The political economy of joining the European Union: Iceland's position at the beginning of the 21st century

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7. Fisheries Policy

This chapter looks at and compares fisheries management in the high seas around Iceland and in European Union (EU) waters. The approach is at the macro level, which includes the objectives (and difficulties) of the government, authorities, and the regulator. Fisheries policy does not fall under the EEA agreement and Icelandic fisheries policy differs from the EU Common Fisheries Policy (CFP). Our methodology focuses on establishing some of the facts about fisheries management in Iceland and in the EU, followed by a discussion of the three main pillars of fisheries management, notably:

a. Ecology and scientific knowledge of the ecosystems of the oceans;

b. Economy and food production;

c. Politics and social needs.

7 – 1 Discussion on Fisheries Management

Fish stocks in the high seas are a natural resource, which is only renewable if it is not overexploited. If too many fish are caught, the fish stocks collapse as not enough fish are left to ensure reproduction. Because what happens in the sea is invisible, the resource is unfortunately often overexploited. During the last half century, fisheries have seen large technological advances and capacity increases, which can destroy the resource if used recklessly. In the same period, the biological knowledge of the ecosystems in the oceans has also increased and the use of the fisheries as a resource has been adapted. Fisheries in the high seas face the same problem as management of a common property resource without a specific owner. The one who grabs the most comes out winning. Fisheries management is a mixture of several disciplines: biology, ecology, economics, sociology and perhaps also political science.

Discussion on fisheries management has evolved considerably over the last half century and we believe that a short historical overview is useful. In 1954 H. Scott Gordon wrote in his groundbreaking article "The Economic Theory of a Common Property Resource: The Fishery", that the bulk of the research on fisheries ("primary production phase of the fishing industry") has been in the field of biology. Even though a lot has been

written on fisheries since then, the largest part seems still to be publications on marine biology. Biologists have ventured into the economic use of the fisheries, and the term "bionomics"[232] seems to describe well some of the current trends in the management discussion. Gordon claimed that words such as "conservation", "overexploitation", and "depletion" are manifestations of the fact that the natural resources of the sea yield no economic rent. Based on the management practices at the time, where greed ruled a common property resource, it was obvious that fisheries would be depleted as a resource if continued unrestricted. Gordon continued by discussing other statements and research such as that management of fisheries are for the benefit of man's economic purposes, not for the fish as such[233]. But he also referred to other statements of the époque that the fish in the sea are unlimited[234]. He continued further and observed the problems we see today, that fishermen are very immobile, live in isolated communities, and have little financial and educational opportunities to move elsewhere. He also noted that when there are natural cyclical fluctuations in fish catches, restrictive measures are applied and biologists think the sea is being depleted, only to change their collective opinion a decade or so later.[235] In the 1950s, fisheries in the high seas where open to everybody. Gordon pointed out that the one who pulled the most out of the sea got the biggest benefit, because the fisheries where global commons. Reducing efforts would be counterproductive because somebody else would take it. Increased catches would be in direct proportion to the effort, causing overfishing and finally no economic rent. In 1955, Anthony Scott in his article "The Fishery: The Objectives of Sole Ownership", continued the discussion on that everybody's property is nobody's property, arguing for a private ownership of the resource, in addition to private ownership of the fishing vessels. Although these two papers written by H. Scott Gordon and Anthony Scott are half a century old, we find them highly relevant to today's problems since what their theory said has happened in the case of the CFP over the recent years. Common property and greed rules who gets the most, although in today's CFP it is not the greed of the various

[232] Used by Russian marine biologist T. I. Baranoff (bio-economics).
[233] Gordon (1954) quoting Martin D. Burkenroad.
[234] Harden F. Taylor in 1951. Nobody would say today, fifty years later, that wild fish are unlimited.
[235] We believe that there are still cyclical fluctuations, but the bottoms and tops of every cycle become smaller because of the large quantities of fish removed by man.

fisheries companies as such, but the fisheries ministers representing their constituency.

In 1969, when there was still in principle free fishing access to the high seas, Vernon L. Smith in "On Models of Commercial Fishing" wrote that commercial fishing has three key economic and technological features: (1) although fisheries are conceivably exhaustible, they are replenishable, (2) that the fishing stock growth or decline is a function of how much is harvested, (3) there are various possible external effects, such as stock externalities where the cost decreases with larger fish populations, fishing net mesh size, and crowding externalities where fishing vessels cause congestion on a common property resource. Smith claims that a sole owner of a resource will not deplete it but utilize it for maximum sustainable yield. In contrast, competition under free entry would absorb the benefits of the resource by higher costs. He states that reduction in fish population increases operating costs. Costs are a function of the effort, the yield is a function of the effort and the gross revenue is a function of the yield. At a certain point the yield or revenue will start to decrease, despite increased efforts. However, Fullenbaum et al. in 1972 disagree with Smith and claim that the traditional theory of a firm integrated into a model of fisheries exploitation remains an unfinished task. In any case, we observe that political developments in the 1970s made the discussion about utilizing unlimited and free access to the high sees for commercial fishing irrelevant. We find that it is not possible to throw away completely the economic theory of a firm under free competition when discussing fisheries. But it needs amendments, because of restrictions on access to the resource since the 1970s and onwards. This is best shown in a certain over-capitalisation in the fishing fleets, where the capacity exceeds the allowed catches.

During the 1970s most states extended their exclusive economic zones to 200 nautical miles (almost 400 km). Consequently, the discussion on free access to fisheries ceased and states began to control the resource much tighter than earlier. Large parts of the fishing grounds were not open any more without restrictions. At this point, coastal states became virtual owners of large portions of the fisheries resource through their newly acquired extended exclusive economic zones. The change is that from now on fish stocks are heavily managed by government regulators, compared to earlier times when it was a question of who grabbed the most, fastest, and most efficiently. Karpoff (1987) published his article, "Suboptimal Control in Common Resource Management: The Case of the Fishery" and described how economists continue to be actively concerned about forming policies to manage a common resource

stock. Karpoff discussed the "biological bias" in fisheries management, claiming that most government fisheries managers are trained in biology and therefore focus too narrowly on stock preservation without regard to economic costs and benefits. He suggested that fisheries regulations would get better once fisheries managers learn some economics. However, Karpoff stated that the biological bias theory does not explain why fishermen would favour traditional regulations (gear and vessel restrictions) rather than a limited entry or quota system under grandfathered rights. We should note, however, that today most regulated fisheries have both gear and quota restrictions. Karpoff also put the harvest function (fish stock in the previous period, its growth function and the catch rate), the effort function, and the cost function into a fisheries model (each vessel as an individual without a perceived effect on the average return, although the aggregate return will be at a diminishing rate). Although Karpoff's 20-year-old fisheries model has a lower emphasis on biology than more modern fisheries models, his theory is still relevant considering that many fishing fleets are too big and powerful for the available fish stocks. Both the EU and Iceland have found themselves with overcapacity on a global scale. The industry had to adapt, as individual firms would like to behave differently than the group has to do under the regulator's restrictions. These management issues are not only relevant for government regulators but also for individual firms and vessels.

