SOCIOECONOMIC ANALYSIS OF SFSAG NORTHERN DEMERSAL STOCKS, SCOTLAND UK

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SEEDLY

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EXECUTIVE SUMMARY

The Marine Stewardship Council (MSC) commissioned this study to explore the social and economic impacts experienced by UK fisheries as ax result of becoming MSC certified. In 2020, these issues were explored in the Cornish hake and sardine fisheries, in the South West of England. Now, in 2021, the Scottish Fisheries Sustainability Accreditation Group white fish fishery (SFSAG Northern demersal stocks) has been selected as a case study. The study comprises two parts: i) a survey exploring the socioeconomic impacts of MSC certification with the fishery's stakeholders and ii) an economic analysis comparing the value of SFSAG haddock pre- and post-certification to a non-certified control group.

Social research

To explore the perceived socioeconomic impacts of certification, nine stakeholders comprising fishers, processors, vessel managers and members of fishery management and public bodies, were interviewed by two independent consultants (L Anderson & J Latham). Interview questions examined the perceived and realised socioeconomic benefits of MSC certification, as well as exploring the challenges faced and lessons learned through the certification process.

Economic analysis

The economic component of this study, conducted by NEF Consulting, applied an analysis of the Marine Management Organisation's (MMO) annual sea fisheries statistics to one species under the SFSAG (Scottish Fisheries Sustainable Accreditation Group), Northern Demersal Stocks: haddock. These data were used to explore landing weight and value of the catch, and to calculate quayside price per kilogram. The MSC haddock fishery was then compared with a control group (i.e. a fishery of the same species) that did not have MSC certification. We visually examined price trends to observe any differences between the groups and applied the difference-in-difference (DiD) statistical technique. This statistical analysis tool offered insights as to whether MSC certification might have had an impact.

Key insights:

Social research

- The most frequently cited reasons for the SFSAG Northern demersal stocks fishery undergoing MSC certification were **maintaining market access** (89%); **improved reputation** (78%); and **a higher (or at least retained) price of fish** (33%). Most respondents believed MSC certification was critical to future-proofing the fishery by enabling it to maintain access to UK retail chains.
- The anticipated benefits of certification were realised, with eight out of nine respondents satisfied that market access had been maintained. In addition to maintaining market access, four respondents said MSC certification had **opened up access to new European markets**, including in Denmark, the Netherlands and Italy. That said, the COVID-19 pandemic and the UK's formal exit from the European Union (hereafter referred to as Brexit) had, at least temporarily, hampered the growth of European markets.
- Unforeseen benefits of certification included **improvements in quality control** and improved morale among fishery staff who were **proud to work for an MSC certified fishery.**
- The most common concern associated with MSC certification was the potential **reputational risk of losing certification** in the future.
- 100% of respondents believed the **benefits of MSC certification had outweighed the cost** of becoming certified.

Economic analysis

- Landing volumes and values in both the MSC group and control group did not follow a clear trend in the years following MSC certification.
- For SFSAG haddock, there was a brief rise in landings up to 2013 followed by a year-on-year decline to 2021.
- SFSAG haddock prices rose during the time period but remained lower than the control group.
- In the years following MSC certification, the control group saw a greater increase in price compared to SFSAG haddock. However it is worth noting that the volume of haddock landed by SFSAG is considerably higher than that of the control group.
- Following certification, **SFSAG haddock prices remained more stable compared to the control group**, which experienced high levels of fluctuations across the time period.

1. Introduction

The Marine Stewardship Council (MSC) is an international non-profit organisation that recognises and rewards efforts to protect oceans and safeguard seafood supplies for the future through its ecolabel and certification program.

MSC certification is a way of showing that a fishery meets international best practice for sustainable fishing. Fish and seafood from certified fisheries can carry the [blue MSC ecolabel](), assuring customers that what they're buying is sustainable. At present 446 fisheries are certified against the MSC Fisheries Standard globally. To become certified, fisheries are assessed by independent certification bodies and must demonstrate that they meet the three principles of the MSC Standard: sustainable fish stocks; minimising environmental impact; and effective fisheries management.

The environmental impacts and benefits of certification are examined in detail during the certification process, and then subsequently during annual audits and five-yearly recertifications. The socioeconomic impacts of certification are not audited as part of the fishery assessment process, and are more difficult to determine, in large part due to the complex international markets and supply chains within which fisheries operate.

A number of studies have begun to explore the economic benefits associated with MSC certification. Examples include the exploratory research that this study replicates aspects from, where it found some indications of a price premium associated with certification of Cornish hake.[1] Another study undertook hedonic analysis (a type of regression analysis that estimates the impact various factors have on prices) using scanner data to explore whether consumers were paying a price premium for MSC certified fish and found this to be the case.[2] When it comes to the effect of MSC certification on quayside prices, research remains relatively sparse. A study in 2016 using the DiD method suggested some price premium exists at a quayside level.[3] Research by Poseidon in 2014 did not find a price

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[1] Davies, W. and Williams, C. 2020. Retrieved from: https://www.msc.org/docs/default-source/uk-files/evaluating-the-socioeconomic-impacts-of-marine-stewardship-council-certification-at-the-fishery-level.pdf

[2] Roheim, C., Asche, F. & Santos, J. (2011). The elusive price premium for ecolabelled products: Evidence from seafood in the UK Market. *Journal of Agricultural Economics, 62. 655–668*. 10.1111/j.1477-9552.2011.00299.x.

[3] Stemle, A., Ucida, H. and Roheim, C A.2016, Have dockside prices improved after MSC certification? Analysis of multiple fisheries. *Fisheries Research, 182, 116–123.*

premium for first sale of haddock directly attributable to MSC certification, but did anecdotally observe that processors and wholesalers would pay up to an additional 10% for MSC certified haddock and this premium moves up the supply chain.[4]

Despite these studies exploring some of the economic impacts of MSC certification, research into the wider (and less quantifiable) socioeconomic impacts of certification remains limited.

To better understand the socioeconomic impacts of certification, the MSC has commissioned research that explores the social and economic benefits realised by fisheries in the UK and elsewhere through a series of case studies. In 2020, the MSC commissioned NEF Consulting to explore the socioeconomic benefits of MSC certification in the Cornish hake and sardine fisheries, combining social research with economic modelling to explore price premiums[1].

