



norden

Nordic Council of Ministers

Complementarities in the fisheries proceedings from NAF workshop in Hirtshals

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Danish Summary

Baggrunden for workshoppen skal findes i, at der med jævne mellemrum er konflikter mellem dem, der forvalter fiskeriet, og dem, der udøver det. Dette på trods af, at parterne principielt har samme intention: På den ene side er der fiskerne, der ønsker sig et fiskeri, som de kan leve af og med over tid. På den anden side er forvaltningen, der formelt har til hensigt at gøre fiskeriet bæredygtigt biologisk, økonomisk og socialt.

De reguleringer, der iværksættes af fiskeriforvaltningen, virker ikke altid efter den politiske hensigt. Dette kan naturligvis have flere årsager, men kan i vid udstrækning tillægges dynamikken i fiskeriet. Det betyder, at når fiskeriforvaltningen implementerer reguleringer i fiskeriet, så ændrer og tilpasser fiskerne sig til de ændrede reguleringer, hvorefter der kan komme et misforhold mellem hensigt og resultat. Det kan være såvel tilpasninger inden for den generelle regulering som omgåelse af fiskerireguleringen. Ofte synes disse tilpasninger irrationelle eller direkte uhensigtsmæssige for såvel fiskeriet som fiskene.

Indtil videre har der kun været begrænset fokus på denne interaktion eller komplementaritet mellem fiskere og forvaltning i såvel forvaltnings- som forskningssammenhænge. Formålet med workshoppen var derfor at få belyst relationerne mellem fiskere og forvaltning med henblik på at øge den gensidige legitimitet mellem de 2 parter.

Et andet formål med workshoppen var at få belyst forskellige perspektiver i forhold til problematikkerne: 1) Workshoppens deltagere havde forskellig institutionel baggrund – fiskeriforskning (social- og samfundsvidenskabelig samt biologisk), fiskeriforeninger samt fiskeriforvaltningsinstitutioner. 2) Deltagerne repræsenterede deres nationale fiskeri som case for debatten. Der var således deltagere fra både Danmark, Sverige, Norge, Island og Færøerne. Der opereres med forskellige forvaltningssystemer i de respektive fem lande. Dette gør det særligt relevant og interessant at samle og udveksle erfaringer på området på tværs af landegrænserne med henblik på at etablere en bredere forståelse for forholdet mellem fiskeriregulering og praksis.

Denne rapport er struktureret – som workshoppen var det – i tre sektioner, hver med et overordnet tema for præsentationerne, efterfulgt af et spørgsmål til debat blandt deltagerne.

Sektion 1:

Tema: Hvordan tages der på nuværende tidspunkt højde for fiskeripraksis i reguleringen?

Diskussion: Hvad er de interne forskelle mellem de nordiske landes systemer?

Sektion 2:

Tema: Hvorfor virker fiskeriforvaltningen ikke altid efter hensigten?

Diskussion: Hvad er de centrale problemstillinger i forholdet mellem fiskeripraksis og reguleringer?

Sektion 3:

Tema: Hvad er udfordringen for fremtidens fiskeriforvaltning i forhold til fiskeripraksis?

Diskussion: Hvordan imødekommes nutidens problemstillinger i fremtiden?

Introduction

The background for this workshop is to be found in the conflicts that regularly arise between those who manage the fishery and those who practise the fishery. This happens in spite of the fact that the parties in principle have the same intention: On one hand the fishers want a fishery they can live by and with, on the other hand the management formally wants to make fisheries sustainable, biologically, economically and socially.

The regulations of the fisheries management do not always work according to the political intention. There are several reasons for this, but to a great extent it can be due to the dynamics in the fisheries. This means that when the fisheries management implement regulations in the fisheries, the fishers change behaviour and adapt to the new conditions, and a disproportion between intention and result will arise.

An example of the complementarity between fisheries and fisheries management: In addition to the traditional quota system, a system of days-at-sea for all fishers in the EU was introduced in January 2003. At the same time the quotas were reduced dramatically – the North Sea cod by 45%. The Danish demersal fishers (whose main income comes from the cod fishery) were initially given nine days-at-sea a month. Until this point in time the Danish demersal fishers had not really been subject to effort limitation.

The days-at-sea-regulations had – at least – four unfortunate effects seen from the fishers' perspective: 1) Some fishers changed to other fisheries e.g. the fisheries for nephros, where the fishing mortality increased. These new fisheries have a heavy by-catch of cod, which had to be discarded if not illegally landed. 2) Due to lost income because of the reduced cod quota, some fishers started high-grading the cod. This means that they only landed the bigger and more expensive fish in order to increase the value of the landing. One can only guess what happened to the smaller, but still target-sized, cod. 3) Some fishers changed from mesh sizes up to 130 mm to using smaller ones under 100 mm in order to gain more days-at-sea. As the sizes of the quotas are not proportional to the allowed number of days-at-seas, these fishers had an increased over-catch of cod. 4) Other fishers chose to dis-comply with the regulations by stating a smaller mesh size in the logbook than actually used. The fishers did this in order to avoid the increased discard and the investments in new gear, which they did not want to use if it had not been for the regulations, but still getting the larger number of days-at-sea. Doing this, the fishers were taking the risk of being caught and fined by inspection.

These implications of the introduction of the days-at-sea-system were told about – or rather admitted – in interviews with Danish fishers during spring 2003. Many of these fishers assumed in the interviews that the fishing mortality for cod was much higher after the introduction of the days-at-sea system.

The results of the days-at-sea-system were thus possibly increased catches of cod, frustrated fishers of whom some had become criminals by using too big mesh sizes while others were using unnecessarily small mesh sizes. This is not what management had in mind when introducing the days-at-sea-system.

Until now, too little focus has been put on the phenomenon of interaction between fishers and management both in scientific and management context. The purpose of the

workshop was to shed light on the relations between fisheries and fisheries management with regard to the complementarity in the relations and the implications of the rationalities and actions, formally as well as informally.

The intention with this workshop was to look at the complementarities in the fisheries from different perspectives; the participants in the workshop had different institutional backgrounds; fisheries research (both social sciences and biology), fishers' organisations and fisheries management. Further, the participants represented their national (Iceland, the Faeroe Islands, Norway, Sweden and Denmark) fishery as a case for debate. The five Scandinavian countries have different ways of managing the fisheries. Thus a comparison of what is complementary in the respective countries and how the complementarities find expression etc. would be the first step in order to establish a broader understanding of the relations between fisheries regulations and fishers' praxis/adaptation.

This report is structured – as the workshop – in three sections with an overall theme for the presentations followed by a question for discussion among the participants:

Section 1:

Theme: How is the fisheries practice taken into account in the regulation at present?

Question for discussion: What are the internal differences between the systems in the Nordic countries?

Section 2:

Theme: Why does the fisheries management not always work as intended?

Question for discussion: What are the central problems in the relation between fisheries practice and regulations?

Section 3:

Theme: What are the challenges for the fisheries management of the future in relation to fisheries practice?

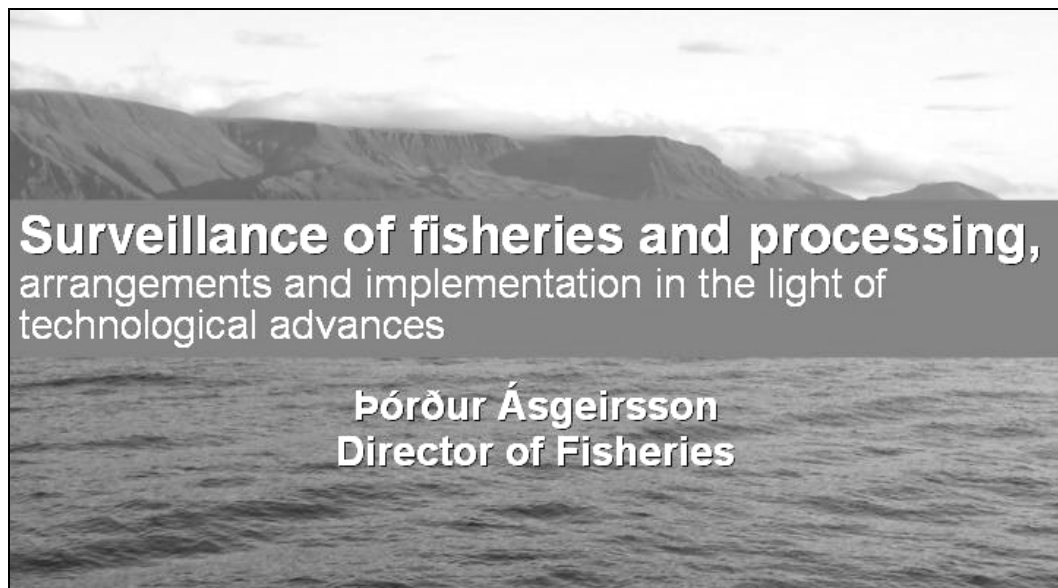
Question for discussion: How do we comply with the problems of today in the future?

In these proceedings, the presentations from each section are followed by a summary of the debate.

1 How is the fisheries practice taken into account in the regulation at present?

1.1 Surveillance of fisheries and processing, arrangements and implementation in the light of technological advances

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Information system on fishing quotas and catches

Electronic collection of data on landed catch

Distribution of information on the Internet



DIRECTORATE OF FISHERIES

Collection of data

- ▶ All catches from Icelandic fishing vessels are weighed and recorded at the port of landing



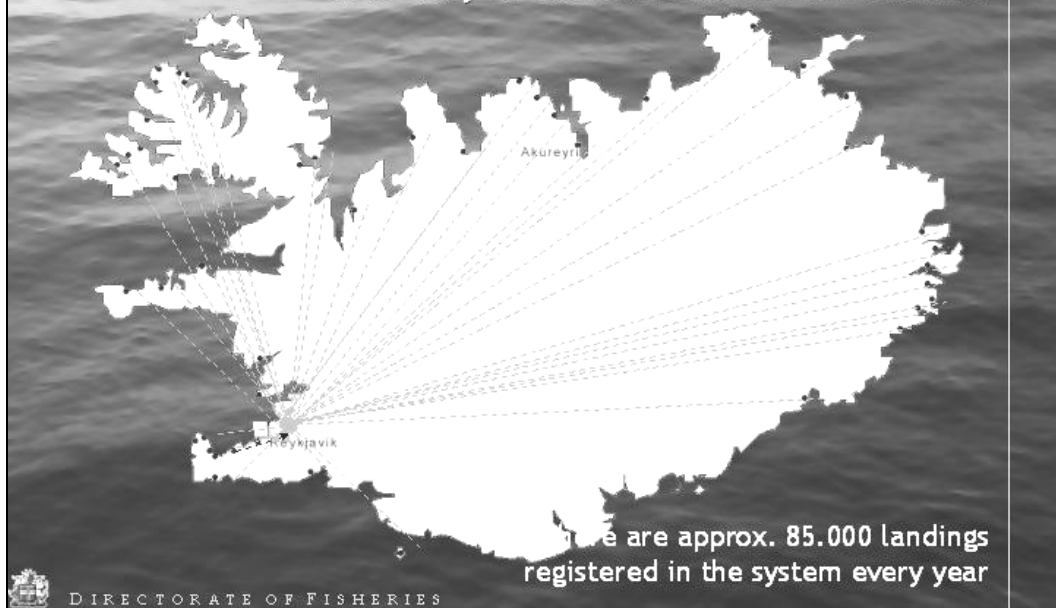
- ▶ The port authorities record the catch in a computer and send it at the end of the day to the Directorate's of Fisheries database



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Collection of data

50 Ports of landings in Iceland send electronic data daily to the Directorate of Fisheries



Processing and distribution of data

- ▶ The data is processed in the Directorate's database and catches are subtracted from the vessels' quotas
- ▶ With up to date catch figures the Directorate can act quickly if vessels have overfished their quotas



- ▶ The Statistics Iceland receives copies of the data for the production of statistics on the economy



DIRECTORATE OF FISHERIES

Internet service

Information from the database is immediately made available on the Internet

Features:

- ▶ Open to everyone, all hours every day
- ▶ Easy to use
- ▶ Updated every 12 hours

Includes:

- ▶ Information on individual vessels
- ▶ Summarized data for all Icelandic vessels



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Information on individual vessels

To find information on a particular vessel the user enters its registration number

Directorate of fisheries: Fishing information - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media

Address http://www.fiskistofa.is/difish/quota/auk_krok.cgi/skipaskra Go Links

FISKISTOFA

Vessel Registry

Enter ship number Search

or name of ship Search

Done Local intranet



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Information on individual vessels

When the name of the vessel appears on the screen the user can choose from:

- List of all landings
- List of transferred quotas
- Detailed catch report
- Quota status

Furthermore the user has the possibility to find out how new info. can effect the quota status of a vessel

Vessel Registry

9 30 22 November 2001

Registration number **2203**
 Name of vessel **Berney RE 101**
 Home port **Reykjavik**
 Gross tonnage (Grt) **1199.35**
 Gross tonnage (Grt) **1099**
 Length(m) **64**
 Type of vessel **Trader**
 Owner **Grandi hf**
 Social number **5411050309**
 Vessel operator **Grandi hf**
 Social number **5411050309**

[Vessel Registry] [Quota status] [Transfer of quotas] [Landed catch] [Catch report]



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Done

Local intranet

Total catch and quota

- Total catch and quota of all Icelandic vessels are published in a table that is updated every 12 hours

Total catch quota 2001/2002

25 November 2001

Species	Catch	Quota
Cod	153327	24776
Haddock	12540	643
Saithe	17113	25040
Redfish	39206	2166
Ling	131507	10024
Tusk	30205	4573
Atlantic whiffish	72	4
Angler	1074	10400
Halibut	0	866
Plaice	1074	10256
Lemon sole	262	1059
Witch flounder	812	10207
Common dab	201	3622
Long rough dab	0	0
Atlantic herring	124993	430340
Capelin	17115	0
Lobster	142708	430340
Outshore shrimp	45706	234756
Iceland scallop	96952	307634
Inland shrimp equivalent	22710	0



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Local intranet

Benefits - Administration perspective

- ▶ It is of vital importance for the administration to have prompt information on catches
- ▶ Monitoring of the fisheries is made easier and more efficient
- ▶ The administration is more transparent, efficient and trustworthy



- ▶ Cost has been reduced
- ▶ Workload has been reduced
- ▶ Enormous amount of time is saved
- ▶ Improved quality of the data



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Benefits - User perspective



Icelandic fishing vessels have individual catch quotas. Excess catches can result in a revocation of fishing licences and fines

- ▶ It is therefore extremely important for vessel owners and fishermen to monitor their catch figures and quota status
- ▶ The electronic collection of data and the service on the Internet has made their job a lot easier



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Benefits - *User perspective*

- ▶ Fishermen and vessel owners do always have an easy access to up to date information
- ▶ Fishermen and vessel owners can check if catches are registered correctly
- ▶ Interested parties have information on available quotas (Transfer of quotas is allowed in Iceland)
- ▶ The public can observe the utilisation of the fisheries resources



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History - Experience

- ▶ Computerized collection of catch data began in 1992
- ▶ Data was first made available on the Internet in 1995
- ▶ The Directorate was among the first Icelandic governmental institutions to provide real time data on the Internet



- ▶ The Directorate has gained valuable experience in making databases accessible on the Internet
- ▶ The system is constantly being improved



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1.2 The Norwegian System

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The Norwegian System

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Is the fisheries practice taken into account?

- CONCLUSION: could be a YES with possibilities for improvement
- Would always be room for improvement
- Goals not always clear



Is the fisheries practice taken into account

- CONCLUSION: could be a YES with possibilities for improvement
- Would always be room for improvement
- Goals not always clear



What should be taken into account?

Traditionally, the management of fish is conducted on a single-species basis. That is, no account is taken of the influence between species. In the Barents Sea it is known that the species may interact strongly. Capelin is the most important food for cod and cod is the most important predator on capelin. Strong year-classes of Norwegian spring spawning herring will feed in the Barents Sea until they are 3-4 years old when they migrate out and join the adult stock in the Norwegian Sea. During this period the herring has a profound influence on the Barents Sea ecosystem by strongly hampering the growth of the capelin stocks. Collapse of the capelin stocks and reduced individual growth of the cod can be the result.

Alf Håkon Hoel; review in an article "Norwegian Management of Living Marine Resources"



There is an increased awareness in the multi-species fisheries research in the Barents Sea of the importance of studying the spatial dimension in species interactions. This will be a major focus during the next decade.

The impact of physical factors like climate on stocks of marine mammals is a major area of study. A better understanding of how fish stocks respond to changes in their environment is one of the major challenges in fisheries science.



TODAYS SITUATION

Regulatory Council, with representatives from the fisheries authorities and the fishing industry debate the distribution of fish quotas among various groups in the industry and give advice to the Ministry of Fisheries. The Ministry decides on the final management measures.



IS THIS THE BEST SITUATION?

- The quota is set
- Is the knowledge about stocks and distribution sufficient?
- Is the knowledge of fishing pattern updated?



Ways to improve

- In Norway a reference fleet is established
- Along the coast experienced fishermen judge recruitment for saithe (not number but strength)
- Information from the commercial fleet is obtained in several ways



- Today's "network" of fishermen could be expanded
- Use the information in logbooks
- Collect information from the fleet in order to "verify" information from survey (length, distribution, temperature)



- When introducing technical regulations the experience is not the same
- OFTEN: Don't trust the fishermen's knowledge!
- Discussion is often how to implement a technical regulation, not "is it necessary"
- Difficulties for fishermen are "ignored"
- The ideal situation is seldom practical



Example

- Mesh size in the North Sea demersal fishery
- The fishermen want to rebuild the stock of cod
- Lifting the mesh size gives one result - loss of saithe and haddock
- Other means to take care of a weak stock than increasing mesh size?



- The discussion should take place before introducing a technical regulation – not after
- Must trust the information from producers of gears and fishermen
- If impossible to reach the goal, must discuss other ways to improve the fishing practice



1.3 Fisheries management before '200 miles' - an historical overview¹

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During the workshop days in Hirtshals two of the participants were discussing whether it is possible to say anything general about the duration of management systems. One of them stated that no management system lasted forever while the other said that the management system used in the pilot whale hunting in the Faroes had lasted for over 1000 years.

Looking at management of fisheries from a historical view, or a comparative view, stipulates the importance of contextual analysis. When you work from a historical viewpoint it sometimes reveals that nothing, and this includes management systems as well, is forever, but it also reveals that some things last longer than others. Management systems differ in time and place. Some systems work, some don't, some work for longer periods, some for shorter. Even though some systems are better than others there is no certain way of saying that 'one system is better than any other'. What kind of system works and what kind of system to choose depends on the circumstances. And, finally, how you perceive things, e.g. whether management systems are forever or not, depends on what your approach is. This statement can be seen as opportunistic or a way of scoring cheap points at the expense of other peoples informal statements during a debate. But still I think not totally invalid because it states that when we are debating pros and cons of different management systems we have to remember that we have different approaches.

A brief look at the historical writings on the subject of fisheries management in the Faroes reveals two things. First that there is not much literature on the subject, and second that there is not much historical research done on the question of fishery management, especially the early period. Historical sources dealing with this question are also scarce. The knowledge of early Faroese fisheries management are consequently limited. Still I would say that there is a relatively large amount of literature dealing with fisheries in general, at least from the late 19th century. – The following presentation is a short intro to the development of fisheries and fisheries management until the mid 1970'ies.

Early fisheries

Although agriculture, from the early settlers about 800 AD and onwards, seems to have been the main basis of the Faroese economy, fisheries was an important part too, both as

¹ This paper is mainly extracted from articles and working papers. Main sources are Guttesen 1990, 1991; Joensen 1996 and Johansen 1997. The maps are from Guttesen 1991.

a supplement to domestic needs and as an export product.² From the Middle Ages the pattern in the European economy gradually marginalized the Faroese economy. The trade with fish still was an important part of the Faroese economy, now exported through Bergen by foreign trade companies. One of the main export articles was dried fish to Northern Europe. Later though, as dried fish lost its commercial value, wool and especially woollen products became the main export article.

The fisheries formed a part of the collective work of the villages. The fisheries were done with (small) rowboats. Each farm in the village had its own boat, and they were duty bound to maintain the big boats that were used for fishing in the winter. In return the occupiers of land had the right to enlist crews for their boats. In summer everyone could fish freely.³ As long as the fishing was done with open rowboats it was done only locally, on banks relatively close to land.

The fisheries were regulated through the collective system, but there was no real inspection on the seas. From time to time there were guard ships around the Faroes, but their main task was to stop any illegal trade between foreign vessels and the inhabitants of the Faroes. The organisation of the communities and the lack of technological innovations in the boat fisheries set limitations for expansion and over-fishing. There are no sources telling about early Faroese over-fishing, but according to the Faroese authorities' foreign fisheries created problems. Even though the fishing limits in the early 17th century was 16 nautical miles, English and Scottish fishing vessels came so close to the shores, and in doing so prevented the Faroese rowboats from reaching good fishing grounds. During the late 1620ies and early 1630ies the agriculture failed and the fisheries were catastrophic. This was followed by famine in the Faroes and falling tax revenues. At the same time illegal trade with foreign vessels increased and piracy became an increasing problem. In 1631 the Danish Crown decided to lock out foreign fishermen from a 24 mile zone around the Faroes, but a few years later, in 1636, the fishery limit was changed back from 24 miles to 16 miles.

