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SUMMARY

The management of the pelagic fishery in the North East Atlantic is covers a huge area, involves a range of fishing vessels from various countries, where some are members of EU, while others are not. This gives rise to complexities and challenges in the management of especially herring and mackerel, which are the dominant species in the pelagic fishery.

Besides the above mentioned complixities, the biological development within the latest years has increased it even further. Mackerel migrated into other parts of the North East Atlantic giving increased tensions between EU and non-EU states with respect to questions like who can catch what and how much can they catch.

Many different types of vessels participate in the pelagic fishery using various gears types. However, the major share of herring and mackerel catches is taken by large fishing vessels using trawl and purse seine. These vessels are specialised to this type of fishery and are capital intensive. Minor shares are taken by smaller vessels, but these do generally not rely much on these two species.

Many of the vessels involved in the pelagic fishery are managed with Individual Transferable Quotas. This has facilitated the possibility for a further specialisation and concentration of catches on fewer vessels, thus making them more profitable. However, no transferring of quotas between individual vessels from different nations is possible, but could potentially give rise to a further development in the fleets involved in this fishery. The problems about getting an agreement for the mackerel fishery most likely have to be solved before this and other management developments can become possible.

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Introduction

The pelagic fishery in the North East Atlantic is primarily targeting mackerel and herring, but other species may also contribute to these vessels income. For instance capelin is important in the Icelandic pelagic fishery and various industrial species are important for the Danish pelagic vessels. The pelagic fishery is conducted various vessel sizes, but it is generally larger hgighly specialised vessels, which are very dependent on these two species. Thus significant changes in the Total Allowable Catches (TAC) of these species also have a significant influence on the economic performance of these vessels.

Mackerel is a species that can be found throughout the Atlantic, from Norway to Portugal. Currently, it is considered the existence of a single stock of mackerel in the area of Northeast Atlantic (ICES 1996), instead of the three stocks that were distinguished before (ICES, 1992). In 1995, it was agreed to combine the stocks of North, West and South in a single population, the North East Atlantic mackerel (ICES, 1996) with some spawning components (North Sea, West and South). These components set for mackerel are not totally independent but there are, to some extent, reproductive exchanges.

Herring can also be found in a large part of the North East Atlantic, but consists of various stocks. Norwegian spring-spawning herring is a widely migrating stock. The feeding grounds of the adults are in the Norwegian Sea. Spawning takes place in late winter and early spring along the Norwegian coast. In the North Sea, three main stock units of herring have been defined, while the herring stock in the waters west and south of Ireland and United Kingdom also consists of various stock components.Furthermore, there is the Icelandic summer-spawning herring in the waters around Iceland.

Historical background

The management of the pelagic species is mostly undertaken by the countries around the North East Atlantic through the NEAFC (North East Atlantic Fisheries Commision)[1]. Members of NEAFC is Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Norway and the Russian Federation and the purpose is maintain a rational exploitation of fish stocks NEAFC area in the North East Atlantic, taking scientific advice from ICES, the International Council for the Exploration of the Sea into account. The management is based on agreement between the members about the size of the yearly quota and the division between the countries.

The Norwegian spring spawning herring has had long history in Norway, Iceland and the Faroe Islands. In 1996, Norway, Russia, the Faroe Islands and Iceland agreed to a divison of the fishery. EU was included in the agreement in 1997. In 2003-2004, disagreement rose in relation to the split of the fishery between the member states, and no agreement was in place from 2003 to 2006. This did not lead to overfishing, and in 2007 an agreement was again obtained.

The stock of North Sea herring is not regulated through NEACF, but shared between EU and Norway through bilateral agreements. Within the EU, the quotas are distributed using the key of relative stability. EU and Norway agreed in 2008 to a joint management plan for North Sea herring.

[1] http://www.neafc.org/

EU, Norway and the Faroe Islands agreed in 2000 and a distribution of mackerel, and this agreement was in place until 2009. A long term management plan was also agreed for mackerel. However, the development in the mackerel stock gave rise to intensive discussions, which lead to a situation, where it was not possible to reach an agreement between EU, Norway and the Faroe Islands about the distribution of landing possibilities. To complicate things even further, the migratory patterns for mackerel started to change, leading to larger concentration of mackerel in the waters around Iceland, which then led to a directed Icelandic fishery for mackerel, despite that Iceland was not a part of the agreement. The changed migratory patterns furthermore led to pressure from the Faroe Islands with respect to obtaining a larger share of the Total Allowable Catches, because there was also higher concentration of mackerel in the waters around the Faroe Islands. All this has lead to a situation, where it has not been possible to negotiate an agreement, which all parties involved can agree to. So the management plan for mackerel agreed between EU, Norway and Faroe Islands has not been followed in recent years.