But the issue of fisheries management goes beyond biology (protecting the planet) and economics (maximum yield). There is also a social factor and in 1989 Anthony T. Charles wrote his article on "Bio-Socio-Economic Fishery models: Labour Dynamics and Multi-Objective Management". Charles observed that while population dynamics of fish stocks have received considerable attention in the ecological literature, the dynamics of human communities depending on them are equally important. In order to determine appropriate management policies, joint dynamics of fishermen and fish stocks must be taken into account. The task of fisheries management would then be to balance multiple objectives such as conservation, income generation, employment and community stability. The social factor is highly relevant to our study of the CFP, because one of the objectives is to allow fishermen to catch fish, in other words to serve human communities in a social way.

As time goes by, the facts about the state of fisheries evolve and so does the academic discussion. The discussion becomes more how to prevent the source from disappearing and less how to get maximum economic yield from the source. In 1995 Ralph E. Townsend

(Transferable dynamic stock rights), wrote: "Ex Post analysis of overfished stocks often conclude that fishermen as a group behave as if they are indifferent to the future status of the stock. This seeming focus on the present is a result of short-sighted incentive structures under which fishermen are required to operate." In other words, Townsend finds that the regulator has not been good enough in promoting conservation minded fisheries. Instead of the individually transferable quota (ITQ), he proposes transferable dynamic stock right, where the fishermen would be allocated a certain quantity of fish from a certain year. If that fish would not be caught in the same year, it may be caught later in addition to its growth in the meantime. The principle in Townsend's idea is good because it promotes conservation of fish stocks, although we believe that it might be technically difficult and risky. It appears that we would be reaching the limits on biological knowledge on growth of fish stocks. Fish stocks do not grow without limits in a linear function and the optimum harvesting time would have to be determined by biologists rather than by the fishermen. If a fish stock diminishes because of unforeseen natural reasons beyond fishermen's control, the fisherman who waited to harvest his fish would lose both parts of his stock and projected growth.

Flaaten et al. (1998) claim that fisheries management has generally suffered from lack of explicitly stated management objectives and that may have contributed to overexploitation by putting more emphasis on short-term losses rather than long-term gains from reducing fishing efforts. They claim that uncertainties are often not properly measured, and usually not explicitly accounted for in yield predictions, which results in management strategies with substantial risk of stock depletion. According to Flaaten et al. uncertainties in fisheries arise in three principal forms: (1) random fluctuations, (2) uncertainties in estimating parameters and state of nature, (3) structural uncertainty that reflects a basic lack of knowledge about the nature of the fisheries system. In a sub-chapter on management objectives, Flaaten et al. find that management objectives are often vaguely formulated and at times even self contradictory. They also find that the solution to some of the management problems are not hampered by lack of knowledge, but by conflicting interests among various user groups. Flaaten et al. conclude with: "World wide, examples of overexploitation are numerous. Overcapitalisation, international disputes on allocation of catches, and disagreement on the principles of management have resulted in failure to act on scientific management advice. There are also numerous examples of fish stock predictions which in retrospect have been proven to be in large error or where serious prediction problems are presently

experienced, impeding reliable scientific advice on optimal utilization of the resources." Flaaten et al. mention facts about the state of the fisheries and correctly mention also the problems in assessing fish stocks to be able to make future forecasts.

Arnason et al. (2000) start off by mentioning that fisheries management stems fundamentally from the fact that fish resources are common property, and both theory and experience show that common property resources will be overexploited and possibly irreversibly depleted. They find that fisheries management essentially comprises: (1) research (biological and economic); (2) formulation, dissemination and implementation of management policy and rules; and (3) enforcement of the management rules. They also note that there is a large difference in the management costs as a part of gross value of fish landings (Iceland 3%, Norway about 10%, and Newfoundland 15-25%), although as a part of the countries' GDP it is a small expense. They assume considerable economic rent from the Icelandic fisheries, but also see little or no economic rent from the Norwegian and Newfoundland fisheries, despite their higher management expenses. From a national macroeconomic perspective, management costs are issue that influences if the fisheries are a viable economic activity or just a social policy to keep fishermen employed. If management costs cannot be recuperated from the industry but have to be supported by the taxpayer, the industry will act differently than if it were the firms' own direct expenses. We agree with what Arnason et al. say, which is if fisheries are only a small portion of the GDP and the management costs are only a small part of this part, nobody really cares about those costs. We should add that this appears to be the case in the EU where fisheries represent only ¼ of a percentage point of the Union's GDP.

In retrospect it is easy to be wise. Boude et al. (2001) wrote that one of the main areas of the CFP is resource conservation, and discuss the three paradigms of conservation, rationalisation and social community. They correctly state that in practice there is a significant difference between the opinions of the biologists and the measures that are adopted. They blame this on the managers of the CFP, but accept that the financial situation of the fishermen would not enable them to support the losses that would result from drastically reduced catch quotas. In fact the scientists' proposals on Total Allowable Catches (TAC) are not followed by the Council of Ministers. Consequently, the conservation paradigm in the CFP is influenced by other factors. Boude et al. say that for economists the main objective is to achieve economic efficiency and to maximise the rent. However, because of the common property nature of fisheries and

congestion, individual interests do not correspond to the collective interests. By the late 1980s a situation of overinvestment had emerged along with other problems. Boude et al. find that in the field of efficacy, the rationalisation of the CFP is not evident. However, in the field of social community, it appears that the CFP has been very flexible to accommodate fishermen, despite it being very vaguely formulated. Control effort is based more on social peace considerations than conservation policy efficiency. Boude et al. find that in fact the unwritten objective of the CFP is to conserve social peace amongst fishermen. They explain that ministers constantly give in to fishermen's demands to catch more than marine scientist recommend and the goal to preserve the resource is not evident in the CFP.

Foss et al. (2003) discuss several aspects of the differences between the CFP and Norwegian and Icelandic fisheries policies. They speculate if CFP reforms will eventually lead to that the gap in differences will be bridged if Norway and Iceland joined together in negotiations with the EU. Since fisheries management in Norway and Iceland is not the same, Foss et al. often list matters of concern for Norway and Iceland as separate issues. They give recommendations on the various issues, thereby going beyond an academic discussion and provide political guidelines. We see it as a possible political problem that Norwegian and Icelandic fisheries interests are not always the same, meaning that joint negotiations with a harmonised viewpoint vis-à-vis the EU would possibly be difficult.

