

# **Fishing at the Edge of Existence: Shetland, Faroes, Iceland, c. 1540-1790**

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*‘Ónákvæmur fróðleikur sé betri en sú mikla óvissa sem við bíuum nú við um þessi efni’*

‘Inaccurate information is better than the great uncertainty we now have about these topics’

Karlsson 2007, 6

## **Introduction**

FOR THE North Atlantic islanders, fishing was an existential reality: pandemics, famine, warfare, environmental disasters, political conflicts, and the implicit dangers of catching fish in all weathers threatened their very lives while they sought to feed their families and their domestic populations - and to possibly profit from trade.

In the sixteenth century, fisheries expanded in the Northwest Atlantic due to the discovery of large cod stocks off the coast of Newfoundland and on the Grand Banks.<sup>1</sup> The catches flooded a market that was traditionally served by Northeast Atlantic fisheries off Norway, Iceland, the Faroes, and the Shetland Islands. As early as 1560, catches in the Northwest amounted to more than 120,000 metric tonnes and by 1620 were just under 200,000 tonnes. While landings levelled off through the seventeenth century, they rose spectacularly through the eighteenth century. An all-time high of 700,000 tonnes was reached in 1788, just prior to the European and Atlantic wars that put a temporary end to most fishing in the region.<sup>2</sup> Probably because of increased supplies, cod prices fell relative to grain. In London and Amsterdam, a barrel of grain

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1 Holm et al. 2019.

2 Holm, Nicholls, Hayes, Ivinson and Allaire 2021.

bought twice as much cod in 1600 than a century earlier. The price relation remained fairly constant through the next two centuries with a temporary improvement for cod around 1700.<sup>3</sup>

How did the fisheries in the Northeast Atlantic fare during the rise of the Northwest? This may seem a question that surely will have been covered by historians. However, when we looked for the answer, it became apparent that there is a lack of comparative research based on solid quantitative estimates. A recent overview of North Atlantic fisheries history did not include quantitative estimates.<sup>4</sup> Thus, we found no answer to the question as to whether the rise in fish production in the Northwest also happened in the Northeast Atlantic. This paper therefore raises the very simple question: How large were the catches? We focus on Iceland, the Faroes, and Shetland as the Norwegian experience raises complicated issues of the evidence base that are best treated separately.

The islanders primarily targeted fish of the order of Gadiformes, 'whitefish', which could be dried and kept for more than a year. Cod (*Gadus morhua*) was the prime target in Iceland and the Faroe Islands, while ling (*Molva molva*) dominated the Shetland fishery with cod playing a significant but minor role. Other types of marine life such as basking sharks, herring, and whales were harvested occasionally for domestic consumption but were not traded and will not be considered in this assessment. The role of these purely domestically exploited marine resources was quite limited in Iceland, while the harvest of pilot whales played an important role in the Faroe Islands.<sup>5</sup> Apart from the islanders' fisheries, there were large distant-water fisheries conducted by French, English, and Dutch fishers that we will not consider.

Historians have meticulously researched the fish trade of the North Atlantic islands, and we benefit from comparing their findings.<sup>6</sup> Many new data on the North Atlantic trade have been assembled by a recent research project on German Hanseatic trade with the North Atlantic islands, led by Professor Natascha Mehler. Archaeological excavations revealed the presence of Hanseatic trade stations.<sup>7</sup> Parallel research in German and Danish archives identified 986 charters, letters, diplomatic correspondence, and legal documents between 1416 and 1750, which are now accessible in an open online database.<sup>8</sup> Much of this evidence provides glimpses of past fishing practices, boats, gears, seasonality, people, and catches. However rich

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3 Gunnarsson 1983, p. 37.

4 Starkey and Heidbrink 2009.

5 Karlsson 2007; Bloch 1996.

6 Degn 1929; Gunnarsson 1983; Karlsson, 2007; Smith 1984.

7 Gardiner and Mehler 2019.

8 Holterman and Nicholls 2017.

the evidence is in terms of lending colour and detail to our understanding of the North Atlantic islands in the early modern period, it needs to be complemented by a quantitative perspective. We need estimates of the scale of production to fully assess the dynamics and international scale of marine wealth utilisation. In this paper, we therefore review the evidence to assess the scale and development of the marine production and trade of the islands through the early modern period.

## **The evidence**

This evidence came primarily in the form of records of trade, customs, and tithes. We selected only records that were likely to contain information about fish trade in bulk. Shetland's primary trade relation was with Bergen, but most ships went in ballast from Shetland to buy wood products, including boats.<sup>9</sup> The records considered by us concerned:

Shipping from Hamburg to the North Atlantic islands, 1542-1647  
Exports through the Sound, 1597-1790  
Exports from Iceland, 1624-1796  
King's tithes in the Faroe Islands, 1584-1652  
Exports from the Faroe Islands, 1707-1799  
Exports from Shetland, 1742-1796

We systematically converted figures of fish payments and exports into estimates of live weight in metric tonnes. Human population figures were used to inform the analysis. This conversion enabled a comparative assessment of overall trends and changes through time.