The management of the pelagic species does to some extend apply the same instruments within the nations involved. Denmark, Norway, Iceland has used individual transferable quotas for many years, while Norway and United Kingdom has used individual non-transferable quotas either allocated to the vessel or the producer organization. In Spain, the management of the mackerel quota led to a race for fish situation and overflooding of the mackerel market leading to low prices. In order remove these negative outcomes, a new management tool based on daily limits was introduced in 2009 (Orden ARM/2091/2008), where it was related to the fisherman, and changed in 2011 to the vessel (Orden ARM/3315/2010.

Fleets and fisheries

Many different vessel types of different sizes catch pelagic in form of mackerel and herring species in the North East Atlantic, also known as area 27 using the FAO code. However, many of these vessels only catch limited amounts of mackerel and herring, which does therefore not constitute a huge propotion of their income. The distribution of Total Allowable Catches between EU member states in 2010 is shown in Table 3.1 and Table 3.2 for mackerel and herring respectively.

Table 3.1 Adjusted EU-quotas for mackerel in the North East Atlantic, 2010 (tonnes)

	BEL	DNK	FRA	NLD	IRL	PRT	ESP	GBR	SWE	DEU
02A-N.		11,626								
05B-F.		3,765								
2A34.	175	14,031	1,511	1,072				1,754	2,990	849
2CX14-	5	4,833	13,846	23,569	62,426		20	173,128	442	17,061
8C3411			4,000	457		3,830	24,604			984
Total	**180**	**34,255**	**19,357**	**25,098**	**62,426**	**3,830**	**24,624**	**174,882**	**3,432**	**18,894**

Source: The Danish AgriFish Agency

Table 3.2 Adjusted EU-quotas for herring in the North East Atlantic, 2010 (tonnes)

	DNK	EST	FIN	FRA	NLD	IRL	LVA	LTU	POL	GBR	SWE	DEU
03A-BC	642										1,034	
03A.	8,000										20,171	219
07A/MM	.									5,030		
1/2.	29,336			158	24,829	8,563				23,931		11,106
2A47DX	13,008			67							64	
30/31.			92,295								20,278	
3BC+24	4,185								2,032		3,108	12,519
03D.RG		15,643					19,591					
3D-R31	4,415	13,906	25,564				3,896	2,189	31,486		42,533	2,387
04-N.											846	
4AB.	36,837			8,590	15,332					3,242	3,828	2,455
4CXB7D				6,560	9,317					1,799		5,043
5B6ANB				514	3,376	3,096				13,925		3,592
6AS7BC						8,510						
7EF.				500						500		
7G-K.				640	510	9,243				14		267
Total	**96,423**	**29,549**	**117,859**	**17,029**	**53,364**	**29,412**	**23,487**	**2,189**	**33,518**	**48,441**	**91,862**	**37,588**

Source: The Danish AgriFish Agency

Using the latest available data collected under the EU Data Collection Framework (DCF), the most important EU fleets in the pelagic fishery can be identified. Six fleets from Denmark, United Kingdom, France and Ireland had above 45% of landings value from mackerel and herring caught in the North East Atlantic in 2010.

Furthermore, some Spanish fleets also catch mackerel in the North East Atlantic, but no DCF data is available. Most mackerel catches from Spain are landed by the artisanal fleet (mainly with hand lines), though some catches are also made with gillnets. The second largest fleet in terms of fishing method has traditionally been the purse seiner fleet, despite that its catches have dropped by 19% in recent years, mainly due to a decrease in the number of vessels using this method. The drop in their

relative contribution to overall catches by Spanish vessels has been even greater than the drop in their actual catches in percentage terms. This is due to the major increase in catches with trawl nets, where the amount of fish caught by bottom trawling increased by 232% during the last decade.

The physical characteristics of the six fleets for which DCF data exists are shown in Table 3.3, while the characteristics of the Spanish fleets are shown in Table 3.4, where primarily the purse seiners are dependent on the mackerel fishery.

Table 3.3 Physical characteristics of key pelagic fleets, 2010

Country	Length	Gear	Number of vessels	Average length (meters)	Average tonnage (GT)	Average engine power (kW)	Average Capital value (Euro)	Employ-ment (FTE)
Denmark	VL40XX	DTS	29	50.5	910	2,009	305,937	11
France	VL40XX	TM	4	85.8	2,498	2,881	n.a	30
Ireland	VL1824	TM	8	21.7	139	374	n.a	0
	VL2440	TM	14	30.2	324	710	122,940	8
	VL40XX	TM	20	55.3	1,298	1,954	24,575	9
United Kingdom	VL40XX	PS	34	67.6	2,091	4,664	59,626	5

Source: Data downloaded from http://datacollection.jrc.ec.europa.eu/index.htm

Table 3.4 Physical characteristics of key Spanish pelagic fleets, 2009

Fleet	Number of vessels	Average length (meters)	Average tonnage (GT)
Trawlers	19	36	361
Coastal trawlers	5	30	224
Purse seiners	56	27	157
Gillnet	26	12	13
Hand lines	57	20	60

The importance of mackerel and herring catches for the six fleets in various parts of the North East Atlantic is shown in Table 3.5 together with the total ladings value the fleet has in the specific area. For instance the Danish VL40XX DTS fleet lands for around 7 million Euros of fish caught in the Baltic Sea, out of which herring constitutes 23%.