Discussion on management of fisheries is incomplete without a few words on environmental economics. Literature on environmental economics highlights that the environment is having an increasing role in contemporary political and economic thinking. Cottrell (1978) wrote a booklet on environmental economics with a heavy emphasis on the environmental part. With the rapid population growth, and perhaps up to a certain degree changes in climate and the environment, not all the resources he mentions are free any more. Examples are salt-water fishing, which is not considered abundant and free any longer, increased restrictions on air pollution, which in fact also costs money, and increased expenses in obtaining pure water in many regions of the world. But the number of people in the world has also almost doubled since his writing. Logically he discusses energy, minerals and pollution, but he also discusses food. Here he draws attention to the fact that arable land in the world is limited, and although there is still enough, many countries have very limited agricultural land relative to their population. Advanced agricultural systems can drastically boost production per hectare and

agricultural land is only "a consumable" if it is unintelligently used, leading to soil erosion. If properly treated, its quality can even improve, which in our opinion applies to fish stocks as well. Cottrell draws attention to that humans need to change more from a "cowboy economy" with reckless exploitation, to a "spaceship economy" where there is conservation, maintenance and reuse of materials.

Turner et al. (1994) draw attention to the key difference between non-renewable (exhaustible) resources and renewable ones. Just as Cottrell (1978), they use the expression "cowboy economy" and "spaceship earth". Turner et al. draw attention to the definition, taken from the World Commission on Environment and Development, that "sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Turner et al. highlight the differences between State Property, Private Property, Common Property and Open Access with no defined owner, and how this may influence management of a resource. It ought to be mentioned here that Hanley et al. (2001) in their book also clearly reflect the trend towards increased emphasis on the environment and on sustainable environment. They analyse trading environmental permits and explain to some length economic impact of environmental policies. We believe that sustainability is a major factor when discussing the economics of fisheries in the high seas and catch quotas are nothing but an environmental permit. Like others have done before him, Rotillon (2005) in his discussion on the economy of natural resources draws attention to the difference between renewable and exhaustible natural resources and that the management approach is not the same. Rotillon mentions the option of a centralised management and regulator, and notes that in a national system management is considerably easier than in a multinational system where measures have to be negotiated. We like to draw attention to how Rotillon's remark is clearly shown in the differences in fisheries management in Iceland and in the EU where the EU member states cannot agree amongst themselves on a sustainable fisheries policy. By studying contemporary political discussion, we have the impression that many environmentalists are more indifferent about fisheries than land and air problems since what is at the bottom of the sea is hidden from the human eye.

7 – 2 European Union's Common Fisheries Policy (CFP)

Fishing still remains essential to many local economies in the EU, although its overall contribution to the economies of EU member states is modest, not exceeding 1% in any member state, and 0.25 % for the EU GDP as a whole. However, many local communities, where there are often few alternatives[236], depend on the earnings of EU's approximately 250 000 full or part-time fishermen. Furthermore, service and support industries such as boatyards, equipment suppliers and fish processors also employ another several hundred thousand people. Table 27 (below and on next page) shows the current employment in the EU fishing sector and Figure 18 on next page shows the distribution of EU's fishermen before the 2004/2007 enlargements. It is interesting to note that the numbers employed in the sector varies drastically and ranges from 350 in Slovenia to well over 50 000 in Spain.

Table 27. Total employment in the EU fishing sector [237]

	1998	1999	2000	2001	2002	2003	2004
Austria	2300	2300	2300	2300	2350	2350	:
Belgium	564	714	691	710	720	962	880
Czech Republic	2100	1992	1944	1842	2167	2154	:
Cyprus	1361	1386	1351	1281	1139	1114	1123
Denmark	6999	6711	5436	5382	5112	4490	:
Germany	4335	4363	4358	:	:	:	:
Estonia	10068	:	9710	6437	7352	7954	:
Finland	5928	5718	5711	5660	5562	4912	4762
France	19689	19479	19080	42954	40530	18691	18415
Greece	18007	19620	19847	20049	19879	18885	:
Ireland	8478	:	:	:	:	:	:

Table continued on next page

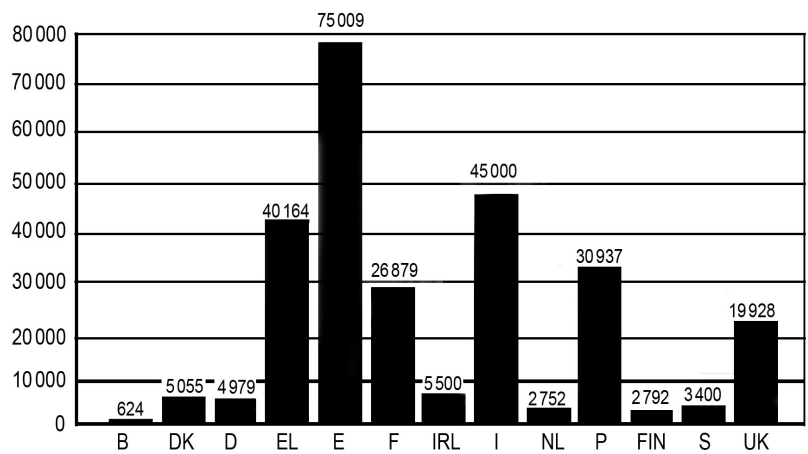
[236] Note Gordon's (1954) discussion on the immobility of fishermen.

[237] We would like to urge some caution in assessing these figures as reporting methods can vary somewhat, e.g. France reported aquaculture separately in 2001 and 2002 but did not report on aquaculture the other years listed.

Table continued from previous page.							
	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Italy	:	:	48770	42137	:	:	:
Latvia	:	6578	6571	6195	6145	6378	4115
Lithuania	:	:	:	3030	:	:	:
Hungary	4600	4660	4900	:	:	:	:
Malta	2120	2060	2077	:	2552	:	:
Netherlands	3743	:	:	3435	:	:	:
Poland	8640	:	:	6300	:	:	:
Portugal	27197	26660	25021	23580	22025	20457	21345
Slovakia	:	:	215	244	:	:	:
Slovenia	187	208	231	311	336	341	352
Spain	:	:	:	64900	55800	:	:
Sweden	:	2880	2782	2791	2231	2066	1913
United Kingdom	17889	15961	14894	14645	12746	11774	11720

Source: European Commission 2005. The blank spaces mean that data has not been reported.

Figure 18. Distribution of the directly employed 263 000 fishermen in the EU before the 2004/2007 enlargements.
(In addition there were also approximately 50 000 part time jobs. This Figure complements Table 27, on the previous page and above, as it is not complete due to lack of member states reporting).

