

**Exploring attitudes towards aquaculture development in the UK:  
A consultative stakeholder approach**

**Juliet Memery<sup>1</sup>, Dawn Birch<sup>2</sup>**

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<sup>1</sup> Professor in Marketing, The Business School, Faculty of Management, Bournemouth University, Bournemouth, Dorset, UK

✉ [jmemery@bournemouth.ac.uk](mailto:jmemery@bournemouth.ac.uk)

<sup>2</sup> Senior Lecturer in Marketing, The Business School, Faculty of Management, Bournemouth University, Bournemouth, Dorset, UK

## **Exploring attitudes towards aquaculture development in the UK: A consultative stakeholder approach**

### **Abstract:**

**This study explores attitudes towards aquaculture development as a way of providing a sustainable source of seafood through a consultative stakeholder approach. Given aquaculture is a less familiar concept within South West England, gaining insight of the views and perspectives of such a development in the region is required to facilitate stakeholder engagement. In-depth qualitative interviews investigate attitudes across five stakeholder sectors: government, fishing/marine, business/catering, tourism/leisure, environmental/charity. Findings show a mix of stakeholder attitudes, which differ by industry sector, from very negative to very positive. From this two segments are proposed (Commercially-Focused; Environmentally-Focused) to enable targeted communication and information dissemination strategies based on key areas of concern.**

*Keywords: attitudes, stakeholders, aquaculture, qualitative research, segmentation*

## **1. Introduction**

Food security is a key item on the UK government's agenda, and is an issue attracting attention from major funders keen to explore ways in which this concern may be addressed. One solution is further development of the aquaculture industry, with the UK government recognising the potential for it to contribute to food security in the UK (Defra, 2012). Such expansion is likely to involve developing sites outside of familiar aquaculture territories, so requiring consideration of, and 'buy-in' from, stakeholders in and around the seafood industry in these locations. Stakeholder engagement is a central tenet of any new product/service development to gain understanding, views and perspectives, yet to date little academic literature exists in relation to the aquaculture industry from a wide stakeholder perspective. The research presented here reports on overall attitudes of stakeholders in the South West of England towards aquaculture development in the region. Furthermore it explores whether these attitudes differ across sectors, and outlines implications for future strategies.

## **2. Conceptual Background:**

### *2.1 Defining food security*

Concerns regarding the availability of food as well as access to it are evident throughout history, yet it was not until 1974 that the term 'food security' was formalised as a concept at the first World Food Conference. The definition of 'food security' has evolved over time from being demand and supply focused to include the individual and household levels of measurement, with the 1996 World Food Summit stating "*Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life*" (FAO, 2006). The World Health Organisation consider the concept of 'food security' to be built on three pillars: food availability, food access, and food use (WHO, 2014), with the Food and Agriculture Organisation adding a fourth – stability (FOA, 2006). Hence food security can be seen as a complex issue linked to health, the environment, economic development and trade.

### *2.2 The policy context: food security and aquaculture*

A number of challenges and risks exist to achieving food security e.g. population growth, climate change, land use, etc. meaning alternative methods of producing food (and nutrition), need to be considered. Fish, as an animal protein source is considered one of the most efficient converters of feed into high quality food (HLPE, 2014). However, seafood sustainability, and as a result food security, has become of increasing societal concern as marine environments

have been put under pressure due to a growing global population, resulting in problems arising from factors such as overfishing and environmental destruction (Ocean Wise, 2013; Sustain, 2013). Currently 85 percent of the world's fisheries are fished at or beyond their maximum sustainable limit due to "irresponsible fishing practices" which have resulted in a high level of depleted stocks (Bassan, 2011). Hence aquaculture is playing an increasingly important role in global food supply and security (FAO, 2014) as a way of providing a sustainable source of seafood to meet global demands for safe and healthy protein as wild catch declines.

Aquaculture is defined as "the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants and implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc." (FAO, 1988). It entails fish farming in inland reservoirs or in sea cages and is the fastest growing way in which to source seafood (The Fish Site, 2012). According to the FAO (2014) almost 50 percent of seafood consumption resulted from aquaculture in 2012 with this share projected to rise to 62 percent by 2030. In the UK, aquaculture is critical for the sustainable supply of seafood for the local population and to this end the UK government has identified "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" (Defra, 2012).