## **Hamburg-Bremen shipping to Iceland, Faroes, and Shetland**

The German cities of Hamburg and Bremen had an extensive trade with the North Atlantic islands in the fifteenth and sixteenth centuries. Large ships carried some forty to sixty people each, of whom ten or fifteen would be merchants, fifteen to thirty servants, and ten to twenty crew members.<sup>10</sup> The merchants set up trading booths by the shore and exchanged goods, primarily grain, for ling and cod, prepared and assessed by different dried and salted qualities. The merchants of Hamburg were organised in a fraternity and the

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9 Smith 1984, p. 34.

10 Ehrenberg 1899, p. 23.

evidence of members and lists have enabled a reconstruction of the annual number of ships.<sup>11</sup> The evidence has recently been reviewed by Grassel.<sup>12</sup>

The Hamburg series commences in 1533 when the Danish Civil War likely impacted shipping. The figures are probably complete by 1544 and continue for the Faroes until 1593, for Iceland until 1623, and for Shetland until 1642. The evidence shows a marked decline of shipping during the Nordic Seven Year War in the 1560s. In the 1580s trade built up and Iceland was regularly visited by fifteen to twenty Hamburg ships in a year. An abrupt but not complete decline of shipping to the Faroes and Iceland in 1602 followed the Danish King's decision to award exclusive trade rights to Danish denizens. Shetland continued the Hamburg link. Unfortunately, we do not have similar documentation of the Bremen trade. We know that in 1585 fourteen ships from Hamburg and eight ships from Bremen, Lübeck, and Danzig reached Iceland.<sup>13</sup> On the other hand, Bremen merchants seem to have dominated the Shetland trade. By the mid-sixteenth century Bremen sent five ships per year while Hamburg only sent one or two.

We used this evidence, imperfect as it is, to estimate total exports from the North Atlantic islands to the German cities. We assumed that Hanseatic shipping to Iceland and the Faroes amounted to 1.5 times the Hamburg numbers through the period and that Bremen sent two times the number of ships of Hamburg to Shetland. Incidental evidence indicates that average vessel capacity for Iceland was around 50 lasts, with one last equating 1.25 metric tonnes (t).<sup>14</sup> We assumed that 80% of the cargo was fish, half air-dried, half salted and barrelled, and used a conversion rate of cargo to live weight of 1:5 (the historical conversion rate in Iceland of dried cod to live weight was 1:7.7 while the conversion rate of salted cod was 1:3.5).<sup>15</sup> For Shetland, Baasch provides the lastage of eighteen vessels, showing an average of thirty-four lasts.<sup>16</sup> We have assumed a similar carrying capacity also applied to Faroese shipping.

Figure 1 shows that the fish trade from the North Atlantic islands through the sixteenth century to Hamburg and Bremen in most years amounted to 6,000-8,000 t live weight. The Nordic Seven Years War caused severe disruption of exports, and the trade remained depressed into the 1580s. Exports recovered but declined precipitously following the institution of Danish monopoly

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11 Baasch 1889, 1894; Ehrenberg 1899.

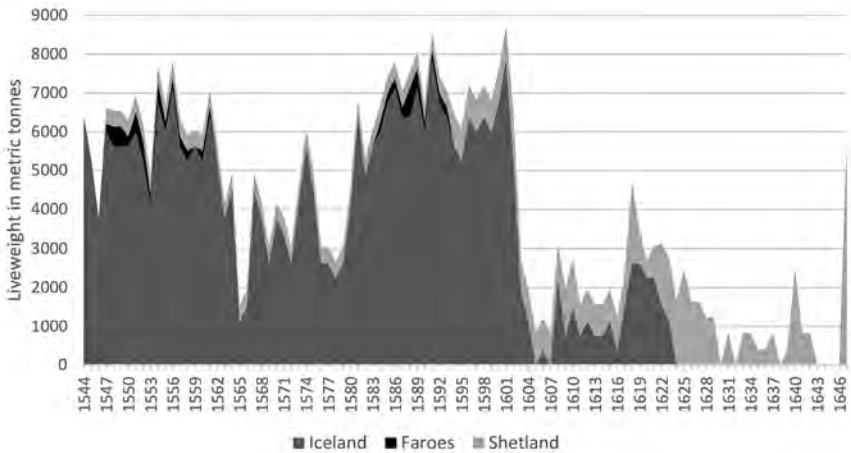
12 Grassel 2017.

13 Ehrenberg 1899, p. 19.

14 Baasch 1894, pp. 48, 51.

15 Jónsson 1994.

16 Baasch 1894.



**Figure 1: North Atlantic islands fish trade with Hamburg and Bremen 1544-1647**

trade with Iceland and the Faroes. After 1602, German trade with Shetland increased to some four to five ships a year, indicating exports to Hamburg of 1,000-2,000 t live weight fish.