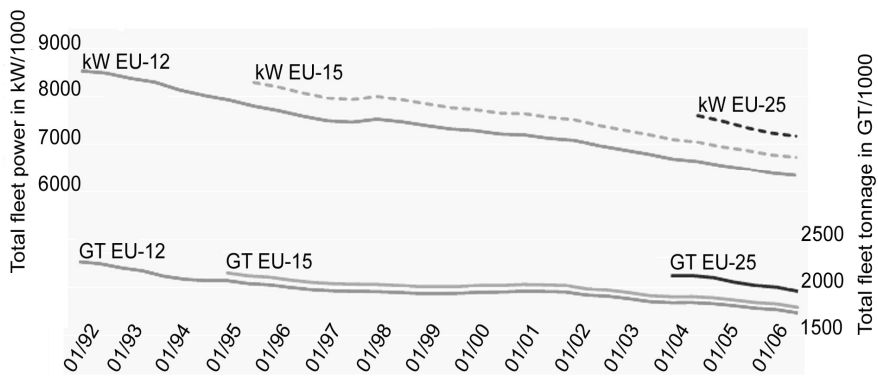


Source: 1995 OECD data published by the EC in 2001.

Aquaculture (fish farming) is a growing sector and provides also several thousand full and part-time jobs, mostly in coastal and rural areas. Aquaculture produces around 1 million tons of fish per year, valued at almost 2 billion[238] Euros. The EU employment in aquaculture is shown in Annex 3 on pages 252-253.

The fishing industry helps to supply fish products to the EU market, which is one of the biggest in the world. With a production of approximately 6 million tons of fish from fisheries and aquaculture, the EU is the world's second largest fishing power after China.[239] Yet, while between 1 and 2 million tons of fish products are exported, 4 to 5 million tons are imported to meet the needs of the Union. This imbalance between imports and exports results in a yearly deficit in the vicinity of 10 billion Euros. The EU fishing fleet capacity has declined over the past few years, shown in Figure 19 below, as it was too large for the fish available and had become uneconomic. The fleet today comprises almost 90 000 vessels, which vary greatly in size, fishing capacity, and catching power, from small boats to huge trawlers (distribution shown in Table 28 on next page). It is interesting to note that within the EU there are large differences in fleet size. The Mediterranean has almost half of the fishermen as well as fleet measured in number of vessels. However, their catches are only about 15 % of the EU total fish production.

Figure 19. Reductions in EU fishing fleet capacity from 1992 to 2006



Source: European Commission: Facts and figures on the CFP (2008)

[238] Billion meaning thousand millions (1 000 000 000).

[239] For comparison, Iceland is the world's 12th largest fish producer in terms of catch volumes.

Table 28. The EU fishing fleet in 2005

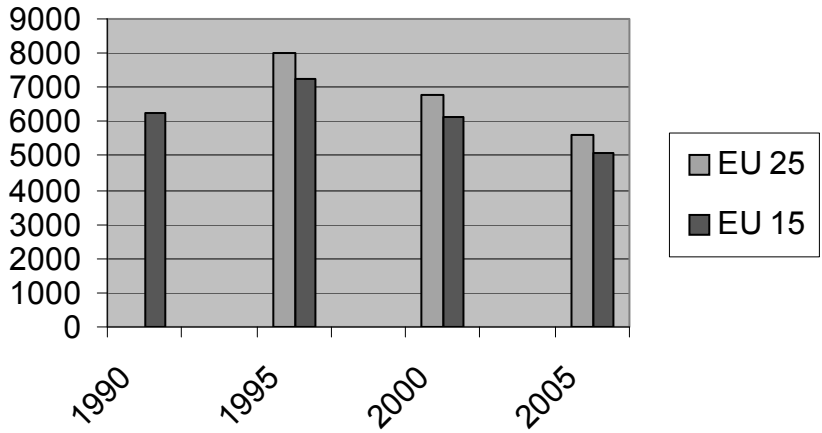
	Number of vessels	Tonnage	Engine power (KW)
Belgium	121	22 694	65 643
Cyprus	889	9 174	47 635
Denmark	3 281	92 826	327 737
Estonia	1 044	24 254	62 001
Finland	3 291	17 009	172 244
France	7 853	215 706	1 069 396
Germany	2 131	64 117	159 780
Greece	18 334	93 141	540 997
Italy	14 504	213 260	1 228 196
Ireland	1 400	90 112	222 222
Latvia	928	38 580	66 209
Lithuania	270	64 390	70 572
Malta	1 426	18 966	102 264
The Netherlands	840	175 439	414 258
Poland	983	30 613	106 602
Portugal	9 998	110 696	387 597
Slovenia	150	865	8 768
Spain	13 714	488 304	1 127 497
Sweden	1 634	44 795	221 274
United Kingdom	6 875	219 448	886 331
EU	89 666	2 034 389	7 287 223

Source: European Commission (2006)

The detailed distribution of the actual fish catches are shown in chapter 7, part 5, on the economic aspects of fisheries (page 227, Table 31), which indeed ranges from zero (Luxembourg[240]) to almost a million tonnes in Spain and Denmark (and EFTA-EEA members Iceland and Norway with even more). Figure 20 (on next page) indicates how EU catches have been diminishing over the last decade.

[240] Luxembourg is landlocked (no fishing fleet) and has no aquaculture either.

Figure 20. Total EU fish catches from 1990 to 2005 (in thousands of tonnes).



Source: Eurostat 2007.

EU's Common Fisheries Policy (CFP) began to take shape in the 1970s when coastal states, driven by evidence of dwindling fish stocks, extended their fishing zones under international law to 200 nautical miles (over 370 km from the coast). The EU member states decided that the European Community, as it was at that time, was the best instrument to defend their collective interests in international negotiations and to manage their fish stocks. The CFP is based on the principle that access to coastal waters within a 12 nautical mile band is usually reserved for fishermen from local ports, but outside this line there is generally free access for all Community fishermen. However, a fishing license is needed and there is a Total Allowable Catch (TAC) in addition to a variety of technical measures, such as closed areas and seasons, mesh size of fishing nets and a minimum size or weight of fish landed, which is all intended to protect and preserve fish stocks.

The concept of TAC is a key element in the management of fishing exploitation. Stock levels are annually assessed by scientific organizations. At the end of each year, TACs are fixed by the Council of Ministers for certain important species to EU fleets in given maritime areas. Each TAC is divided up among the member states in the form of quotas. They, in turn, allocate them nationally or exchange them with other member states. When a TAC is exhausted the fisheries have to stop. (EC 1999). However, the EU CFP TACs are not based exclusively on

biologic-scientific recommendations, but rely much on social, economic and political considerations (Boude et al. 2001).

The fisheries can only prosper if there is sufficient fish to catch. As noted by the European Commission (EC 1999), the key challenge facing the CFP over the past two decades has been the need to reconcile the demands of fishermen to maintain their livelihoods with diminishing fish stocks. The EU fishing industry has been in a constant state of crisis for some years, caused by too large a fleet, overfishing of stocks, debts and marketing problems. The EU's instruments for dealing with the structural problems are/were:

(1) The Multiannual Guidance Programs (MAGPs) in use until 2002, which aimed at restructuring and modernizing fishing fleets. The programs fixed ceilings for fishing effort by the main segments of the fleet, i.e. trawlers and netters, and aimed at a reduction in ship tonnage and power.