In 2021 the MSC commissioned this second study to expand on the findings of the Cornish research, this time focusing on the SFSAG Scottish white fish fishery which targets haddock, hake, whiting, plaice and saithe in the Northeast Atlantic. Like the study of 2020, this research combines qualitative interviews, with nine key fishery stakeholders (fishers, processors, vessel managers, fishery managers and a UK public body), with an economic analysis of price premiums; the latter was completed in parallel, and again by NEF Consulting. This economic component of this study specifically focused on haddock.

The aim of the social component of the study was to explore the anticipated and realised socioeconomic benefits of MSC certification to the SFSAG fishery, as well as the challenges and lessons learned throughout the certification process.

The economic element replicates the 2020 study, applying analysis of the Marine Management Organisation's (MMO) annual sea fisheries statistics to one species under the SFSAG (Scottish Fisheries Sustainable Accreditation Group) Northern Demersal Stocks certificate: haddock. The research explores landings and price changes pre- and post-MSC certification for MSC certified haddock fisheries landed from the North Sea and west of Scotland, to gauge the extent to which MSC certification has had an impact.

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[4] Poseidon. 2014. Benefits of MSC Certification to the Scottish North Sea Haddock Fishery. Retrieved from here

2. Fishery overview: SFSAG Northern Demersal Stocks

The Scottish haddock fleet has been certified since 2010. Fishing is carried out by vessels within the membership of the Scottish Fisheries Sustainability Accreditation Group (SFSAG), which consists of 11 Producer Organisations, as well as several fishermen associations. The members represent the majority of the Scottish demersal industry operating in the mixed demersal fisheries of the North Sea and West of Scotland.

Table 1. Key details of the SFSAG Northern Demersal Stocks. Full information available online[5]

Client group	Scottish Fisheries Sustainable Accreditation Group (SFSAG)
Certified since	2010
Species and stock	Haddock *(Melanogrammus aeglefinus*) European hake (*Merluccius merluccius*) European plaice (*Pleuronectes platessa* Saithe(=Pollock) (*Pollachius virens*) Whiting (*Merlangius merlangus*)
Method of capture	Scottish seines and bottom trawls
Tonnage	73, 659 (2019)
Location	27 (Atlantic, Northeast)

At present, 415 vessels target bottom-feeding fish including haddock, hake, plaice, saithe and whiting. North Sea cod was also originally included in this certificate but was suspended in 2019 after stocks fell below safe biological levels. These fish are found at depths of 40 to 200 metres mostly in the northern and central areas of the North Sea, but can range as far south as the Humber Estuary. Vessels use demersal trawls and seines, either singly or in pairs, with pair seine gear being lighter than the equivalent trawl gear and generally reducing fuel use.

[5] MSC Track a Fishery: SFSAG Northern Demersal Stocks https://fisheries.msc.org/en/fisheries/sfsag-northern-demersal-stocks/@@view

20 vessels operating in the fishery have trialled CCTV technology to help with monitoring catches, and the entire fleet has improved its fishing gear to reduce bycatches of cod and spur dog[5]. All nets are governed by the same mesh regulations, which require 120mm mesh cod-ends.

Haddock is the most important demersal whitefish species to Scottish fishermen. Over 27,000 tonnes of haddock were landed into Scotland by Scottish vessels in 2015, worth £41 million[6]. MSC certified haddock is estimated to make up 30-40% of certified Scottish catch[7]. Globally, there are 20 haddock fisheries that have met the MSC Fisheries Standard. Combined, these represent 91.56% of the global haddock catch being MSC certified. The UK is an important market for these fisheries, accounting for nearly 77% of all MSC labelled haddock product sales (by volume) globally.[8]

3. Research Approach

3.1 Social research

Survey instrument/question selection

The MSC developed a survey instrument for semi-structured interviews in 2017, aimed at monitoring socio-economic impacts of certification on harvesters and first buyers in the supply chain. In addition to MSC staff, this survey was co-authored with external researchers and reviewed by a working group of economists, social scientists and political scientists[9]. In 2020, NEF Consulting reviewed and modified the existing instrument, contributing a series of additional questions to create a survey for the specific purposes of the 2020 socioeconomic study of Cornish hake and sardine fisheries[10].

The survey instrument was further updated for this study to aid the interpretation of the questions while ensuring that the answer options were comparable to previous surveys. See Appendix A for the full survey.

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[6] Scottish Sea Fishery Statistics (2019) https://www.gov.scot/publications/scottish-sea-fisheries-statistics-2019/pages/3/

[7] https://fisheries.msc.org/en/fisheries/sfsag-northern-demersal-stocks/about/

[8] https://www.msc.org/docs/default-source/uk-files/uk-and-ireland-market-report-2021.pdf?Status=Master&sfvrsn=52a488d2_10

[9] NEF Consulting, 2020. Evaluating the socioeconomic impacts of Marine Stewardship Council certification at the fishery level. Available at https://www.msc.org/docs/default-source/uk-files/msc-socioeconomic-impact-report.pdf?_ga=2.187851112.1343155014.1637877843-1324768005.1637266930

Stakeholder selection

Given the small number of stakeholders available to participate in interviews, the survey tool was used as a semi-structured interview guide. All interviews were conducted by one of two independent consultants commissioned by the MSC (L Anderson & J Latham). Eleven interview respondents were selected purposively having been proposed by members of the SFSAG for their involvement in the certification process, and knowledge about the fishery at different stages of the supply chain.

The small sample size and purposive selection approach prevents any quantitative results from being extrapolated beyond the case study of this particular fishery. However the qualitative approach does allow us to capture rich answers from respondents, and to delve deeper into the 'why' and 'how' surrounding particular outcomes, something that is challenging to do with quantitative survey approaches alone.

The aim of the interviews was to gather stakeholder perceptions of the socioeconomic impacts of MSC certification, including perceptions of any change in fish prices, market access, reputation/credibility and/or job creation.

Limitations

Despite the interviews being conducted by independent consultants, these consultants were commissioned by the MSC and the respondent selection process by SFSAG may have introduced some unintentional bias into results. All respondents were informed of the purpose of the interviews (that the consultants were freelance and independent from MSC, that all answers would remain anonymous) and gave consent to participate in the study.

3.2 Economic analysis

To explore how prices and landings volume changed for the SFSAG North Sea haddock fishery after achieving MSC certification, we used the MMO sea fisheries annual statistics.[10] This dataset provides a range of information related to the UK fishing industry, including landing port, vessel nationality, length group, landing volume, and value as far back as

[10] UK Government. (2014). UK Sea Fisheries Annual Statistics. Retrieved from https://www.gov.uk/government/collections/uk-sea-fisheries-annual-statistics

2008. From this data, we observed monthly and annual variables such as prices and landing volumes over a certain period (e.g. before and after certification). A counterfactual fishery acts as a control group, for example a fishery of the same species, but one that is non-certified, throughout the same period. By comparing the certified fishery with this control group across the period before and after certification, it is possible to gain indicative insights into the effect MSC certification might have on ex-vessel (quayside) prices and landings volume.