The loss of the Iceland/Faroes trade seems to have caused Hamburg merchants to look to the new fishing ground in the Northwest Atlantic for supplies. Salted cod of the ‘laberdan’ (salt cod) quality was imported from the Dutch harbour of Enkhuizen and ‘tornuefish’ (Terre Neuve/Newfoundland fish) from the English port of Plymouth.<sup>17</sup>

In 1647 Hamburg sent no less than fourteen ships to Shetland, indicating exports as high as 5,700t, but we do not know if such a high volume was actually available on the island.<sup>18</sup> German trade to Shetland continued in the second half of the century, in part facilitated by Hamburg-based Scottish merchants.<sup>19</sup> In 1700/1701 total Shetland fish exports, carried by eight or nine German ships, was estimated to be around 8,800 cwt (492.8 t); in 1709 the same observer reported that ten to twelve German ships exported 800 lasts (1,000 t) of fish (ling, cod, herring, skate, and train oil), as well as butter.<sup>20</sup> However, the Act of Union between Scotland and England effectively closed Shetland to German traders.<sup>21</sup> As was the case of Iceland and the Faroes,

17 Baasch 1894.  
 18 Ehrenberg 1899.  
 19 Smith 1984, 12-14; Zickermann 2013.  
 20 Smith 1984, 19.  
 21 Smith 1984, 40-42.

Shetland now became dependent on traders from one country. However, trade with Germany continued through Scottish and Shetland-based agents. We shall see below that Shetland exports in the 1740s and 1750s continued at a level of 1,500-2,500 t.

## Sound Toll Records of Shetland trade

The Sound Toll Records provide lists of customs paid at Elsinore to the Danish Kings by ships entering and leaving the Baltic through the narrow strait of the Sound. The customs officials did not systematically record vessels of toll-exempt countries (primarily Denmark-Norway). While they often did record cargoes, the lists were not exhaustive. Nevertheless, the records provide an invaluable insight into the Baltic trades. While they cannot provide full awareness into trade from the Faroes and Iceland because of exemptions, they provide evidence of the Shetland trade into the Baltic.

The records are online and searchable in two separate data files before and after 1634.<sup>22</sup> In the years 1597-1633, a total of sixty-five ships were recorded as coming from Shetland. Before 1625 most years saw two ships pass, while after 1625 passages were down to only one ship in a year. After 1634, traffic was noticeably down. In more than one and half centuries up to 1790, the total number of vessels arriving directly from Shetland was only fifty-seven, one in every third year.

In the earlier period, 1597-1633, thirteen journeys from Shetland into the Baltic were conducted by skippers who stated their home as being on the islands. Another seven were Scottish, while the remainder were twenty-nine Danish, fifteen German and one Dutch skippers. In the case of twenty-six voyages, we know the value of the cargo as assessed by customs officials. The average value was 521 rigsdaler, and fish accounted for 87% of the value. The value of the fish cargoes was divided between 60% cod, saithe, and train oil, and 40% herring. Danish, German and Dutch ships almost all had a cargo of herring while only a couple brought cod. The Shetland/Scottish vessels had a mixed cargo of ling, cod, herring, train oil, and sometimes butter and hides. The ling/cod trade was of very marginal importance, amounting to less than fifty tonnes annually.<sup>23</sup>

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22 Sound Toll Registers Online 2020.

23 The live weight tonnages of the fish may be calculated by simple formulae (1 last = 1 metric tonne; 1 cod = 4 kg). Eighteen vessels registered an average cargo of 6 t cod. Twelve Shetland vessels carried an average of 7.1 t cod, five German vessels brought 4.1 t, while two Danish had 1.2 t onboard. Thirty vessels accounted for an average cargo of 14.4 t herring. One Dutch vessel had an impressive 53 t herring, doubtless a fishing vessel direct from own catch off Shetland, while ten German vessels carried an average 21.3 t, nine Danish vessels had 14 t and twelve Shetland/Scotland vessels brought 5.9 t.

After 1634, direct shipping by Shetland skippers into the Baltic seems to have ceased almost entirely, only two skippers stating their home as Shetland, in 1637 and 1658. Indeed, shipping from Shetland into the Baltic by other nationalities seems to have ceased by the eighteenth century. Before 1700, nine skippers came from ports near Copenhagen, Denmark, seven from German ports, eleven from Dutch ports, four from Scottish ports, and three from Courland in the Baltic. An additional six skippers stated their last port as Shetland, but their ships arrived in ballast and probably had just sought shelter by the islands. The cargoes almost exclusively consisted of herring with just a few barrels of cod. The Dutch vessels very likely had caught the fish themselves off Shetland, leaving only twenty-three vessels possibly trading with Shetland fishers.

After 1700 there seems to have been a long caesura of communication. In 1720 one Scottish skipper arrived directly from Shetland and in 1749 and 1754 two Swedish skippers ventured to undertake the journey. Then there was a sudden flurry of activity out of the Danish/German port of Altona with the passages of twelve vessels direct from Shetland into the Baltic. Between 1771 and 1784 they arrived heavily loaded with a couple of hundred barrels of herring. No doubt these were fishing vessels using Dutch driftnet technology, operated by the Altona Fishing Company that had been set up in 1771 by the Danish state and private speculators.<sup>24</sup> It is unlikely that any of them had made port in Shetland, and they simply implied the name as a designation of the fishing grounds.