Commercialisation of the open boat fisheries

Until 1709 the trade was handed as privilege to foreign citizens. From 1709 the trade came under royal monopoly, until it was given free in 1856. During the last part of the royal monopoly period, especially from the first half of the 19th century, the export of fish products, dried/salted fish products, became of greater importance, and an increase in commercial fishery became evident from the mid 19th century. There were several reasons for this increase. First there seemed to be a demand for alternative ways of livelihood, as the population grew. Secondly the authorities seemed to be interested in promoting a change, or modernization. And finally there was a growing market for dried salt cod in Europe.

Technological innovation in the fisheries had been scarce, at least until the first half of the 19th century. The traditional open boat did not change, and the same equipment was used, namely the hand line. In some places a form of long line was used at the end of the 18th century, but not until mid 19th century the long line became more common. From late 18th century the number of small open boats grew rapidly, several new

² The Faroese economy has always been an 'open economy', since many basic products were unavailable locally. Export of Faroese products, in exchange for import of commodities not available in the Faroes, has thus always been a basic condition for a well functioning Faroese economy.

³ Joensen 1996, p. 29

villages based on a livelihood with a more equal division between agriculture and fisheries were founded, and a new class of 'fishing peasants' emerged. The developments in the fisheries, still with smaller open rowboats, became of growing importance to the Faroes as a whole. Through export via the trade monopoly, the fisheries exceeded the need for local consumption and became commercialised. In the late 1830ies, early 1840'ies the royal trade monopoly was restructured and built departments in three places outside of Tórshavn, i.e. in Tvøroyri, Klaksvík and Vestmanna.

When the trade monopoly was dissolved the flow of capital grew and the conditions for commercialized fisheries bettered. But the increase in fisheries was not to come in the small boat fisheries. First there were limitations to how much the open boat fisheries could expand. Secondly not all the measures that the authorities made were of advantage to the open boat fishery. For some reason the fishery limit was changed from 16 miles to 4 miles in 1859. Nine years later, in 1868, the collective system in the fisheries ended and the villagers were now free to decide how the boats should be manned. The same year the fishery limit was reduced even more to 3 miles from the coastline. At the same time the problems with foreign vessels fishing in Faroese waters, also within the 3 mile limit, grew. These foreign trawlers sometimes came all the way into the fjords to fish. In the 1880ies the Faroese authorities several times appealed to the Danish government to strengthen the surveillance within the fishery limit, but for several years these attempts were in vain. In 1881 foreign vessels were forbidden to set out nets within the 3 mile fishery limit, but this didn't seem to have any effect as the number of foreign vessels just grew. As the problem continued into the late 1890ies, the Danish authorities finally acted. On the 4th of February 1899 the Danish inspection ship 'Guldborgsund' arrived in Faroese waters. Two days later 'Guldborgsund' arrested 22 British trawlers nearby Fuglafjørður for illegal fishery.⁴ In 1901 Denmark and UK agreed on some minor adjustments concerning the Faroese 3 mile fishing limit. - The open boat fisheries still remained important, but the expansion in the fisheries first and foremost came from the smack fishery.

The smack fisheries

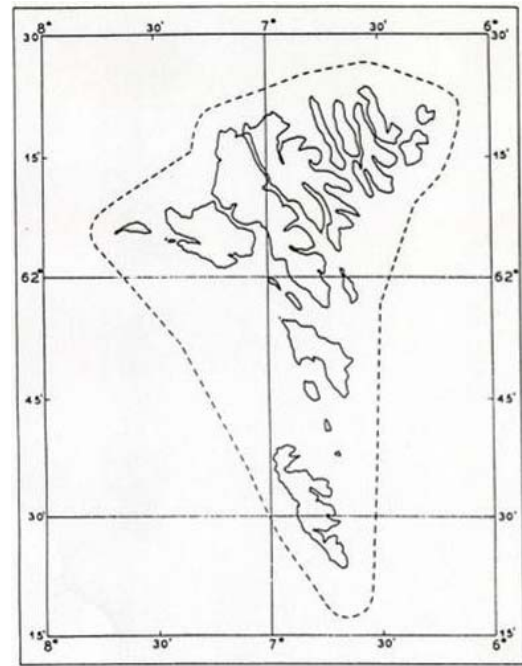
When the royal trade monopoly was dissolved in 1856 it created the basis for further commercialisation of the fisheries, a fishery based on the sloop or smack. In 1872 the first fishing 'smack' was purchased to the Faroes, and later others followed. Within a period of about 30 years, the fisheries went from short distance fisheries with open boats to long distance open sea fisheries from larger sail vessels.

In the beginning vessels were bought and owned collectively by fishermen. But this new fishery showed itself to be very capital demanding, compared to the open boat fishery. Soon almost all the vessels were purchased and owned by merchants. The take over by the merchants was followed by steeper increase in the fleet. Until about 1890 the number of vessels had grown very slowly. But from the early 1890ies the number really started to increase. In 1890 there were 20 seagoing vessels in the fleet and in 1900 the number was 91.

⁴ Madsen 1999, p 152

Until now one of the main problems for the Faroese fisheries had been the uneven competition with foreign vessels within Faroese waters. The smack fishery presented the Faroese with a partial solution to this problem. Now the whole North Atlantic lay open to them, and the Faroese took this opportunity and went further up North to Iceland and later on to the whole of the North Atlantic to fish. The main catch was cod, and the end product was 'klipfisk' which is dried salt cod.

The smack fisheries were predominant in the Faroes until World War II. But as early as World War I it already had become evident that the smack fisheries had its limitations. Even though some attempts were made to renew the fleet, e.g. through buying steam trawlers, the Faroese failed in modernizing the fleet in any fundamental way. As time went by the limitations of the smack fishery became more evident. Especially during the 1920'ies and 1930'ies the economy stagnated and went into deep crisis.



Fiskimarkið eftir sáttmála frá 22. apríl 1955.
(The Faroese fishery limit from 1955. In principle it is a 3-mile limit without baselines, but with certain extensions, especially to the west).

In some ways World War II could be seen as a relief for the merchants who owned the smacks and to some degree also to the fishermen. Two major changes were introduced during the war. First, as Denmark was occupied by Germany and the Faroes by Britain, the contact between these two parts of the Danish Kingdom was broken throughout the war, and the Løgting was given more power over internal matters. Secondly, the fisheries went down to a minimum. Instead of fishing a majority of the vessels were occupied with transporting fresh fish from Iceland to the British markets.

On the economic level, the Faroese felt more secure. The income from the transport of fish during the war had made them confident about their own ability to solve the problems they had been facing during the crisis of the 1920ies and 1930ies. Shortly after the war the Faroese started to buy old steam trawlers from Britain in the anticipation that this would solve the problems in the fisheries. Very soon the investments showed themselves to be wrong, and in the early 1950'ies the last of the trawlers went bankrupt. Although this 'adventure' was a failure and all the capital was spent, this gave the Faroese the belief in renewal of the fishing fleet, a project they worked on all through the crisis years of the 1950ies, and, with financial help from Denmark, succeeded with in the early 1960ies.

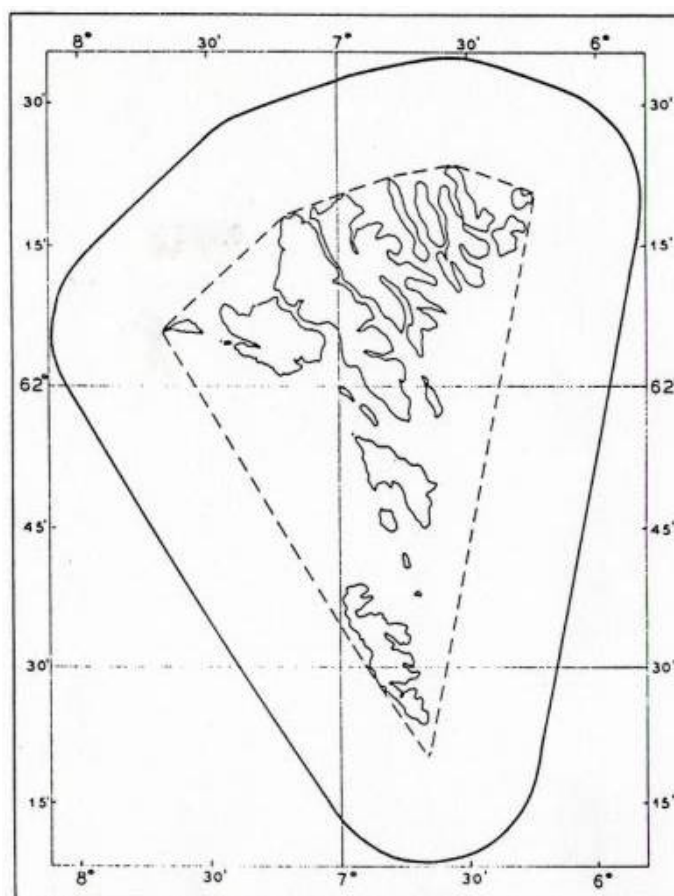
On the political level this lead to a change in the relation to Denmark. For a majority of the members of the Løgting it seemed impossible to return to the old Faroese County status. Internally though the political parties in the Løgting could not agree upon a common strategy, some wanted full sovereignty, others extended self-government and some wanted to return to the County Rule. During negotiations between the Danish government and representatives from the Løgting it was not possible to reach an agreement. Instead a referendum about the question was agreed upon. The voters were

presented with the choice between an extended form of County status or independence. Much to everybody's surprise there was a small majority in favour of independence. This was unacceptable to the Danish authorities that absolved the Løgting and called for a re-election to the parliament. The non-separatists won the parliament election. During the following negotiations between the Danish government and the Løgting, the Faroes in 1948 obtained Home Rule within the Danish Kingdom. Foreign policy was still under Danish rule and a matter for the Danish Foreign Ministry. Consequently all foreign relations did go through the Danish Foreign Ministry, including negotiations with other countries about fishing rights in Faroese waters or fishing limits.

Among the Faroese politicians in the Løgting there seems to have been a consensus that the fishing limit should be expanded. But they disagreed on how this was to be achieved. While the radicals wanted to follow the Icelandic example, the moderates were more reluctant to take any action that might create a conflict with the Danish authorities.⁵

The Danish authorities seemed to be in a predicament concerning the question of expansion of the Faroese fishery limits. The fact that it was Britain who was the major counterpart in bilateral negotiations about the fishing limits around the Faroes created this predicament. Foreign fisheries around the Faroes were dominated by British vessels. At the same time Great Britain was the main market for the most important Danish export article, bacon. During the 1950'ies and 1960'ies Denmark and Britain had several bilateral negotiations on the question of the Faroese fishing limits.

In 1958 Iceland expanded their fishery limit to 12 miles and the following year, through Danish-British negotiations, the Faroes obtained a 6+6 mile fishing limit. British fishermen with 'historical rights' were allowed to fish into the 6 mile zone except for some areas going out to 12 miles that were closed for trawlers in certain periods (see map 2). This agreement was supposed to be renegotiated in 1963. The following years the British authorities refused to negotiate further expansion. The Faroese authorities on the other hand wanted to expand the fishing limit further and in



Fiskimarkið 12. mars 1964.
(The Faroese fishery limit from March 12, 1964. It is a 12-mile limit measured from straight baselines).

⁵ Guttesen 1991

the following years put a lot of pressure on the Danish government. As a result of this pressure the Danish government in 1964 unilaterally declared a 12 mile fishing limit from straight base-lines around the Faroes.⁶

Britain answered with countermeasures by setting 'import restrictions' on iced fish to British harbours. While the Faroes won new fishing grounds they lost their most important market for iced fish. The following years the investments in modern filleting- and freezing plants were in the Faroes, and subsequently the Faroese catches switched to these new plants. At the same time the old fishing vessels were replaced with modern ships like long liners and trawlers. Finally industrialization came to the Faroes, and fisheries and fishing industry became the basis of a modern Faroese economy.

In the 1960ies and early 1970ies there was a reduction in many of the long distance fisheries that the Faroes traditionally used, e.g. Iceland and Greenland, while fisheries in other areas like the North Sea expanded rapidly. The fisheries around the Faroes grew steadily, but still the greater part of the catches came from long distance fisheries. As the catches grew so did the landings to the factories in the Faroes as well. Cod was still the most valuable species, but other food species like saithe and haddock also became very important, and industrial fishing grew as well. Instead of only producing salt fish, other products, especially frozen fillets, became important export articles. – The growing fisheries around the Faroes, by Faroese vessels as well as foreign, put a lot of pressure on the fish stocks. Consequently in 1973 six countries accepted an agreement that reduced the fishing effort in five 'boxes' outside of the 12 mile limit.⁷

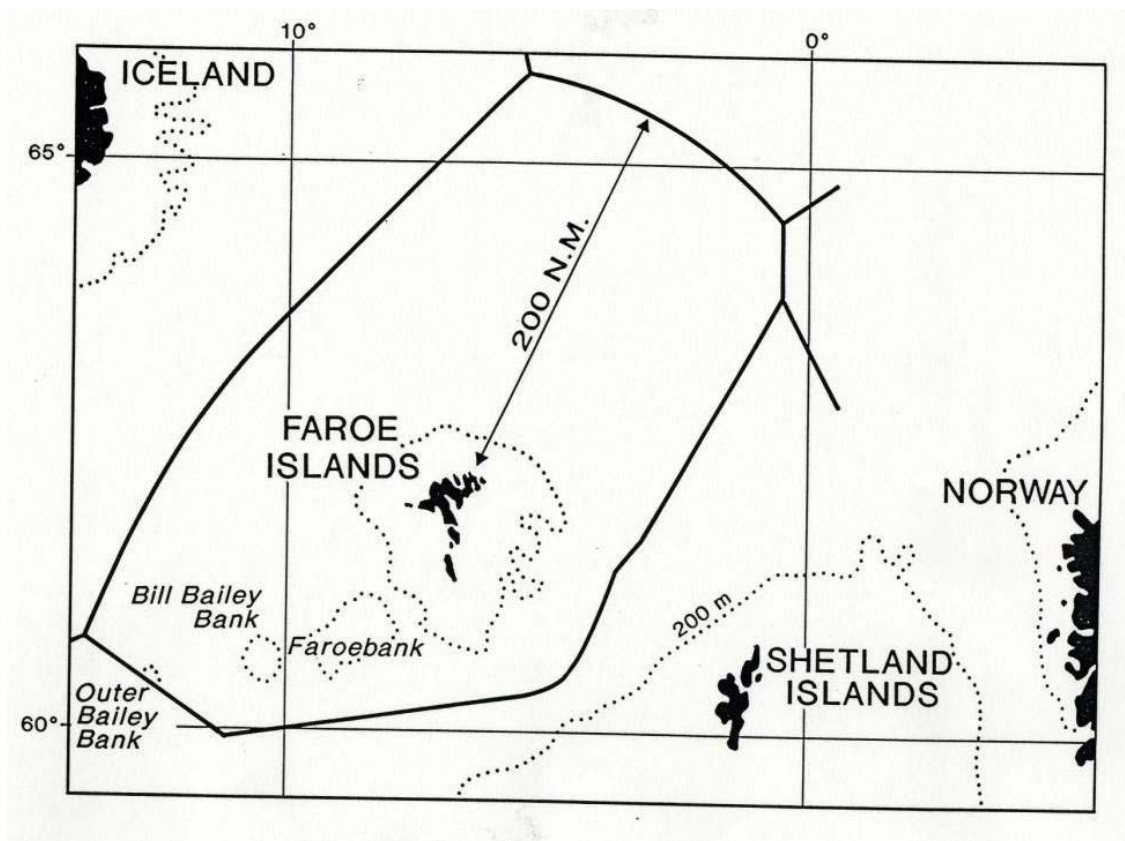
In the years from 1947 to 1970 the global catches of fish grew from 18 million tons to 60 million tons per year, a growth rate of 6% per year. The following years this growth rate fell dramatically down to about 2.3% per year.⁸ Most fishery nations were convinced that an expansion of the national fishing zones was the only solution. In 1976 the UN Convention on the Law of the Seas was adopted by the participants, and in 1977 most countries implemented the 200 mile exclusive zone.

In the Faroes there was ambivalence towards a 200 miles exclusive economic zone, mainly because the majority of the vessels were fishing in distant waters. Whether they wanted it or not, the Faroes had to follow the international development of nationalization of the seas, there was no choice. On January 1st, 1978 the Faroese 200 miles fishing limit, or economic exclusive zone, became a fact (see map 3). - Seen from outside nationalisation of the seas seemed the only sensible choice. Getting the 200 mile zone under Faroese jurisdiction created the opportunity to manage the resources away from the chaos of international relations and gave the Faroese authorities a tool to manage the resources in a 'sustainable' way. But as history has taught us it wasn't going to be that easy. After a period of economic growth and expansion, over-fishing was almost inevitable, and as we all know the economic expansion was followed by economic collapse in the early 1990ies. But this is another story, which we might tell some other time.

⁶ Guttesen, 1990, p.2

⁷ Guttesen 1990, p. 3

⁸ Johansen, 1997, p. 145



Some concluding remarks

Fisheries management or regulation has many forms and many reasons, and it differs through time and space. Not only one factor, but a number of factors decide what form of regulation is chosen.

It is difficult to say that the Faroes had any real fishery management system before the 200 mile exclusive zone was implemented. The main strategy in Faroese fishery policy seems to have been a struggle against foreign vessels in Faroese waters and an effort to catch resources in foreign waters. One exception was the agreement between the six countries to reduce the fisheries in secluded areas.

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Hänsyn till fiskeriet i det svenska regelverket – några aktuella utgångspunkter

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Remissförfarande är ett traditionellt sätt för intressenter att utöva inflytande över lagstiftning. Dessutom finns ett otal andra former för kontakter och påverkan, både formella och informella. Inom fisket har vi särskilt arbetat med arbetsgrupper för olika segment i fisket som gett råd angående t.ex. ransoner.

Utöver den traditionella formen för inflytande är nya former för samförvaltning under utveckling. Nedan följer en uppräknig av nya former för samverkan som berör det svenska fisket:

- Inom ramen för en förändring av trålgränsen pågick under 2003-2004 ett kvalificerat samverkansarbete mellan företrädare för kräfttrålfisket på svenska västkusten och administratörer/biologer från Fiskeriverket.

Arbetsättet var nyskapande och innebar att fisket på ett systematiskt sätt delade med sig av sin kunskap kring fiskemönster, biologisk påverkan och redskapsbeteende. Fisket fick också insikt i de bedömningsgrunder som biologer/administratörer använder sig för sina avvägningar. Som metod för anpassning av framtida fiskeregler var det konstruktivt. Arbetet var visserligen resurskrävande, inte minst för de medverkande från fisket, men det bidrog otvivelaktigt till ett långsiktigt hållbart och robust beslut.

- Beslut om Regional Advisory Committees – RAC – fattades sommaren 2004 av EU. RAC innebär ett ”legaliserat” inflytande för fisket i utformning och uppföljning av förvaltningsåtgärder.

EUs beslut om RAC, som direkt påverkar svenskt fiske i Östersjön och Skagerak/Kattegatt, ger fiskenäringen ett påtagligt inflytande över rådgivningen av förvaltningen av fiskeresursen i berörda områden. Samtidigt får andra intressen – miljö- och naturvårdsorganisationer samt sportfiske – möjlighet att föra dialog med fisket och att göra sina röster hörda i rådgivningen.

- I behandlingen av kustfiskepropositionen våren 2004 tog Sveriges riksdag beslut om en delvis ny inriktning på kustfisket med betydande utrymme för ”samförvaltning”.

Regering och riksdag har dock ingen klar uppfattning om hur begreppet lokal och regional förvaltning eller samförvaltning skall definieras utan konstaterar i propositionen att det är ”en komplex process med ett flertal variabler att ta ställning till”. Med detta avses att man inte beslutat hur fiskets inflytande skall förhålla sig till andra brukarkategorier, vilka de andra viktiga brukarkategorierna är (man nämner särskilt miljöorganisationer och fritidsfiskare), hur stort den lokala/regionala nivåns inflytande skall vara i förhållande till en nationella nivå, vilken geografisk omfattning som avses. Trots att det ännu föreligger viss osäkerhet när det gäller RAC kan man här konstatera att ovissheten är i det närmaste total vad gäller innebörden i begreppet lokal och regional samförvaltning för svenskt fiske.

Till 2006 skall pilotprojekt minst fem pilotprojekt genomföras för att få erfarenheter för att ”ytterligare utveckla samförvaltning runtom i landet”.