Table 3.5 Distribution of mackerel and herring catches and total landings value, 2010

Country	Length	Gear	Area	Mackerel	Herring	Total value (million Euro)
DNK	VL40XX	DTS	3 - Baltic Sea	0%	23%	7
			4 - North Sea	29%	11%	138
			7 - Vest of Irish Sea	26%	63%	18
			8 - Biscayen	0%	0%	0
			Total	27%	18%	163
FRA	VL40XX	TM	4 - North Sea	0%	100%	21
			6 - Vest for scotland	0%	53%	2
			7 - Vest of Irish Sea	13%	42%	18
			8 - Biscayen	60%	0%	6
			Total	13%	62%	47
IRL	VL1824	TM	6 - Vest for scotland	82%	17%	0
			7 - Vest of Irish Sea	3%	0%	1
			Total	90%	7%	1
	VL2440	TM	4 - North Sea	71%	16%	1
			6 - Vest for scotland	87%	0%	4
			7 - Vest of Irish Sea	81%	14%	9
			8 - Biscayen	37%	12%	0
			Total	20%	32%	15
	VL40XX	TM	4 - North Sea	26%	25%	12
			6 - Vest for scotland	100%	0%	32
			7 - Vest of Irish Sea	65%	9%	28
			8 - Biscayen	33%	12%	0
			Total	0%	0%	72
GBR	VL40XX	PS	4 - North Sea	47%	10%	68

			5 - Færøsk farvand	100%	0%	0
			6 - Vest for scotland	78%	4%	61
			7 - Vest of Irish Sea	16%	4%	62
			8 - Biscayen	100%	0%	0
			Total	57%	3%	191

Source: Data downloaded from http://datacollection.jrc.ec.europa.eu/index.htm

The Icelandic catch of herring in 2010 amounted to 66.579 tonnes. Of that total volume 48.466 tonnes were caught in Icelandic waters, while the rest (18.114 tonnes) were caught outside the Icelandic EEZ. The total landing value of this catch was approximately EUR 7.5 million[2].

The distribution of days at sea on subregions is shown in Table 3.6 covering 2010, except for the Irish VL1824 TM for which no data is available.

Table 3.6 Distribution of days at sea on subregions, 2010

Subregion	Denmark VL40XX DTS	France VL40XX TM	Ireland VL2440 TM	Ireland VL40XX TM	United Kingdom VL40XX PS
21.1					161
21.1.B					29
27.12.A		0			
27.2.A	222		28	32	83
27.3.A	152				
27.3.D.24	1				
27.3.D.25	19				
27.3.D.26	352				
27.3.D.27	68				
27.3.D.28	227				
27.3.D.29	117				
27.4.A	1,121	32	28	155	381
27.4.B	2,962	4			87

[2] Based on information from Statistic Iceland (www.hagstofa.is). 1 Euro = 165 Icelandic Kronor.

27.4.C	401				29
27.5.B					8
27.6.A		85	254	517	475
27.6.B				16	9
27.7.A			2		75
27.7.B		22	181	230	159
27.7.C		17	25	140	42
27.7.D		16			81
27.7.E	37	39		8	161
27.7.G	7		115	51	5
27.7.H	66	7		195	27
27.7.J	391	409	201	761	449
27.7.K		2	197	17	5
27.8.A	6	6		6	20
27.8.B		1			
27.8.D		1	27		12
34					201
34.1.3			50	40	
Total	6,150	642	1,108	2,168	2,501

Source: Data downloaded from http://datacollection.jrc.ec.europa.eu/index.htm

Note: FAO area subarea codes can be found here:
http://datacollection.jrc.ec.europa.eu/wordef/fishing-area

Finally, the key economic performance measures for the six pelagic fleets identified above are shown in Table 3.7.