MAGP I, 1983-1986 aimed at preventing increase in fleet capacity,
MAGP II, 1987-1991 aimed at a modest reduction,
MAGP III, 1992-1996 aimed at cutting fishing effort,[241]
MAGP IV, 1997-2001 finally cut fishing effort by 30% on fish stocks in danger of collapse and 20% on overfished stocks (EC 2001);

(2) The Financial Instrument for Fisheries Guidance (FIFG), which was created in 1993 and replaced in 2007 by the European Fisheries Fund (EFF). The EFF is currently planned until 2013, with a total seven-year budget of 3.8 billion Euros distributed between 26 member states (Luxembourg does not participate). The EFF is intended to support sustainable exploitation of the fisheries resources and to promote a stable balance between the fisheries resources and the capacity of the fishing fleet; to strengthen the competitiveness and the viability of operators in the sector; to promote environmentally friendly fishing and production methods; to provide adequate support to people employed in the sector; and to foster sustainable development of fisheries areas.

(3) Socio-economic measures for areas depending on fishing that can benefit from aid from the European Regional Development Fund and the European Social Fund.

Another key aspect of the CFP is the common organization of the market. First introduced in 1970 and then reviewed in 1993, these are measures designed to stabilize the market, guarantee a steady supply of quality products, ensure reasonable prices for consumers and support

[241] Ministers only agreed to cut fishing efforts less than the Commission proposed.

fishermen's' incomes. The key elements of the market organization are (EC 1999):

* Quality standards covering size, weight, presentation, packaging and labelling;
* A comprehensive pricing system which allows prices to be fixed by supply and demand but which sets a floor price at which fish are withdrawn from the market and not sold. In most years, the total quantities are quite small - less than 50 000 tons;
* Producers' organizations to which most fishermen belong which market the fish, help to improve quality levels, adjust supply to demand and make sure that fishing quotas are properly managed;
* Imports without which the Union could not satisfy domestic demand for fish. After fruit and vegetables, fish is the Union's second largest food import. Prices are monitored by the Commission, which intervenes whenever imports undermine the market.

The EU, being an economic and political giant, has also made fishing arrangements with third countries, providing access for the Union's fleet to the waters of non-member countries. Without such arrangements the general extension of fishing zones to 200 nautical miles and the resulting substantial reduction in fishing opportunities would have resulted in serious repercussions for the Community fishermen. In plain language this means that prior to the generally accepted 200 nautical mile exclusive economic zone of coastal states in the 1970s, many Community fishermen based their livelihood on catching what had now become other nations' fish. Large parts of the common high seas with no owner suddenly became states' "private property". The EU has concluded fisheries agreements with over 25 non-European states around the world. Different categories of fisheries agreements exist, which are distinguished according to the type of concession offered:

- Reciprocal arrangements,
- Access to surplus stocks,
- Access to stocks in return for market access,
- Access to stocks in return for financial compensation,
- Access to stocks in return for payment and market access.

The EU also participates in the work of various international fisheries organizations like the North-West Atlantic Fisheries Organization, the International Baltic Sea Fishery Commission, the North Atlantic Salmon Conservation Organization, the Food and Agriculture Organization and the United Nations Organisation. More than 25% of all fish taken by EU boats for human consumption is taken from international waters or those controlled by non-EU members.

By the late 1980s a situation of overinvestment, overexploitation and smaller landings had emerged. Over ten years ago, (MAGP III in 1992) when the European Commission proposed reductions in fish catches based on scientific advice, the Council of Ministers only adopted parts of those proposed reductions. In retrospect, as will be discussed later, it appears that the fisheries ministers were more concerned about the contemporary economic health of their voters, having minimal regard to the long-term effects and what might happen after their time in power. Townsend (1995) blames this disregard of the future on the fishermen themselves and on the regulator's incentive structures. Fish stocks are like capital. It yields interest, but when more is consumed, the capital stock goes down, and so does the interest in the future. As reported by the EC Directorate General (DG) for Fisheries, (EC 1999), the European Union must in the next few years rise to the challenge of establishing and maintaining a sustainable and economically viable equilibrium between the conservation of resources and their exploitation. With drastically reduced fish catches, re-thinking the CFP has now become unavoidable. The European Commission has adopted a Green Paper on the future of the CFP. According to then Commissioner Franz Fischler in charge of Agriculture, Rural Development and Fisheries, (interview in Morgunbladid, 13 May 2001), "the CFP needs urgent change because many of the most important fish stocks are on the verge of collapse. We are catching too much fish too young, which is seriously hindering the renewal of fish stocks. Decisive action is required to ensure the sustainability of the fisheries sector".

The Green Paper (2001) presents a bleak picture of the situation of European fisheries today. Many of the most valuable fish stocks in Community waters are overfished and, as a result, are currently outside safe biological limits. The quantity of adult demersal (bottom-dwelling) fish in EU waters was about 90% larger in the early 1970s than in the late 1990s. This is due to too much fishing by a fleet that is too large for the quantity of fish that should be caught and conservation measures that have not been effective or selective enough to protect fish stocks and marine ecosystems. The evolutions of selected fish stocks in EU waters are shown in Annex 4 on pages 254-255. (For comparison, Annex 5 on pages 256-257 shows the evolution of selected fish stocks in Icelandic waters). Shrinking economic returns tend to encourage people to put more effort into their fishing, often by investing more in better fishing technology, thus compounding the vulnerability of the stocks and of marine ecosystems as well as undermining the economic situation of the industry itself. Thus, according to the Green Paper (2001), between 1990 and

1997, employment went down by 19% in the catching sector and 10% in processing sector. The message was clear. Unless fishing is reduced in EU waters, the sustainability of many fish stocks is threatened. Since then, every year in December when the EU fisheries ministers have met, they have adopted a reduction in TACs, but not as much as the Commission and the scientists advised.

Greenland's experience of the CFP is an interesting case. When Denmark joined the EU in 1973, Greenland, as a Danish territory, automatically became a member of the Union and of the CFP. However, Greenland left the Union in 1985 after holding a national referendum on continued membership.[242] Greenland's reason for leaving the EU was a dispute with the EU over fisheries rights, as the EU CFP at the time was based on equal and unrestricted access for all EU fishermen outside the 12 nautical mile zone. This was unacceptable to the Greenlanders, as foreign trawlers would swamp their fertile fishing grounds. It should be recalled that in the years following the universal 200 nautical mile exclusive economic zones, many EU fishermen found themselves without fishing rights in far-away waters, including what had now become Greenland's exclusive economic zone. After Greenland left the EU, the EU concluded fisheries agreements with Greenland (fisheries partnership agreements). The current agreement covers the period 2007 to 2012, where the EU pays Greenland 15.8 million Euros for fishing rights, including a financial reserve of 1.5 million Euros for additional capelin and/or cod quotas and 3.2 million Euros for defining and implementing a fisheries policy in Greenland. This fisheries agreement allows EU vessels to fish in Greenland's waters with a yearly catch quota of approximately 90 thousand tons. The vessel owners are furthermore expected to pay up to 2 million Euros to Greenland in fishing license fees. The users of these quotas are mainly British, Danish, German, Portuguese and Spanish fishermen. The agreement includes a clause stating, "The quotas may be increased if scientific advice allows". As we shall mention later, a clause on scientific advise will be important for Iceland to keep in mind in future fisheries negotiations with the EU. Since Greenland's decision to leave the EU in 1985, the CFP has evolved with limitations on catches, gear and vessel restrictions, but only after many fish stocks had been drastically

[242] Greenland is a Danish territory with self-governance for home affairs. Greenland, however, keeps its status as a Danish overseas territory and therefore keeps some links to the EU in a similar manner as British and French overseas territories.