Den nya politiken, på europeisk och nationell nivå, kan innebära större inflytande för fisket, men det ställer också krav på fisket att vara aktivt och söka delvis nya vägar för att framföra sina uppfattningar och visa upp sina erfarenheter. Det handlar delvis om att gå utanför de inarbetade kontakt- och påverkansvägarna. Om man inte är aktiv i de nya sammanhang som skapas finns risk att fiskenäringen trängs ut av andra s.k. indirekta intressenter i fisket, som också getts tillfälle att delta i RAC samt kustfiskets lokala/regionala samförvaltning. Samförvaltning är med andra ord en utmaning för yrkesfisket.

1.4 Discussion: What are the internal differences between the systems in the Nordic countries?

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Following the presentations from an Icelandic, Danish, Norwegian, Faroese and Swedish perspective respectively, the experiences were discussed and compared. Based on the brief presentations the following simplified conclusions with regard to the role of fishery experiences in regulation could be made:

Iceland is characterized by communication between fisheries and the government, efficiency in management and long-term planning, to the extent possible within fisheries. According to Thordur Asgeirsson there is a strong element of consensus regarding the basic principles governing the management of Icelandic fisheries.

Denmark, on the other hand, is suffering from short-term instability and a short planning horizon for the industry. In the view of Ole Lundberg Larsen, the lack of cooperation between fisheries and regulatory agencies is significant. However, he pointed out that there is good cooperation with local authorities, and general agreement on fisheries policy with the government.

Norway has many examples of cooperation between government and fishermen, but improvements are possible, according to Elling Lorentsen. For example, in the area of

technical regulations the industry is not involved, and government has shown little trust in the fishermen.

Faroe Islands is characterized by "soft-regulation" with days at sea as its main instrument. Samal Johansen described the aspects of the Faroese system, believing there was a degree of consensus between government and fishermen.

Sweden's fishery policy is confused. Anders Carlberg described a political interest in taking account of fishermen's views, but at the same time also a great mistrust of fisheries. The tendency of the government is to favour environmental and green interests at the expense of the fishermen.

Defining differences in the Nordic fisheries

The differences within the Nordic community are striking. It can only be explained in the light of the role of the fishery sector in the different countries. In Denmark and even more in Sweden, fisheries play a marginal role economically as well as politically. In Norway, and most markedly in the Faroe Islands and Iceland, fisheries is a business sector in the centre of the economic body. This is reflected in policymaking and the intellectual effort put into the creation of systems for communication and management.

Petter Holm pointed out that the views presented were not only from different countries, but also from different sectors: One perspective from the government, three from the industry. One historical perspective, another one took an economic angle. This makes comparisons even more complicated.

Olaf Olsen reminded the seminary that there are also biological and physical differences between the countries. The Icelandic and Faroese fisheries are not so biologically and administratively complicated. In Sweden, to take the other extreme, the coast is from the sea of Botnia to the Skagerrak and includes freshwater fisheries. On top of that most of the fishing involves decision-making in the EU.

Thordur Asgeirsson described the Icelandic experience before the introduction of ITQs. A days at sea system resulted in increased capacity and low profitability. The ITQ that is used today is significantly different from the original design, with important concessions to regional and coastal interests. Asgeirsson also pointed out that although the working relationship between the agencies and the business is good, the nation as a whole is rather negative to the idea of a market system at sea. According to a recent poll, 67 % of Icelanders believe the ITQ system should be changed but could not offer an alternative system. The political opposition is against the ITQ system for ideological reasons.

Furthermore, Asgeirsson is surprised to hear from the other Nordic countries that technical measures can be introduced without prior consultation with fishermen. In Iceland a working group is always formed as the first step.

The only area where fishermen are not involved is in decision-making for TAC. But over the last ten years, fishermen have always been in agreement with the government of the TAC decided. Fishermen accept low TACs because experience has shown that changes from year to year are small, and because they feel sure that they can "keep their fish in the sea like money in the banks", according to Asgeirsson.

Örn Paulsson added that "Icelandic people trust their fishermen not to fish too much". Samal Johansen pointed out that fisheries dominating to the extent that they do in the Faroes create new complications because it "diffuses into all parts of society".

Multi-countries and multi-species

Ole Lundberg Larsen reminded non-EU participants that for Denmark and Sweden decisions are always taken in Brussels. So even if there is domestic agreement, as there often is in Denmark, the common opinion may be overrun by the majority decision of the Council.

Jesper Raakjer Nielsen picked up on this view. The system is more complicated in countries where you share stocks with other countries. In South Africa and New Zealand it is still possible to find stocks in "a beautiful state" because they are managed by a single state. In the Baltic, on the other hand, you have a biological situation for the cod that is very vulnerable – management of the Baltic cod is like "walking on a cliff on a windy day; if you put your foot in the wrong place you may fall to your death". To ask for stability in TACs from year to year in such a system is unrealistic. If you exploit the resource too intensely it may collapse in a short time-span.

The North Sea is complicated with many stocks, many species and many fishing nations. The ecosystem is different and this fact is ignored by the single-stock assessment, according to Petter Holm. To define relative stability on single-stock TACs is not viable.

Discussion on "biological dictatorship"

Petter Holm questioned the idea put forward by Ole Lundberg Larsen that the biological perspective is accepted without hesitation in decision-making regarding e.g. TACs. Holm suggested that the biological input is just advice and there are many other options.

Elling Lorentsen's experience was fundamentally different. He believed "politicians lean on biological advice". He had many examples of quotas that were set higher than ACFM advice, which later proved to be wrong, although they had been presented as absolute values. He was sceptical of involving new indirect stakeholders in the decision-making process. They lack sense of responsibility, he claimed.

Olaf Olsen asked the group if biologists from different countries can agree on scientific advice. Kjellrun Hiis Hauge, with experience from two ICES working groups, said that usually scientists agree, but that it has happened that consensus is not reached.

Bo Sølgaard Andersen described the ICES system with 60 stocks assessed in 20-30 working groups, involving 120 biologists. "Of course there are differences with such a wide variety of perspectives". Petter Holm also informed the meeting of the limits of modelling, as explored in a study by Adam Lautrec of the EU Commission. Lautrec has shown that the models can be tuned to produce certain results. If the biologists have the same basic perspectives, they may "tune" the model to produce the results that correspond with their basic outlook.

2 Why does the fisheries management not always work as intended?

2.1 Why does the fisheries management not always work as intended?

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The simple answer to the question posed to this session is: because humans set up the regulations. Human societies develop in leaps and bounds, setting up rules, making mistakes, sometimes learning from the mistakes and in so doing making new ones. If history learns us anything, it is to be patient and forgiving as we should never wish for the perfect regime. That is not, of course, not to try and correct our mistakes. In fact, often the best way forward is to discard tradition and look afresh at a system that is perceived as deficient by everybody.

There is a dearth of historical studies on the question, but one pioneer in the field is Bogue (2000).

We need a history of Northern European regulations, but the general outline of differences between the restricted access regulation of the Baltic and the open access regime of the North Sea is known from two works: Hasslöf (1938) and Holm (1996).

In sum, fisheries have been regulated since times immemorial

- ☐ By community practices
- ☐ By inter-community agreements
- ☐ By town regulations
- ☐ By state intervention

For all sorts of reasons

- ☐ Financial (taxes)
- ☐ Social
- ☐ Ecological

The key question however is: Did the regulations work?

The Limfjord in Denmark is a good case as we know of mesh size regulations in the Limfjord since 1490. However, it is not clear if the regulations served mostly a social or an ecological purpose. Limfjord commissions in the 1690s and 1740s clearly focused on tax interests and property rights (Rasmussen, 1968). The regulations did not prevent overexploitation of resources as is evident from Poulsen (2002). The collapse of the Limfjord fishery 1828-1832 was caused by fishing the herring spawning grounds with

heavy ground seines. Fisheries collapse due to inefficient regulation is therefore not a modern phenomenon and not only caused by industrial gear.

However, it might be argued that regulations will be more successful with the advent of biological science. However, The Limfiord provides another case where almost perfect knowledge of the ecological impact of a fishery regulation did not prevent a disaster. This was the case of the 1922-25 series of fisheries legislation for the fiord. Biologists had established a sound basis of understanding of the fiord ecology, but that time and later events proved them right. Nevertheless, in the face of active lobbying by the fishermen's association the politicians lifted the ban on engine-powered winches for seines, which they had introduced in 1907, and first allowed for seasonal and later for all-year use of the winches. The result was a collapse of the fiord's fisheries after only a few years of fishing. Overcapitalization proved a stronger motive for political decision-making than the longer-term biological advice (Jacobsen, 2003).

In this case, one might see the role of the biologists as a modern Cassandra that will warn of disaster, but is heard by no one. In recent decades we have, however, seen many cases of a shift of responsibility from politics to science, and fisheries science has been caught in a dilemma of the predictive and prescriptive roles. Fisheries science has become an advisory to policy, and with that shift the burden of responsibility of the success of a regulatory system has become a question of blame rather than a question of outcome.

History does teach us that the deeper a crisis, the higher are the chances for radical reform. In that light, one might expect the EU fisheries regulatory system ripe for radical reform. When that day comes, one might hope that the reform will build on another historical lesson: Regulations work when they are in accordance with socio-economic expectations. Regulations don't work when they do not serve socio-economic expectations or when lobbying cannot be resisted (unless the state is strong or there is a high degree of social control).

In short: What is the testing-stone of a regulatory system?

- ☐ Social acceptance
- ☐ Goal achievement
- ☐ Time

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2.2 Roles of uncertainty in fisheries management

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Uncertain perceptions on stock status and distrust in scientific results are topics that have been discussed in the Norwegian fisheries press lately. The presented solutions to the problem of uncertainty have either been to reduce the uncertainty or to improve the communication, in other words, science should solve the problem. Although science may be able to reduce some of the uncertainty in stock assessments and predictions, we must expect a significant part to remain. What fisheries science can do is to improve its communication on the uncertainty. This may contribute to accept that fisheries science cannot give precise answers to all questions. How to manage under uncertainty is a political problem as different ways of handling it affects the parties differently. The issue of uncertainty should therefore be moved away from a battle about distrust on to a discussion on how management should take the uncertainty into account.

Certainty, the virtue of science

“Can any discipline which tolerates a margin of error $\pm 40\%$ really be called science?” This citation is from a front story of Fishing News in 2003. Hamish Morrison from the Scottish Fishermen’s Federation expresses his scepticism on the scientific basis for deciding the total allowable catch in the North Sea.

In 2004 there have been two surveys among the fishermen and within the fishing industry in Norway on the confidence in science. Both have been presented in Fiskaren (2004a and 2004b), and the main conclusions were that science is thought to be important for the future fisheries, but that the confidence in scientific results was generally low. This lack of confidence is explained by the mismatch between scientists’ descriptions of the status and development of fish stocks and the fishermen’s own observations (Fiskaren 2004a, Fiskaren 2004b) and that there is a 2-3 years’ delay in scientific knowledge concerning the stock status (Fiskaren 2004c).

Many fish stocks are managed by setting a total allowable catch. The decisions are partly based on predictions of spawning stock biomass after next year’s fishing. These predictions are indeed uncertain, as the first digit of a quantified prediction is normally not significant. The stories above indicate that uncertainty in fisheries science is not accepted. This coincides with the general picture in society; science is expected to be precise and uncertain science is thought of as bad science.

Reduction of uncertainty

The scientific knowledge and advice on blue whiting is often criticised for its failure in predicting the stock development. The scientists (including the author) advised to reduce the fishing pressure substantially several years in a row while the total catches continued to amount to more than a million tons a year. In spite of continuing warnings from the scientists, the stock maintained in a good shape. A journalist in *Fiskaren* calls this the symbol of distrust (Fiskaren 2003). He fears that a decreasing confidence in science may result in a total collapse of the blue whiting fisheries. His solution to this problem is more funding and research to reduce the uncertainty.

The fisheries press is naturally not alone in suggesting to fill the knowledge gaps on blue whiting. A research director at my institute writes in *Fiskaren* (2004e) that research on this stock will be prioritized the next years to increase the understanding on stock development in order to improve the scientific advice for this stock.

A significant reduction of the uncertainty in stock assessment and predictions might have reduced the political tension in fisheries management, but it is doubtful whether such a reduction is achievable generally speaking. Uncertainty is due to the data quality, lack of knowledge and the complexity of nature. To provide data that would give us an exact, quantified picture or understanding of the stock situation is not feasible although the potential to reduce the uncertainty varies from stock to stock. Predictions are even more uncertain as it builds on uncertain estimates and on developments not yet seen. Surprises cannot be predicted, like introduced species, new temperature regimes, new species interactions etc. In our predictions we need to take some kind of average on growth, maturation, species interactions, recruitment and expectations on the correctness of catch data which all may vary a lot from one year to another and contribute to the total uncertainty.

A frequently presented solution to the problem of uncertainty is to intensify research or cooperation with the fishermen in order to reduce the uncertainty. What is not discussed is how much of the uncertainty is reducible, how long it will take to reduce the uncertainty and whether the present management strategy takes the present uncertainty into account in an acceptable way or whether there are alternatives.

Uncertainty and communication

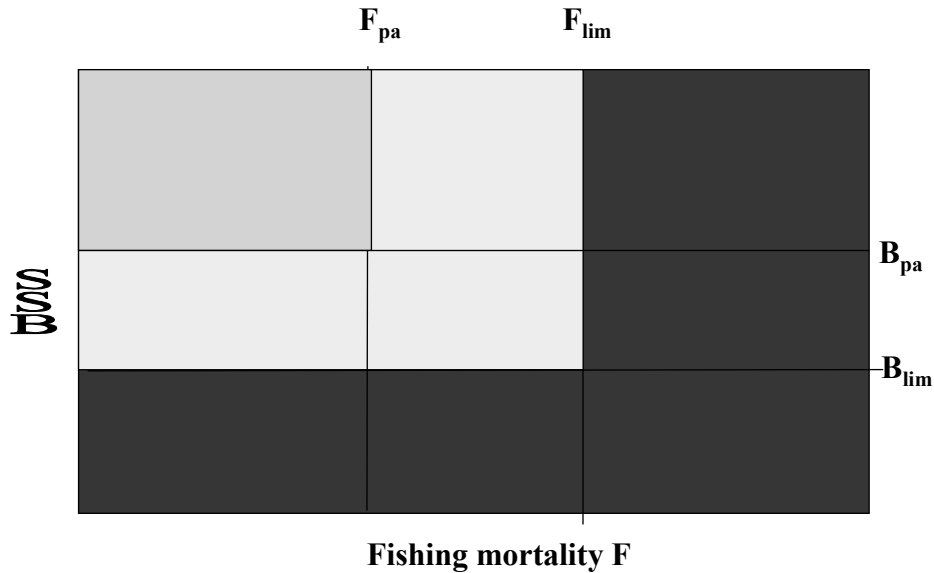
Improved communication of uncertainty is another presented solution to the problem of uncertainty. The managing director at my institute responds to the last survey by saying that the problem of distrust is due to lack of communication. In an interview (Fiskaren 2004d) he defends the scientific results and advice, but states that there is a problem of communication and explanation. The communication of scientific advice has been under scrutiny lately and recognized by the fisheries science community to be insufficient and partly misleading. The earlier ICES wording “outside safe biological limits”, e.g., was criticized by Sandberg et al (2003) for being too dramatic. ICES has now changed the standard phrasing to the much less dramatic: “suffering reduced reproductive capacity”. Also the form of advice from ACFM (Advisory Committee on Fisheries Management) is changing.

While these examples focus on one-way communication there are several examples from the fisheries press where mutual communication is addressed. The editor of *Fiskaren* (2004f) calls for improved mutual communication between scientists and

fishermen, accusing the scientists for not taking the users seriously. A similar message is repeated a few months later in an interview with a representative from the Norwegian Fishermen's Association (Fiskaren 2004g).

We have seen that the problem of distrust has been explained by the level of uncertainty in quota advice and by poor communication. We therefore take a brief look at how advice and uncertainty is communicated in advice provided by ACFM.

Figure 1) The precautionary flag



The underlying philosophy of advice is that 1) we need to keep the spawning stock biomass above a certain level to avoid a reproduction failure, and 2) the fishing pressure should not be too high in order to stay away from this limit. B_{lim} defines the threat of a reproduction failure and F_{lim} defines the threat of a too high fishing mortality (see the precautionary flag in Figure 1). Therefore the part of the flag where these thresholds are crossed is black. However since we are uncertain about the stock level and fishing mortality today and their predictions, the precautionary points define a buffer zone. The distance between a limit (B_{lim} and F_{lim}) and a precautionary reference point (B_{pa} and F_{pa}) is decided by the acceptable level of risk of crossing the limit points. Either this level of risk is politically agreed or it is suggested from the science community.

Given that the data basis for stock assessment is regarded as sufficient, advice on quotas are based on a comparison of the stock status with the reference points and given on the form: The catch should be below a certain level. This level is usually presented with 2-3 significant figures, suggesting a high precision. The text in the ACFM report may include comments on the uncertainty, but not how the uncertainties affect the advice or the presented numbers. The distance between the reference points therefore remains as the main tool for communicating uncertainty although risk and uncertainty are two different concepts. My personal view is that there is a great potential in improving the communication of the advice and its uncertainties, but that the communication alone cannot solve the problem of uncertainty and management.

The political aspects of uncertainty

As the truth on stock status is not given, the uncertainty allows for several interpretations that are valid (given the existing information and knowledge). Disagreements on which interpretation is more likely than the other are a consequence of the uncertainty and the stakes. A user is affected by the concluded interpretation, so why uncertainty is such an issue in the fisheries press is thus easy to understand. The politics of uncertainty is clearly present in the fisheries press since underestimations of stocks are frequently translated into lost profit. Headings like “Feel like robbed by the scientists” (Fiskeribladet 2003) illustrate this.

Conflicting interests make the uncertainty a political issue: How should which user or party benefit from the uncertainty? A decision can side with the fishermen (at least in a short time perspective) letting the fishermen fish more and letting the resource (or the future viability in that fishery, future generations or the interests of NGOs) bear the burden of risk. A decision can side with the resource by restricting fishing activity, letting the fishermen bear the burden of risk of losing income. The problem of what party is taking what kind of risk is of course more complex than this.

The precautionary reference points were intended to make management decisions robust to uncertainty by advising to stay in the dark grey part of the precautionary flag. Experience suggests that a management strategy based on trying to keep the spawning stock biomass and the fishing mortality at the precautionary points is not robust to uncertainty. This balancing on the border of precaution will frequently result in falling on the non-precaution side of the border. Drastic cuts in the total quota may be necessary in order to recover a stock but may be politically difficult. The quality of such a safety net will depend on social aid schemes, the economy and the overcapacity in the fishing fleet. The stakes may be so high that the uncertainty is even more difficult to take into account.

On the question on how to make management more robust to uncertainty, there are many aspects where fisheries science is not a natural contributor, like the overcapacity issue, flexibility in the fleets, social aspects etc. The examples above from the fisheries press suggest further research, cooperation between fishermen and scientists and improved communication of science and scientific advice. There is indeed a great potential to improve the communication of uncertainty and this may facilitate a discussion on how to handle it in a management context. The scientific results and advice can be presented so that the number of non-zero digits reflects the uncertainty, both the quantitative and qualitative uncertainty can be presented and the uncertainty can be explained (the underlying assumptions, the complexity, knowledge gaps, low quality data etc). Maybe even more important is an evaluation of the form of advice: how valid the predictions are and whether they actually are helpful in decision-making. Science can help finding alternatives like advice based on scenarios to show the effect of the uncertainty or advice based on a more solid understanding of the past. ICES is about to take a step in a new direction by focusing on eco-system-based advice and maximum sustainable yield, and the Joint Russian-Norwegian Fisheries Commission is turning to harvest control rules enabling more stable quotas. We have yet to see whether these new ideas will be developed into successful management strategies.

We have to live with uncertainty in scientific knowledge. At the moment the uncertainty discussion is about how bad fisheries science is. Uncertainty is an important political issue and we need a discussion on how to make management strategies robust to

uncertainty. It is in time that we move the discussion on uncertainty away from a battle on distrust on to how to take the uncertainty into account in fisheries management.

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2.3 Trusting that those working with fisheries legislation lead to the best care-taking of the marine resources

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First of all I want to thank for the opportunity to be with you here today.

When I got the invitation from IFM to give a presentation about conflicts between those who manage the fisheries legislation, shall we say bureaucrats and politicians, and those who work within the legislation, say fishermen and others handling fish products, I got a bit puzzled. I asked myself: Is there such a great conflict? Well, certainly regarding specific issues, but in general the bureaucrats and politicians have learned from experience not to force just any legislation or regulation upon those who have to work by them. Occasionally they loose track, but from my point of view they are bettering themselves.

The most successful way is to prepare laws, regulations and rules in settlement with the fishermen and boat owners, listen to their views and react quickly towards changes, aiming at cutting off shortcomings without weakening the core of the legislation.

For several years I think it is fair to say that the Icelandic government has, in general terms, managed to do so. Therefore there is no ongoing “war” between Icelandic authorities and the fishermen. Of course there have been and are conflicts, but I would like to point out a time period where things were sometimes boiling over, but settlement was reached, somehow.