Table 3.7 Key economic performance measure, 2010

Country	Length	Gear	Total income	Variable costs	Gross profit	Depreciation and interests	Net Profit
Denmark	VL40XX	DTS	176.3	76.8	99.5	40.1	59.4
France	VL40XX	TM	20.7	20.4	0.4	0.5	-0.2
Ireland	VL1824	TM	0.0	0.0	0.0	0.0	0.0
	VL2440	TM	24.4	18.1	6.3	9.1	-2.7
	VL40XX	TM	82.1	51.3	30.8	30.0	0.8
United Kingdom	VL40XX	PS	221.5	156.5	64.9	29.4	35.5

Source: Data downloaded from http://datacollection.jrc.ec.europa.eu/index.htm

In Iceland, the pelagic fishery is an important fishery, and there exist relatively reliable economic data. In 2010, the total revenues of this fleet was estimated at EUR 88.8 million, while total costs were around EUR 60 million resulting in a profit as a percentage of revenues of around 77% (Statistics Iceland).

Management processes

Science

The biological advisory process related to the pelagic species is taking place within the ICES system, where scientists from various research institutions contribute with their expertise in order to obtain the most up to date advice regarding the stock situation and fishing opportunities. The ICES's working group in charge of providing the scientific advice for mackerel is the WGWIDE (Working Group on Widely Distributed Stocks), while it for herring is HAWG (Herring Assessment Working Group). Then, ICES' Advisory Committee (ACOM) delivers the final advice to the relevant parties, EU as well as non-EU countries.

Once the European Commission receives the report from ICES's ACOM consults its own Scientific, Technical and Economic Committee for Fisheries (STECF), which is composed of independent scientific experts. Having received the outcome of this process, the Council of Ministers decides on the TACs

In Iceland, the Marine Research Institute carries out wide ranging and extensive research on the status and productivity of the commercial stocks, and long-term research on the marine environment and the ecosystem around Iceland. The results of this research are the foundations of the advice on sustainable catch level of the fish stocks.

Operational policy

Besides the scientific contributions from ICES and STECF related to the biological advice, the pelagic Regional Advisory Council also prepares an advice on the management of pelagic fish stocks on behalf of the fisheries sector and other stakeholders. Furthermore, some regional inputs may also be a part of the process, for instance the Spanish fishing sector organizes meetings - with different regions stakeholders: administrations, scientifics, and fishing sector representatives - to discuss different issues related the fishery for mackerel. In particular, the inshore fishing organizations, so-called cofradias, and currently organized under the Producer Organization's umbrella, take decisions on limits by day, on rules to share the Spanish TAC among the diferene technologies, among other issues.

All these various contributions feed into the discussions at the management level within NEAFC (North East Atlantic Fisheries Commision).

Decision-making

Within the areas covered by NEAFC, conservation and management measures are decided within NEAFC for mackerel and herring, including setting the Total Allowable Catches. Outside the NEAFC areas, other decision structures are used. For instance, the TAC of the North Sea herring is decided through a joint-agreement between EU and Norway, while mackerel in the Southern part of the North East Atlantic is decided within the EU.

Management objectives and principles

The guiding objective for management for the EU is expessed in the basic regulation of the Common Fisheries Policy (COUNCIL REGULATION (EC) No 2371/2002)):

"The objective of the Common Fisheries Policy should therefore be to provide for sustainable exploitation of living aquatic resources and of aquaculture in the context of sustainable development, taking account of the environmental, economic and social aspects in a balanced manner"

Some nations have expressed this even more firmly. For instance, one of the objectives in the Danish national management system was to address how to obtain the highest economic outcome from the allocated quotas.

According to the Icelandic Fisheries Act (last revised in 2006), the main objectives of the law are to promote conservation and efficient utilisation of the resource, thereby ensuring stable employment and settlement throughout Iceland. In practice, the main emphasis has been on economic efficiency and stocks sustainability through the use of ITQ systems for most fisheries, including the pelagic fisheries.

In Spain, the Basque inshore fleet is subject to the Law 3/2001, which is the general law of Spanish fisheries. This legal instrument aims at being consistent with the Common Fisheries Policy (CFP). It aims at ensuring a sustainable exploitation of the fishing resources, targeting to adapt fishing effort to resource status, and ensuring an efficient and competitive fishing sector, amongst others. It establishes the rules to access and exploit the fishing resources such as census of fishing vessels, fishing authorizations, permits, distribution of fishing rights criteria of allocation and characteristics

of fishing rights, close areas and seasons and the establishment of a system of Monitoring, Control and Surveillance. Role, scope and characteristics of fishermen organization are also defined and regulated by this law.

However, none of the objectives are expressed very specifically in form of quantitative objectives. It is more generic objectives giving some preferred directions, but there are no commitments with respect to actually reaching an actual level in the future.