### *2.3 Benefits and concerns of aquaculture development*

The predominant benefits associated with a well-developed aquaculture industry include improved food security, meeting the growing demand for sustainable seafood, and improved health (Defra, 2012, p.11). When compared with other types of livestock farming, sustainable aquaculture has the environmental benefit of no requirement for arable land, less reliance on freshwater, improved food conversion rates and lower greenhouse gas emissions (Defra, 2012). Given it is dependent upon pristine water quality, the aquaculture industry serves to protect the aquatic environment; further, wild stocks may benefit from research conducted on farmed species (Scottish Government, 2002). Economic benefits are found to be in the form of improved economic growth, diversification of the local economy, improved infrastructure and direct and indirect employment opportunities, particularly in rural communities (Defra, 2012; Scottish Government, 2002; White and Costelloe, 1999). Social benefits of aquaculture include access to a consistent and more varied supply of high quality, safe, nutritious and more affordable seafood, improved diet, reduced pressure on wild stocks and a varied landscape (Defra, 2012; Scottish Government, 2002). Moreover, as a result of increased employment opportunities, communities enjoy greater job security, technical skills development, improved

well-being, and the development of social capital (Lantra, 2006; White and Costelloe 1999), and “poverty alleviation” (Hinrichsen, 2007, p.26).

Despite these numerous benefits, aquaculture has been associated with detrimental impacts on the environment. Major concerns relate to pollution and eutrophication, negative impacts on water quality, fragile eco-systems and marine environments and the associated costs to manage these impacts (Defra, 2012; Hambrey and Southall, 2005). Aquaculture also faces image problems due to consumers’ general lack of awareness and knowledge of the seafood category and limited understanding of aquaculture, exacerbated by negative media coverage. Key concerns include disease, impacts on wild stocks, parasites, chemical treatments, animal welfare, fish feeding methods, product quality and safety (Defra, 2012; Hambrey and Southall, 2005; Tiller et al., 2014). Social and economic drawbacks include loss of access to common resources for other users including recreational and commercial activities (Scottish Government 2002; White and Costelloe, 1999). Competition for the use of coastal waters at the exclusion of other uses, such as tourism, and reduced access has also been identified as a major source of conflict (Nimmo and Cappell, 2009; Tiller et al., 2014). Moreover, aquaculture can have negative impacts on commercial wild-catch fisheries (Hambrey and Southall, 2005; Tiller et al., 2014).

#### *2.4 Aquaculture and Stakeholders*

Whilst aquaculture may address certain issues around food security and nutrition, it also raises concerns regarding how such fish value chains are managed, the contributions and roles of those within them (HLPE, 2014) and the impact on stakeholders around them. Given the diversity of the fishing sector, from individual fishermen to fishing communities to multi-national fishing companies, the impact of trading practices and decisions within the industry make it prone to significant inequalities (Burbridge, et al., 2001). This, together with the impact potential developments could have on a wider group of stakeholders in the locality, requires transparency and inclusivity through greater engagement and information sharing, particularly in an area where activities such as aquaculture are less familiar e.g. South West England. Indeed Hinrichsen (2007, p.26) recommends adequate opportunities for relevant stakeholders to “voice an opinion” about proposed aquaculture ventures, and that perceptions of negative impacts be effectively “managed by the provision of adequate information and active liaison” with the community.

### **3. Methodology**

Eighteen qualitative, semi-structured, in-depth interviews were undertaken with key stakeholders interested in the use of marine waters in South West England, or the associated business/community network surrounding it. Government, fishing/marine, business/catering, and tourism/leisure sectors, as well environmental organisations and charities were represented. In line with past studies (e.g. Georgakopoulos and Thomson, 2008), information was sought from stakeholders who could offer a diverse mix of experiences and perspectives. Open-ended questioning around a proposed aquaculture development site in Cornwall was used to identify pertinent issues in a non-prescriptive format and allow probing, thus gaining a sense of the relative importance of issues. With permission interviews were recorded and transcribed verbatim. Interview transcripts were analysed using NVivo 10 to allow identification of key themes and issues. Template analysis was used to thematically organise and analyse the emergent findings across the various stakeholder groups.