For 20 years the Icelandic fishery management system has been based on an Individual Transferable Quota System – ITQ. From 1984, when the system was first enforced, and until 1991 an effort controlled system was run parallel with the ITQ system. After 1991 only part of the small boat sector has been effort controlled.

The legislation that changed this, agreed by the parliament in 1990, was prepared in such a way that the effort control system for the small boat fleet was supposed to be a “preparation period” - that is from 1991 till 1994 when they would be included into the ITQ system. At the beginning of this time period, there were 2000 small boats with a fishing license. The legislation said that only some 2% of the TAC (total allowable catch) for cod should be their share and be split up among the boats according to their fishing history throughout the “preparation period”.

The effort limitations were these:

- A new fishing license was not issued unless a boat of the same size was taken out of fisheries.
- The calendar was loaded up with “forbidden” days for fishing.
- Only long line and hand line (jigging) was permitted.

The holders of these licenses refused to believe that they would be enforced into the ITQ system by the end of the time period. And they had a reason. Even if the legislation included certain effort limitations, it did not deal with the so-called problem. (I should mention here that I - and I believe the majority of Icelanders - still do not understand how the small boats can be a problem within the fisheries).

Therefore the effort capacity multiplied, and the older boats were renewed with, yes, sure, equally as big boats according to the rules, but much more powerful and capable of things not possible before. It was not uncommon that the new boat fished tenfold of what the old one did. It needs no expert to see that the legislation was quickly obsolete, and the 2% share unrealistic. NASBO and local authorities of the small communities all around the country did everything in their power to prevent these paragraphs of the legislation to be enforced.

The government decided to listen to this, and increased the share from the 2% mentioned to almost 14% and made the license holders an offer: they could choose between the ITQ system or keep on fishing under effort limitations, or “days at sea”, where the number of days would be calculated afterwards. That is – the number of days at sea this year would depend on how close they were to the TAC they were allowed to catch last year. If you are getting confused, don’t worry. A member of the Icelandic Parliament once said that in order to understand the Icelandic fishery management system you need at least to be a nuclear scientist.

One third of the boat owners decided to stay with the effort limitations. The catch of the fleet within the “days at sea” system kept increasing, and according to the calculating formula the number of days was to decrease from 84 days down to 26. Again the small boat association with a little help from friends put on pressure, and the Ministry of Fisheries agreed to increase the number of days to 40. Still their catch increased and - believe it or not – the number of days was supposed to drop to 9 for the following year.

Now, this might start to sound like a nightmare one can’t wake up from, but this went on. The number of days was lifted to 23 days, and still these boats increased their landings immensely. Great and unexpected runs of fish that according to the scientists was not supposed to be there, is the main explanation, along with more efficient boats, loaded with the latest technology in fish finding and navigation.

At this point the government decided to remove the calculating formula, and for three years the number of days stayed the same – that is 23. After that their number was supposed to decrease by 10% per year.

Along with these changes, authorities created a “buy-back” programme for those who wanted to quit, along with attempting offers for others to go into the ITQ system. All these actions by the Icelandic authorities reflected their fundamental opinion that the ITQ system is superior to the effort control. It is fair to say that little was done to make real experiments with the “days at sea” system to make it more survivable.

On the first day of this September the Icelandic authorities reached their goal. They decided to make the “days at sea” system very unattractive, and shut it down completely from 2006. On the other hand, quotas were offered that almost equalized their landings last year. Of almost 300 boats that were working under the “days at sea” system, 277 will now go into the ITQ system, and only 14 boats will fish under the “days at sea” system for the two remaining years, 18 days each year.

I have here, in very general terms, described a history that to my mind is a living example of a legislation that did not apply to circumstances. Authorities underestimated the strength and unity of the small boat owners and their capability to make the parliament change things in their favour. Neither did the authorities foresee the arrangements of the big seafood companies with the purpose of merging quotas and thereby decreasing the number of ships, with the consequences that a number of fishermen had no other shelter to run to but the small boat fishery.

Nevertheless, it is my opinion that all this strengthened the small coastal communities. It was very fortunate that a system came about that could actually benefit from the immense increase of fish runs, especially cod, that the Marine Institute of Iceland somehow never detected - as its proposals to the Ministry of Fisheries reflect.

Within the effort control the fishermen were allowed to catch as much as they could within a certain time frame, along with other mentioned limitations. Therefore the landings reflect very well the status of the stocks, and the temptation to throw fish overboard hardly exists within such a system.

The Icelandic legislation for the fisheries is very complicated. The Ministry of Fisheries just issued a 68 page booklet that shows this clearly. The booklet comes in four chapters:

- Fishery management
- Orderliness of the marine resources
- Fisheries within the 200 miles jurisdiction
- Fisheries outside the 200 miles.

The booklet contains 9 regulations, based on these laws. In many cases the regulations are complicated, making it hard for the fishermen to figure them out.

This causes again and again that the fishermen are accused of breaking the law and are threatened with harsh punishments for things done unintentionally. In general, the fishermen and boat and ship owners are well enlightened about the laws and regulations.

With the ITQ license the fisherman gets a paper telling how much he can catch of each species. At the beginning of each new fishing year the boat and ship owners try to figure out how they can make the most value from their permits, and the focus on value of the landed catch is a total priority. Usually, the bigger fish gives greater value, and therefore many of them focus on such fish. In the legislation about the orderliness of the marine resources it says: "All fish that comes aboard from the fishing gears shall be landed". But in the regulation it says on the other hand that fish of no value can be thrown overboard.

Breaking the law costs dearly. Quotation: "Any violation against these laws, intentional or unintentional, leads to a fine of minimum 35,000 DKK, but no more than 350,000 DKK. For those who still think that Iceland is a Danish colony, I want to say that the law actually talks about Icelandic Kronor.

Icelandic fishermen and boat and ship owners have been convicted several times under these laws. There have been cases of strong protest where the Coast Guard and the Fishery Institute have been accused of not taking circumstances into consideration.

I want to give you an example of a man who was fishing with a long line. A part of the long line brought up a few very small fish that he estimated to be worthless. Not that he was hiding anything. A surveillance officer from the coast guard was on board, and the fisherman asked him if he was of the same opinion. And the officer agreed, but reported everything that he saw coming back to his gunboat. The fisherman therefore threw these fish back into the sea and was sure he was not breaking any law by doing so. The courts were not of the same opinion. He was fined 35,000 DKK, and his license was revoked for 14 days. Such verdicts do make a difference, but I doubt they are positive. The message it brings to those at sea is that they are not capable of judging what is “worthless” and what is not.

In spite of the examples I just told about and the harsh punishments, fish is still being thrown overboard on Icelandic fishing grounds. It takes little imagination to see that it is impossible to prevent this, unless you have a surveillance officer just about everywhere.

The discussions of the marine resources have to my mind been the most productive. In these discussions the core has been that the marine resources are common property of the Icelandic nation, and they should not only deliver good living for the generation now in charge, but no less for the future generations. This point of view is, to my mind, the most productive one. The Icelandic fishermen know that the fish resources are the bread and butter of the nation, and they are the first ones to benefit from good care-taking of the resources.

As I mentioned, throwing fish overboard is well known on Icelandic fishing grounds. It is not easy to say if this has decreased or increased in recent years. Many, especially inside the bureaucracy, state that it has decreased. I think this might be true. The attitude of the fishermen has changed, and the legislation is more flexible today than it used to be. One example of this flexibility is a paragraph saying that a certain part of the catch does not count for quota deduction – that is undersize fish. The temptation to throw fish overboard is smaller with such paragraphs. This single paragraph has brought to shore catch worth millions – value that otherwise would have been thrown back into the deep blue sea. I want to emphasize, however, that the change in attitude among the fishermen regarding the care-taking of their catch has produced the greatest difference, and I specifically want to point out that such progress can be permanent.

In many cases new legislation can be traced directly to requirements from the fishermen, who in the first place put pressure on their organization that then again puts pressure on the authorities. Most of the time, no matter how new regulations come about, the changes should not be a surprise to the fishermen.

What the mentioned changes in the legislation have in common, is that they mostly aim at the same thing: making adjustments to changed circumstances easier. Unfortunately, this is not always the case. Sometimes changes are made without any consultation, even revoking rights already existing. I specifically want to mention a rule that was in place from the beginning of the ITQ system. This rule allowed the fishermen, when fishing with hand line, jigging, to release fish that was undersize, since it was survivable. All these fishermen agreed that this was a wise rule, since most of the fish released from hand line survives.

Without notice, the Ministry of Fisheries revoked this rule, leaving these fishermen very angry. The Minister defended his actions by pointing to a report from the Marine Institute, stating that fish released from hand line would die soon afterwards.

The hand liners knew better. They protested and pointed out that professional fishermen know how to release a fish to make it survivable, and they had no reason to throw dead fish overboard, since the “days at sea” system only had effort limitations. In this case, the Minister showed little faith in the fishermen. For the time being NASBO is trying to have this changed for the better.

I find it impossible to finish this speech without mentioning the incredible accuracy of handing out quotas in Icelandic waters. With each license the boats get quotas down to the kilo, and it is unfortunate if you fish 101 kilo of a certain species instead of the 100 kilos. One fisherman even made the front pages in Iceland for fishing “half a fish” more than he was supposed to do. It should be easy for the legislator to adjust things to prevent such nonsense to occur.

More about this incredible accuracy: For years the Minister has chosen to follow to the point the scientific advice from the Marine Institute. For the fishing year that just started on 1 September, it was 205,000 tons for the cod. NASBO has criticized harshly that there is no flexibility for environmental factors taken into an account.

In this context, I want to mention long lining, as this fishing gear causes the minimum disturbance in the marine environment. NASBO has also pointed out that trawling kills more fish than comes on board, since a number of fish goes through the mesh while trawling and dies afterwards. We have argued that fishing gears causing the minimum damage should be rewarded when calculating the quotas. NASBO got the first recognition for this point of view, only last winter, when it was put in the legislation that quota deduction for the long line fishery is a bit slower than for other gear types. For us, this is a victory for the environment and the future, but the arguments of the authorities were that this created more jobs, since long lining is labour intensive.

I want to propose that the Institute for Fishery Management and Coastal Community Development, (IFM) starts serious research programmes on the possibility that fishery management systems involve the fundamental fact that the lifetime of the marine resources can depend on the gear types used by the fishermen. It is my firm belief that future management systems will reward the gear types that harm the least the fragile environment of the marine living resources.

Finally, I want to thank the organizers of this conference for inviting me to give this presentation and giving me the opportunity to introduce the views of Icelandic small boat owners on these matters.

Thank you.

2.4 Comments on the problems between the fishing sector and the management of the regulations thereof

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Is this a problem particularly for the fishing sector, or do we recognize similar questions in other areas?

We all know there have been conflicts between the fisheries management and the people carrying out the fishing itself - also conflicts between the fishing sector and the politicians. In many cases it has been difficult to get a political consensus for regulations and rules. There have even been serious conflicts between different kinds of fishing and different kinds of fishing vessels within the same country.

Is this a special problem for the fishing business, or are there similar problems in other business sectors?

When you are working in a given area, you will try to utilize the possibilities as much as possible. If there are regulations and restrictions, you have to follow the rules, otherwise you will be fined or punished, but still, you will go as far as you can. Will you go beyond the limit? No, of course not. Will there be others, who will try? Yes, probably. It depends on how easy it is to control the activities, and how efficient the inspection is.

If a person has a company, carrying goods from A to B, and his earnings depend on how many miles he can drive per time unit, he will try to be as close to the speed limit as possible, but of course he will not pass the limit, especially if there is automatic control on the road.

I suppose it is the same with fishermen. They will be as close to the limits as possible, but nobody will say they are crossing the limit, for example to fish inside a closed area. Recently we have got satellite control, and some fishermen say that the number of fishing days is far too low, and that the fishing is not what it has been. Is it because of less fish? Or could it be reduction of the factual fishing ground? Admitting that the fishing changed when we got the satellite control is the same as admitting that there has been fishing where it should not be. This complicates the argumentation.

The situation is probably the same in all kinds of business. Rules are everywhere, and with reasonable understanding and efficient control it should be possible for the business and the management control to cooperate.

Some examples

The Norwegian fishing, as an example, is very complex. They have coastal fishing and ocean going fishing. There are developing areas, the southern and the northern areas etc. To balance these questions between the different parts in the fishing sector is not an easy task.

And these conflicts have been in practically every country. With Denmark inside the EU there are other problems, where the balance between the different countries in the union also shall be taken into consideration. Why is it so difficult, and what can be done?

There is probably no easy solution to these problems.

In the Faroe Islands we have also seen these problems, but a few years ago we got a new system, where we made new rules for a large part of the fleet, which is fishing demersal species in the Faroese EEZ. This system has been working fairly well, and I think it is because it was done as an agreement between three parts: The fishing organisations, the fisheries management and the biological institute. And I am afraid that if it was done without the understanding from the fishing sector, it would not work properly.

The reasons why the fisheries management does not always work as intended can be the following:

1. **They are not easy to understand.** The legal language is not always easy to understand for a layman, for example a fisherman. Therefore it is important that the rules are worded in a language, which is as plain as possible.
2. **It does not make sense to the fishermen, why the rules are as they are.** If the rules do not make sense to the fishermen, it will be difficult to get them to stick to the rules. There should be a more thorough explanation of the rules, so they are clearer to the fishermen.
3. **They are easy to get around.** If it is easy to get around the regulations, it will be done to a certain extent, especially if the reasons for the regulations are not very clear to the fishermen. Again it is a matter of explaining the importance of the rules.
4. **The reporting system is not clear enough.** The reporting system has developed considerably during the last decade. And now, with the new computer technology every fisherman in charge and every official from the inspection system should attend courses, where they learn how to use this technology. At the courses they should communicate in order to obtain the most convenient methods, understood and accepted from both sides.
5. **Difficulties with inspection and control.** If it is difficult to carry out the inspection, because the rules and regulations are hard to live with or difficult to control, it should be tried to make them more simple. If they are so difficult to inspect that you do not know, if they are really followed to a considerable extent or not, it is better to be without them than just to keep them in force, knowing they are not followed properly.
6. **The persons who make the rules, do not have sufficient knowledge** of the circumstances in the fisheries, how things really are, for example the behaviour of the fish, how species mix together, how they escape, how the fishing gear is made, the shape and the material of the bottom, how it is to work in bad weather conditions on rough bottom among many fishing ships, where and when it is possible to land the fish to the best obtainable prices. And so on and so on. The inspectors have to know the rules and to what extent they are reasonable or not to the people at sea, in order to be able to explain to the politicians, which rules are possible to live with, and which are not.

Recommendations

In order to get the understanding of the rules as clear as possible for everyone involved, and how they can be used in a practical manner, there should be lessons (courses) for the fishermen in charge – they who have the responsibility for the vessel in action – and for the persons who make the rules. Perhaps the courses should be compulsory for both parts. Together with the lessons there ought to be workshops, where the two parts discuss with one another, until they understand the situation that each part has to deal with.

2.5 Discussion: What are the central problems in the relation between fisheries practice and regulations?

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The four contributors to this session approached the theme from different fields of activity: historical research, marine research, fisheries association politics and enterprise management. In addition they represented Danish, Norwegian, Icelandic and Faroese experiences, respectively.

Poul Holm presented a long-term historical perspective on the session theme. The short and general answer is that fisheries management is but human and, therefore, never will be perfect. This is quite a realist position. Heaven is elsewhere. Management systems belong in the domain of the temporary just like ecosystems - one might add – since even ecosystems without humans may change or be imperfect. Fisheries take place in organised societies, and in that sense they are always managed by tradition or community, market, state etc. - and for many different purposes. The workshop theme concerns intentional management by state authorities and based on scientific advice. This kind of public interventionist management has dominated the Danish fisheries for the last 30 years, but long-term history knows of other instances.

The Limfjord fisheries were for centuries subject to public regulation, and ongoing research suggests new explanations for some of its problems. Until 1828 there was a large-scale herring fishery on the spawning grounds in Nibe Bredning (Rasmussen, 1968). Because of its scale, it was of national economic importance. Besides, it was a fishery using fixed gear (fyke nets and pound nets) in inland waters, and fishing rights were tied to property rights. For these reasons, this fishery was the object of intense legal and public interest – and regulations. Did the management work? It did secure taxes and rents and property rights, but the effect of the minimum mesh sizes from 1490 onwards will be difficult to assess.

The Limfjord herring fishery broke down in the late 1820'ies. The conventional explanation is that influx of North Sea salt water in the western Limfjord changed the aquatic environment and ruined the spawning grounds. A new explanation suggests that the introduction of new types of gear (seines) ruined the spawning grounds. A hundred years later – in the 1920'ies - lobbying resulted in permission to use new equipment (engine powered winches), and this is suggested to be the beginning of the end for the Limfjord.

The lesson to be learnt concerning successful management – thus Poul Holm – is that the *management schemes worked for as long as they matched social and economic expectations*. This cannot be taken to mean that schemes work as long as they are accepted. They might not. Nevertheless, it must be an important success criterion for a management system that its component parts and partners harmonise with one another. How does a situation come about where management system and expectations match

one another? It is certainly more likely to characterise the spontaneous forms of order that grow out of long-term mutual adaptation than the planned design introduced at short notice. Without the test and learning of long-term processes, successful management requires at least alternative ways to secure communicative adaptation between component parts of the management system. Complementarity, as Anne-Sofie Christensen points out, is to say that management and fisheries develop as interdependent and opposite. A change in one will lead to adaptations in the other that the short term designer or the clever entrepreneur could not easily anticipate - the more so in a complex system - and you may count on each party to try to prevent their world from changing. The planned order changes into a spontaneous different order that may be undesirable to all.

I would suggest that what happens in the Danish case is “involution”, a form of development where the system becomes more and more complicated because of the attempts of each party to neutralise the effects of changes initiated by the other parties (economist would probably talk about increased transaction costs to obtain the same result). Mismatch between component parts of a management system (schemes vs. social and economic expectations) will definitely be an obstacle to the attainment of intended management results.

Kjellrun Hiis Hauge introduced another theme, which is at the core of fisheries management problems: uncertainty. Stocks, ecosystems, and fisheries are not simple mechanical systems, and therefore they are difficult or impossible to predict (Botkin, 1990). That is a serious practical problem. The fisheries themselves are often characterised by technologies, strategies, forms of organisation and expectations adapted to coping with changes and fluctuations. Some management systems are better suited than others to cope with the uncertainty pertaining to the behaviour of ecosystem and fishing industry. Quota management as we know it in Denmark is not one of them. The attempt at target shooting for precise quantities has not been very successful, and the inflexibility of the exercise has made it difficult for the fishermen to rely on customary flexibility strategies (Vestergaard, 1997).

Kjellrun Hiis Hauge draws attention to a specific and unfortunate aspect of the uncertainty issue: the confusion about the role of science. It is a strong popular idea that science delivers certainty. It is true that the role of advisory science is (or should be) to supply authorised and disinterested statements on how things are. However, the scientific truth may be that things are not certain and not completely known. It is a vain belief that science should and could supply absolute certainty about fish stocks or the weather. It generates communication problems and antagonism or misplaced support (they need more funding). The problem is not just in the expectation. There is a bureaucratic and political need for precise and certain information, and there is unwillingness to accept that you cannot have it, when fisheries management relies on TACs and quotas. The EU system is married to precise stock predictions, because that is the key to the division of EU fish resources between member states.

Besides, there is the temptation for politicians to escape from responsibility by allowing the scientists to make the political decisions. In totalitarian systems, politicians may want to decide which scientific results the scientists should deliver. When politicians allow the scientists to make the political decisions, this is a chance for the totalitarian scientist to decide what the world should be like.

The conclusion on the uncertainty issue is that the role of uncertainty in fisheries management should be understood and accepted, since we have to live with it. According to Kjellrun Hiis Hauge, the best thing we could do to match management with the condition of uncertainty is to shift the focus from limits and short-term precision to long-term possibilities. How can this be done, if annual TACs and quotas remain the basis of management?

Örn Pálsson focused especially on the relationship between legislation and fishermen. “Trusting the ones that work within the fisheries legislation leads to the best care taking of the marine resources.” It could mean: “Trust the legislators”, but the point seems to be to “Trust those who live under this legislation”. In many of the known scenarios neither seem to be justified. I think we have understood from Örn Pálsson’s presentation that good relations now prevail between management and fisheries in Iceland. Legislators no longer force legislation, but consults with the industry.

It was not always like that. The small-boat fishermen went through a long and probably wasteful process in the transition to ITQs after 1984, an example of legislation that mismatched the circumstances. The small-boats were initially exempt from the ITQ system. When from 1991 ITQ’s were to be extended to small boats, there was only little quota to share, and long prospects, if vacant quotas had to come from decommissioning of tonnage. Some got quotas, but some could choose days at sea. Because of rapidly increasing technical catch capacity, the numbers of days at sea were continuously shrinking. The situation became untenable and had to be amended several times. This long drawn story will end in 2006 with the abolition of days at sea.