The two fisheries being compared

1. **MSC certified fishery:** The MSC fishery was designated as haddock landed in Peterhead. Data accessed through contacts at Peterhead port indicates that the vast majority of haddock landings are MSC certified from the North Sea (94%). Whilst not 100%, this very high proportion is deemed sufficient for the purposes of this analysis.
2. **Control group:** The control group for the fishery was designated as haddock landed in the English port of Newlyn, a port where it is known that MSC certified haddock is not landed. Whilst significantly smaller in volume than Peterhead in terms of haddock landings, Newlyn represents the port with the largest haddock landings in England. Whilst acknowledging different factors in each port context, a comparison between each group was deemed appropriate for an indicative exploration of price differences.

Building on the 2020 study[10], the DiD method was used as it represented the most effective way of exploring the relationship between MSC certification and quayside prices, using the MMO data. This statistical technique controls time-varying factors and common trends in both the treatment and control groups. This allows the isolation of treatment effect (as long as certain assumptions are made).[11] In this instance, the treatment effect is MSC certification. As such, given the availability of data before and after certification, and the ability to ascertain control groups from similar fisheries, DiD represented the most appropriate method available to understand the effect of MSC certification on quayside prices. The DiD method requires several assumptions, most notably that both treatment and control groups have similar parallel trends before intervention and that no new factors

[11] Stemle, A., Ucida, H. & Roheim, C A. (2016). Have dockside prices improved after MSC certification? Analysis of multiple fisheries. *Fisheries Research, 182, 116–123.*

influence trends after the intervention period.[12] To ensure that such assumptions were met as closely as possible, a control group was chosen that had as much in common as possible with the MSC certified fisheries. It is important to note the limitations in the DiD method, namely that it does not allow any changes in price to be directly attributable to MSC. Nevertheless, if assumptions are met, the method provides a good indicator of the effect MSC certification has had.[12]

This study uses a DiD model adapted from Stemle et al.'s study of quayside prices in US and Japanese MSC fisheries.[12] An extra variable was added to the standard DiD model to account for different factors. This included a control variable using a logarithm of landed weight to account for the differing quantities of landings between the control and the treatment group.

$$\textbf{Price (£/kg)} = X_0 + X_1G_{if} + X_2T_{tf} + X_3MSC_{ift} + X_4\mathrm{ln}(\mathrm{landings})_{ift} + u_{ift}$$

Dependent variable = dockside price
f = fishery
i = group
t = time period
G = binary indicator variable for group
T = binary indicator variable for time period
MSC = interaction group and time dummy variable to isolate treatment fishery after certification
ln(landings) = logarithm of landed weight (ln)
u = error term

[12] Columbia Public Health. (no date). Difference-in-difference estimations. Retrieved from https://www.mailman.columbia.edu/research/population-health-methods/difference-difference-estimation

4. Results

4.1 Social research

In total, nine of the eleven stakeholders took part in semi-structured interviews (two declined due to work commitments). Stakeholders included members of fishery and vessel management bodies, fishers, processors and a public body. Interviews were conducted online (via video call) by one of two independent research consultants (L Anderson or J Latham) between September and October 2021. A summary of the key insights, which relate to the impacts of MSC certification, are presented below.

Anticipated benefits of certification

Key insight: The most frequently cited reasons for undergoing MSC certification were:

1) Maintaining market access (89%)[13]
2) Improved reputation (78%)
3) High [or at least no lower] price of fish (33%)

Maintaining market access

Eight out of nine stakeholders named market access as the main motivation for the SFSAG fishery to undergo MSC certification. In particular, they believed MSC certification was required to *maintain* access to markets, specifically access to UK retail chains including Sainsbury's, Tesco, Waitrose and Marks & Spencer, and particularly for popular white fish species such as haddock. The certification process was considered by most to be a necessary process to go through to futureproof the fishery and its supply chains.

"There was no option but to go for it, to continue selling to supermarkets we would have to be MSC certified." – Fisher

"Our M&S order would be hard to keep hold of if not MSC certified." -- Vessel Manager

[13] Given the small sample size (n=9 respondents) and qualitative approach, percentages are provided for illustrative purposes only to demonstrate common themes.

Improved credibility and reputation

A high proportion of respondents (n=7; 78%) -- including fishers, fish processing companies and fishing management bodies -- considered reputation to be a key factor in the decision to pursue MSC certification. Boosting the fishery's reputation, by showing that it met an external benchmark of sustainability, was considered important, both for consumer confidence and to demonstrate to wider stakeholders along the supply chain and across the fishing industry that they were doing 'the right thing'. This was particularly true in light of the negative press associated with North Sea cod stocks during the time of certification.

"A lot of the buyers wanted it, they wanted confidence in the product. Gave a clear approach of where they were going. Consumers needed confidence in what they were buying." -- Fisher

"At the time [of certification] the fishing industry was getting negative publication from the press, especially in Scotland. Certification was the first step to get the confidence of the consumers back."-- Fisher

"When being attacked about trawling, we can defend ourselves by demonstrating sustainability against an external benchmark, showing that we're doing the best we can." -- Management body

Improved price

In addition to market access, a small number of respondents (n=3/9; 33%) believed that certification would allow them to reach a higher price for their catch. However, when this theme was explored in further depth, the higher prices mentioned related more to the fact that fishers could maintain contracts with retailers and continue to achieve the high price they perceived they were getting through retail contracts.

"Because the supermarkets were demanding it, we could keep the top price in the fish market [by getting certified]" -- Fisher

"The benefit was sold as getting "no lower a price for your fish", because if you don't get certification the buyer will source fish from elsewhere." – Fishery Management

Realised benefits of certification

Key insight: The most frequently cited benefits realised since becoming MSC certified were:

- Maintained UK market access (89%)
- Improved reputation/credibility (67%)
- Access to new European markets (44%)

Nearly all respondents (n=8; 89%) were positive about the benefits that they had received since becoming certified, with the remaining respondent saying they were neither satisfied nor dissatisfied. In line with anticipated benefits, all but one respondent (89%) believed retaining market access to be the greatest benefit that the fishery had received as a result of certification.