In conclusion, the Sound Toll Records indicate that fish exports by Shetland skippers into the Baltic played a very minor role before 1634 and then ceased almost completely. The Shetland fishing grounds remained attractive to Dutch and later Altona herring drifters, and the islands provided occasional shelter from foul weather. However, after 1634, there is little indication that foreign ships exported Shetland goods into the Baltic.

### **Shetland customs records 1742-1796**

Shetland customs records provide a series of export data from Shetland from 1742 to 1796.<sup>25</sup> These data incorporate exports to Hamburg, Barcelona, Dublin, and an aggregated value for 'Other' ports. The records do not account for cod being transported to Scotland and England. After the union of Great Britain and Ireland in 1801, home market consumption was about six times

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24 Holm 1995.

25 Goodlad 1971, p. 122.



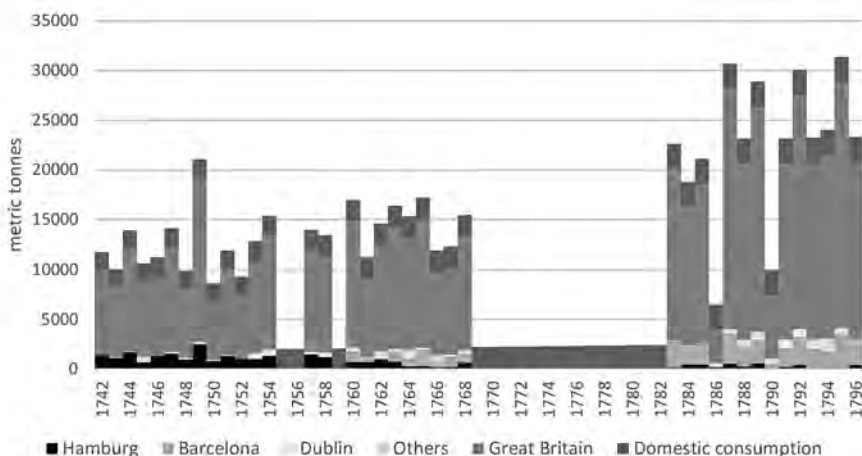


Figure 2: Shetland: dried cod and ling production, metric tonne live weight

that of foreign markets.<sup>26</sup> Domestic consumption is unknown, but we may use Icelandic and Norwegian data to establish a reasonable estimate. In 1770, the documented Icelandic per capita consumption was 245 kg live weight fish. In the Norwegian coastal districts from Rogaland to Finnmark, home of about half the Norwegian population at the time, the average fish consumption is estimated to have been between 160 and 215 kg per person.<sup>27</sup> Conservatively, we assume a consumption of 120 kg in Shetland as agricultural production may have provided a larger variety of foodstuffs. Shetland population data is derived from GB Historical GIS / Shetland Islands District through time | Population Statistics | Total Population, A Vision of Britain through Time.

Figure 2 shows that the Shetland fish production doubled in the second half of the eighteenth century under the assumption that the ratio of English and Scottish home markets remained stable throughout the period. Exports outside of Great Britain made up about 12-15% of total production. In the 1740s, the old strong link with Germany, now through Hamburg, was still very much in place.<sup>28</sup> Exports of about 1,400 t indicate that not much change had taken place since the eighteenth century.

The traditional ties with German merchants were only severed in the 1760s when links were opened to a new Mediterranean market. The cod was now processed in a new way to suit Spanish customers. The inspiration came

26 Smith 1984, p. 131.

27 Døssland, Løseth, and Elstad 2014, pp. 160-161.

28 Rössner, 120.



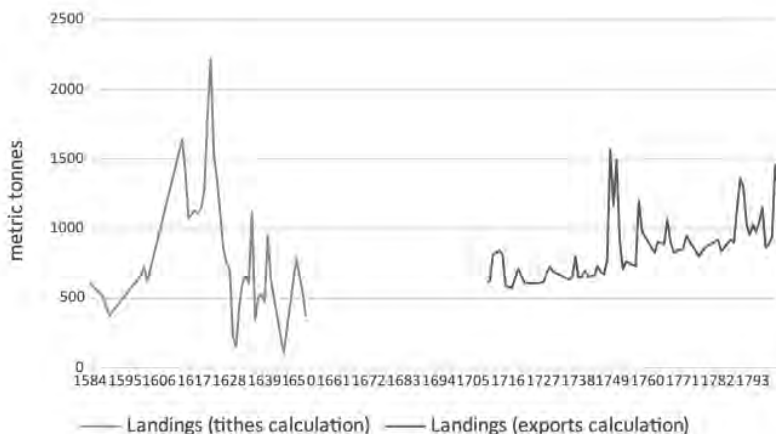


Figure 3: Faroese landings: cod 1584-1801

from Norwegian fish traders who already, in the 1730s, had introduced a new curing method of cod and ling - 'split fresh from the sea, pressed, lightly salted and hard dried, these earned an international reputation for quality'.<sup>29</sup> Similarly, the introduction of new types of vessels added to the efficiency of the fishers in landing and processing cod. In 1743 eight six-oared boats were bought from Bergen. Such boats had certainly been used in Shetland before, but they now became widely used for offshore fishing.<sup>30</sup> The name for the new period of 'haaf fishery' indicates the longer travels into open-sea fishery and bigger catches that became possible with improved technology.