The CFP 2002 also expresses principles of good governance. The first principle explicitly requires the involvement of stakeholders in the decision-making processes: "*The Common Fisheries Policy shall be guided by (…) broad involvement of stakeholders at all stages of the policy from conception to implementation*" (Article 2.2c). The second principle requires sound scientific advice in the decision-making processes: "*the Common Fisheries Policy shall be guided by (…) a decision-making process based on sound scientific advice which delivers timely results*" (Article 2b). Finally, the CFP 2002 makes a reference to the precautionary approach principle: "*(…) the Community shall apply the precautionary approach (…)*" (Article 2.1), which "(…) *means that the absence of adequate scientific information should not be used as a reason for postponing or failing to take management measures to conserve target species, associated or dependent species and non-target species and their environment*" (Article 3i).

Management strategies

The pelagic stocks have been subject to various management strategies over time. The following management plan for mackerel in the Northeast Atlantic was agreed in 2008:

1. For the purpose of this long-term management plan, SSB means the estimate according to ICES of the spawning stock biomass at spawning time in the year in which the TAC applies, taking account of the expected catch.
2. When the SSB is above 2,200,000 tonnes, the TAC shall be fixed according to the expected landings, as advised by ICES, on fishing the stock consistent with a fishing mortality rate in the range of 0.20 to 0.22 for appropriate age groups as defined by ICES.
3. When the SSB is lower than 2,200,000 tonnes, the TAC shall be fixed according to the expected landings as advised by ICES, on fishing the stock at a fishing mortality rate determined by the following: Fishing mortality F = 0.22* SSB/ 2,200,000
4. Notwithstanding paragraph 2, the TAC shall not be changed by more than 20% from one year to the next, including from 2009 to 2010.
5. In the event that the ICES estimate of SSB is less than 1,670,000 tonnes, the Parties shall decide on a TAC which is less than that arising from the application of paragraphs 2 to 4.
6. The Parties may decide on a TAC that is lower than that determined by paragraphs 2 to 4.
7. The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES.

But it had only a short lifetime due to the management complexities arising after the changes in the behaviour of the mackerel stocks. After 2008, no management plan has therefore been in function.

With respect to herring, EU and Norway have agreed to a plan in November 2008, where the implementation of the management system introduced in 1998 is continued, and which is consistent with the precautionary approach and as they specifically mention "*designed to ensure a rational*

exploitation pattern and provide for stable and high yields".

More specifically, the system consists of the following:

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 800,000 tonnes (Blim).
2. Where the SSB is estimated to be above 1.5 million tonnes the Parties agree to set quotas for the directed fishery and for bycatches in other fisheries, reflecting a fishing mortality rate of no more than 0.25 for 2 ringers and older and no more than 0.05 for 0 - 1 ringers.
3. Where the SSB is estimated to be below 1.5 million tonnes but above 800,000 tonnes, the Parties agree to set quotas for the direct fishery and for bycatches in other fisheries, reflecting a fishing mortality rate on 2 ringers and older equal to:
1. 0.25-(0.15*(1,500,000-SSB)/700,000) for 2 ringers and older,
2. and no more than 0.05 for 0 - 1 ringers
3. Where the SSB is estimated to be below 800,000 tonnes the Parties agree to set quotas for the directed fishery and for bycatches in other fisheries, reflecting a fishing mortality rate of less than 0.1 for 2 ringers and older and of less than 0.04 for 0-1 ringers.
4. Where the rules in paragraphs 2 and 3 would lead to a TAC which deviates by more than 15 % from the TAC of the preceding year the parties shall fix a TAC that is no more than 15 % greater or 15 % less than the TAC of the preceding year.
5. Notwithstanding paragraph 5 the Parties may, where considered appropriate, reduce the TAC by more than 15 % compared to the TAC of the preceding year.
6. Bycatches of herring may only be landed in ports where adequate sampling schemes to effectively monitor the landings have been set up. All catches landed shall be deducted from the respective quotas set, and the fisheries shall be stopped immediately in the event that the quotas are exhausted.
7. The allocation of the TAC for the directed fishery for herring shall be 29 % to Norway and 71 % to the Community. The bycatch quota for herring shall be allocated to the Community.
8. A review of this arrangement shall take place no later than 31 December 2011.
9. This arrangement enters into force on 1 January 2009.

For herring in the Celtic Sea, a rebuilding plan was in place until 2011. The plan was put forward by the Irish local fishery management committee and was later agreed to by the pelagic RAC. It was also evaluated by ICES and found to be in accordance with the precautionary approach. A long term management plan has been proposed by the Irish industry setting a target fishing mortality as well as a biomass level. Again the pelagic RAC agreed to this, but neither ICES nor STECF have evaluated the plan.

In the late 1960s, it became evident that the Icelandic herring stocks were heavily overfished and that a total collapse was imminent. Therefore an overall quota was imposed in 1969. As this measure did not have the impact that was hoped for, a complete moratorium was introduced in 1972. In 1975, the state of the Icelandic herring stock had somewhat improved but it was obvious that the whole fleet could not participate in the fishery so an individual vessel quota (IVQ) system was introduced that year. Only some specific boats were given a quota. The quotas were small and were issued on a year to year basis. In 1979, the Ministry of Fisheries allowed a fairly unrestricted transfer of the vessel quotas. The Fisheries Management Act of 1990 made the vessel quota system in the herring fishery an integral part of the general ITQ system and have been managed under that system

ever since.