UK Market access

Retail contracts had been maintained in the UK as a result of becoming certified, prompting many to believe that the benefit of certification had outweighed the costs of the process. Six of the respondents said that the reputational benefits of certification had also been a primary benefit of certification.

"If you stack the costs of certification against the cost of losing the M&S/the retail contracts, it pales into insignificance. 40% of North Sea haddock landed in Peterhead is directly for MSC contracts - if you were to lose the certificate - the buying power in the market is something that you would lose very quickly." -- Fishery management

Despite the widespread positivity around UK market access, there was some scepticism about MSC certification being the only reason that market access had been maintained. For example, two respondents believed the Scottish white fish industry was so dominant that retailers would have to rely on their landings, regardless of whether they were MSC certified or not, and that it was difficult to tease apart whether the maintenance of market access in the UK was entirely down to MSC certification.

"MSC is not a priority for buyers, if there is no MSC they will buy other fish, but I do think there is a higher demand for fish with MSC." -- Vessel manager

"When talking about the haddock fishery, people would have to take [SFSAG] fish anyway as we're the biggest supplier in the UK. There wouldn't be enough of an

alternative. When there has been non-MSC cod alongside it in the cold store, it's never been an issue to sell that." -- Fishery management

Improved credibility and reputation

Also, in line with anticipated benefits, six respondents (67%) believed improved credibility and reputation was one of the greatest benefits that the fishery had received as a result of certification after market access.

"Yes, [MSC certification] helped reputation and credibility, I'd say this was 80% attributable to MSC. In general fishermen have been proactive in recent years working towards sustainability." – Processor

"The most important benefit is to our reputation." – Processor

"I can see on TV that the blue tick is popular, consumer confidence has improved." – Fisher

However, maintaining this reputation was also perceived by some respondents as an added risk of certification. This is discussed in more detail below.

"We want to maintain the reputation - if the fishery has to reach a bar where it becomes too expensive to implement - what happens then? Catch 22 situation. The reputational risk of losing it is potentially very damaging." – Non-governmental body

Export market access

In addition to UK market access, access to export markets had increased, particularly across northern Europe. Respondents acknowledged that Brexit and the COVID-19 pandemic had influenced European market access, particularly in terms of the volume of catch being exported into Europe during lockdown restrictions (and the associated stall in restaurant trade) in 2020. One respondent said that during the COVID-19 pandemic, the volume of fish exported reduced by two thirds during lockdown. Nonetheless, Dutch and Danish export markets were provided as two examples where access was perceived to have improved as a result of certification (with an associated price premium for MSC certified fish), and respondents believed that access to further European markets would open up in future.

"Market access has improved, yes. In the UK though it was a case of retaining what you had…[but] certification is beginning to become more important in the EU

(pre-COVID-19), Italy mostly, some France, less so in Spain. Northern states are very much into MSC, further south it becomes less of a selling feature." -- Vessel Manager

"We have a greater marketplace in Europe now, but COVID-19 and Brexit have impacted that since becoming certified. MSC stocks get a better market in the EU. The hope is that it will be more help in future post brexit/COVID-19. There has been a little increase in the domestic market too." -- Fisher

"Yes, probably greater export markets since certification, more fish might have gone to the continent. MSC holds up pretty well especially in Holland." -- Fisher

"There was an economic benefit away from home; Danish vessels landing into Hanstholm were getting an inferior price compared to MSC certified fish" - Fishery management

Price premiums

One respondent believed that prices and profits had improved as a result of certification, however most agreed that prices had been retained as a result of certification, rather than increased, or that the many and varied influences on fish prices were outside of the influence of MSC certification.

"Whether fish prices have improved is very difficult to answer. Certain species of fish have good prices but over the two years the price has fluctuated a lot. Any boat that isn't MSC would get a poorer price, so maybe a price increase has been seen. Buyers will buy from MSC approved vessels over one that isn't, so potentially an increase in price there but it is not seen on a day to day basis." - Fisher

Unexpected benefits

Several respondents mentioned unforeseen benefits of certification including an improvement in quality control. This was in part perceived to be due to the MSC's association with the Seafish Responsible Fishing Vessel Standard (RFVS), and improved morale among fishery staff who were proud to work for an MSC certified fishery.

"Crew members take more pride in the fish now, and turn out a better product." -- Fisher

Perceived and actual costs of certification

Key insights:

- 100% of respondents believed that the benefits of certification had outweighed the cost of becoming certified.
- The reputational risk of losing certification in the future was the most common concern associated with MSC certification.

Overall, respondents were positive about the impacts of MSC certification, with all agreeing that the benefits of certification had outweighed the cost of the process. However, four of the nine respondents (44%) raised concerns about the reputational risk of losing the fishery's certificate in future. Respondents feared that if the MSC bar kept being raised, they might -- at some point in the future -- struggle to meet it. As such, they believed they might be "setting themselves up for failure" if their contracts and market access relied on them maintaining MSC certification.

"What if I have a fishery that is certified but then it loses it. Do all your buyers head to the hills? Setting yourself up for a fall perhaps, as so many external factors that dictate why or why not a fishery is in a certain state. You leave yourself open for failure at some point, at every point in the cycle of a fishery it will go through good and bad phases. Cod bucks that trend though, with high prices now even though it has lost certification." -- Vessel manager

One other negative raised was a perception that more certification and accreditation schemes are now becoming available, causing confusion to the fishery and its stakeholders in terms of which were the most relevant and what the differences were between them .

Table 2. Anticipated and realised benefits of MSC certification stated by SFSAG fishery stakeholders

Benefit	**No. respondents who anticipated this benefit (n = 9)**	**No. respondents who said the benefit had been realised (n=9)**
Higher price for fish	3	1
Market access	8	8

Increased credibility	7	6
Job creation	0	0
Increased catches	0	0

Stakeholder reflections on the certification process

Key insight: Certifying multiple species at once and recruiting a project manager would have improved the efficiency of the certification process

When respondents were asked what they would change about the certification process if they were to go through it again, three (fisher stakeholders) were very positive, saying that it was a smooth process and they wouldn't have made any changes.

Two management stakeholders said that they would have certified multiple species under the same scope, rather than approaching it piecemeal, starting with one species and adding more over time. While they acknowledged that this was a less risky process as it allowed them to 'test the water' of certification, the admin involved with having certification processes, recertification processes and annual audits for different species groups at different time points had created a higher administrative burden than if everything had been certified at once.