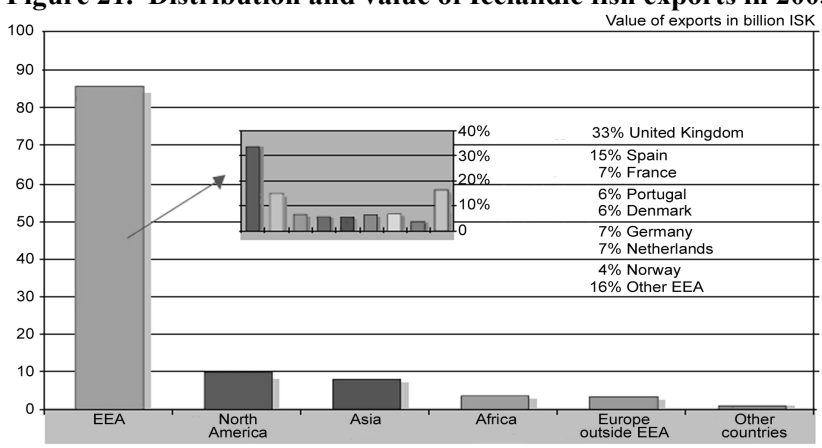
reduced. However, Greenland has not returned to the EU, although it cannot be ruled out at some future date.

7 – 3 Icelandic Fisheries Policy

Fisheries have been important to Iceland ever since the country was settled in the ninth and tenth centuries. The waters around Iceland are fed by the warm Gulf Stream from the south, which offer good conditions for fish stocks to thrive. As stated by Palsson, (Minister of Fisheries) (1998), understandings of the marine ecosystem are the foundations of sensible and sustainable harvesting of the fisheries resource. Iceland has assigned a key role to marine research, which is the basis for effective fisheries management and its implementation. The system that has been developed in Iceland today aims to harvest fish stocks in a responsible manner in order to ensure and maintain maximum long-term productivity of all marine resources.

Fishing and fish industry provide close to 6% of the total GDP, down from 10-12% a decade ago. This percentage reduction is more because of an increase in other sectors, than reduction in fisheries per se. Given the catch quotas, which are aimed at sustainable yield, there is no room to increase the catches and the size of the industry. Fisheries provide about half of Iceland's revenues from goods exported and yield approximately 1/3 of all national foreign currency earnings. Foreign currency earnings are critical in a small and non-diversified import-export dependent economy like the Icelandic. Over 2/3 of the fish exported from Iceland goes to the EU and Icelandic fish exports represent about 5% of the world's total fish exports. Figure 21 (below) shows the distribution and value of Icelandic fish exports in 2005, measured in monetary units rather than in tonnes.

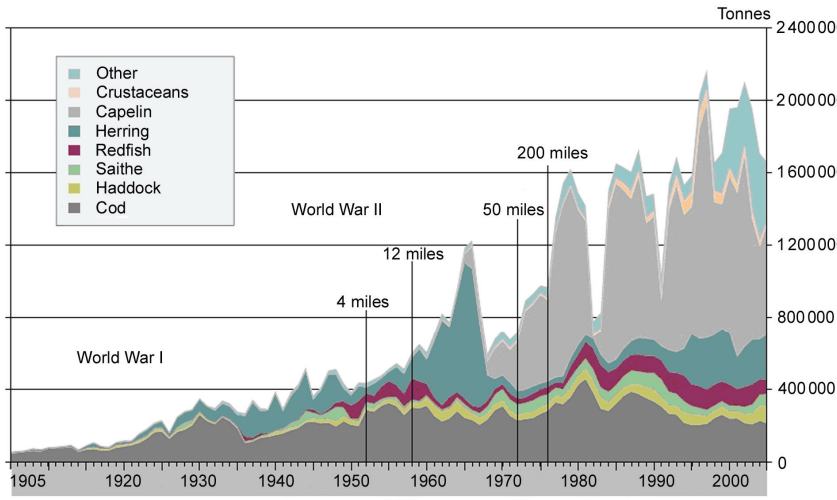
Figure 21. Distribution and value of Icelandic fish exports in 2005



Primary source: Statistics Iceland. Published in Icelandic fisheries in figures (2006).

In 1995 Iceland exported marine products valued at 90 billion Icelandic Kronas, or 1.3 billion USD, from a total catch of well over one million tons. The 2003 figure was close to 1.8 billion USD for a total catch of almost 2 million tons. However, annual catches in recent years have averaged around 1.5 million tons and the quantity depends very much on catches of pelagic species, especially capelin, which have fluctuated widely from year to year. As an example, the total catches in 2006 were down to 1.3 million tons. In terms of total catch, Iceland ranks 12th among the world's leading fishing nations (2005 data), although few, if any, others are so overwhelmingly dependent on fisheries. Figure 22 (below) shows the evolution of total catches in Icelandic waters over the last 100 years.

Figure 22. Total catches in Icelandic waters 1905 to 2005



Source: Ministry of Fisheries, Iceland (2006).
(For comparison, the EU total catches are about 5 times larger).

In 1995, 15 000 people in Iceland, (about 11% of the total domestic workforce at the time), worked directly in fishing or fish processing, whereof 6000 were actual fishermen and 9000 worked in the processing industry. In the last few years the trend of total number of persons employed in fisheries has been downwards. In 2005 there were around 5000 actual fishermen and 4000 additional workers in the fish processing industry. The reduction of personnel employed in the processing industry is mainly due to automation and on-board processing

in some vessels.[243] Activity within fisheries extends far into other sectors of the Icelandic economy. Many more work in related services or sales and marketing of products. Various kinds of other industry are connected more or less to the exploitation of marine resources. Shipbuilding, repair, and maintenance of vessels is an important service sector, while rapid technological development and progress in all areas of fisheries have spawned a flourishing secondary industry which specialises in the design and manufacture of fishing gear and processing equipment. This sector is the one of the main growth areas among Iceland's manufacturing industries today. (Ministry of Fisheries, 1998 and 2005).