## **4. Findings**

### *4.1 Stakeholder benefits and concerns relating to aquaculture development*

A number of perceived benefits and drawbacks in terms of potential social, environmental and economic impacts associated with aquaculture development in the region were stated. These tended to be in line with those mentioned in previous research with benefits such as food security, economic growth, employment opportunities, (Defra, 2012; Scottish Government, 2002; White and Costelloe, 1999) and ‘social advancement’ (Hinrichsen, 2007) being stated. Identified drawbacks include disease, parasites, animal welfare, fish feeding methods (Defra 2012; Hambrey and Southall, 2005; Tiller et al., 2014) environmental impacts (Defra 2012; Hambrey and Southall, 2005) and access issues (Nimmo and Cappell, 2009; Scottish Government 2002; White and Costelloe, 1999).

### *4.2 Attitudes towards Aquaculture Development*

The business/catering sector was found to have a very positive attitude towards aquaculture development in the region with all respondents in the sector voicing support. Positive perceptions in this sector are based on believing that the enterprise will be good for the local economy and fit well with the regions psyche and the existing food and drink industry in Cornwall. However this attitude was underpinned by the requirement for a high quality output for the market. One business sector respondent stated “*I very much welcome it*”, highlighting the potential knock-on effects of such a development, e.g. the potential to become a renown

food destination. Other business respondents echoed this, with one stating that Cornwall has goodwill toward “any additional 21<sup>st</sup> century style businesses”:

*“I think that aquaculture, done properly, is a 21<sup>st</sup> century industry... it meets the ‘Cornwall psyche’ as well as our tradition of great food and drink... I think there’d be a lot of goodwill because it is one of the sectors that Cornwall’s aware of we need to develop.”*

A respondent servicing domestic and export markets as well as the catering sector, was also very positive about fish farming in the region stating, *“I can’t see nothing but a plus in lots of directions”*, and noted the increasing acceptance of farmed fish, including by local chefs.

The fishing/marine sector displayed a cautiously positive attitude toward aquaculture development in the region based on potential opportunities and perceptions of minimal conflict with existing fishing due to the species in question (i.e. rainbow trout). One respondent, a representative of a Harbour Commissioner, advised that the Commission was positive toward such development as it perceived potential opportunities to become involved as part of the supply chain:

*“if an installation was put in the coast near to us, we might be part of that supply chain... if it didn’t create jobs, it might secure jobs or create a different infrastructure and things that might diversify our own business so... it should be a positive thing.”*

These positive perceptions, however, were balanced with questions regarding the economic and logistical viability of such a development and the need to address potential conflicts and environmental impacts. Hence, interviewees from organisations representing fish producers had mixed views, with one being cautiously positive, considering such development to have *“the potential to be a good thing”* as long as any conflicts could be overcome and there was no adverse environmental impacts, whilst another who deals with issues related to both fisheries and conservation was more neutral/negative, primarily due to scepticism concerning the *“economic and logistical viability”* of such a development.

Respondents from the government sector (local council members) had a neutral attitude overall. While not opposed to aquaculture development, they required more information and assurances that social and environmental issues associated with a fish farm would be addressed. One respondent had a neutral attitude, tending toward negative, primarily based on the need for more information and *“a lot of social and environmental concerns that needs to be addressed first.”* The other also had a neutral attitude, but tending toward positive, accepting that despite concerns, fish farming is *“creating a sustainable product, or trying to... so surely that’s not bad”*.

Analysis of responses from those in the tourism/leisure sector revealed mixed perceptions of the impact aquaculture development would have on local tourism. In keeping with this, overall the tourism/leisure sector had a neutral, tending towards negative attitude. Negative perceptions were mainly associated with the potential scale of such an operation, detrimental environmental impacts, reduced access for other users and activities including recreational activities (beaches, water sports, fishing, etc.) and navigation. A couple of respondents held neutral views and required further information to establish a stronger opinion:

*“Before we would venture to say we’re pro or against it... we would need a lot better information to become informed and then to make an informed decision.”*

Another respondent, a recreational angler, held a very negative attitude toward such development, despite acknowledging the inevitability of fish farming.

