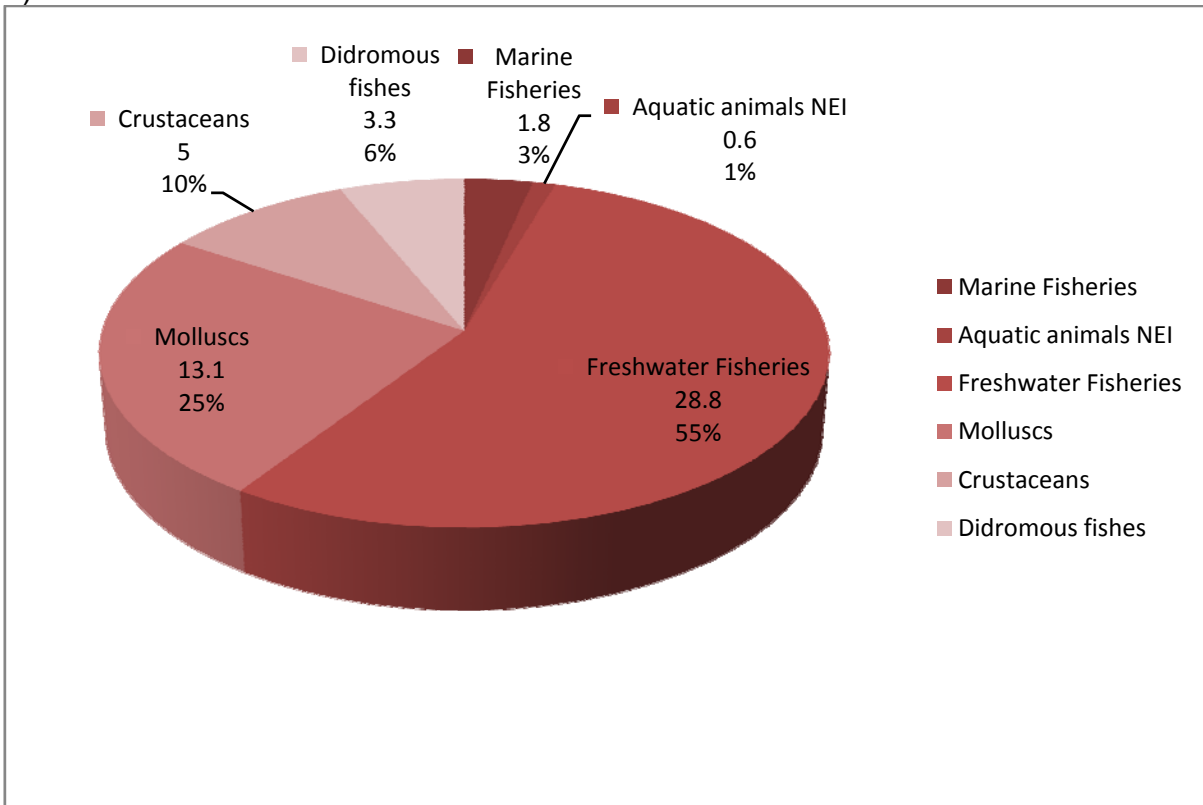
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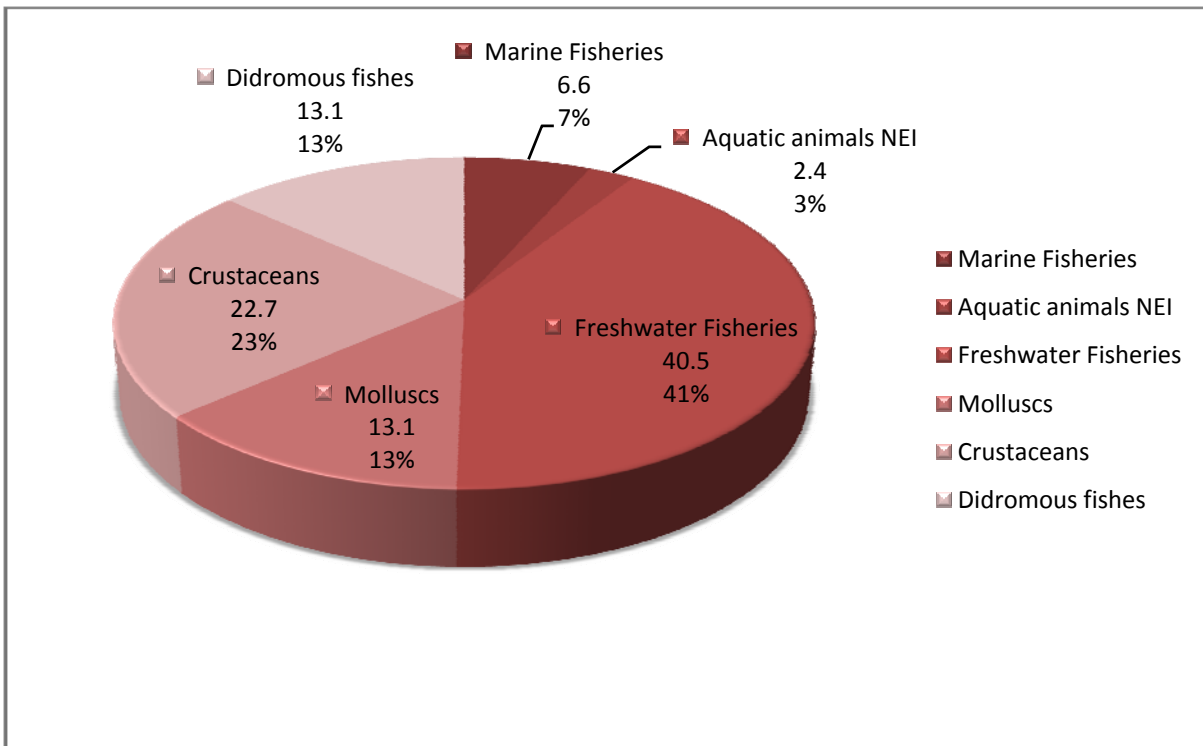
**ANNEX 1**