Looking back at historic developments in fisheries management, Iceland first officially declared a fishing limit in the year 1901 with an exclusive zone of three nautical miles, which remained in effect until 1952. During the decades that followed, Iceland campaigned to win full jurisdiction over the fishing grounds around the island. Without jurisdiction, fisheries management and prevention of overfishing is impossible. Known as the "Cod Wars," this campaign saw the fishing limit extended in four stages to reach its present 200 nautical miles in 1975, giving Iceland an exclusive economic zone covering a total area of 758 000 square kilometres, more than seven times larger than the country itself. Since then, other coastal states have followed, and 200 nautical miles are the normal exclusive economic zones in the world today. The open access and common property resource had become state property with restricted access.[244]

As pointed out by Gylfason and Weitzman (2003), until the mid-1970s, when the Icelandic Marine Research Institute issued its so-called "Black Report" with dire warnings about the impending collapse of the cod stock, Iceland's fish resources had appeared unlimited. The fish stocks were in decline, at least partly due to overfishing, but catches, while volatile, remained high by historical standards. The "Black Report" made clear that somehow the fisheries would have to be limited and the

[243] Automation in factories is a worldwide trend, replacing humans with machines and robots.

[244] Interestingly, with increased technology to exploit the deep oceans floors for oil and minerals, in the first few decades of the 21st century the World community will have to decide on who owns the sea and the seabed beyond the 200 nautical mile limit. This part of the planet could become a World common property with a United Nations administration, the property of the first one to acquire it like the contested Russian flag at the seabed on the North Pole, or coastal states could draw a middle line or extend the 200 nautical mile line depending on the depth of the sea and the extension of their continental shelves.

successful expulsion of foreign fishing vessels from Icelandic waters and the subsequent extension of Iceland's fisheries jurisdiction only provided a brief respite. Shortly thereafter it became evident that sooner rather than later, free and unlimited access for all Icelandic fishermen would jeopardize or even deplete the fisheries resource.

At first the authorities attempted to apply fishing effort limitations, which primarily focused on limiting the number of vessels and fishing days. These measures did not achieve the protection objectives they were intended to secure and also led to inefficiency of effort and overinvestment. Total Allowable Catches (TACs) have therefore been implemented, based on scientific advice. Over the last decade the Icelandic TACs have followed scientific advice very closely, although that was not always the case in the past. Under the current law, the Minister of Fisheries sets the TAC for the main species for the coming fishing year and the TAC decision is based on recommendations from the Marine Research Institute. These recommendations have been submitted to the Advisory Committee on Fisheries Management of the International Council for the Exploration of the Sea (ICES) for comment. Along with the TAC decision, which is the cornerstone of Iceland's fisheries management, there are a number of other measures aimed at supporting the management system. One is that for every new vessel added to the fishing fleet, vessels adding up to the same numbers of metric tons have to be "retired" and withdrawn from the fishing fleet. Other provisions give the Marine Research Institute the authority to close fishing areas temporarily without prior notice if the proportion of small fish in the catch exceeds certain limits (Ministry of Fisheries, 1998). The evolutions of selected fish stocks in Icelandic waters are shown in Annex 5 on pages 256-257. Although some Icelandic fish stocks have decreased over the last two decades, some are stable or have increased, e.g. the herring stock. For comparison, Annex 4 on pages 254-255 shows the evolution of selected fish stocks in EU waters. The negative evolution in EU waters is more critical, having a limited political will to stop it.

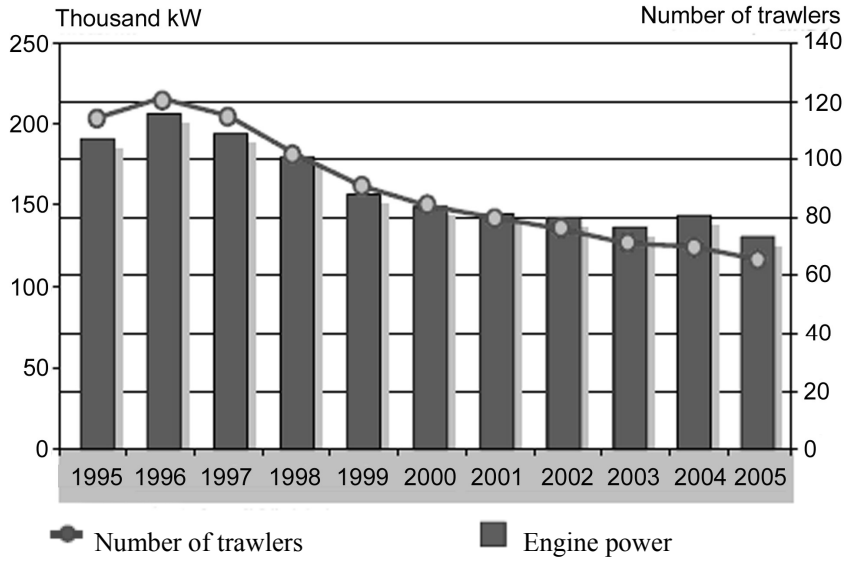
Cod is the most important of the Icelandic commercial fish stocks. After 1990 the annual cod catch had to be reduced year after year, from between 300 000 and 400 000 tons, to less than 170 000 tons. As a result of these reductions, however, the TAC for cod for the 1996/1997 fishing year was increased in expectation that it would not upset the recovery of the stock and further increases were projected. Nevertheless, the TAC set in 2007 drastically cut the cod catch quota as the state of the stock was deemed more critical than previously expected. This cut, based purely on scientific advice, caused some political uproar amongst fishermen, but

was nevertheless deemed necessary bearing in mind the long-term use of the fisheries resource. It appears that the Icelandic cod stock has declined over the last two decades (see e.g. Annex 5 on pages 256-257), in a similar manner as cod stocks in EU waters have declined (see e.g. Annex 4 on pages 254-255).

The Icelandic government had adopted a catch rule for cod, which was based on an annual quota amounting to 25% of the total stock. This catch rule was the result of work by marine biologists and economists formulating the most favourable stock size and speed for rebuilding the cod stock, taking into account interaction with capelin and shrimp stocks, but both cods and humans eat the latter two. At present the size of the cod stock is estimated to be about 600 000 to 700 000 tons and the objective is to let it increase, perhaps up to around 1.5 million tons. As far as the Icelandic herring and capelin stocks are concerned, an informal rule has been followed for a number of years to manage these stocks, but the goal is to develop comparable formal catch rules for these and other species. It is worth noting that deliberate efforts to allow the fish stocks in the ocean to increase is in stark contrast to what has dominated the EU CFP until now, where the stocks are decreasing. Nevertheless, sharp fluctuations in Icelandic catches have dealt heavy blows to both the fisheries industry and the economy as a whole.