### Faroese records of tithes and export

Records of Faroese fishing are available as a near-continuous series of payments of tithes from 1584 to 1652.<sup>31</sup> Tithes were paid as 10% of the catch and divided into four equal parts (paid to the King, the Bishop, the Church, and the poor). Certain parts of the total catch, amounting to about one third, were exempted before the tithe was applied. The data provide the amounts (in terms of dry cod) in respect of the Royal share of the tithe. After 1652 no records are available but trade figures from the Faroes to Copenhagen are

29 Irvine and Morrison 1987, p. 43.

30 Irvine and Morrison 1987, p. 48.

31 Zachariassen 1961.

documented from 1709 onwards.<sup>32</sup> To estimate total catch in the later period, we added to the export figures estimated domestic consumption based on the Norwegian per capita consumption of 0.160 tonnes mentioned above.<sup>33</sup> We estimated demographic growth based on Degn and Guttesen<sup>34</sup>.

Figure 3 shows calculated Faroese cod landings. Total production centred around 1,000 t live weight annually with strong interannual variation. A series of good years between 1613 and 1624 with landings around 1,500 t was followed by a severe downturn to a prolonged series of poor catches around 500 t. When the export evidence begins in 1709, catches were still very low but shot up for a few years 1747-1750. The trend in the eighteenth century was one of slow long-term growth. It should be noted that the tithes records are probably a better reflection of overall landings as the calculation of domestic consumption necessarily smoothes the export figures.

The Faroese population was about 4,000 people in 1740, or a fourth of the population of the Shetland Islands. As fish catches largely reflected fishing effort per fisher, one might have predicted that Faroese landings would be about a fourth of the Shetland landings. The calculations indicate that landings were only one-tenth of the Shetland fishery, perhaps conditioned by relatively less accessible fishing grounds.

### **Icelandic export accounts, 1624-1790**

As noted above, German merchants lost direct access to Iceland because of the Danish ban of foreign trade to Iceland in 1602, and more effectively in 1619 when the 'Iceland, Faroe and Northland Company' was established in Copenhagen. The fish were sold from Copenhagen through Hamburg into the European market, and the chartered company was intended to offset good years against bad. Prices were fixed by royal decree and offered some protection against the vagaries of the market. The system favoured farming at the cost of fishing and prevented capital formation in the fisheries. Farmers controlled most labour and, in many regions, restricted fishing to winter periods when there was less need for land-based work. Only codfish was cured for export and sold as dried, dry-salted, and barrel-salted fish. The dried fish was the most cost-effective due to the transportation costs of salt and was a premium product preferred by the German market. The dry-salted cod, produced by the so-called 'terreneuf' method was probably in more

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32 Degn 1929.

33 Døssland, et al. 2014, pp. 160-161.

34 Degn 1929; Guttesen 2004.

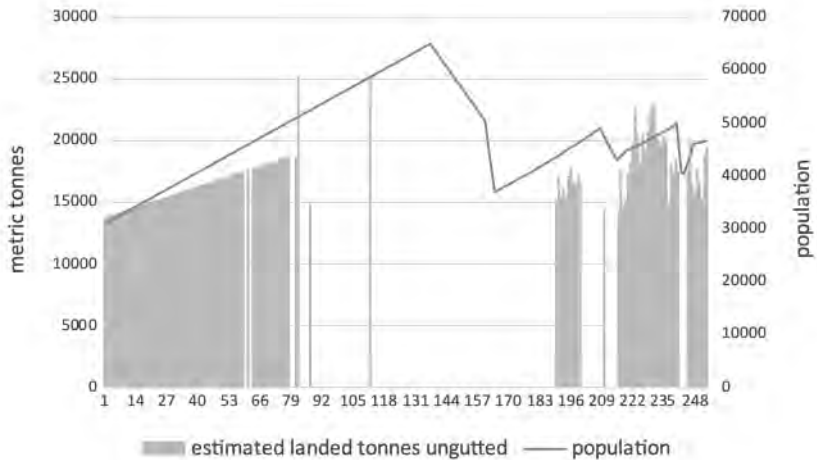


Figure 4: Icelandic cod landings and human population, 1544-1796

direct competition with Newfoundland products on the European market.<sup>35</sup>

Records of the fish traded by the chartered company are available for a few years of the seventeenth century from 1624 onwards, and an almost continuous series is preserved from 1733, all published in tabular format.<sup>36</sup> To estimate total landings, we calculated domestic consumption based on the figure provided by G Jónsson for observed consumption in the 1770s, and assumed a constant per capita consumption in previous centuries.<sup>37</sup> The first population census of Iceland was carried out in 1703. Estimates of the seventeenth- and eighteenth-century population development have been recently revised by Júlíusson (forthcoming), and we trended population figures for gap periods. Figure 4 shows the aggregated data 1544-1796 for the human population and annual landings (merging Hanseatic and Danish export data and adding

35 Gunnarsson 1983, pp. 67-73.

36 G Jónsson and Magnússon 1997.

37 To estimate total landings, J Jónsson (1994) assumed that 63% of all catches by Icelanders were consumed domestically; he based this on documented average rates for 1764 to 1773. This assumption rests on the hypothesis that domestic consumption was as elastic as the export trade. We agree with Karlsson (2007, 8) that this assumption is unrealistic as domestic per capita consumption would have been relatively constant except for periods of catch failure. Karlsson (Ibid, 19) finds incidental evidence to indicate that domestic consumption was likely about 300 kg per capita. We have, however, followed G Jónsson (1998) and assumed a per capita consumption of 245 kg annually.