**The Current State of the Aquaculture Industry**

**Fig 4:** World Aquaculture Production: Major species groups in 2008 (quantity millions of tonnes)<sup>23</sup>

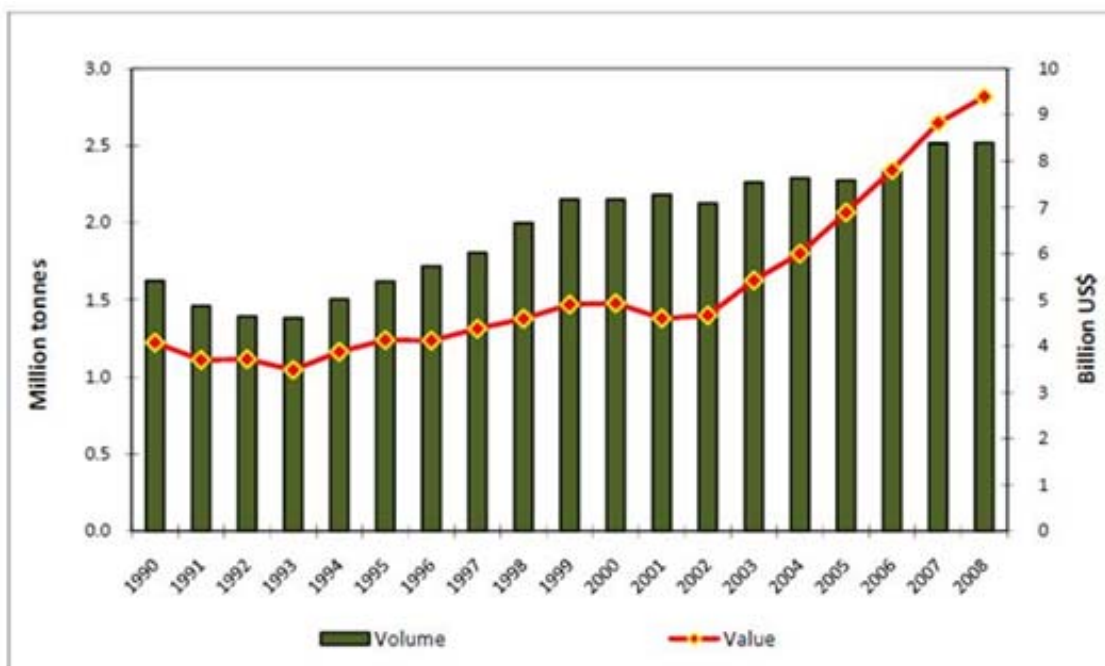


**Fig 5:** Value and Market Share (US\$ Billions)<sup>24</sup>



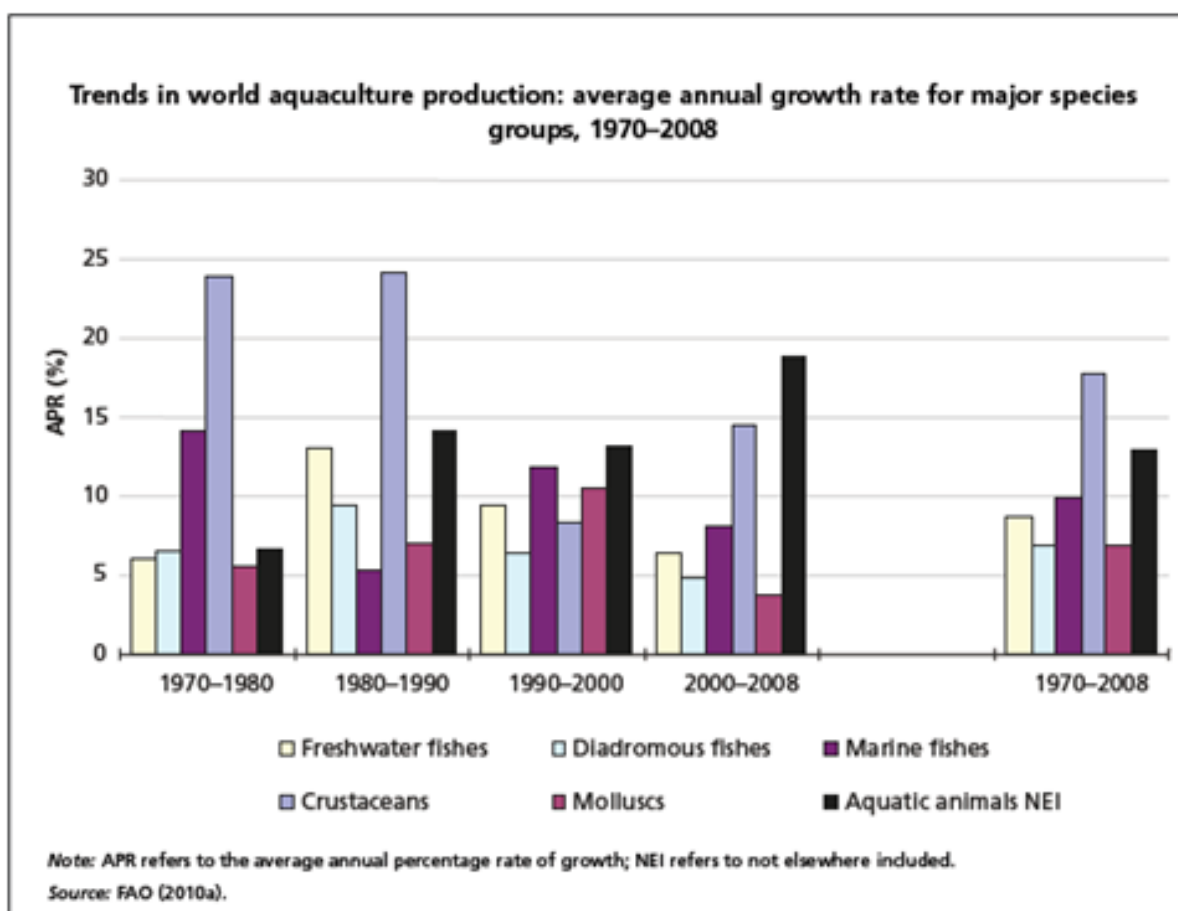
<sup>23</sup> <http://www.fao.org/docrep/014/ba0132e/ba0132e.pdf>

Figure 6<sup>24</sup>:



Aquaculture production quantity (tonnes) and value (US\$ billion) in Europe between 1990 and 2008 (Source: FAO, 2010)

Figure 7<sup>25</sup>:



<sup>24</sup> <http://www.fao.org/docrep/014/i2311e/i2311e.pdf>

<sup>25</sup> <http://www.fao.org/docrep/014/ba0132e/ba0132e.pdf>

## UK context

Aquaculture within England and Wales differs significantly from other parts of the UK such as Scotland. Scotland is undoubtedly the major player in the production of salmonid product (approx 95%) which dominates the UK finfish production figures. Scotland's industry is primarily marine based and also incorporates a significant shellfish sector. However, collectively the English and Welsh industries have more employees than Scotland and have a more species diverse industry which is still mostly locally owned, currently has a greater emphasis on freshwater production and is often situated closer to markets. Table 1 demonstrates the differences between the separate administrations.