With effort rather than quantity (quota) regulation there ought to be little incentive to discard fish (Thórdur Ásgeirsson may disagree), but with ITQ’s high-grading could be a temptation. Astronomical fines were introduced to prevent fishermen from overstepping the limits of their ITQ’s. This was lack of trust in the morality of the fishermen, but the situation has been changed with the ingenious provision that you may now land 5% otherwise discardable fish the revenues of which go into a fund. This shows a change of attitude between legislators and fishermen. Consultation with the fishing sector has improved, and the fishing sector may now be seen to demand new legislation. One suggestion by fishermen is to reward environmentally desirably fishing methods with quota bonuses.

Örn Pálsson’s point is that fisheries management does not work as intended, if management does not trust those who work under the fisheries legislation. This must be followed by the question: What does it take to make them trustworthy? Is communications enough?

Olaf Olsen: Fishermen, like people in other sectors, will go as far as the rules allow, more or less, and fisheries management will not work unless there is a reasonable understanding between the industry and the management parties. We may take Olaf Olsen’s words for it, since he is a fishing vessel owner. However, circumstances differ in the North Atlantic region, and therefore problems of making it work are different. *Iceland* and the *Faroës* have large areas of ocean to manage almost by themselves. This applies to *Norway*, too, but here the fisheries are more complex: coastal and ocean, north and south. *Denmark* has varied small and medium scale waters with different salinities, a corresponding variation in fishing enterprises and the Common EU Fisheries Policies to come to terms with. So has *Sweden* with the additional challenge of an influential green political party with popular support and a devotion to fisheries.

In the Faroes a new management system seems to work reasonably, and Olaf Olsen attributes this to the cooperation between the authorities, the fishing sector and the research sector in designing the system. Lack of understanding between these parties used to create unintended consequences. Rules were often difficult to understand and made no sense to the practitioners, they were easy to get around, difficult to control and revealed little knowledge on the part of the authorities of practical fisheries problems.

The remedy suggested is better mutual information and communication such as compulsory courses and workshops with the participation of all the parties involved. The process of mutual adaptation cannot be left to long-term evolutionary processes, so improved communication seems to be one obvious way of compensating for it.

What are the central problems in the relation between fisheries practice and regulations?

This was the discussion theme to be addressed with the four presentations in mind. The problems are different, because environments, practices and regulations are different. Yet, the fisheries are in all instances complex ecosystems of a sort including biological, technical, organisational and cultural components. In every case the elementary challenge is to create harmony between the component parts of the management system. It cannot, nowadays, be left to slow evolutionary processes of mutual adaptation - for what it is worth. However, the mechanisms of evolution are useful to keep in mind in so far as they concern mutual rather than one-sided adaptation.

The national fisheries in the North Atlantic region differ in many identifiable respects:

- Different seas and fish species composition (ocean, few species/mixed waters, many species)
- Technologies (few/many)
- Structure (large, companies/small, skipper owned)
- Economy (national importance/national insignificance)
- Markets (distant and few buyers/near and many buyers)

To the extent that conditions are recognised and communicated among the parties to the management domain, some of the mismatches boil down to practical and manageable problems. It seems that the Icelandic, Faroese and Norwegian fisheries are focusing on solvable problems for the time being, a fine-tuning of the relationship between management system, fish and fishermen's social and cultural expectations. The advice we were offered focused on communication and understanding, which may work where fine-tuning is the problem.

Some of the practical problems may rely on circumstances that are politically or otherwise difficult to change or recognise, that is fundamental mismatches. It is a practical problem where set quotas and predictions do not match actual fishing opportunities, and it remains a question whether communication can solve it. In the EU quantifiable quotas are the key to distribution of fish resources among member countries. Marine biologists may recognise the uncertainty of stock prediction, but the political systems need national quotas. Unfortunately, fishermen catch fish and not quotas or stocks, just like car drivers drive on roads and not on automobile maps. Quotas and stock predictions have been a major arena for lack of mutual understanding between management schemes and fishing sector (Smith 1991), particularly in the

Danish case. Quota management would have the fishing sector believe that fish stocks can be correctly assessed and predicted, whereas the basic tenets of the theories of the fishing sector itself were that fish stocks fluctuate. The industry has evolved its technology, organisation and strategies accordingly – a versatile species adapted to opportunistic change of target species, waters and seasons. Rather than adaptation this species seems doomed to replacement.

In the discussion some speakers returned to the difference between north and south in the public standing of the fishing industries. In Iceland, the Faroes and Norway the fisheries have public attention, whereas in Sweden and Denmark the fisheries are unimportant and peripheral occupations. This falling from grace in the south is part of a more fundamental change of the spirit of the times – the change from producer to consumer society.

Örn Pálsson pointed out that people in Iceland expect fishermen to take as much value from the sea as they can – they are important to the Nation. This used to be the case in the south, too. It seems, though, that fishermen are increasingly alone in entertaining that notion. A favourite quotation of mine is a statement of a fisherman on television in 1991. He said: “The noblest task of fishermen is to fish. Well, we have fishermen, because they should fish.” (Nyhederne, DR TV 19.5.1991). This statement belongs in a society where productive work is a citizen’s duty held in honour by the state. The consumer society has the inverse perspective: citizens should enjoy their rights, and the state will be honoured in return for securing rightful consumption. The producer cannot be trusted to work in the pursuit of honour, the producers’ ministries (fisheries, agriculture) have accordingly been changed into a consumers’ ministry, the food ministry, and the research assignments of the Fisheries Research Institute has shifted to consumer protection, e.g. food quality. This may not be a change for the better when it concerns the improved communication between the fishing sector and the authorities responsible for management schemes.

In sum, this session presented four central problems in the relation between fisheries practice and regulations:

- *Mismatch.* The management schemes worked for as long as they matched social and economic expectations. How does a situation come about where management system and expectations match one another?
- *Uncertainty.* The role of uncertainty in fisheries management should be understood, since we have to live with it – and how can that be done? It would help if focus were shifted from limits and short-term precision to long-term possibilities. The question is then: is this possible when annual TACs and quotas are the basis of management?
- *Distrust.* Fisheries management does not work as intended, if management does not trust those who work within the fisheries legislation. This must be followed by the question: What does it take to make them trustworthy? Is communications enough?
- *Lack of understanding and communication.* The reasons suggested for unintended consequences of management focus on problems of understanding and communication between management and fisheries, and the suggested remedy to counteract it is mutual courses for fishermen and for those who make the rules.

The common theme for the workshop was *the complementarity problem* – the relationship of interdependence and opposition between management and practice. The suggested remedies all depended on communication as a means to create harmony between the component parts of management systems. It is then to be hoped that communication can bridge the gap between fundamentally different understandings, overcome or find ways around fundamental political obstacles, and find ways of overcoming the limitations of uncertainty and imperfect knowledge. Even improved communication will not equip us with total knowledge. The Soviet system had to adapt to that, and so will fisheries management.

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3 What are the challenges for the fisheries management of the future in relation to fisheries practice?

3.1 Complementarities in the fisheries

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This is an attempt to look at the fishing sector from an economic angle.

In the background paper/note for this workshop I have found these main statements:

- “Conflicts arise regularly between those who manage the fishery and those who practise the fishery”. The short answer is “YES”.
- “The fishermen want a fishery they can live by and with!” The short answer again is “YES”.
- “The management formally wants to make fisheries sustainable biologically, economically and socially”. The formal answer is probably “YES”, but the real world answer is “NO”.

In the management of fisheries in the EU there is only one priority – sustainable fishery, as it is defined by biologists/ICES. This means that the main objective of the regulation from year to year is management of fish stocks, and the management of fish stocks is mainly based on assessment of fish stocks from ICES and advice of quota change/reductions. The social and economic dimensions of the fishery are to a large extent absent. And that is the real cornerstone of the conflicts between those who manage the fishery and those who practise the fishery.

I will not discuss whether the biological advice is of good quality or not. I will discuss the trouble that the high priority of biological advice from ICES gives us in management terms.

In principle there could be many priorities in fisheries management!

- To save some threatened fish?
- To save all fish at all times?
- To give the fishermen good long-term framework conditions?
- To secure safe and healthy food?
- To prevent discard?

Sustainable fishery based on the ICES advice is what managers try to fulfil.

Today I have chosen to focus on some important factors that could give many fishermen a chance to make a living and in my opinion reduce the conflicts between fishermen and managers. In principle it should be simple. We just need to give the fishing industry approximately the same possibilities to produce as in other similar sectors.

If we compare the development of changes of rules/framework conditions in the fishing sector to other sectors, I think we all here can agree that in the fishing sector in the EU, major changes happen overnight every year in December!

If we compare with agriculture – another sector where nature plays an important role for production - the situation is completely different. If rules, subsidy systems etc. change, it happens over several years. That gives the producers and the industry in the sector time to adapt to the new system. If the rules for support for a certain product in the agricultural sector change it happens over a period of for example 5, 7 or 10 years. I recently joined a Conference about the WTO-negotiations. It was discussed when the subsidies for export of agricultural goods were expected to be phased out. Just for your information – subsidies for export is one of more subsidy systems for agricultural goods. The experts at the conference expected that the subsidy could be phased out by approximately 2015. The sector and the producers have 10 years to adapt to the new situation!

In the fisheries sector the same reduction could happen overnight. It is not unusual to decide a cut in important quotas of for example 20%, 30% or 50% in December, and the reduction comes into force from January 1st. In 2002 the Council of Ministers introduced the Days at Sea scheme in December, and it was implemented in February 2003! See example of the development in the quota for cod 1996-2004 on next page.

Nothing of this is new – but it is still the main problem in the fishing sector, and in my opinion it is the main reason for the conflict between those who manage the fishery and those who practise the fishery. The conflicts, of course, get worse, when those who manage the fishery and those who practise the fishery disagree on the assessment of the fish stocks.

If we shall ever reach the goal – reduction of the conflicts between management and the fishing sector - we need to focus on the economics in fisheries. Fishermen – as other people – actually want to pay their bills, to buy food, to buy clothes and what other people need money to buy. If anyone should have forgotten, it also costs money – sometimes a lot of money - to run a vessel. The employees need a salary, fuel is more expensive than ever, and lots of the costs exist whether you have a good catch or a bad.

This means that it is important to plan or at least to have knowledge of the main framework conditions in the sector for 2-3-4-5 years. Some of the goods that we buy make it necessary to have an income for a longer period – several years maybe. When you have bought a vessel you have also bought a lot of costs for many years. To be able to pay your cost – the bills – you have to fish! That's it.

The first figure below shows the development of the Danish quotas for cod from 1996 to 2004. In total there has been a reduction of the quota for cod from 94,145 tonnes to 29,202 tonnes – or 69%. That is a heavy change in the fisherman's possibility to generate economic surplus.

The other figure shows other important elements – landings, average prices, fuel prices and value of landing (running prices, not fixed prices!). From an economic point of view the value of landings is of course the decisive figure. The value of landings has been falling since 1999. Fuel prices increased from 1999 to 2000 and have been on a high level since (I fear rising costs for fuel in 2004).

2003



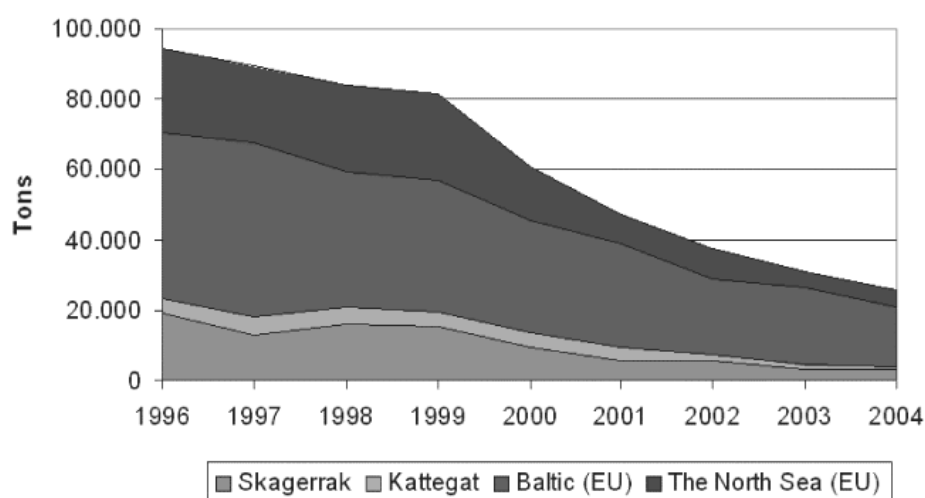
Cod

Value of landings (1000 €) 57.911

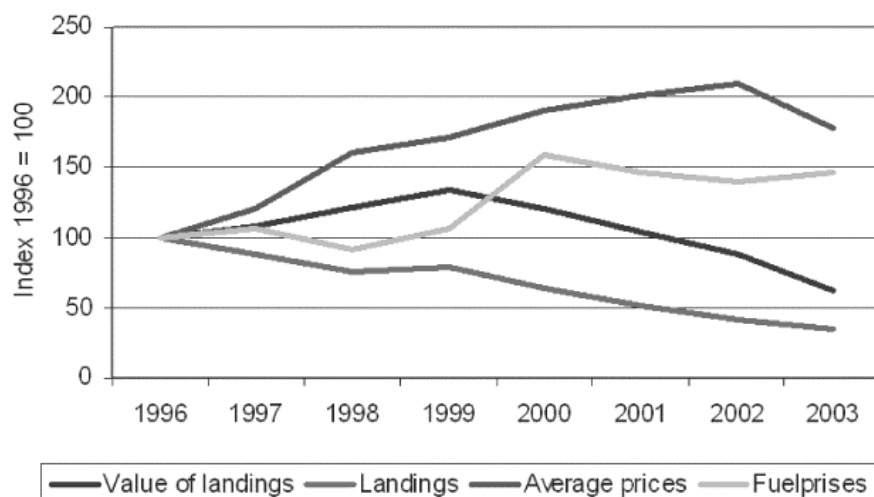
Landings (tonnes) 27.927

Average prices of landings (€) 2,07

Cod quotas 1996-2004



Cod 1996-2003



Source: The Danish Directorate of Fisheries

Quota has been reduced heavily. Some years by 30% and other years by 45% - but the decision has been taken each year in December. The fisherman has few possibilities to adapt his fishery to these changes in framework conditions. If he does, it will involve costs for new gear etc.

In 2003 a new days-at-sea system was implemented. The result was heavy limits on the days at sea and a reduction of the flexibility of the fisherman. In this period the regulation has not given the fisherman a fair chance to adapt his economy to the changing catch possibilities.

What happens for a fisherman, when a quota is reduced heavily?

- Turnover will be reduced.
- Surplus will be reduced, maybe disappear.
- Bankruptcy is getting closer.

What if days at sea are reduced?

- Turnover is reduced.
- Costs will rise – a bad combination.
- Bankruptcy is getting closer.

What if new technical rules are implemented?

- Costs are going up.
- Turnover is going down, and surplus is reduced.
- Bankruptcy is getting closer.

How can the fisherman react to the regulations, if he wants to survive economically?

- He can try to find other quotas/fish to catch.
- He can sell his vessel for decommission.
- He can try to deliver some black fish.
- He can try to upgrade the fish he catches.
- He can try (with great risk) other kinds of fraud.

What can we do in management to prevent this development? This is in my opinion the main theme of the workshop.

- We can create good possibilities for fishing.
- We can work on creating stable framework conditions for several years.
- We need – as others sectors - a long-term policy for regulation and development.

Main factors

- Economics:
 - o Stable framework conditions – production, subsidies etc.
 - o Quota/Days at Sea framework that makes long-term planning possible.
 - o More focus on market conditions (You will not repeat your success very often if you have once worked for 5 years to build up a new market, and then – overnight – cannot deliver the fish).
 - o Long-term structural development – not random decommission schemes.
- Biology:
 - o Long-term advice.
 - o Improvement of the quality.
- Social dimension:
 - o We must decide whether we want these small communities based on fishery in the future, and how we can help them survive.

The rest is mainly details, but important for the development internally in the sector.

- I don't think it is decisive whether the regulation is based on days at sea or quotas, but we cannot absorb substantial changes in these regulations every year.
- I don't think it is decisive whether the internal regulation is based on ITQ, IQ or and other sorts of regulation. If the system is rather stable, the sector will adapt to the framework within a few years.
- But it is decisive that framework conditions are kept stable.

What if it is not possible to reach the goal?

- Most likely the fishing regulation will continue to produce different kinds of system failures and with a serious risk of a breakdown of the fishing sector and the communities depending on it, in near future!
- If we cannot provide long-term management, we will not get long-term development!

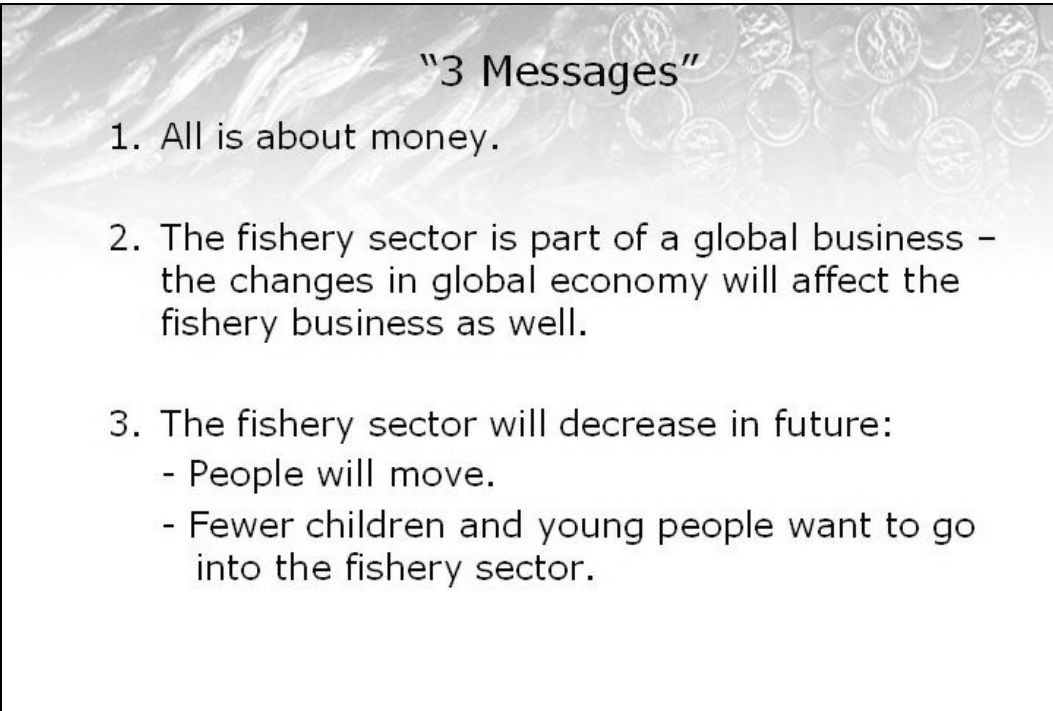
3.2 Future challenges for the fisheries

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Future Challenges for the Fisheries

Óli Samró



"3 Messages"

1. All is about money.
2. The fishery sector is part of a global business – the changes in global economy will affect the fishery business as well.
3. The fishery sector will decrease in future:
 - People will move.
 - Fewer children and young people want to go into the fishery sector.

"It's all about money"

- ✓ Why does the most beautiful girls live in Ikast?
- ✓ Because the business environment is internationally competitive!
- ✓ Well educated people will move to the areas where they can utilize their skills, and where the industry/public sector is willing to pay their salaries.
- ✓ If the basic industry earns money, then the service sector is increasing, and the welfare will increase (schools, health care, after work activities - sport and entertainment).
- ✓ In the fishery sector in general too few people have focus on money – they are looking at other elements.
- ✓ Iceland has managed to move focus.

"Summary Iceland, Norway, Faroes"

Assumptions

- On the next slides I will present the summary of the analyzes of profitability and competitiveness in these three countries.
- The figures are a summary of trawlers/boats over 30 meters and factories on land (except traditional saltfish producers).

Iceland

- Iceland has managed to increase profitability.
- The debt in Iceland has increased to a very high (critical) level through the liberalization of the fishing rights.

Norway

- The development in Norway is in general poor. Less profitability and increasing debt.

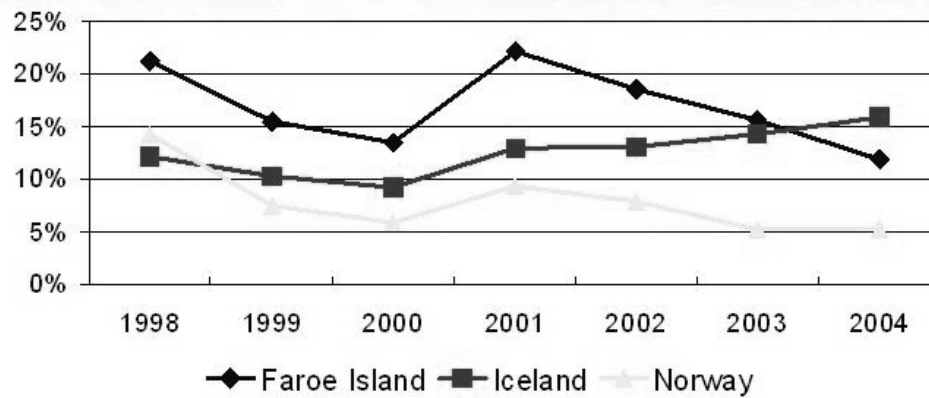
Faroe Islands

- The very positive trends from 1996 to 2002 have stopped. Poor movements the last two years. There is in general little or no debt in the fleet and the plants.