Figure 5: Annual Catch per Unit Effort (CPUE) per fisher: Iceland 1544-1796

calculated domestic consumption). As landings likely reflected human fishing effort fairly directly, catches roughly trended the population.

### Catch-per-unit-effort

Population was a key factor for the size of the fishery as manual technology constrained total fishing effort. Calculation of catch-per-unit-effort (CPUE) is an indicator of the performance of a fishery and may provide a key to assessing likely catches in undocumented periods. CPUE was originally developed to determine the abundance of a stock, and ideally requires information about time, location, and length of a fishing operation, energy spent, and type of gear deployed.<sup>38</sup> For most historical fisheries we do not have precise information about these variables. However, the much cruder calculation of annual catch per fisher is a strong proxy for the success and failure of a fishery.<sup>39</sup>

In Iceland, longlining was introduced in 1482 and was the preferred technology in Northwest and East Iceland while it was prohibited on the Westman Islands in the south. Longlining with usually 1,200 hooks was much more efficient than handlining but also costly in terms of iron and bait and therefore was resisted by many fishers. In 1770, the first census of boats showed 1,869 fishing boats, indicating a total of 9,027 fishers (19.4% of the population). By an estimated total landing of 19,191 MT, the CPUE per man

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38 Garstang 1900.

39 Taudal Poulsen and Holm, 2007.



Figure 6: Annual Catch per Unit Effort (CPUE) per fisher: Faroe Islands 1584-1801

was 2.125 MT. If we assume that the relative percentage of fishers of total population was constant, the annual CPUE per fisher from 1544-1796 varied between 1.2 and 3.3 MT. The outstanding peak of 3.3 MT in 1707 occurred in a year when fishing effort will have been very low due to the deadly smallpox disease; the good result on effort reflects that few fishers made it to the fishing ground this year. Other peaks may be noted at multidecadal intervals: 2.9 MT in 1625, 2.6 in 1655, and 2.6 in 1765 and 1774. Lows occurred at 1.2 MT in 1565, 1.3 in 1578, 1.7 in 1630, and 1.6 in 1755 and 1780 (Figure 5). The annual median CPUE 1544-1796 was 2.0 MT.

In the Faroes, handlining for cod was the primary technology used throughout the early modern period. CPUE may be calculated by assuming that the percentage of fishers out of total population was like Iceland (19.4%). Accordingly, CPUE amounted to a median of 0.95 t (range 0.2 in 1645 to 3.6 t in 1622) (Figure 6). The Iceland and the Faroes CPUEs are not related ( $r^2 = 0.06$ ; correlation = 0.25), indicating that the fisheries depended on different ecological and climatic conditions.

Unfortunately, we do not have comparable evidence for Shetland. Goodlad estimates that '400-500 boats were in use and about 3,000 men employed in them' in the early nineteenth century when the haaf fishery peaked after the discovery of offshore fishing banks.<sup>40</sup> A conservative estimate of a 1.5-2 t catch per fisher per annum indicates total catches of around 45,000-60,000 t. This may be compared with the values derived for 1787 and 1795 of totals of around 30,000 t.