In addition, a catch rule has been in place for the Nordic-Icelandic herring stock since 1996 based on keeping the fishing mortality within a limit which secures future long-term recruitment.

Currently there are no management plan in place for herring in the Irish Sea, despite that this has been recommended by ICES (ICES, 2012b)

Management tools

Conservation measures

At the overall level, the herring quotas are managed by TACs, which are distributed amongst the relevant countries, who have historically conducted a fishery in various areas. For mackerel, things are obviously a bit more complex, given that there is no agreement between the EU and the non-eu countries conducting the fishery. The various parties therefore sets unilateral mackerel TACs, irrespective of conservation concerns and the levels set by the other ones involved in the fishery. The EU quotas for herring and mackerel are shown in Table 3.1 and Table 3.2.

Currently there is only a discard ban for the pelagic fishery in the Norwegian zones of the North East Atlantic. However, EU is expected to also impose a discard ban in the pelagic fishery from 2014 as a part of the CFP reform.

Some EU member states have implemented further administrative measures in order to regulate their own pelagic fleets. For instance, a regulation was implemented in 2010 with the aim of distributing the Spanish quota by gear, with 30.5% of the quota for trawlers, 27.7% for purse seiners and 34.6% for artisanal fisheries. For all of them, 7% of the catches should be kept for the second half of the year.

There is no specific conservation measures based on instruments influencing the economic incentives. Elements like landing taxes, decommissioning schemes have not been applied for many years. Subidies have to a minor extend been used in Spain during the fuel crises in 2008, but these were not due to the low rentability of the mackerel fishery itself, but to the low rentability of the vessels in general.

It is for mention that in 2011, EU implemented a new regulation scheduling payback until 2015 due to overfishing of the mackerel quota allocated to Spain in 2010 (Commission Regulation (EU), No165/2011). A similar regulation applied to Scottish and Irish vessels expired in 2012.

Access regulations

Within the EU, the CFP has set an overall capacity ceiling for the national fleets in order to prevent their overexpansion. Strict entry restrictions have been imposed to ensure Member States comply with these limits.

In Denmark, anyone that fulfils the general requirement for being a fisherman and owns a vessel (has a license) is eligible to buy quota shares from other fishermen and apply them to his vessel in order to enter any fishery. Through a Fish Fund, new entrants can also apply for additional allocations for a

limited time period.

In the Spanish mackerel fishery, no specific access regulation tools (I(T)Q, I(T)E, licenses, TURFs) apply, although each vessel should belong to an official census (not being easly to move from one census to another one).

In Iceland, a fishing license is required as well as having an ITQ in the species concerned, if any fishery is to be conducted.

Compliance and monitoring measures

The Danish pelagic vessels are all using the electronic logbooks and have VMS installed onboard. Furthermore, observers are sometimes onboard the vessels, but this is not related to a control purpose, but instead to obtain important biological information related to the data collection undertaken, when undertaking the ICES stock assessment.

The introduction by the Spanish fishery administration of stricter checks on compliance in all Spanish ports in 2011 (currently continuous) seems to have resulted in an increase in prices and a narrowing of the differences in price behaviour between the regions. However, only data for 2011 and 2012 are so far available, so it would be advisable to wait before conducting any in-depth analysis.

AIS technology is mandatory in certain types of boats, those larger than 24m that have to wear the equipment for the AIS. However, EC has extended this obligatoriety to every commercial fishing vessel larger than 15m according to the following time calendar: vessels between 18-24m before May, 2013; vessels between 15-18m before May, 2014.

In Iceland, the Directorate of Fisheries monitors Icelandic fisheries closely to ensure that all rules are being followed. Iceland has a sophisticated enforcement regime using compulsory electronic positioning systems and a thorough system of port control with obligatory weighing of all catches by certified personel.

Management performances

Conservation

Table 8.1 describes the development in the various mackerel and herring stocks in the North East Atlantic from 1991 to 2011. Huge variation between the years is observed in the spawning stock biomass for the various components. This variation does of course influence the incentives and planning for the fishermen involved in the fishery. In order to make long term investments in the fishery, some stability is often needed in order to obtain loans. Alternatively, fishermen either have to take a risk or develop their fishery in a way, which can account for the variation, for instance by having a smaller vessel not able to utilise the TAC in the peaking years.