Overall benchmarking

Return on investment Vessel + plant 1998-2004

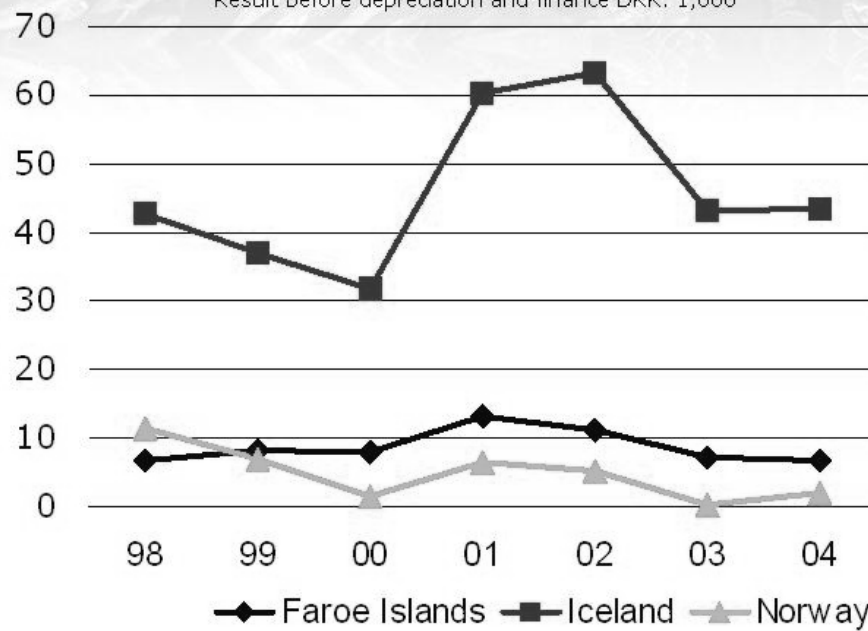
Return on investment: (Primary result/Assets) * 100



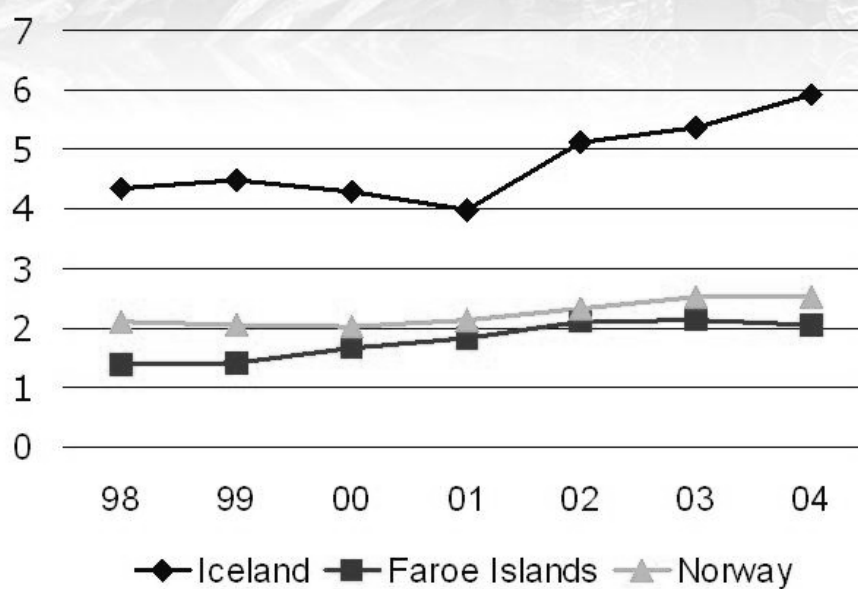
Profitability per processing unit

Vessel + plant

Result before depreciation and finance DKK. 1,000

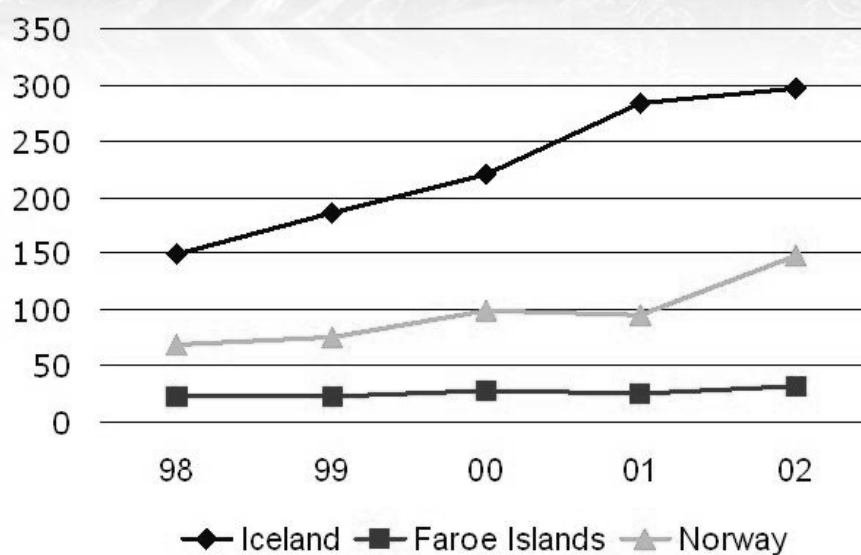


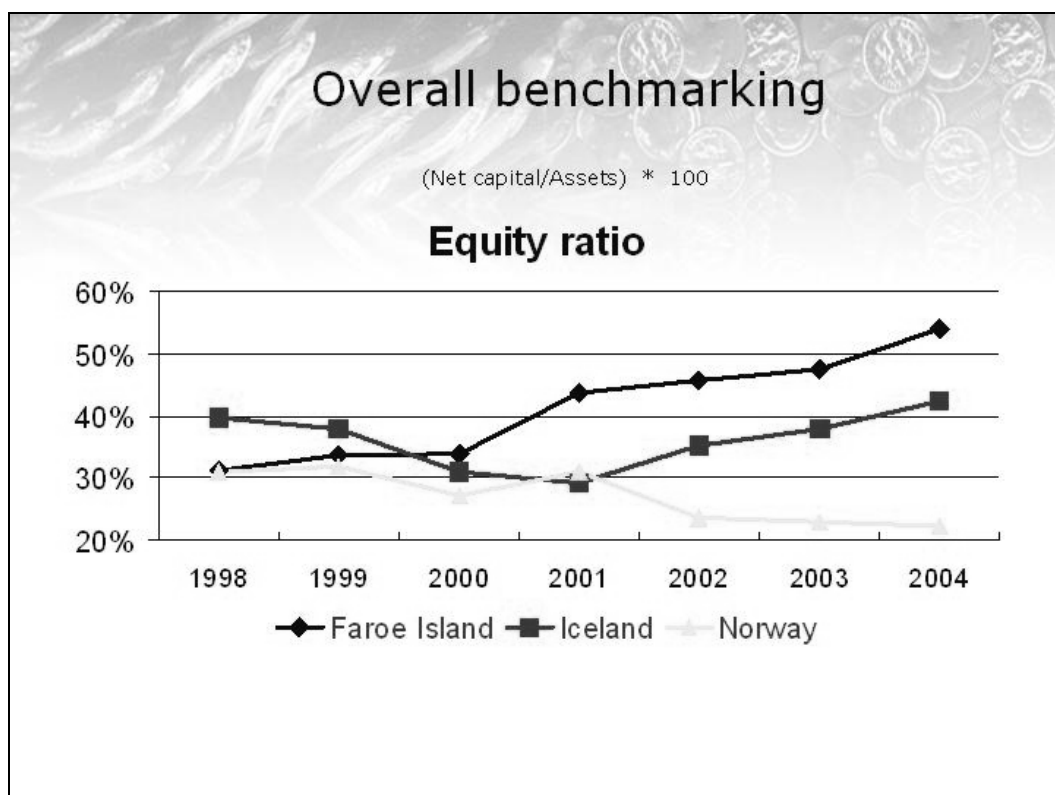
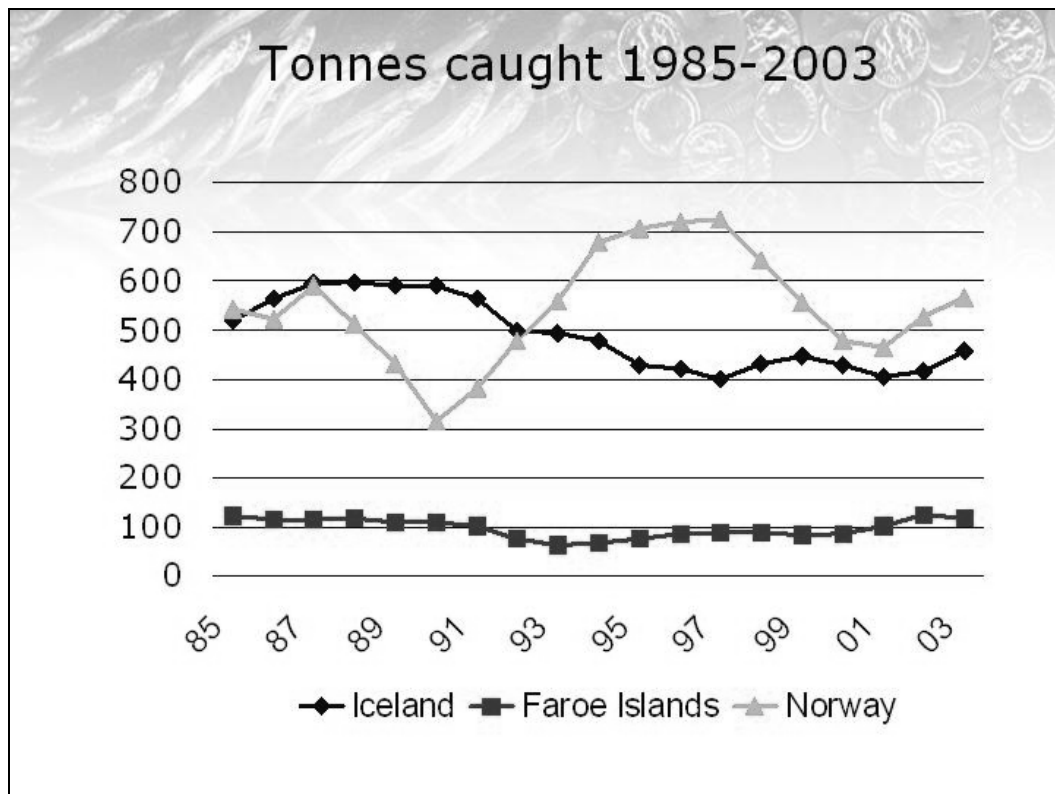
Tonnes per freshfish trawler



Debt

Vessel + Plant mill. DKK





Summary

Diagnosis:

- ✓ Fisheries communities in EU and Nordic Countries are in general struggling.
- ✓ Low or negative economic growth.
- ✓ The finance sector is negative (critical) or going out of the fishery sector (except in Iceland).

Symptoms:

- ✓ Parents do not want their children to go into the fishery sector.
- ✓ Average age of the people in the fishery sector is increasing.
- ✓ Average age of boats/trawlers is increasing.
- ✓ Tamils, Filipinos, Chinese etc. can do the same work on board and on land much cheaper than the people in the Nordic fisheries community.
- ✓ The work is too simple compared to the salaries in Nordic countries.

Focus:

- ✓ "Wrong focus" .
- ✓ Scientific people, politicians, and a part of the ship-owners/industry, organizations have focus on all other things than money – biology, social things, urbanization, culture, environment, fishery as a part of foreign policy (EU) etc.

Conclusions

- ✓ Politicians, scientists, organizations and the people in the fishery sector have to look at the fishery sector like they are looking at all others sectors in a market economy.
- ✓ The fishery sector will not survive in the long run, if politicians and scientists do not accept the fishery business like all other businesses in a market economy.
- ✓ There will be fewer people working in the fishery sector in the coming years, and the people left will on average produce more and earn more.
- ✓ It will give the fishery community the opportunity to move on. (Example from Iceland: My neighbours and 15 other young icelanders are selling IT-solutions to IKEA worldwide, Marell equipment all over the world to fish and chicken industry).
- ✓ Fisheries Management Systems are mainly operated by people with focus on only biological arguments. But the fisheries management systems must in future have more focus on economic issues as well.

3.3 Towards a fleet based advice system

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With many fish stocks in EU waters in rapid decline questions are being asked about the reason for the failure of fisheries management as well as about the improvements that could be implemented. The present fisheries management system is primarily based on biological advice on a stock-by-stock basis in terms of a TAC separate for each fish stock.

One of the problems with the single species approach is that it disregards technical interactions, for example in the demersal fishery in the North Sea where often more than one species is caught in the same area and different types of vessel catch different proportions of the various species. Vinther *et. al.* (2004) noted that ignoring the mixed-species problem of a fishery may result in the quota for one species being exhausted early in the season, but vessels continue fishing and catching that species because there is still quota available for the other species in the given fishery. As a result, the quota for the first species would not provide an effective constraint on fishing mortality on that species. To deal with the mixed fishery problem the later mentioned authors have developed an approach that gives advice on a fleet basis instead of stock basis (better known as the MTAC model).

A fisheries/fleet based advice model

The concept of a fleet/fisheries-based advice has been the keystone in many ongoing EU funded projects such as TECTAC, EFIMAS etc. Also a Danish project TEMAS (Technical measures - Development of an evaluation model and application in Danish fisheries) is developed on the same concept. The main objective in TEMAS is to develop a management evaluation tool (a user-friendly software toolbox which at present is named after the project, “TEMAS”) to evaluate the effect of technical measures in a multi species and multi fleet fishery accounting for spatial and seasonal aspects. Compared to the MTAC approach the TEMAS model has included several new modules such as multi-fishery, structural management and TAC/quota management components (See figure 1). Among the new components are fleet dynamics and fisher's behaviour (module 8 in fig. 1). This component operates with two types of models: a trip related behaviour part (short term behaviour) and a structural behaviour part (long term behaviour).

In figure 2 are illustrated the most important behaviour rules in TEMAS for both the short and long term behaviour part. In the present version of TEMAS there are four short term related models; 1) model for fishing/not fishing, 2) model for choice of fishing area, 3) model for choice of riggings and 4) model for discarding. For the long term part also four behaviour algorithms exist at present: 1) model for decommissioning, 2) model for disinvestment, 3) model for attrition, and 4) model for investment. It should be noted that that the behaviour components are still under development. Due to the limited experience by including fisher's behaviour to fishery

management models the behaviour module is still under development. Further detailed information of the structure of the TEMAS management evaluation toolbox can be found in Sparre (2003) or Eigaard *et. al.* (2004).

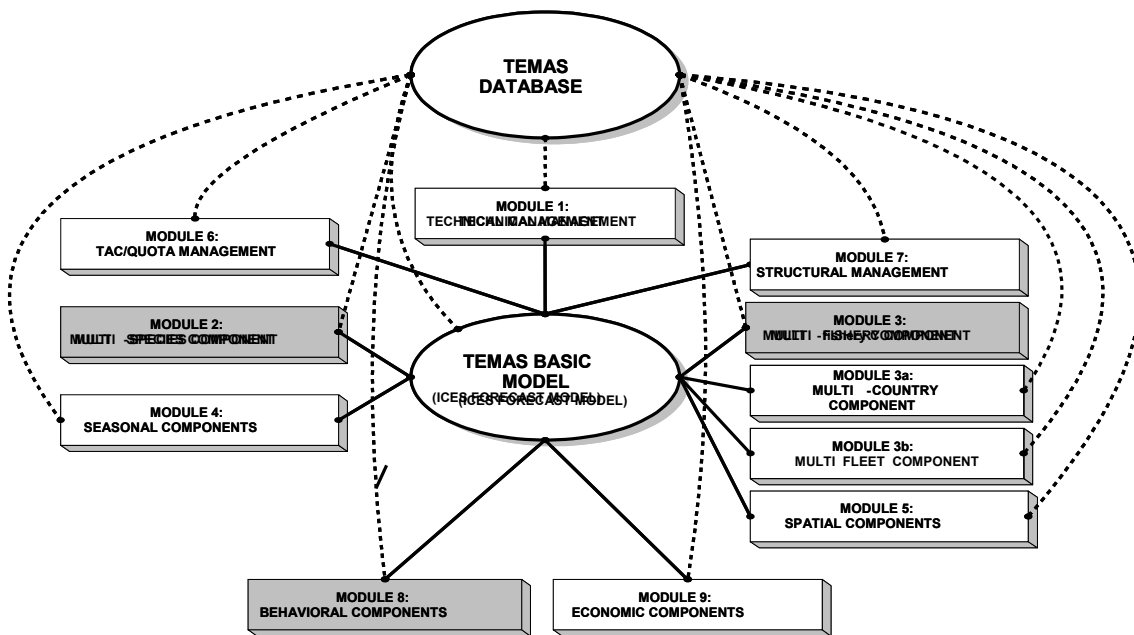


Figure 1: A simplified structure of the TEMAS fisheries management toolbox

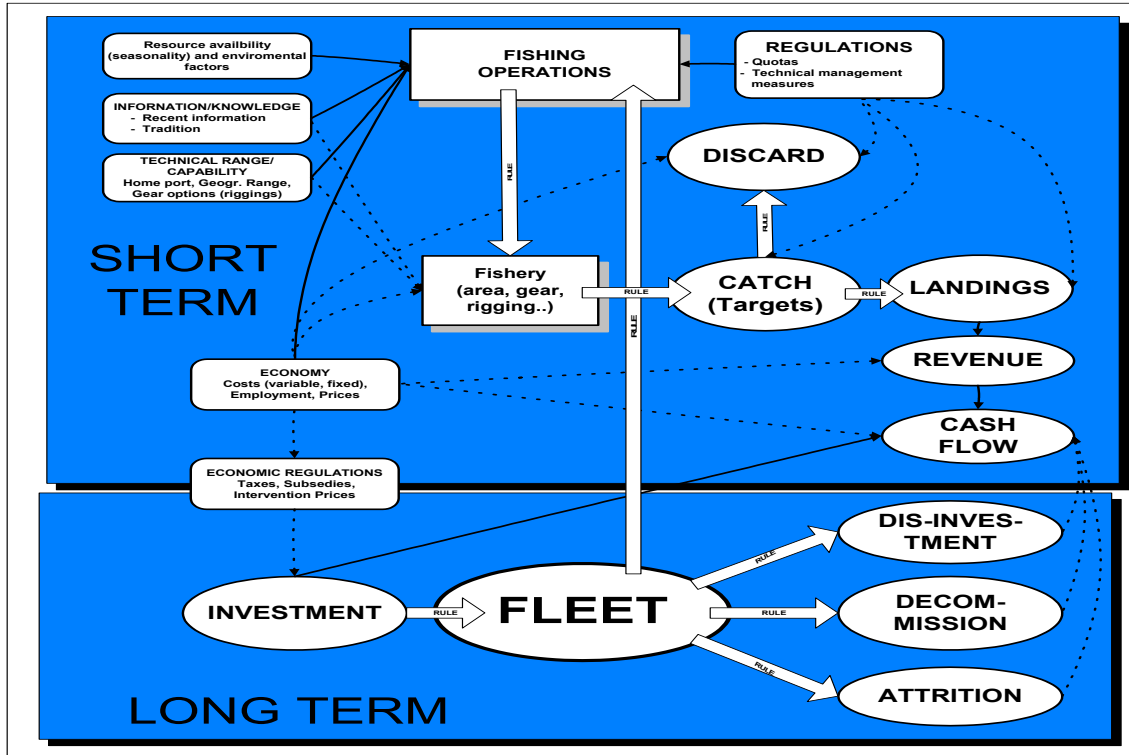


Figure 2. Behaviour rules modelled in TEMAS, The elements of this flow diagram are “quantifiables” (ellipses), “actions” (rectangles with sharp corners), “factors influencing behaviour” (rectangles with round corners). This is a modify version from Sparre (2001).

Fleet dynamics

Empirical analyses of fleet dynamics have been done based on logbook information from Danish fishers in the period of 1991 to 2001. Preliminary results show that the Danish fleet is very diverse in terms of fishing activities (this is reflected in the many different kinds of vessel and the high number of fisheries identified). We also found high variation in the flexibility in the choice of fisheries among the different vessel groups. In the higher end of the scale we found the demersal trawlers that were characterized by choosing among many different fisheries in different fishing areas. In the other end of the scale were the Danish seine fishers that were characterized by being very conservative in the choice of fisheries. The observed differences in their flexibilities can have a major influence on how a given vessel type react to e.g. changes in management regulation in terms of allocation of effort and not least the economic loss for the individual fisher. See more detailed description in Ulrich and Andersen (2004).