One management stakeholder also believed that appointing a project manager to manage the certification process from the client side would have improved the organisation of people and documentation and perhaps speed up the certification process. Another management stakeholder regretted not engaging with retailers earlier in the certification process to see whether they would have been willing to contribute to the cost of certification, given their influence in demanding certified products for market access.

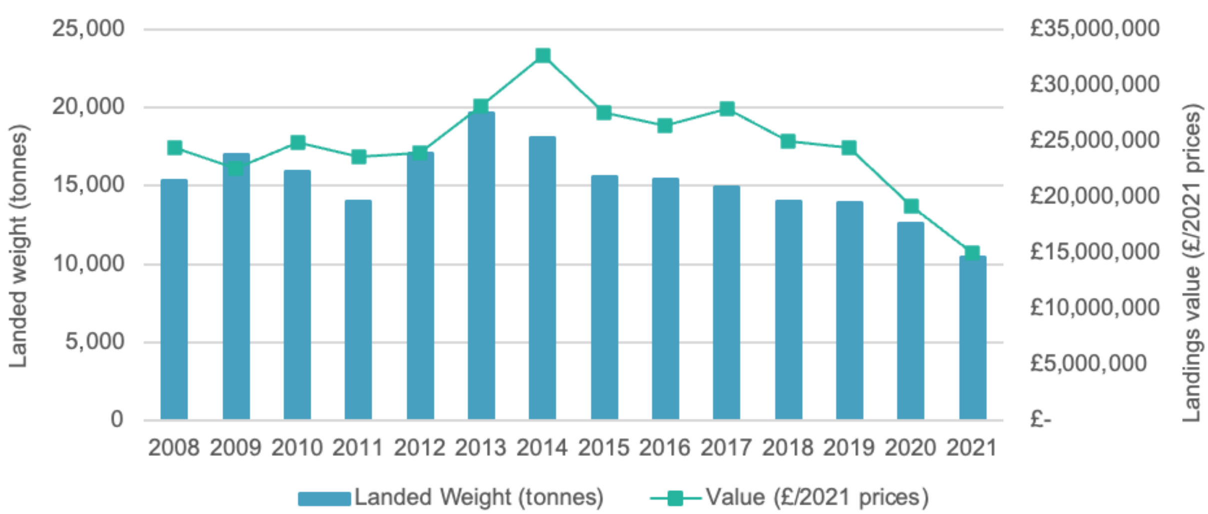
4.2 Results of the economic analysis

Landings and price changes pre- and post- MSC certification

Landings

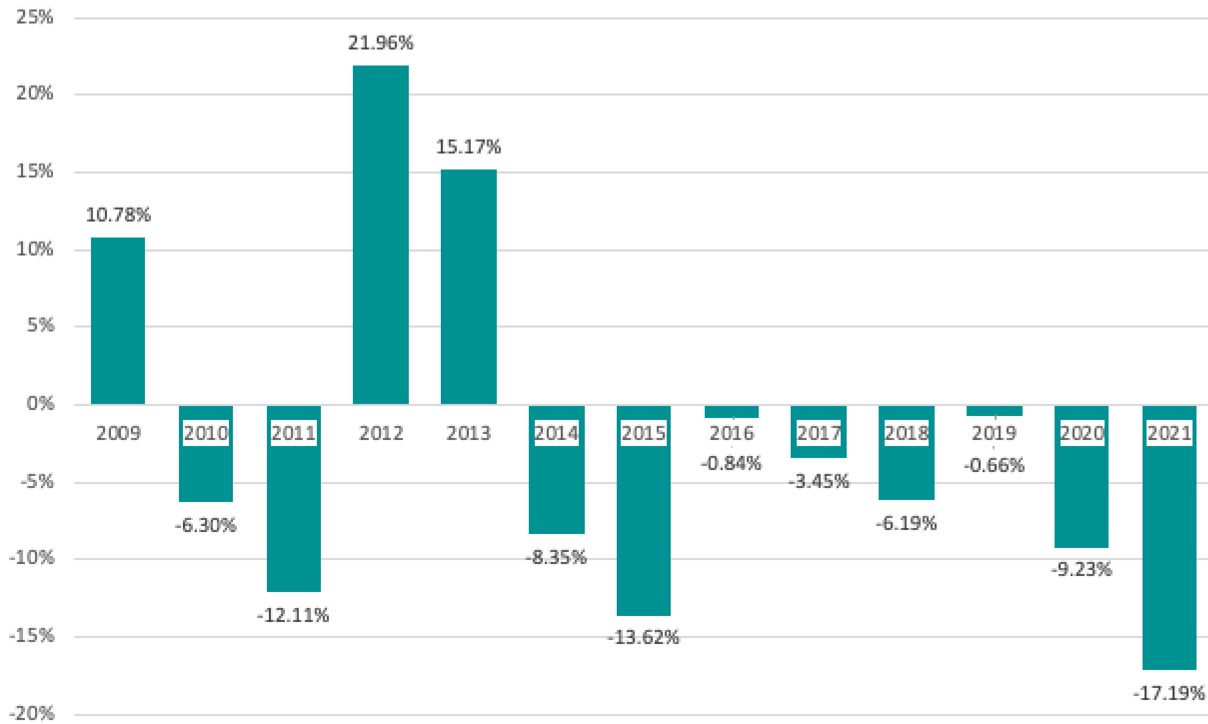
Between 2008 and 2021, there was a relative decline in haddock landings in Peterhead, from 15,390 tonnes in 2008 to 10,471 tonnes in 2021, a decline of 32% (Figure 1). However, there was a two-year rise in volumes landed in the years following MSC certification in October 2010, rising to 19,721 tonnes in 2013. Since 2013, there has been a decline in haddock landings year-on-year, with some years seeing drops as high as 17% (2020 to 2021) and 14% (2014 to 2015) (Figure 2). Overall decrease in landed weight between 2013 and 2021 was nearly 47%.

Figure 1. *Landed weight and landings value (adjusted for 2021 prices) for haddock landed in Peterhead by UK vessels 2008–2021 (gear category 'demersal trawl/seine' for period 2008-2019[14])*



[14] Note: gear type categorisation changed for 2020 and 2021 datasets. For these years, the following gear type was used: 2020 (demersal seine, otter trawls); 2021 (demersal seine, seine nets and trawls).

__Figure 2.__ Annual changes (%) in landings volume for haddock in Peterhead port 2009–2021 (gear category 'demersal trawl/seine' for period 2008-2019[1])



For comparison reasons, Figure 3 and Figure 4 present landed weight and landings value (adjusted for 2021 prices) for haddock landed in Newlyn by UK vessels 2008–2021 (Figure 3) and annual changes in landings percentages (Figure 4). Landings and value fluctuate throughout the time period, sometimes increasing in one year by as much as 83% (2010 to 2011) or decreasing by 54% (2013 to 2014). The lower overall volumes landed compared to Peterhead may play a part in these fluctuations.