Table 8.1. Spawning stock biomass (SSB) of mackerel and herring in the Northeast Atlantic

	Mackerel	Herring in the Northeast Atlantic						
Year	Northeast Atlantic[a]	Norwegian spring spawners[b]	North Sea[c]	Western Baltic Sea[c]	Celtic Sea[c]	Area VIa(N)[c]	Area VIa and VIIa(N)[c]	Irish Sea[c]
1991	2,465,887	3,812,000	1,501,737	306,843	47,279	118,280	166,691	9,523
1992	2,487,167	3,889,000	1,151,701	317,845	53,243	91,338	133,531	8,987
1993	2,322,842	3,832,000	818,342	290,995	54,581	93,058	113,286	8,904
1994	2,126,968	3,964,000	874,154	228,122	62,996	85,194	95,035	9,937
1995	2,277,196	3,919,000	921,587	179,570	66,336	67,987	79,394	9,205
1996	2,261,416	4,405,000	1,057,787	132,151	59,374	106,239	62,548	7,250
1997	2,332,185	5,641,000	1,216,920	147,601	49,644	69,092	63,719	7,043
1998	2,240,916	6,342,000	1,467,383	119,440	40,456	98,641	52,162	7,214
1999	2,279,975	6,470,000	1,536,391	126,726	38,068	82,770	44,349	7,043
2000	2,074,604	5,506,000	1,531,376	140,102	36,511	70,735	36,854	7,367
2001	2,028,410	4,486,000	2,085,051	161,426	32,130	115,407	34,202	5,743
2002	1,687,771	3,951,000	2,397,833	201,125	38,575	135,005	32,711	5,850
2003	1,682,326	4,895,000	2,455,913	162,782	29,223	134,388	37,450	5,473
2004	1,721,746	6,158,000	2,419,299	168,338	22,819	118,908	39,366	7,727
2005	2,107,192	6,308,000	2,295,493	166,503	30,274	99,572	39,280	9,195
2006	2,262,265	6,652,000	1,797,072	184,317	36,930	95,588	37,442	9,627
2007	2,488,322	7,491,000	1,444,261	143,326	39,072	92,895	29,945	13,130
2008	2,755,441	8,076,000	1,525,478	123,711	51,306	93,734	21,886	15,928
2009	3,112,217	9,049,000	1,900,075	116,377	69,145	79,721	22,292	16,946
2010	2,973,399	8,326,000	2,003,951	108,427	84,263	63,785	17,433	18,542
2011	3,040,108	7,055,000	2,343,957	107,342	84,232	82,158	19,644	18,858

Sources: [a]ICES WGWIDE REPORT 2012 - section 2 - Northeast Atlantic Mackerel; [b]ICES WGWIDE 2012 - Sec 07 Norwegian Spring Spawning Herring; [c]ICES HAWG REPORT 2012 - Report of the Herring Assessment Working Group for the Area South of 62 N (HAWG)

Table 8.2 shows the trend of several indicators (including the spawning stock biomass and fishing mortality) for Icelandic herring over the period 1987-2012.

Table 8.2. Biological indicators for Icelandic herring

Year	Recruits $_{age\ 3}$ (millions)	Biomass age 3+ (kt)	SSB (kt)	Landings age 3+ (kt)	Yield/SSB	Fishing mortality
1987	530	504	384	75	0.2	0.35
1988	271	495	423	93	0.22	0.27
1989	448	459	386	101	0.26	0.32
1990	301	410	350	104	0.3	0.4
1991	842	424	310	107	0.34	0.44
1992	1.035	503	344	107	0.31	0.41
1993	638	547	424	103	0.24	0.25
1994	694	555	442	134	0.3	0.31
1995	204	464	408	125	0.31	0.34
1996	183	350	309	96	0.31	0.36
1997	778	371	271	65	0.24	0.25
1998	324	370	301	86	0.29	0.28
1999	564	378	294	93	0.32	0.37
2000	405	395	313	100	0.32	0.33
2001	496	360	281	94	0.33	0.4
2002	1.551	542	313	96	0.31	0.39
2003	1.203	628	419	129	0.31	0.26
2004	707	680	540	112	0.21	0.22
2005	1.310	829	600	102	0.17	0.22
2006	797	934	735	130	0.18	0.12
2007	997	888	706	158	0.22	0.24
2008	844	955	769	151	0.2	0.23
2009	924	1.003	655	46	0.07	0.07
2010	976	838	478	43	0.09	0.1
2011	1.271	692	371	49	0.13	0.17

Source: The Icelandic Marine Resource Institute.

During the fishing year 211/2012 an infection of the stock was observed. which has not been accounted for in this data. The fishing mortality has a downward trend over this period. although fluctations are great.

Economics

Unfortunately on economic information collected under the EU Data Collection Framework is available from 2008 to 2010. Based on the figures for gross profit3 shown in Table 8.3, there seems to have been an improvement in the economic performance of the included fleets.