40 Goodlad 1971, 112.

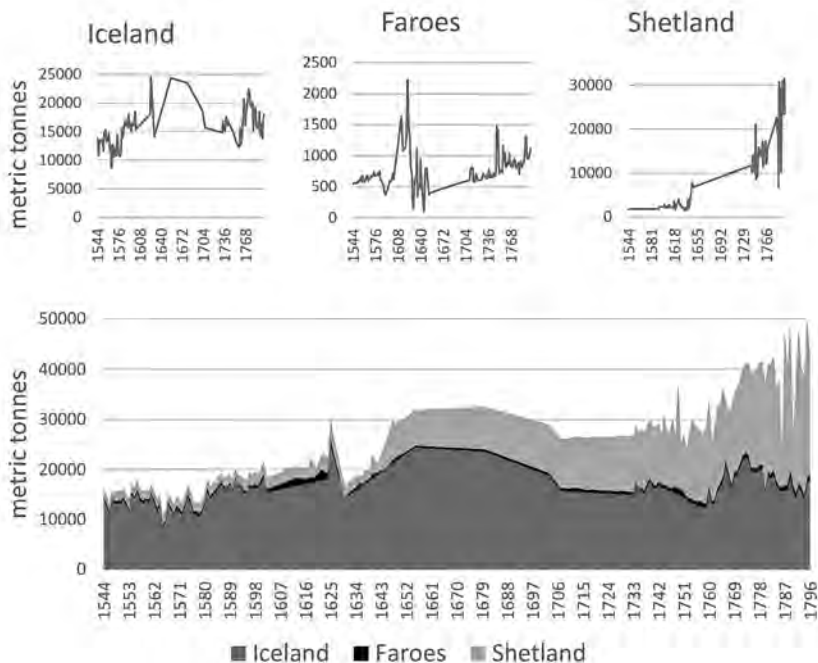


Figure 7: Total cod landings, Iceland, Faroes, and Shetland 1544-1796

The CPUE of the Faroese and Icelandic fisheries may be compared with other longlining enterprises. In 1770 a total of French offshore longliners made catches per man per year of 2.3 t in 1764 and 3.4 t in 1777; in the mid-nineteenth century, catches were between 3.3 and 4.3 t, decreasing to only 1.4 t in 1884.<sup>41</sup> As late as the 1890s, Danish haddock fishers in the North Sea, using longlines and half-decked sailing vessels, had average annual catches of 2.6 tonnes per man with considerable year-on-year variability between a low of 0.7 tonnes in 1900 and a high in 1896 of almost 4 tonnes.<sup>42</sup>

Finally, we may compare the median CPUE in the North Atlantic islands of between 1.5 and 2.5 t per fisher with the Newfoundland French longlining. The CPUE of the French fishery off Port au Choix and Saint Pierre et Miquelon between 1764 and 1792 was on average about 30 quintals per man, with single years as bad as 20 and good years as high as 50 quintals. By the standard calibration to live weight (1q = 48.95 kg, dry : wet 1:4.7) this

41 J. Jónsson, 1994, pp. 7, 10, 12.

42 Poulsen 2007, p. 205.

converts into 6.9 t (4.6 - 11.5 t) per fisher.<sup>43</sup> In other words, the Newfoundland fishery offered much greater returns on a day's labour than in the Northeast Atlantic.

## Discussion

The evidence is patchy but enough to assess total landings in the North Atlantic islands through the early modern period. For the 270 years between 1521 and 1790 we have direct information (vessels or export data) in Iceland for 103 years, distributed across the period 1544-1790.<sup>44</sup> In the Faroes, direct observation (tithes and exports) amounts to 122 years between 1547 and 1790. For the Shetland Islands we have direct observation (exports) for 143 years between 1547 and 1790. Unfortunately, we could not infer trends between the fisheries as regression analysis shows that variations in landings did not show significant relationships; we assume that the ecological conditions varied significantly between the three regions, except for some outlying years which we discuss below. While data coverage is good for the sixteenth and most of the eighteenth centuries, there are significant gaps in the seventeenth century records. In Iceland we have only a few data points, but, fortunately, they are well spread across the century. For Shetland and the Faroes, the data coverage is good until 1647 and 1652 respectively, when there is a complete lack of information until 1709 for the Faroes and 1742 for Shetland. We have inferred a linear growth rate between known years to establish long-term developments. Therefore, the graph only gives a very generalised view for the seventeenth century (Figure 7). The graph highlights the downturn around 1630. We cannot follow the volatility in detail but in Iceland the years 1624-1632 have three data points that show the extremes of very good fishing followed by an almost immediate plunge. In Shetland, starvation was widespread in 1633-1635.<sup>45</sup> We do not know the losses of life but in the Faroes the population declined by about 20%. Another downturn of the fishery ensued from the smallpox epidemic which hit all the islands in and after 1700 and resulted in severe depopulation.<sup>46</sup>

At the macro level, the fisheries of the islands nearly doubled from 16,000 t in 1544 to 30,000 t in 1625 and increased by nearly 40% by the late eighteenth century. However, growth was precarious and uneven. Sustained growth only happened in the second half of the sixteenth century and again in the

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43 Turgeon 1997, Figure 6.

44 Holm et al 2021a, 2021b, 2021c.

45 Smith 1984, 40.

46 *Ibid.*; Júlíusson (forthcoming); West 1985, 24-32.



second half of the eighteenth century. A very significant downturn hit all islands in the late 1620s. Recovery was very uneven but overall production had recovered by the middle of the century, only to stagnate through the next hundred years. Total production figures only began to rise by the middle of the eighteenth century to a peak of 50,000 t by 1795.

The Iceland fishery shows an extreme pattern of repeated growth and decline. Through the sixteenth and most of the seventeenth century Iceland saw long-term population growth which would have carried the fishery forward. Sustained population growth likely characterised the sixteenth century and built the population to a maximum of around 60,000-70,000 people by 1680. A weakening of the population was notable before the turn of the seventeenth century and then disaster struck. In 1707-1709, the outbreak of smallpox killed as much as 40 or 50% of the population by recent estimates and will have caused a decreased fishing effort. Very poor catches in 1747-1750 were followed by six years of pack ice accumulated along the northern coast that prevented winter fishing.<sup>47</sup> A century of disasters reached its zenith in 1783-1784 when nine thousand people died as the Laki volcano erupted spewing fatally poisonous gasses.<sup>48</sup>