Figure 3. *Landed weight and landings value (adjusted for 2021 prices) for haddock landed in Newlyn by UK vessels 2008–2021 (gear category 'demersal trawl/seine' for period 2008-2019[15])*

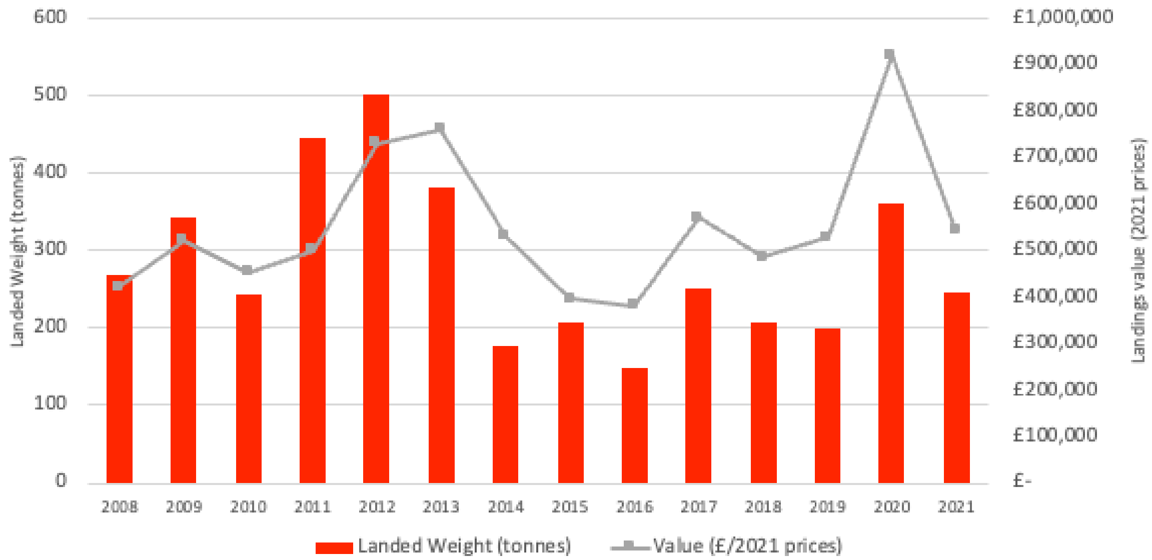
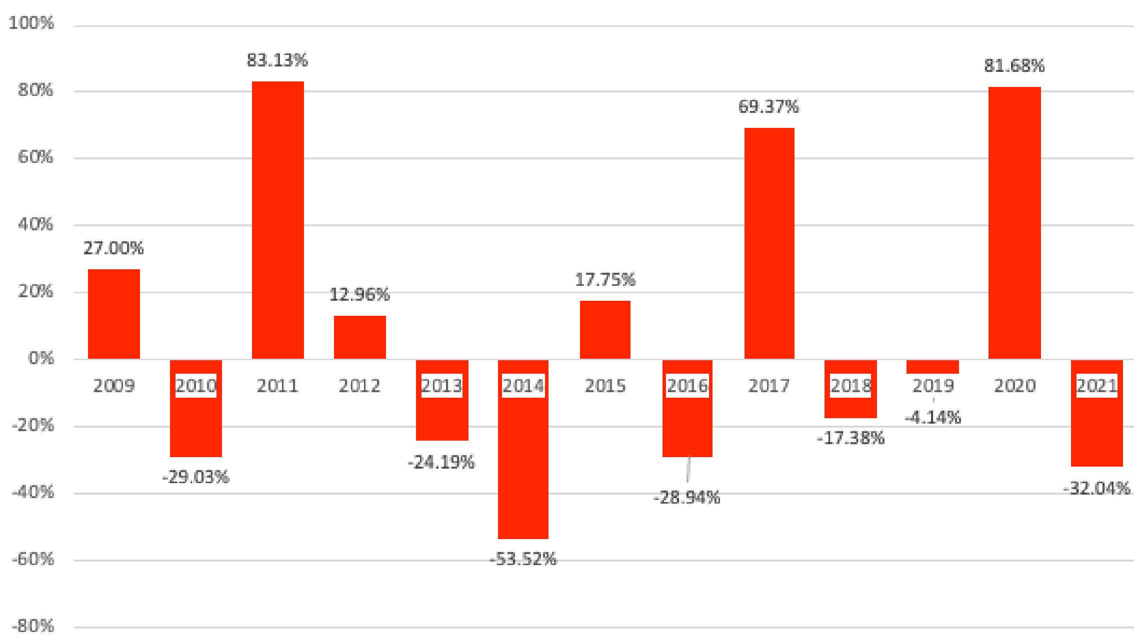


Figure 4. *Annual changes (%) in landings volume for haddock in Newlyn port 2009–2021 (gear category 'demersal trawl/seine' for period 2008-2019'[2])*



[15] *Note: gear type categorisation changed for 2020 and 2021 datasets. For these years, adjustments were made. For 2020, the following gear types were used: drift and fixed nets, otter trawl and beam trawl. For 2021, the following gear types were used: demersal seine, seine nets and trawls.*

Prices

Using MMO data, the MSC haddock fishery was defined as all the landings of haddock in Peterhead from UK vessels, with gear type categorised as ‘demersal trawl/seine’ between 2008-2019 and other similar gear types for years 2020-21, where gear categorisation labels differed to previous year’s datasets (see Footnotes 1 and 2). The period was set as 2008–2021, with certification taking place in October 2010. As outlined in the methods section, the control group selected was haddock landed in the English port of Newlyn by UK vessels via similar gear types.

Prices were calculated by dividing the landed weight by value, to provide a price per kilogram of haddock landed and adjusted for inflation (presented as 2021 prices). Figures 5 and 6 show the longitudinal changes in the annual average price for both treatment (Peterhead) and control group (Newlyn) over the 13-year period.