*“... if we want eat, if the human race wants to carry on eating fish, I think it’s [fish farming] something we’ve just got to live with.”*

In contrast to other members of the sector, one interviewee from a local tourism organisation was cautiously positive about such a development, dependent upon the size of the operation and the impacts on the environment:

*“If the scale is right and the environmental issues are [not] much, no, I haven’t got a fundamental problem... its fine in principle.”*

Predominately, the environment/charity sector had a negative attitude towards aquaculture development in the region, with two respondents expressing very negative attitudes. Not surprisingly, their negative attitudes were primarily based on concerns about detrimental impacts on the environment, inefficient feeding methods and threats to biodiversity, with them highlighting the need for close assessment and good management to mitigate potential detrimental environment impacts:

*“... there would have to be the most immense environmental impact assessment to cover all of the issues that we have and to say how they would overcome those issues which will be, obviously, incredibly tough, tough thing to do but possible.”*

Three interviewees from this sector were more positive toward aquaculture development believing that if “done well” by taking into consideration lessons learnt from elsewhere and focusing on attaining high standards and best practice it could represent a “*fantastic opportunity to do something really exciting*”. However, one of these respondents warned that such development is “*fraught with pit falls if it’s done as it’s always been done*” but states:

*“If it’s done in a way that really is new and exciting, then it has a fantastic potential for the rest of the world really... that would be awesome.”*

### 4.3 Different Strategies for Different Groups

The thematic analysis identified a range of attitudes across the stakeholder sectors. Stemming from further analysis, similarities and differences between their concerns were identified, and hence their future information needs relating to the development of aquaculture in Cornwall. In terms of similarities, all respondents stated they required further information as to where any aquaculture development site may be placed, proof of economic viability, proof it is environmentally friendly, with any evidence being from a reliable and unbiased source. After this different requirements appear, from which two larger groups (or segments) materialise: the Commercially-Focused Segment and the Environmentally-Focused Segment, each requiring tailored messages and media that fully address the related issues of each group and work towards further engagement and understanding with them.

*The Commercially-Focused Segment* tends to consist of those with more of a business focus, who are more likely to have a neutral to very positive overall attitude, and who see commercial opportunities developing out of aquaculture. In terms of specific information needs, this segment requires evidence of market demand for farmed fish, and investment in supportive marketing/branding of such produce. This is not to say they are not concerned about aquaculture development, more that they can see beneficial outcomes if it is delivered in an appropriate and sustainable way. Key messages should therefore incorporate these elements, such as an “emphasis... on the naturalness of it”, that it is “sustainable” and “producing healthy fish protein” through good animal husbandry methods, alongside a focus on potential business network opportunities and further raising the profile of the premium ‘Cornish’ brand.

*The Environmentally-Focused Segment* tends to cluster those who have more of an environmental and marine preservation focus; hence overall they tend to have a neutral to negative attitude, and are concerned about the impact aquaculture development has on the surrounding habitat. This is not to say they will not potentially support such development, more that they require further information to be able to assess the proposition and make an informed decision of their stance. In terms of segment specific information they require clear process and methods for on-going stakeholder engagement, a full environmental impact assessment, mapping of activities in, and users of, the development area, how such a development would be managed/monitored, and evidence any equipment used would be robust against the elements. Hence key messages for this segment should address the methods of producing the product “demonstrating that aquaculture can be done properly... and

responsibly, and emphasise the fact that “it’s innovative, it’s responsible”, that the operation is a “fantastic different kind of modern 21<sup>st</sup> century facility” and that “all we’re doing is harvesting really what’s there in their natural environment in a more cost effective and suitable for market way”, so that “it would be perceived in a different light”.

## **5. Conclusion**

A number of perceived benefits and concerns associated with aquaculture development were stated in line with those identified in past research (e.g. Defra, 2012; White and Costelloe, 1999). Responses show a mix of stakeholder attitudes towards aquaculture development, from very negative to very positive. This differs by industry sector with Government, Business/Catering and Fishing/Marine industries tending to range from neutral to very positive, whilst Tourism/Leisure and Environmental Bodies/Charities are neutral to very negative. From these findings it is established that the information needs of respondents varies dependant on the stakeholder group they are aligned with. Recognising and addressing these differences enables a segmentation strategy for future communications to be proposed, based upon two segments: Commercially-Focused Segment; Environmentally-Focused Segment. Future communication activities, media type, and messages should be adapted accordingly in order to engage, educate, inform and alleviate any concerns regarding the development of the aquaculture industry, or highlight any opportunities it may provide. On-going engagement and consultation is vital within this sector to ‘put minds at rest’. Key players would be prudent to recognise this in order to avoid tension, harbour positive attitudes and develop good working relationships with, and among, these stakeholder groups.

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