**Table 1. The number of businesses and sites in each country (2009)**

	Scotland		England		Wales		Northern Ireland	
	Business	Site	Business	Site	Business	Site	Business	Site
<b>Salmon</b>	72	391	7	7	7	8	2	2
<b>Trout</b>	54	101	130	202	25	28	21	21
<b>Coarse/Ornamental</b>	10	12	115	183	2	2	8	8
<b>Recirculation</b>	1	1	16	16	3	4	1	1
<b>Shellfish</b>	176	339	87	111	11	13	50	61
<b>TOTALS</b>	<b>313</b>	<b>844</b>	<b>335</b>	<b>519</b>	<b>48</b>	<b>55</b>	<b>82</b>	<b>93</b>

Source: Fish Health Inspectorate production figures

## Trout

The trout farming sector operates on a flow through system requiring access to sources of high quality water. Rearing units are usually either concrete raceways, fibreglass tanks, earth ponds and very occasionally cage based.

Restocking fish are usually grown in earth ponds at a lower stock density than the table fish. There are specialist production sectors e.g. fry and fingerling producers, the restocking market, and the table producers. Production units vary in size from large 1,000 tonne producers to farms producing less than 1 tonne. These operations could all be described as small to medium sized enterprises (SME's) mainly run by the owner/operator. There has been some consolidation over recent years to fewer and larger farms.

Two species dominate land based production: rainbow trout, an introduced species farmed for food and also used for restocking angling waters for recreational purposes, and brown trout primarily farmed for the restocking market. Within this sector rainbow trout production dominates for both restocking and table markets. Brown trout production is smaller and almost exclusively produced for restocking angling waters. Other salmonids are also produced but in smaller quantities, e.g. brook trout and Arctic charr.

Farms have a wide geographic distribution across England and are found in areas dictated by availability of water of the required quality. In terms of growth this sector has been fairly static over the last ten years with a very gradual decline in the number of farms.

**Table 2. Size and value of trout sector in England (2009)**

Species	Production (Tonnes)	Economic Value (farm gate)
Rainbow Trout	7,095	£17,028,000
Brown Trout Restocking	359	£1,795,000

Source: Fish Health Inspectorate production figures

## Salmon

England currently has no sites producing salmon for the table market and the sector is very small in comparison to the Scottish salmon industry. There are no cage based salmon farms and most farms are either flow through tanks or recirculation based. The majority of authorised salmon farms are Environment Agency sites using wild brood fish from rivers, which are then stripped, the eggs hatched and grown on for releasing back into the wild as either, fry, parr or smolts.

There are three businesses supplying smolts into the Scottish Industry which in total contribute in the order of 6 million smolts to the Scottish Industry.

The number and value of this restocking sector to the wild and the natural environment is difficult to quantify. However, this value will be reflected further down the chain in fishing revenue and fishery value due to increased catches.

**Table 3. Size and value of salmon sector in England (2009)**

Stage	Production	Economic Value (farm gate)
Smolts	6.033 million fish	£6,033,000
Fry, Parr, Smolts (Wild)	~ 0.7 million fish	Environmental gain.

Source: Fish Health Inspectorate production figures

## Coarse and ornamental

In the order of 90% of all UK coarse and ornamental farming takes place within England. At the beginning of 2009 this represented 183 sites controlled by 115 businesses. This sector mostly uses extensive or semi extensive still water ponds, tanks and poly-tunnels. Site location is more dictated by availability of sites for clay based ponds rather than large quantities of water.

The most common species farmed is the common carp, with the bulk of the production going for re-stocking. The value of these fish increases significantly with size as they cross certain weight barriers. There is a small but growing market for food production of these species at around 5 – 10 tonnes, but the price obtained is usually lower than for the restocking market.

Significant numbers of other coarse fish such as grayling, chub, barbel, dace, and crucians are produced and also numerous ornamental fish such as goldfish, koi and orfe. This figure is in the order of 7 million fish.

There are a few specialist hatcheries producing fry for on growing, but again most are owner operated SME's. This sector also includes a lot of trade in ranched fish e.g. in golf course ponds

and sales of fish that have been cropped from fisheries and other lakes. The number of registered coarse and ornamental fish farms has increased by 56% since 1997 and seems to be still steadily increasing.