Several patterns emerge from Figures 5 and 6 (below). First, haddock prices fluctuate throughout the year for both fisheries. Secondly, the trend in prices across years is not parallel between the treatment group and the control group from 2008 to the year of MSC certification, 2011 (equivalent of end-2010). While this is only a relatively short period to observe parallel trends, such a pattern makes the use of the DiD technique less favourable. Thirdly, both Peterhead and Newlyn haddock prices increase during the 2008-2021 time period, with Newlyn (non-MSC) prices increasing greater than Peterhead (MSC) from 2008 to 2021 (a 25% increase from average 2008-10 prices to average 2019-21 prices, compared to a 14% increase). Fourth, throughout the time period (with the exception of 2011) Newlyn prices are higher than Peterhead, the gap between these prices growing between 2008 and 2019. In 2008-11 Peterhead prices were 76% of Newlyn (£1.31 compared to £1.71) and 70% in 2019-21.

From the above observations, MSC certification does not appear to influence price changes. The higher price in Newlyn might be the result of the much lower volumes of haddock landed in this port than in Peterhead. Finally, the price of Newlyn haddock is much more prone to fluctuation than Peterhead haddock, which has increased slightly while remaining relatively stable throughout the time period. Indeed, whilst prices are generally higher in Newlyn, in 2011 the price drops below that of Peterhead, and is close to the price of Peterhead haddock in both 2008 and 2020.

Figure 5. *Monthly weighted average haddock quayside price 2008–2021 – Peterhead haddock (MSC) fishery compared to Newlyn haddock (non-MSC) fishery*

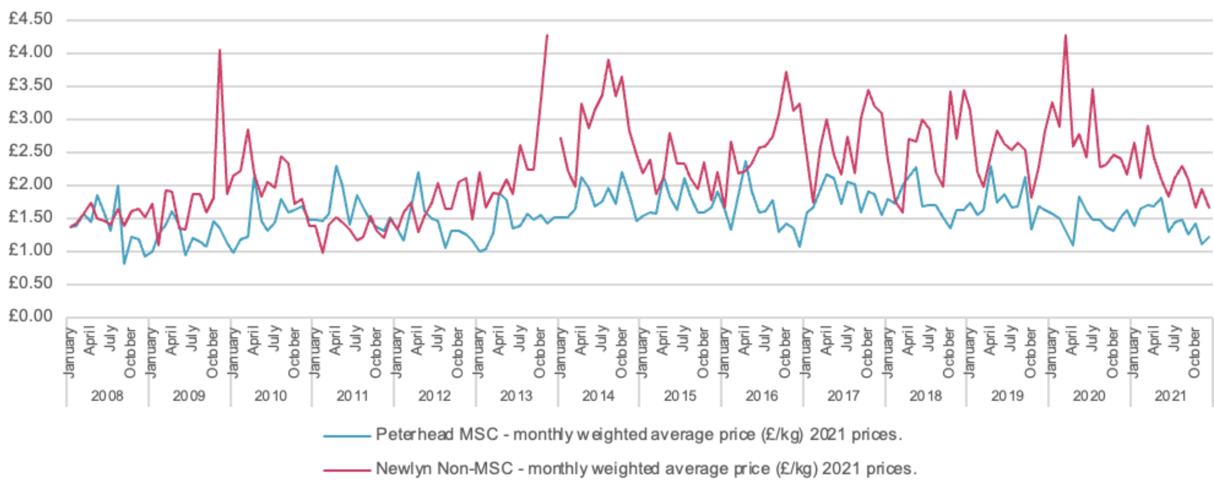


Figure 6. *Annual weighted average prices for Peterhead (MSC) and Newlyn (non-MSC) fisheries: 2008-2021.*

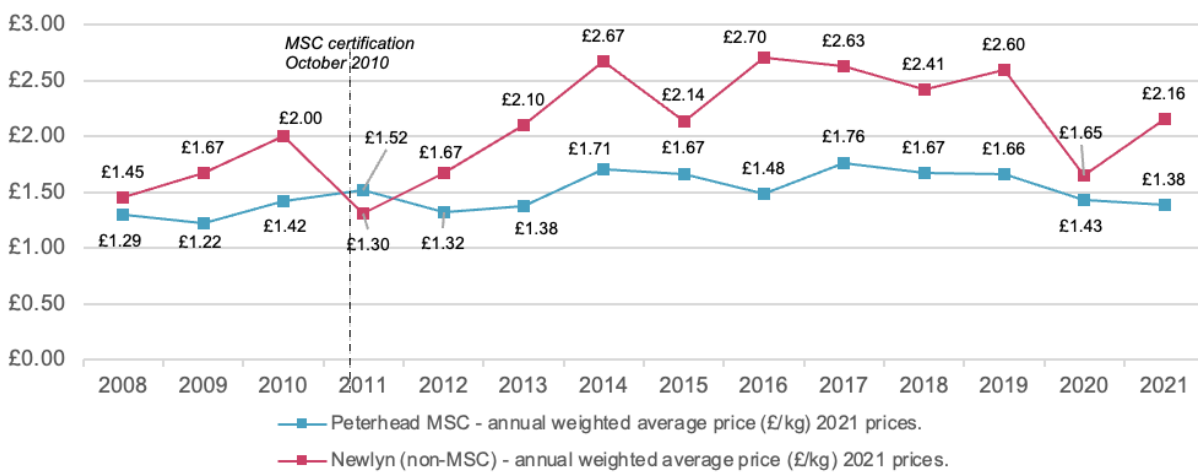


Table 3 presents the results for DiD simulation from the period 2008–2021. The DiD estimator (MSC) was both negligible in size (-0.169) and not statistically significant (p-value = 0.083). This indicates there is no impact of MSC certification on prices of haddock landed in Peterhead, however it is important to remember that the DiD model used here represents a simplified account and does not include all external factors that might impact price changes.

Table 3. *DiD results for Peterhead (MSC) and Newlyn (non-MSC) haddock landings: 2008–2021*

Regression Statistics	
Multiple R	0.539
R Square	0.290
Adjusted R Square	0.287
Standard Error	0.576
Observations	891

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	120.32	30.08	90.53	1.51738E-64
Residual	886	294.38	0.33		
Total	890	414.71			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2.030	0.099	20.518	0.000	1.836	2.224	1.836	2.224
G	-0.419	0.095	-4.429	0.000	-0.605	-0.233	-0.605	-0.233
T	0.444	0.068	6.498	0.000	0.310	0.578	0.310	0.578
MSC	-0.169	0.098	-1.733	0.083	-0.361	0.022	-0.361	0.022
Ln(landings)	-0.024	0.010	-2.382	0.017	-0.043	-0.004	-0.043	-0.004

5. Conclusion

Overall, stakeholders associated with the SFSAG fishery believed MSC certification to have been a positive process, with the majority citing market and reputational benefits that have been realised by the fishery as a result of certification. The primary benefit associated with certification was the retention of UK retailer market share. While clear price premiums had not been experienced as a result of certification (though were mentioned by one fisher in relation to export markets), social research revealed that mitigating the loss of markets and income by meeting the needs of major retailers was considered a significant benefit.