The strength of fisheries/fleet based advice model

Changing from a single species approach to a fleet/fisheries based approach has several advantages. The traditional biological advice is based on one stock separately, instead all the stocks of interest are included. Furthermore, a fleet based approach such as the TEMAS model also includes the user of the resources (the fishers) which makes it possible to evaluate various types of socio-economic considerations (e.g. how changes in regulations may economically effect a given fishing fleet, it could e.g. be an output in terms of net present value). We (fishery scientists and management) do have a general idea of the overall structure of a fleet/fisheries based advice model. Therefore the major tasks in the near future will first of all be to improve our understanding of the new components in a fishery management advice context such as fisher behaviour, spatial fish population dynamics (migration, spatial fish distribution etc.), technological changes in the fishery, social-economic aspects and compliance etc., and secondly to find out how these new components can practically be integrated into a fleet/fisheries based advice system.

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3.4 Challenges to management

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Complementarities in the fisheries

- A management approach
- ***Challenges to management***

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Where do we start?

- My starting point is the North Sea
 - Advice and management has to start with the characteristics of the sea at hand – the fleets and the people in it.
 - Management in the Indian Sea and in the Limfjord 200 years ago can improve our conception of problems, but cannot be a basis for concrete management today.
- The North Sea is complex: 8 countries, 20 basic fleets, a number of traditions and 3 institutional levels.

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What is our problem?

Fishermen are enduring hardship - and managers are in desperate search of solutions to "stock failure" and problems of targeting fisheries.

New management tools are put to play on top of the old and before the effects of the old are assessed.

Advice is insufficient with regard to

- Outtake and targeting of outtake
- New fishing methods
- New management methods

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We must:

- Focus on the relevant problems and the possible solutions, to the benefit of the industry, respecting established ecosystem considerations.
 - Develop "simple" and workable management.
 - Focusing advice and research - using knowledge from other fields and frontiers than those of the fishery.
 - Create acceptance of management among fishermen without compromising sustainability.

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Outtake problems:

- Fewer, smaller year classes and resulting difficulties for assessment.
- Advice is not able to take into account recent stock fluctuations.
- Precision in management becomes more important - and more difficult.

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Outtake solutions:

Do we need "advice"? - No: We need

- Estimations of stock developments consequential to alternative management strategies
 - Understandable data compilations
 - Consistent format and continuity in advice
 - Real-time advice – e.g. based on data from commercial reference fleets
- It should be possible to produce advice from one day to the other, e.g. in the sandeel fishery a real-time advice/management system could be relevant while frequent advice in other fisheries is not necessary.
- It is NOT a given thing, that quotas are given for one calendar year

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Targeting problems:

- Managers with no sense of direction and with little belief in "leap solutions"
- No long-termed focused plans for management or research
- No operational advice to managers

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What could EU do?

- Decide on principles of advice needed
- Improve dialogue and requests for ICES (on its way)
- Consider the decision-making process in EU
 - Long-term strategies and fixing of fishing levels
 - Short-term adaption of quotas/effort based on real-time advice decided on administrative level

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What do we wish from advice?

- Management should give their requests to the advisory bodies (ICES) much more precise.
- It has to be "ICES" advice.
 - Advice has to be given with integrity, but it is not independent as science – it has to accommodate management needs and fishermen's expectations

→ Or managers will take over the advisory institution

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What do we do in Denmark?

- A new programme 9 September 2004 - to close the gap:
 - Hard core technology
 - New fishing methods
 - New management and management goals
 - Fishermen's expectations and compliance
- <http://www.dffe.dk/Default.asp?ID=17142&M=News&PID=192433&NewsID=3072>

Can we cope ?
– or what is needed to cope ?

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Our Challenge:

- **To create viable balances - by making knowledge operational to management**
- **To minimize resource effects of allocation policy**

Science is developing a fine grey scaled picture, while problems are becoming "black and white". This is a common problem for management of fish and of advice.

3.5 The Norwegian model for managing overcapacity

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This presentation is built on a case study about Norway presented to the committee of fisheries in the OECD this spring. The case study is part of an ongoing study analysing economic aspects relating to the transition to sustainable fisheries.

The main purpose of this presentation is to show how market based instruments have been introduced in Norway, and how stakeholders have dealt with the changes and cooperated in the introduction of these instruments.

“Market based instruments,” means, by OECD terminology, regulatory and economic instruments based on market demand. In short this include regulatory instruments like more or less transferable permits or licences to fish, and more or less transferable catch quotas. Market based instruments exclude administrative and technical instruments such as mesh size regulations, amount of gear regulations, area and time closure of the fisheries, or TAC regulations. Economic not market-based instruments such as subsidies, tax and charges are excluded as well from the definition.

The first part of the presentation focuses on the Norwegian fisheries policies by giving some brief characteristics of the fishing industry. The second part focuses on the Norwegian management regime by describing input and output regulations and the measures made to deal with overcapacity problems in the fishing fleet. The third part focuses on Norway’s experiences with market-like instruments, and the last part on the reform process towards the management regime as it is today.

According to catch volume, Norway is the 10th largest fishing nation in the world, with 9.700 registered vessels and more than 13.000 fishers. The waters of the Norwegian coast benefits from an up-welling system that makes the banks one of the most productive coastal marine areas in the world. This has provided Norway with rich fisheries, which throughout history have been of great importance both as a source of livelihood to the coastal population, as well as a major source of export revenue to the nation. Today, about 95 per cent of the catch is exported.

Most of the fish is caught in the Norwegian Exclusive Economic Zone. Norway is also responsible for two additional fishing zones, located around the islands of Spitzbergen and Jan Mayen. However, 80 per cent of the total catches are based on shared stocks, where the management responsibility is shared with Russia, the EU, Iceland, the Faroe Islands and Greenland.

Based on local exploitation of the Norwegian fish resources, the main objective of the fisheries policy is both to maximise profits through an economically efficient use of the resources, but also to ensure socio-economic optimisation with respect to the total gain for the communities - of course - within the limits of sustainable use of the resources.

The Norwegian fleet structure is twofold, with the coastal and offshore sectors existing side by side. In addition to differences in technology, operational patterns and

ownership structure, the two fleet segments were historically subject to very different regulatory regimes. While the coastal fisheries remained an open access fishery, the trawler fleet was subject to strict access control from the start.

The Norwegian system for quota allocation

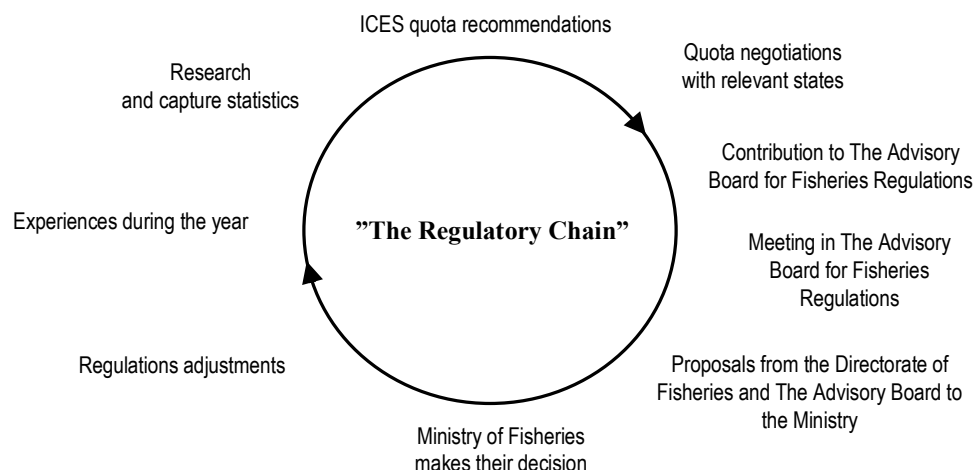
- Regulatory instrument
 - o Input control systems
 - o Output control systems
- Instruments to manage overcapacity
 - o Unit Quota System (UQS)
 - o Structure Quota System (SQS)
 - o Quota Exchange System (QES)
 - o Decommission schemes

I would now like to focus on the management system in Norway, by first presenting the system for quota allocation. Then I will take you through the regulatory instruments Norway has applied, categorised as input and output control systems.

To meet the challenge of overcapacity, various control systems, with the purpose of reducing the number of vessels, have been introduced. This is quota-transfer systems leaving the responsibility for adjusting the fishing capacity to the available resources to the industry. The Unit Quota System, the Structure Quota System and the Quota Exchange System are classified as market-like instruments.



The Norwegian system for quota allocation



The Norwegian model for sustainable marine resource management is based on certain key principles: sustainable harvesting, multi-species approach, adequate regulations and

an extensive control and enforcement scheme. It is vital that these principles are accepted as legitimate by the fishers themselves, and the stakeholders are therefore involved in the process of creating the Norwegian regulatory system.

The fishers early understood that political influence depended on cooperation. Already in 1926, the Norwegian Fishermen's Association was established, organising vessel owners as well as crew members. They take part in discussions on fisheries management and have considerable political influence. This is clearly seen in the annual process of fisheries regulations.

As shown in the figure, the regulation processes start with quota recommendations given by the ICES, before quota negotiations with other states.

In the national regulation process, the Directorate of Fisheries first makes proposals, which are given to an “Advisory Board for Fisheries Regulations”. In this Advisory Board, stakeholders discuss and take decisions, which are then submitted to the Ministry of Fisheries.

The cooperation between the authorities and different stakeholders has proved to be an important way to ensure legitimacy both in the industry and in the community at large.

Input control systems:

- Who are allowed to own fishing vessels?
- Who are allowed to fish?

Two basic models:

- Licences
- Annual permits

The instruments needed to manage a fishery have been divided into measures of input and output controls.

Beside input control systems related to who is allowed to own fishing vessels, Norway has two basic systems regulating the number of vessels that can join the various fisheries: licences and annual permits. The difference is basically that licences are granted for an unlimited time-span, while the fishing permits are limited to one year at a time. The annual permits are, however, renewed each year, if the objective criteria are fulfilled.

As of today, approximately 95% of the catch value comes from access-regulated fisheries.

		Management instruments to regulate the fisheries		Management instruments to manage the overcapacity			
Control System		Input		Output	Input	Output	
Denomination	No	Licences	Annual permits				
Trawlers	125	X					
Industrial trawler	54	X					
Purse seiners	88	X					
Large long-liners	47		X				
Coastal vessels 15-28 m	532		X				
Coastal vessels 0-15 m	1909		X				

The offshore fleet can roughly be divided into four groups: i) cod, saithe and shrimp trawlers, ii) industrial trawlers, iii) purse seiners and iv) large long-liners. The coastal fleet can be divided into two groups: the coastal vessels between 15 and 28 meters, and vessels less than 15 meters.

This division makes it possible to present a table of all the fishing fleet segments showing that trawlers, industrial trawlers and purse seiners require a license. Long-liners and coastal vessels are regulated through annual permits.

The table also shows that coastal vessels account for about 85 per cent of the total number of vessels.

The overall objective of the output control system in Norway is to provide for sustainable and long-term optimal use of the marine resources. This implies that catch of any TAC-regulated species is not to exceed the agreed quotas.

Beside technical regulations and an extensive control and enforcement system, Norway has implemented a system of Individual Vessel Quotas (IVQs). The Norwegian part of the TAC is divided into group-quotas. Each group quota is then shared between participating vessels in fixed and – more or less – guaranteed portions.

		Management instruments to regulate the fisheries			Management instruments to manage the overcapacity			
Control System		Input		Output	Input	Output		
Denomination	No	Licences	Annual permits	IVQ				
Trawlers	125	X		X				
Industrial trawler	54	X		X				
Purse seiners	88	X		X				
Large long-liners	47		X	X				
Coastal vessels 15-28 m	532		X	X				
Coastal vessels 0-15 m	1909		X	X				

Developing the table further, it fills out the picture of the management instruments applied to regulate the Norwegian fisheries.

As earlier mentioned, the coastal fleet is very important for the coastal communities, especially in the northern part of Norway. I am referring to different kinds of vessels: home-based vessels delivering the catch every day in the local harbour and two groups of more ocean going vessels having a considerable catch capacity.

Overcapacity has until recently been constrained by redirecting surplus capacity towards new resources and new fishing grounds. Such expansion is today not possible. It is generally recognised that current fishing capacity in the Norwegian fishing fleet exceeds the available fisheries resources, due to the technical development of vessels, gear and equipment. To meet the challenge of overcapacity, various control systems, have been introduced.

The main instruments used to reduce the number of vessels in the offshore fleet have been decommissioning schemes and a quota-transfer system called the Unit Quota System (UQS). For the larger coastal vessels a quite similar quota-transfer system has been developed and implemented from 2004 called the Structural Quota System (SQS).

Both the UQS and the SQS allow the owner of two vessels to transfer the quota of one vessel to another, and fish the entire quota on one vessel for a period, or part of the quota for an unlimited period, on condition that the one vessel is scrapped. The latter to avoid contributing to worldwide overcapacity by exporting excess capacity.

A third quota-transfer system called the Quota Exchange System (QES) has been developed and implemented as a temporary arrangement for the coastal fleet for 2004 and 2005. The QES allows two vessel owners to team-up and fish both quotas on one vessel for a limited period. If the arrangement is regarded as successful, it may be introduced on a permanent basis from 2006.

A new fund for decommissioning of home-based vessels was introduced in 2003. The scheme is funded through a fee on the first-sale value of every Norwegian fishing vessel. The Government has so far given financial transfers to the fund estimated to about 50 per cent of the contribution from the industry, leaving the industry with a fee on the first-sale value of 0.35 per cent. As licences of the scrapped vessels are withdrawn and redistributed to the remaining home-based vessels, the aim of the fund is to improve the profitability of the remaining vessels. The Ministry aims at scrapping approximately 15 per cent of the home-based coastal vessels within a 5-year period.

		Management instruments to regulate the fisheries			Management instruments to manage the overcapacity			
Control System		Input		Output	Input	Output		
Denomination	No	Licences	Annual permits	IVQ	Pay-back programs	UQS	SQS	QES
Trawlers	125	X		X		X		
Industrial trawler	54	X		X		X		
Purse seiners	88	X		X		X		
Large long-liners	47		X	X		X		
Coastal vessels 15-28 m	532		X	X			X	X
Coastal vessels 0-15 m	1909		X	X	X			X

With the inclusion of these arrangements, we can complete the table with both input and output systems to manage overcapacity.

As the SQS and the QES just recently has been implemented, it is at present too early to say anything about the effect. However, I will not be surprised to see a 30 per cent reduction in the number of vessels within the next three years. Adding this together with a 15 per cent reduction in the coastal fleet less than 15 meters, we will have coastal fleet better adjusted to the available resource base.

The UQS has been in effect for some years now, and some results can be seen. The UQS has led to a 27 per cent reduction in the cod trawler fleet since 2000, and a 12 per cent reduction in the purse seiner fleet in the same period. UQS has decreased the number of long liners by 52 per cent over the last four years. These figures indicate that the UQS is having an effect on the capacity situation in the fleet.

2004	Management instruments to regulate the fisheries		Management instruments to manage the overcapacity	
Control System	Input	Output	Input	Output
Denomination	Licences Annual permits	IVQ	Pay-back programs	UQS SQS QES
Trawlers	X	X		X
Industrial trawler	X	X		X
Purse seiners	X	X		X
Large long-liners	X	X		X
Coastal vessels 15-28 m	X	X		X
Coastal vessels 0-15 m	X	X	X	X

A simplified version of the previous table, where the different input and output instruments are merged, makes it easier to get some impressions of the process towards the implementation of market-based management systems.

The table shows that either licences or annual permits are constraining the participation in fisheries in every fleet segment. Each fleet segment also has IVQs and a quota transfer system, such as the UQS, SQS or QES. However, it has been a rough and slow process to reach the current position and it has required a step-by-step approach.

Up to 1980	Management instruments to regulate the fisheries		Management instruments to manage the overcapacity	
Control System	Input	Output	Input	Output
Denomination	Licences Annual permits	IVQ	Pay-back programs	
Trawlers	X	X	X	
Industrial trawler	X	X	X	
Purse seiners	X	X	X	
Large long-liners				
Coastal vessels 15-28 m				
Coastal vessels 0-15 m				

Looking at the reform process, it started with a collapse in the herring fisheries in the early 60s, followed by an agreement on economic transfers to the industry, pay-back programs and licensing systems for the offshore fleet.

1980 - 90	Management instruments to regulate the fisheries		Management instruments to manage the overcapacity	
Control System	Input	Output	Input	Output
Denomination	Licences Annual permits	IVQ	Pay-back programs	UQS
Trawlers	X	X	X	X
Industrial trawler	X	X	X	
Purse seiners	X	X	X	
Large long-liners				
Coastal vessels 15-28 m				
Coastal vessels 0-15 m				

It continued throughout the eighties with different pay-back programs and the first introduction of a quota transfer system to the cod trawler fleet.

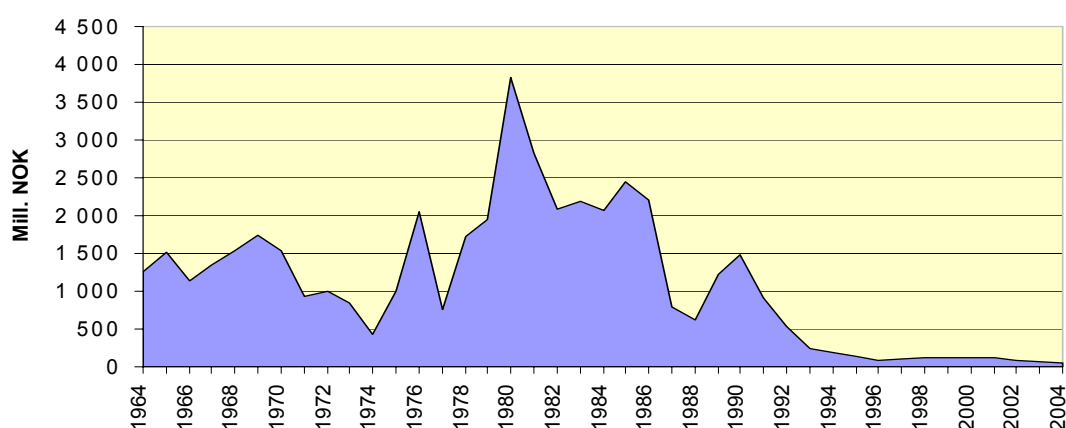
1990-2000	Management instruments to regulate the fisheries		Management instruments to manage the overcapacity	
Control System	Input	Output	Input	Output
Denomination	Licences Annual permits	IVQ	Pay-back programs	UQS
Trawlers	X	X		X
Industrial trawler	X	X		
Purse seiners	X	X		X
Large long-liners	X	X	X	
Coastal vessels 15-28 m	X	X	X	
Coastal vessels 0-15 m	X	X	X	

A new resource crisis in the Atlantic Cod fishery in 1990 opened a debate on an Individual Transferable Quota system, ending up with a closure of the access to coastal

fishery and the implementation of Individual Vessel Quotas also for these groups. UQS was implemented in most of the offshore vessel groups, and a massive reduction in subsidies ended the pay back programs in the offshore fleet. However, new pay-back programs were introduced in the coastal fleet.

2004	Management instruments to regulate the fisheries		Management instruments to manage the overcapacity	
Control System	Input	Output	Input	Output
Denomination	Licences Annual permits	IVQ	Pay-back programs	UQS SQS QES
Trawlers	X	X		X
Industrial trawler	X	X		X
Purse seiners	X	X		X
Large long-liners	X	X		X
Coastal vessels 15-28 m	X	X		X
Coastal vessels 0-15 m	X	X	X	X

The recent years have been dominated by the development of systems to manage overcapacity, ending up with an improved Unit Quota System for the offshore fleet and a Structural Quota System for the coastal fleet.



To complete the picture, this figure describes the development of the economic transfers to the fishing industry, which is almost absent in 2004.

To conclude, today the focus is on profitability within each vessel group. Almost the entire catch value comes from access-regulated fisheries. The TACs are distributed to the various vessel groups through fixed allocation keys, and are further allocated as IVQs. Different quota-transfer systems such as the UQS, the SQS and the QES have

been developed to meet the challenge of an increasing overcapacity due to technical development of vessels, gear and equipment.

Norway has a varied and technologically advanced fishing fleet, encompassing both small coastal vessels and large off-shore trawlers and purse seiners. A fleet composed of a variety of sizes is regarded as vitally important to keep up both employment and livelihood in many coastal communities, but also because a diversified fleet of smaller and larger vessels has the advantage of being able to exploit all parts of the fish-stocks, inshore as well as offshore, in a rational fuel- and cost-efficient way.