The volatility of the Faroese fishery between 1610 and 1635 is striking. Guttesen argues that fishing, because of the volatility, was never secure enough to be the basic industry of early-modern Faroese society.<sup>49</sup> Milk from cows and meat and tallow from sheep provided basic nutrition but fishing was a critical resource. A harsh winter with the loss of sheep and cattle and a season of poor fishing caused famine and increased mortality. The worst years followed the significant downturn of the fishery in 1629-1631, and Guttesen estimates that in the first half of the seventeenth century the human population decreased from 3,200 to 2,500.<sup>50</sup> Our calculation of total landings and estimated domestic consumption reveals this in stark numbers. When the tithe payment had been made in 1629, there was a deficit of 263 t of fish to sustain domestic needs. The following year it was worse with a deficit of 335 t (Figure 8). Indeed, we know that the Faroese retracted from fishing in the second half of the seventeenth century and wool became the dominant trade of the islands.<sup>51</sup>

The Shetland Islands fishery was the only one to experience sustained growth. The islands suffered from the late 1620s crisis but seem to have recovered fairly quickly. One consequence of the downturn appears to have

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47 Ogilvie 2000.

48 Jackson 1982.

49 Guttesen 2004.

50 Ibid.

51 Stoklund 1992.

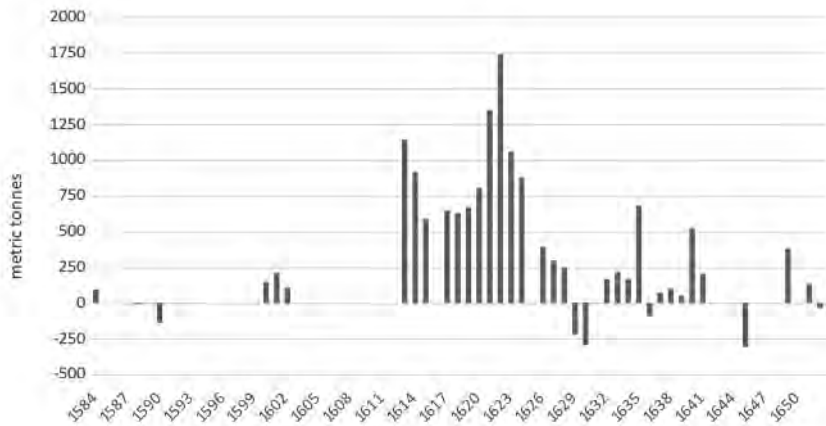


Figure 8: The volatility of Faroese food security: fish availability for domestic consumption by own landings after payment of tithes

been the loss of Shetland's own trade into the Baltic as evidenced by the Sound Toll Tables, which will have left the islands increasingly dependent on German - and eventually Scottish - merchants. The smallpox epidemic in 1700 and the Act of Union will have disrupted the fish trade severely. However, decisive change came with the opening of Mediterranean export markets in the 1760s. This development established Shetland clearly as an economic and technological leader in the North Atlantic islands. Shetland catches were half the size of the Icelandic in the seventeenth century but by the end of the period the two were on an equal standing despite Shetland's population being half the size of Iceland's (21,000 people in 1790 against Iceland's 46,000, and the Faroe Island's 5,000 inhabitants).

The widely differing trajectories of the North Atlantic islands should be a focus of further comparative study. Through most of the period, the islanders seem to have been relatively unaware or uninformed of the fate of each other; most information will have been communicated by word of mouth from foreign traders. The precariousness of existence was evident from the terrible losses of life, not just at sea but in repeated famines and epidemics that swept away many thousands of souls. By the late eighteenth century, information was, however, beginning to circulate more widely. In the aftermath of the Laki eruption, Copenhagen-based authorities decided to invest in Icelandic fishing boats and to liberalise trade as a means to grow the economy.<sup>52</sup> Rumours of

52 Holm 1995.

Shetland's success in developing its fishery eventually reached the Faroes; in 1839 a delegation tasked with learning from fishers in the neighbouring archipelago was the initiating impetus of the modernisation of the Faroese fisheries.<sup>53</sup>

## Conclusion

The North Atlantic Islands lost out during the early modern 'Fish Revolution'. While cod production in the Northwest Atlantic grew seven-fold, production in the Atlantic islands only tripled in the same period. A primary underlying reason was the difference in catch-per-unit-effort that gave Newfoundland fishers returns of two- or three-times higher than colleagues in the North Atlantic islands. Other factors include epidemiological and volcanic disasters in Iceland, and famine which we can detect most strikingly in the Faroe Islands, but likely impacted all islands at times.

The fishery of the North Atlantic islands in the early modern era shared some key characteristics in terms of fishing technology and the heavy dependence on fish for domestic food security. The islands relied almost entirely on foreign merchants, who focused on a German export market that had a strong preference for specific heavily dried fish that left the producers no room for innovative development. The economic system incentivised conservative practices which in Iceland and the Faroes were backed up by strict price control systems. In Shetland, the German traders enjoyed a similarly dominant position, but Scottish traders likely introduced an element of competition, especially in the eighteenth century. Only in the second half of the eighteenth century did Shetland fish break into the lucrative Mediterranean market when they shifted from producing dried stockfish to saltfish. The prerequisite was an increased commercialisation to enable the import of salt, and a break away from traditional buyers. The environmental history of the North Atlantic islands, when we look at the bare numbers of fish extraction, reveals a story of human resilience on the edge.

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53 Pløyen 1840.

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