The economic value of this sector is likely to have been seriously undervalued in the past due to the nature of the industry, production data recording techniques and only recording table fish. The estimated value of this sector is in the order of £10,000,000.

**Table 4. Size and value of coarse and ornamental sector in England (2009)**

Stage	Production	Economic Value (farm gate)
Carp (table)	10 Tonnes	£25,000
Carp (restocking) & other coarse & ornamental fish	7 million fish	Estimated value of sector £10,000,000

Source: Fish Health Inspectorate production figures

### **New and exotic species (Fresh water - recirculation farming)**

There is only a small production at present but there is increasing interest in farming warm water species for the table in land based recirculation systems.

These types of systems have many advantages, such as being able to control the environment, maximisation of growth rates, location close to markets and lower environmental impact. However, despite optimism around these systems, many have been unsuccessful due to a variety of reasons such as poor system design, lack of marketing, high initial set up costs, lack of experience and high running costs. Producers have developed systems for the intensive production of exotic species such as tilapia, striped bass, barramundi and African catfish. The striped bass and the barramundi farms are no longer in existence but the larger tilapia farms are increasing production.

There are currently approximately 10 farms with an estimated potential production of 750 tonnes of tilapia and 10- 20 tonnes of catfish. There are also sites experimenting in production of prawns and grass carp in recirculation systems as potential diversification projects.

**Table 5. Size and value of land based freshwater recirculation systems in England (2009)**

Species	Production (Tonnes)	Economic Value (farm gate)
Tilapia	112	£246,400
Catfish	7	Estimated £5,500

Source: Fish Health Inspectorate production figures

### **Aquaponics**

This is a new and emerging sector of aquaculture where interest is growing rapidly. It involves the re-use of nutrients from aquaculture by plants during the production of a secondary product in a closed loop system. There are currently no commercial scale units in the UK but several demonstration and experimental units, along with a growing number of serious hobbyists.

## Marine based fin fish aquaculture

### North Wales Recirculation Farms: World Leaders

The UK has two very large high specification pump ashore recirculation farms which are situated in North Wales. One of the units is aiming to produce 1,000 tonnes per annum of premium sea bass by 2011. The site is perhaps one of **the most advanced recirculation fish farms in the world** and is being viewed with interest to see if such large scale systems are commercially viable and a prospect for the future. Given investment this could potentially be a model for further expansion around the coast of England.

There is only one turbot farm remaining in England. This site mixes its own salt water and is a fairly small scale land based project in Lincolnshire.

**Table 6. Size and value of turbot production in England (2009)**

Species	Production (Tonnes)	Economic Value (farm gate)
<b>Turbot (2009)</b>	1.2	£7,200

Source: Fish Health Inspectorate production figures

## Integrated Multi Trophic Aquaculture (IMTA)

The Integrated Multi Trophic Aquaculture approach enables different species to be farmed together at different trophic levels, thus alleviating and reducing any potential environmental impact. There is currently only one IMTA pump ashore system which is located in Wales producing rainbow trout with shellfish and rag-worm in an integrated system.

## Shellfish aquaculture

There are currently 76 authorised shellfish aquaculture production businesses within England and Wales. This number is down from previous figures due to amalgamation of some individuals into shellfish growing areas under the new aquatic animal health legislation.

Production methods vary between either re-laying on the sea bed, using trestles, net cages or ropes. By far and away the bulk of the production is mussels and pacific oysters.

**Table 7. Size and value of farmed shellfish production in England (2009)**

Species	Production (Tonnes)	Economic Value (farm gate)
<b>Native oysters</b>	54	£7 million
<b>Pacific oysters</b>	811	
<b>Mussels</b>	3,800	
<b>Clams</b>	12.8	
<b>Cockles</b>	12.5	

Source: Fish Health Inspectorate production figures

## Department for Environment, Food and Rural Affairs

The farm gate values for each category are difficult to specify exactly due to the nature of the industry and the stage at which they are sold. However, the total value of English shellfish farming is currently estimated to be around £7 million.

In addition to production for the table there is significant hatchery seed production from two established sites (mainly oysters). There is interest in other species such as abalone and lobster which are currently in research or production stages but volumes and values are currently low. The national lobster hatchery in Padstow released about 11,000 juvenile lobsters in 2009 as a means of enhancing wild stocks.

**Employment in English Finfish Culture:** Total employment in the English finfish sector = approximately 800 full time employees.

**Employment in English Shellfish Culture:** Total employment in the English shellfish farming sector = 135 full time and 64 part time employees.