Despite the positive results of the social research, the economic benefits of certification remained less clear. Landing volumes and values in both the MSC and control group fishery did not follow a clear trend in the years following MSC certification. For SFSAG haddock, there was a brief rise in landings following certification (2011-2013) followed by a year-on-year decline to 2021.

In terms of prices, SFSAG haddock prices rose during the time period studied (2008 - 2021) but remained lower than the control group. The control group saw a greater increase in price in the time period following MSC certification compared to SFSAG haddock. However, there was more stability in SFSAG haddock prices compared to the control group, which experienced high levels of price fluctuation across the time period.

Limitations and external influences

The social research was limited by the relatively small sample size and the volatile external environment within which it was conducted, which included the ongoing COVID-19 pandemic and uncertainties around the export market resulting from Brexit. During the social research interviews, all but two fisher respondents cited COVID-19 and/or Brexit as having a significant effect on the industry, with this having greater influence on current pricing and markets than certification. Both influences have, at present, prompted a reduction in the volume of fish being exported to the continent from SFSAG, making it unclear how significant access to European markets has been since certification. Nonetheless, Dutch and Danish export markets were provided as two examples where access was perceived to have improved as a result of certification (with an associated price premium for MSC certified fish). Stakeholders remained satisfied with current progress and hopeful that the situation would continue to improve in future.

The economic results should also be considered indicative due to the small sample size. Key limitations centre on the challenges of designating an effective control group (e.g. with similar landing volumes) and accounting for other external factors in the DiD modelling. Nevertheless, this work provides useful insights on this subject and helps lay the groundwork for further research that continues to contribute to the MSC's understanding of how certification affects socioeconomic outcomes in different types of fisheries.

6. Appendix A: Interview Guide

Question guide for semi-structured interviews
1a. How many years have you participated in or worked with this fishery? 1b. What is your involvement in the fishery (e.g. fishing, processing, sales, management)? 1c. What is your age group? (years) • *A: 15-20* • *B: 21-30* • *C: 31-40* • *D: 41-50* • *E: 51-60* • *F: 61-70*
2a. Do you participate in any other fisheries? (Yes/No) 2b. If yes, which fisheries do you participate in, and in what capacity? (e.g. fishing, processing, sales, management)
3a. *Did you participate in the pre-assessment (Yes/no)* • *If yes, what was your involvement?* *3b. Did you participate in the full assessment (Yes/no)* • *If yes, what was your involvement?*
4. Why do you think that the fishery sought certification?
5. Who led the process to get certification?
6. Who paid for the process to get certification?
7. Did you agree that the fishery should go through the assessment process? Yes/No • If yes, what were your top reasons? • If no, what were your top reasons?

8. Now that this fishery is certified, how satisfied **are you** with the benefits that the fishery has received?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

9. Why do you feel this way?

10. Thinking back to when this fishery entered the assessment process, please indicate which **social and economic** benefits of MSC certification you anticipated.

- A higher price for the fish
- Greater market access
- Easier access to credit (with the banks)
- Greater credibility of the industry (reputation)
- Job creation
- Increased catches

Did you anticipate any potential negative effects of certification?

11b. Comparing now to before MSC, which of the following **social and economic** effects were realised?

(i) Fish prices

Greatly decreased	*Decreased*	*No change*	*Increased*	*Greatly increased*
◻	◻	◻	◻	◻

a. How much do you think this was attributable to MSC? [0-100%]

b. Are there any other factors you feel may be responsible for changes in this outcome? *(Note for surveyor: if possible, see if you can get rough % estimates for other factors)*

c. (if relevant) Are you aware of any changes in price further down the supply chain?

(ii) Market access

Greatly decreased	*Decreased*	*No change*	*Increased*	*Greatly increased*
◻	◻	◻	◻	◻

a. How much do you think this was attributable to MSC? [0-100%]
b. Are there any other factors you feel may be responsible for changes in this outcome? *(Note for surveyor: if possible, see if you can get rough % estimates for other factors)*

(iii) Greater credibility of the industry (reputation)

Greatly decreased	*Decreased*	*No change*	*Increased*	*Greatly increased*
◻	◻	◻	◻	◻

a. How much do you think this was attributable to MSC? [0-100%]
b. Are there any other factors you feel may be responsible for changes in this outcome? *(Note for surveyor: if possible, see if you can get rough % estimates for other factors)*

(iv) Job creation

Greatly decreased	*Decreased*	*No change*	*Increased*	*Greatly increased*
◻	◻	◻	◻	◻

a. How much do you think this was attributable to MSC? [0-100%]
b. Are there any other factors you feel may be responsible for changes in this outcome? *(Note for surveyor: if possible, see if you can get rough % estimates for other factors)*

(v) Catches

Greatly decreased *Decreased* *No change* *Increased* *Greatly increased*

☐ ☐ ☐ ☐ ☐

a. How much do you think this was attributable to MSC? [0-100%]

b. Are there any other factors you feel may be responsible for changes in this outcome? *(Note for surveyor: if possible, see if you can get rough % estimates for other factors)*

Q11c - Which of the benefits mentioned here do you consider to have been the most valuable/most important?

12. To what extent do you agree that the benefits of certification outweighed the costs of becoming certified?

- *strongly disagree*
- *disagree*
- *neither agree nor disagree*
- *agree*
- *strongly agree*

13. Have any of the following developments happened to your industry after certification (these may be unrelated to certification)? *(tick any that apply)*

- Improved catch per unit effort
  Estimate/quantify developments, if possible ________________
- Reduced operating costs
  Estimate/quantify developments, if possible ________________
- Improvements in quality control
  Estimate/quantify developments, if possible ________________
- Extended fishing seasons
  Estimate/quantify developments, if possible ________________
- Less time spent at sea
  Estimate/quantify developments, if possible ________________
- Higher profits
  Estimate/quantify developments, if possible ________________

• More fishing to the market *Estimate/quantify developments, if possible* ________________ • More product types produced *Estimate/quantify developments, if possible* ________________ • A greater number of export markets *Estimate/quantify developments, if possible* ________________
14. How have Brexit or COVID-19 affected the industry, after certification?
15. If you were to begin the assessment process again, is there anything that you would do differently?