However, a diversified fishing fleet creates challenges in designing efficient instruments to manage overcapacity. The key to overcome these challenges has been continuous and efficient cooperation between the authorities and the stakeholders in the fishing industry.

The Code of Conduct for Irresponsible Fisheries

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Complementarities

Fishermen and fisheries managers have common interests. Certainly not on every issue; absolutely not all of the time. But if we take a long-term view on one of the fundamentals of fisheries – ensuring sustainable exploitation patterns, or at least avoiding overexploitation – fishermen and managers are clearly on the same side. Fishermen and managers have, in other words, complementary roles. They form parts of a whole (together with other actors, like the fish, fishery scientists, processors, and consumers, to name but a few), and have as such common interests. At the same time, they have different positions within that whole, and have diverse and sometimes conflicting interests.

Such is the case for all reasonably complex, interdependent systems, and is therefore in itself not a particularly useful insight with regard to the fisheries. It becomes interesting only if we can be specific about the complementarities at hand and draw out the patterns of interdependencies and conflicts between fishermen and managers. This paper is an attempt to draw such a more specific map of the relationships between fishermen and managers. It starts with the assumption that these relationships are institutionally shaped. That is, for the purpose of this paper, I will see the relationship between fishermen and managers in the light of the modern institution of fisheries resource management. I will shortly characterize this institution in more detail. For now, it suffices to say that I have in mind modern, science-based resource management in western-developed nations, as it has taken form after the extension of 200 miles EEZs in the 1970s. What, I ask, are the roles, the division of tasks and responsibilities between fishermen and managers, as constituted by this institution? The answer to this question is suggested by in the title's proposal of a code of conduct for "irresponsible" fisheries. That is, within the current institutional configuration, the relationship between fishermen and managers, at least under some circumstances, tends to break down in such a way as to prevent those involved to think and act responsibly with regard to the fishery resources. By referring to this as a 'code of conduct' I do not mean that such behavior is intended. Instead, it means that it is scripted, built into the definition of the situation and the division of responsibilities as configured within the institution of fisheries resource management.

I take it that the point of talking about "complementarities in the fisheries" is that there should be more of it. A valuable outcome of a workshop with such a title would, I guess, would be a receipt for producing more of such scarce resource. While not discounting more local organizational or pedagogical solutions, the analysis in this chapter suggests that we look for ways to adjust the basic institutional configuration within fisheries resource management.

A brief departure through institutional theory

Institutions are recurrent, self-reproducing patterns of practices. They often come with stories of their own creation and role in society. A defining feature of institutions is stability; institutions do not change easily. This means, among other things, that institutions carry with them traits of the past. Institutions, in other words, are museums for the social technology that were in use on the time of their foundation (Holm, 1995). In this way, the class structure of the 1870s can be traced in contemporary railway-companies (Stinchcombe, 1986), while the honor code of the gentleman is visible in the contemporary institution of scientific truth (Shapin, 1994). The relevance of this for the argument here is the following: The new oceans regime and the modern institution of fisheries resource management were established in the 1970s. We would expect that certain traits of the social landscape at that particular time in history were built into resource management regime. What are these traits?

The new oceans regime and the TAC Machine

Let us say, keeping things simple, that the new oceans regime came about in 1977 with the establishment of 200 miles exclusive economic zones. This brought most of the commercially interesting fishery resources within the jurisdiction of the coastal states, allowing them to take on the role as fishery resource managers. While the 200 mile EEZ represents one important constituent of the new oceans regime, there are also others. One is the 1983 UN Law of the Sea Convention, which formalized the new regime in the form of international law. Another is the management instrument we can call the VPA/TAC-Machine, developed during the 1960s and 1970s, and which turned fish stock assessment and management into a practical possibility. A third is the development of the organizational apparatus, including a scientific system, the national marine labs and ICES in order to undertake fish stock assessment, and a legal/administrative system, including the CFP, quotas, licenses, monitoring and control, etc, to implement the management decisions and make them binding for the fishermen (Holm and Nielsen, 2004b, 2004a).

Let us now try to draw out the basic institutional configuration (see figure 1) of modern fisheries resource management. Four main actors are featured in new oceans regime: The Fish, Science, the Coastal State and the Fishermen. The innovation of the new oceans regime lies in the introduction of the Coastal State as the primary management authority. Under *Mare Liberum*, there is a direct and potentially unhealthy relationship between the fishermen and the fish. Whereas Science here could produce the relevant stock assessments and harvest recommendations, these could not be adopted and enforced, because of the free-rider problem. In addition, the free-rider problem would also lead to under-supply of science. This negative cycle was turned to a positive one by the alliance between science and the coastal state, which together – at least in theory – can calibrate the fishermen's removal of fish from the stock towards an optimum.

It is useful to distinguish two types of basic work involved here. The first, portrayed on the right side of Figure 1, is the *work of representation*. This involves all the activities that produce formal knowledge of the fish, that is some empirically informed model of the fish that makes it possible for a manager to take rational decisions with regard to the utilization of the resource in question. How much fish is there? How much can be taken? What is the potential? How can it be reached? Etc. It is the role of science to produce such knowledge. We can picture the scientific machinery of representation as a

macroscope, a collection of data collection instruments, models, assessment criteria, and procedures that make a macro phenomenon, the fish stock, visible from the position of the coastal state as manager and fish owner. In Europe, it is ICES together with the national marine laboratories that constitute this macroscope.

The second type of work pictured in Figure 1 is, on the left side, that of *intervention*. That is, the rational view on the fish stocks and their best utilization, as it becomes visible through the macroscope, must be acted upon and somehow translated and made binding on the activities of the fishermen. This is done through regulatory instruments like TACs and licenses etc, as observed and enforced by appropriate monitoring and control instruments.

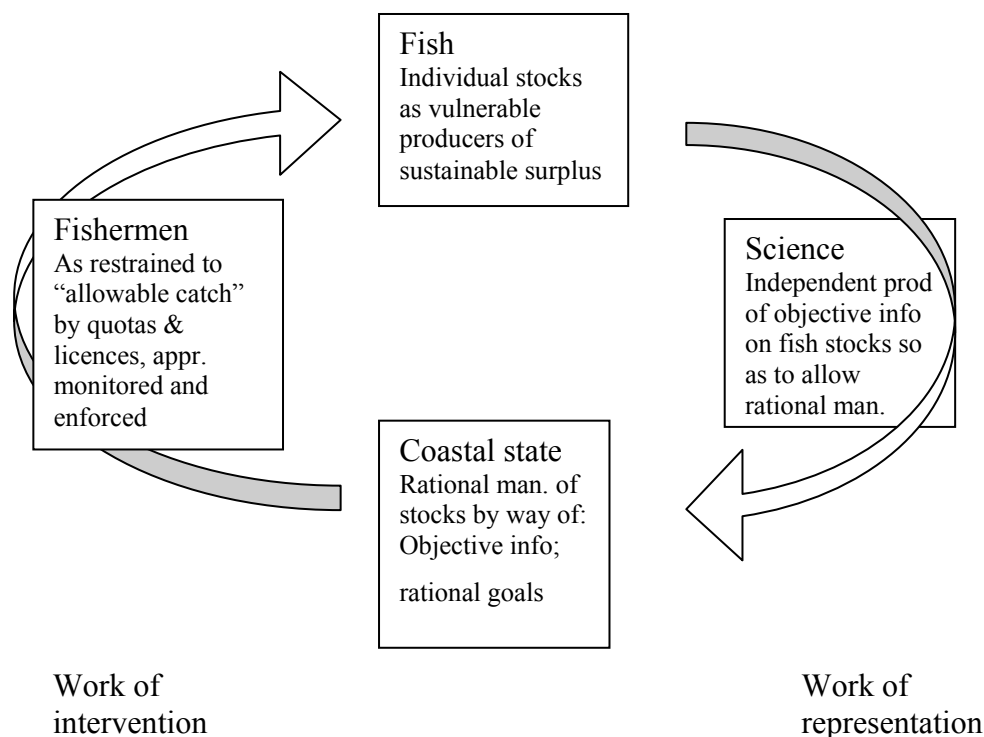


Figure 1: The basic institutional configuration of fisheries resource management

As all institutional systems, the resource management machinery as pictured in Figure 1 comes with specific assumptions and biases. One such bias is biological; the explicit focus of the management efforts remains with the fish, seen as a biological entity. Furthermore, there is a single-stock bias here. The world of fisheries as seen through the VPA model becomes a non-ecological world where fish resources can be decomposed into separate stocks that can be managed individually. The single stock bias also has implications for the interest that constitutes resource management. The main purpose for the management effort is the amount of fish available for fishing tomorrow, and the major factor influencing this is the amount of fish taken today. In other words, this institution of fisheries management is embedded commercial fishing, and ties in commercial fishermen as both the key clients – the stakeholder group on whose behalf management is undertaken – and as variable to be controlled. This means that management, within this institutional configuration, is undertaken on behalf of

fishermen, but with little involvement of fishermen. In this system, the fishermen's capacity to act as co-managers and as co-knowers of the resource is extremely limited.

In this system, then, scientific knowledge becomes a contested commodity, and can only to a limited degree be mobilized in order to construct a common definition of the situation. Or rather, while it can have this function when fish stocks are healthy and the conflict level low, its capacity in this respect deteriorates with the resource status. This is not simply because scarce resource brings out conflicts. In addition it is directly tied to specific blind spots in what we have called the stock assessment macroscope. While the single stock assumption, as embedded in the TAC-VPA machine, is reasonably robust under light harvesting pressures, it tends to generate serious mistakes when harvesting intensity increases, or when the ecosystem comes under pressure for other reasons. This is not only because the model parameters that are assumed constant then become variable and the quality of information, for instance because of discards and black landings, deteriorates. In addition, the transaction costs increase, because of lack of legitimacy, political pressure and external intervention.

While such mechanisms are at play in most complex organizational system, I want to argue that this is more pronounced in the case of fishery resource management. The institutional configuration of the resource management regimes produces no-precautionary behavior, in particular in situations that are in most need of precaution. One reason for this is the strong commitment and faith in positive science. That is, the coastal state's success in inserting itself as manager, as moderator positioned between the fish and the fishermen, is based on the assumption – which turns out to be premature – that gaining accurate knowledge about the state of the stocks is a practical possibility. We can see this assumption in practice in who has the burden-of-evidence in fisheries management. In general, a fishery stays open unless it is documented that fishing is unsustainable. Whereas such is the case when we look at individual management decisions, it is more striking when we take a broader historical view and look at the introduction of fisheries resource management as a closing of the commons. In this perspective, the starting position is one of free access. In order for the coastal state to restrict fishing, and hence act as resource manager, it had to rely on positive scientific evidence. This can best be seen in the fact that the knowledge function remains with the manager, the main role of which is to constrain and control the activities of fishermen. Under a principle of precautionary, this is at least not the only possible configuration. If, instead, the default principle is that fishing remains closed unless it can be shown – according to some agreed procedure – that fishing is sustainable, the institutional location of the knowledge function is not that obvious. In such a situation, it would be much more reasonable to require that those who stand to gain from fishing also carry a responsibility for providing information to show that fishing is safe. How this can be organized in practice is of course a problematic question in itself, which cannot be dealt with here. The main point in this context is that the institutional location of science with the coastal state is connected to the capacity of the system to act precautionary. Because the knowledge function is monopolized by science and tied overwhelmingly to the management function of restriction and control, the fishermen find themselves in opposition to management, and hence in opposition to science. Instead of co-managers and co-knowers, the institutional configuration produces them as skeptical anti-managers.

The new oceans regime hence institutionalized a pathological response to resource crises that I call the Code of Conduct for Irresponsible Fisheries. As suggested above,

this code is generated from the basic institutional configuration of the new oceans regime, and can be traced back to the particular historical situation and social technology of the post-war period. When the resources are in crisis, and need for precautionary management measures are greatest, the following situation typically ensues:

- Fishermen are the key clients for resource management, but come to see themselves as its victims.
- Fishermen have a strong position in management decisions, but come to see themselves believe they are powerless.
- Management & science has a precarious position, but are portrayed as powerful and knowledgeable.
- Scientific knowledge becomes a contested commodity, and cannot be mobilized in order to establish a common definition of the situation.
- Conflicts come in focus, complementarities are forgotten.

What if ...

Now, there are many strains on the oceans regime and the resource management institution as described above. The greatest is perhaps internal – resource management does not produce sustainable fisheries. Since it is based on an instrument, which has severe flaws, flaws that tend to show up in the most critical moments, there are good reasons to reform it. In addition to this there are a number of strong external strains. The first is that it is difficult to maintain the idea – which was uncontested in the 1960s and 1970s – that fisheries resource management primarily concerns fishermen. Today, one tends to see fish as one of many creatures belonging to the marine environment, all of which must be managed with many different viewpoints and stakeholders in mind. Those stakeholder groups that have been excluded and ignored in fisheries management constitute an important external pressure for reform, and new assessment and management models (e.g. ecosystem management) legitimize their stakes. Second, in contrast to the post-war period, new ways of thinking about risk and the relationship between citizens and authorities have come in focus. Instead of the paternalistic model of high modernity, the current “risk society” is one in which there is less willingness to accept management decisions without real possibilities for deliberation and active co-management. Third, and related, there has been a shift in the institution of science, encapsulated in the shift from “sound science” to the “precautionary approach”. Whereas the new oceans regime built on a tremendous faith in (sound) science’s ability to map and monitor marine resources, there is now much less such faith to go around. This is also reflected in the shift from mertonian Mode 1 science to the more contextual, politicized and modest Mode 2 research (Gibbons et al., 1994).

If the established resource management regime should break down, and a new one be built in the ruins, how would it look, given these pressures and changes? Here is an attempt to answer by suggesting two very different routes.

The first regime is the one we can imagine built on the basis of an ecosystem approach to management. The clients within such a regime will be all marine creatures – large and small – as allied with human guardians. As a consequence, commercial fishermen will lose their privileged position and become one of many legitimate interest groups.

Knowledge ownership will reside with the client groups, which as a consequence must employ their own scientists. The precautionary principle will start out in a reverse burden of evidence, so that all activities that may affect marine life are banned, unless they can be proved (by some specified procedure) to be sustainable. The major management process will be one of deliberation, seen as a meeting of the stakeholders to negotiate agreement over the best use of marine resources. The role of the coastal state will be as facilitator and (sometimes) arbitrator or judge in such processes. In addition, it must be a state responsibility to set up the standards and certification procedures for what will count as sustainable use of resources.

The second resource management regime is the one we can imagine built up around Individual Transferable Quotas. In this scenario, the fishermen still will be the dominant client group. However, it must quickly be added that the ITQ path will set off transformation processes that make both the term "fishermen" and "client" less fitting. We can usually substitute "fishermen" with "industry" in most arguments about fisheries management without creating too much confusion. This is because the fisheries in most countries today are small-scale and fragmented. Under ITQs, however, this will no longer be the case, since ITQs encourages a transformation of fishing operations into medium-sized capitalist enterprises. It is furthermore reasonable to talk about fishermen, under the present management regime, as 'clients' because, as argued above, management is undertaken on behalf of and with little involvement of fishermen. Under ITQs, however, the capitalist fishing enterprises as a collective will easily take on ownership privileges and management functions not only with regard to the quotas (which they actually own), but also the stock itself. While this of course remains a development that will be contested, the logic of ITQs points towards a retraction of state management. Why would the state take on and pay for management of a resource whose profits goes to a few capitalist firms? Instead, resource management becomes a variety of capital management, to be undertaken by the industry with the help of marine scientists employed by the firms, or purchased in an open market for fish stock assessment.

In this scenario, the public space that allows fishing to be a policy issue closes. Fishing transforms into a private concern, embedded within the walls of capitalist enterprises. To the extent the state remains engaged, it is to set up the requirements for stock assessment, and for securing access to some fishing for recreational and subsistence purposes.

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3.6 Discussion: How do we comply with the problems of today in the future?

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The presentations forming the basis of the debate pointed in different directions. The overall theme of the presentations in this session was: *What are the challenges for the fisheries management of the future in relation to fisheries practice?*

- Ole Lundberg Larsen called out for stability in the fishing sector through an increased focus on the economics of fisheries in the management.
- Oli Samro's overall point was to start seeing fisheries as an industry, a way to make money, and thus start treating it as such.
- Bo Sølgaard Andersen focused on the management system and discussed a change from single species regulation to fleet based management.
- Mogens Schou asked for a more workable, real time management system. He saw better gear selectivity in the fisheries as important for the future fisheries.
- Jan Frederik Danielsen pointed at the overcapacity and how market based instruments have been introduced in Norway to deal with this issue.
- Petter Holm painted two different pictures of scenarios for the future from two different management systems; eco-system based management and ITQ.

The debate of this last session was centred on the rather optimistic question 'How do we comply with the problems of today in the future?' Even after two days with presentations and debates, this question does not yield an easy answer – neither in identifying the key-problems of today nor in agreeing on what to do about the different issues in the future. From both the presentations and the following debates it was quite clear that the fisheries and the fisheries managements in the Scandinavian countries represented internal differences.

In the two most fishery dependant countries, Iceland (with an ITQ system as the main instrument for regulation) and the Faroe Islands (days-at-sea system), they seemed to have worked out management systems with legitimacy among fishers. Both systems were described as being characterised by communication between fisheries and the government.

For Norway both the industry and management representatives pointed out that good cooperation and communication between the authorities and different stakeholders has proved to be an important way to ensure legitimacy. The fisheries representative felt that the system of today is leaving a lot of options for improvement.

Denmark and Sweden are both members of the EU and their fisheries management is set within the framework of the Common Fisheries Policy. Denmark and Sweden also have in common that fisheries do not play an important role – neither economically nor

employment-wise to the overall society. Both in Denmark and in Sweden fisheries management is often characterised by lack of communication between fisheries and management and mismatches between political intentions and practical outcome.

The debate centred on Mogens Schou's presentation on the real time management and on the requirements and consequences of a move in management system from being predictive with a focus on TACs towards being adaptive. Most participants agreed that a move from input control to output/effort control would be desirable. It was also agreed, however, that the path dependency in the EU on the TAC system and the relative stability could hinder or at least hamper such changes.

Fisheries management will always be a political compromise between different considerations and objectives. The presentations on this workshop have given some ideas as to what should be considered in order to improve the relations between fisheries and fisheries management.

Appendix: Workshop programme

Programme

Complementarities in the fisheries

September 9th and 10th, 2004, North Sea Centre, Hirtshals

The time frames include presentation.

Questions are to be saved for the discussion sections.

Arrival Wednesday afternoon/evening or Thursday morning.

Thursday 9th September 2004

09.00 **Breakfast at the North Sea Centre**

10.00 Opening of the workshop, Anne-Sofie Christensen, IFM, Denmark

Theme: How is the fisheries practice taken into account in the regulation at present?

Discussion: What are the internal differences between the systems in the Nordic countries?

10.30 Thordur Asgeirsson, Directorate of Fisheries, Iceland

10.50 **Coffee break**

11.20 Ole Lundberg Larsen, Danish Fishermen's Association, Denmark

11.40 Elling Lorentsen, Norges Fiskerlag, Norway

The Norwegian System

12.00 **Lunch**

13.00 Samal Trondur Finnsson Johansen, Faroe Islands

13.20 Summary and discussion: Anders Carlberg, Swedish Fishermen's Association, Sweden

15.00 **Coffee break**

Theme: Why does the fisheries management not always work as intended?

Discussion: What are the central problems in the relation between fisheries practice and regulations?

- 15.30 Poul Holm, Center for Maritime og Regionale Studier, University of Southern Denmark
- 15.50 Kjellrun Hiis Hauge, Institute of Marine Research, Norway
Uncertainty and fisheries management
- 16.10 Örn Pálsson, Union of Small Boat Operators, Iceland
Trusting the ones that work within the fisheries legislation leads to the best caretaking of the marine resources
- 16.30 Olaf Olsen, Ship owner, skipper and former Minister of Fisheries, Faeroe Islands
Comments on the problems between the fishing sector and the management of the regulations thereof
- 19.00 Dinner at the North Sea Centre**

Friday 10th September 2004

- 08.00 Breakfast at the North Sea Centre**
- 09.00 Summary and discussion: Torben Anders Vestergaard, Denmark
- 10.30 Coffee break**

Theme: What are the challenges for the fisheries management of the future in relation to fisheries practice?

Discussion: How do we comply with the problems of today in the future?

- 11.00 Oli Samro, FAREC, Faeroe Islands
- 11.20 Bo Sølgaard Andersen, DIFRES, Denmark
Towards a fleet based advice system
- 11.40 Lunch**
- 12.40 Mogens Schou, Ministry for Food, Agriculture and Fishery, Denmark
- 13.00 Jan Frederik Danielsen, Ministry of Fisheries, Norway
The Norwegian model for managing overcapacity

- 13.20 Petter Holm, Norwegian College of Fishery Science, University of Tromsø, Norway
The code of conduct for irresponsible fisheries
- 13.40 Summary, discussion and conclusion, Jesper Raakjær Nielsen, IFM, Denmark
- 15.30 End of the workshop

Departure/dinner