Table 8.3. Development in average gross profit (1.000 Euro)

Country	Length	Gear	2008	2009	2010
Denmark	VL40XX	DTS	1.509	1.325	3.432
France	VL40XX	TM	n.a.	-936	93
Ireland	VL1824	TM	n.a.	n.a.	n.a.
	VL2440	TM	398	431	452
	VL40XX	TM	928	1.076	1.540
United Kingdom	VL40XX	PS	1.756	2.425	1.909

Source: Data downloaded from http://datacollection.jrc.ec.europa.eu/index.htm

Based on more detailed Danish data, the economic situation since the introduction of the ITQ system in 2003 seems to have improved. Furthermore, the number of vessels in the pelagic fishery has been significantly reduced. thus leading to a concentration of ITQs on fewer vessels.

Based on specific studies about Spanish mackerel fishery, the economic situation seems to be bad. The increasing interest in reducing catches and influencing the behaviour of fishermen has led to the introduction of changes in the management of the mackerel fishery exploited by the Spanish fleet, in a situation that can be extrapolated to other European fisheries. In these circumstances the administration has, in recent years, introduced daily limits as a new management tool to reduce fishing effort. The simulations carried out by considering this particular Spanish fishery show that daily limits need to be accompanied by changes in the demand function, because if everything remains the same then selling prices will not cover average costs.

Social aspects

To analyse the development in the social aspects of the pelagic fishery, Table 8.4 below shows the total number of full-time employed (FTE) persons employed in the fishery from 2008 to 2010. The picture is shifting depending on the fleet. For instance, the Danish fleet has increased the number of

[3] Gross profit is defined as income minus variable costs and non-variable costs, except for depreciation costs and interests paid. It thus measures what is left to payment of the invested capital and any excess payment of labour.

FTE's in their fishery. and the same is the case for the fleet from United Kingdom. For Ireland, the trend seems to be in the opposite direction.

Table 8.4. Development total number of full-time employed persons employed

Country	Length	Gear	2008	2009	2010
Denmark	VL40XX	DTS	259	251	313
France	VL40XX	TM	n.a.	n.a.	119
Ireland	VL1824	TM	n.a.	n.a.	n.a.
	VL2440	TM	119	104	116
	VL40XX	TM	205	211	176
United Kingdom	VL40XX	PS	132	231	186

Source: Data downloaded from http://datacollection.jrc.ec.europa.eu/index.htm

No Spanish data is available regarding the employment measured as full-time employed. but in 2009 163 vessels from the Basque Country were involved in the mackerel fishery which means that about 1.380 crew members participated in it. Additionally another 49 vessels from outside of the Basque Country also participated in the fishery (mainly with based port in Galicia. Cantabria and France). In particular, the trawl fleet is composed of 214 crew, coastal trawl fleet of 42, 771 crew are linked to the purse seiners, and finally the artisanal fleet represents 342 crew.

The development in landings value per full-time employed shows that the landing value has in general increased over the three years, cf. Table 8.5.

Table 8.5. Development in value of landings per full-time employed (Euro/FTE)

Country	Length	Gear	2008	2009	2010
Denmark	VL40XX	DTS	413.453	385.131	546.631
France	VL40XX	TM	n.a.	n.a.	174.168
Ireland	VL1824	TM	n.a.	n.a.	n.a.
	VL2440	TM	189.765	208.037	205.715
	VL40XX	TM	271.779	319.368	459.692
United Kingdom	VL40XX	PS	1.163.088	878.709	1.139.056

Source: Data downloaded from http://datacollection.jrc.ec.europa.eu/index.htm

In Iceland there have been no recent changes in the number of fishermen employed in the pelagic

sector. The industry is quite stable with respect to number of vessels and crew.

Conclusions

Management of the pelagic species, mackerel and herring, is not as such complex from a national perspective. Most of the vessels are highly specialised and are operating at a large scale. The complexity arise because the fishery is conducted in the entire North East Atlantic which is an enourmous area covering various countries, fleet types. stock etc.

By the start of 2008, things saw from a management perspective to be working fairly well. Management plans were agreed for mackerel as well as the North Sea herring. However, the mackerel plan was more or less not applied due to the changed migatory patterns of the mackerel. thus making it attractive for Iceland and Faroe Islands to enter the fishery even more than before.

A key management question is therefore how to solve this stand-still situation, where no agreement can be reached between EU, Norway, Iceland and Faroe Islands regarding the mackerel.

In addition, the current low profitability of some European fisheries leads fishermen to catch as much fish as possible to ensure some financial returns on their work, even if this entails a risk of overfishing a species. This has led the Spanish mackerel fleet to fish more than the Total Allowable Catch set by the authorities for this stock.

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