The capacity of Iceland's fishing fleet started declining in 1990 after several decades of growth. This trend has continued because of greater priority given to mergers of fishing quota to improve the efficiency of fishing operations, along with vessel retirement. In 1996, a total of 2132 vessels were licensed to fish in Icelandic waters. Of these vessels 1644 were less than 12 gross metric tons. In 2004 only 1614 ships participated in landing catches. The most powerful part of the fleet is about 75 trawlers, of which half process and deep-freeze their catches on board. Trawlers account for around half of the average annual demersal catches. There are also more than 50 vessels specially equipped for the capelin fishery with a capacity of 700 to 1400 tons per trip. Figure 23 on next page shows the evolution of the Icelandic trawler fleet between 1995 and 2005. (Ministry of Fisheries, 1998, 2005 and 2006).

Figure 23. The evolution of the Icelandic trawler fleet between 1995 and 2005

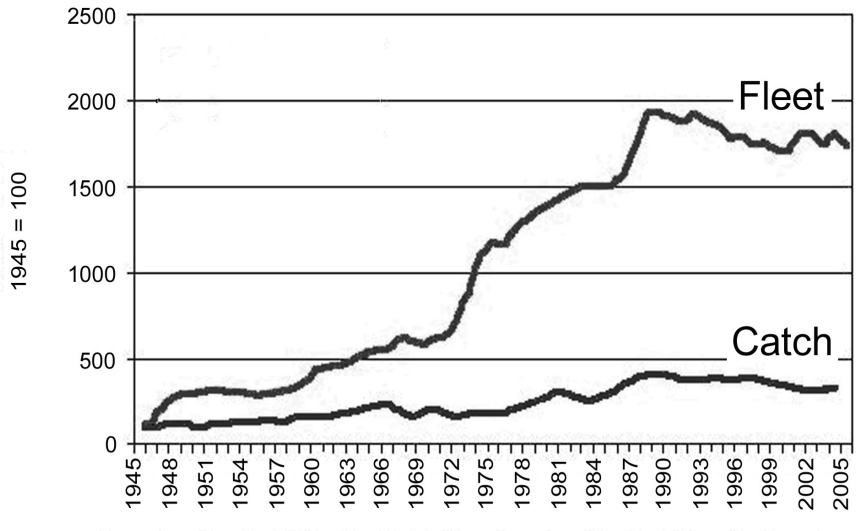


Primary source: Statistics Iceland. Published by Ministry of Fisheries (2006).

Just like in the EU, overinvestment has burdened the Icelandic fisheries. Figure 24 on next page shows the development of the size of the Icelandic fisheries fleet since 1945 seen in relation to total catches. The fleet and catches are measured by value rather than in tonnes.[245] Although the fleet is still too large for the catches, the trend is towards a smaller fleet. The option to increase the catches to better utilize the investments is excluded since increasing the catches will jeopardize the resource.

[245] The fleet size is measured in value until year 2000. As of 2000 the fleet is measured in Tonnes.

Figure 24. The size of the Icelandic fisheries fleet compared to total catches since 1945. [246]



Source: Gylfason, (Kritartaflan, 2008).

It would be logical to expect that the increased investments in the fishing fleet shown in Figure 24 would be a result of mechanisation and thereby reducing manpower, eventually resulting in savings through personnel reductions. This is only partially true and the oldest figures available (Statistics Iceland) show that in the mid 1960s Iceland had about 4500 actual fishermen and the number of fishermen has been on a very slow increase through the last four decades, up to the current figure of around 5000-6000 persons. The figures indicate that over the last 40 years there is increased productivity per employed fisherman, but less than proportional to fleet investments. This was caused by government policy in the 1970s giving too favourable loans to promote investments in increased fishing capacity. Nevertheless, mechanisation and automatic processing has reduced the relative need for personnel.

Fishing and fish processing in Iceland is all done by privately owned companies scattered along the coastline. The quantity exported (e.g. 828 000 tons in 2004[247]) far exceeds domestic consumption and compared to total catches, relatively little fish is imported for processing

[246] Idem.
[247] Statistics Iceland.

facilities (e.g. 200 000 tons in 2004[248]). Most of the Icelandic catches are landed and processed in Iceland, although there are some limited landings by Icelandic vessels abroad. Iceland currently uses a system of Individually Transferable Quota (ITQ). The ITQ structure was intended to increase efficiency. This means that the holder of the rights to catch a certain quantity of fish is not obliged to do it himself, but can sell or lease the rights to the catch to others, who as the new holders of the quota can use it as they see fit. The current Icelandic catch quotas are distributed free of charge, based on past tradition. However, the criticism of the ITQ system is that some companies, which have in the past caught fish, keep on receiving a part of the quota when it is distributed, without using it. Since the right to the catch is valuable, these companies rent or sell their catch quota to others. These rent seeking owners of less active fisheries companies do therefore not fully contribute to the industry per se, but act like they own the wild fish stocks in the sea. As such, rent seekers who in common terms have been referred to as "quota barons" currently burden the industry.[249] The fishing fee used in Iceland since 2004 is based on catches. It is a form of tax on fisheries companies and boat owners for the use of fish stocks as a natural resource. This means that new entrants to the industry must not only pay taxes to the state, but they must also pay the private individual or company who "owns" the quota for the right to catch fish. For comparison, in some EU states there are fishing fees, but

[248] Ibid.

[249] As is the case in other parts of the world where the ITQ system has been used, the de facto owners of the quota have often become wealthy and the quota ownership gathers on a few hands. One remedy is that the quota be sold on a regular auction by the state, rather than given free of charge to some individuals or privately owned companies as if they were virtual owners of the resource. This of course leads directly to the highly controversial and political issue of who owns natural resources. Hannesson (2004) discusses private ownership and points out its many benefits. Indeed a private owner treats his property with more care and respect than the attitude often shown to public or common property. However, in our opinion, freely roaming wild fish stocks are not comparable to aquaculture, cattle, or forests, which are nurtured within confined areas. Although a landowner has a right to use his land, including hunting and other harvesting of nature, extending such rights to the oceans is highly disputed. An analogy can be drawn to e.g. offshore oil wealth, which in many jurisdictions is considered as national or state property, although its use may be leased to private individuals or companies.

the quota per se is not for sale. Nevertheless, new entrants to fisheries in the EU will in many cases have to buy a fishing license.

Sometimes the Icelandic de facto owners of the ITQ, - the "quota barons" - have used the quota as an indirect collateral for business loans not necessarily related to fisheries, leading to a considerable debt.[250] Total invested capital and debts of the Icelandic fisheries industries are shown in Table 29 on next page. This high accumulation of debt does not make fisheries per se any less profitable, but it raises questions about the overall accumulation of debt in the Icelandic financial system with questionable loan guarantees. Theoretically, in case of defaults, the banks will become the de facto owners of the part of the ITQ used as a collateral. This could be considered as a version of the "Dutch Disease" where abundant natural resources push manufacturing and wise investments to the side in the same way as many Arabic states have squandered their oil wealth.

Table 29 printed on next page

[250] The quota itself may not be used as a collateral, but to circumvent the rules, the quota is assigned to a ship of low value. This enhances drastically that ship's value, which in turn makes the ship far more valuable as a collateral than if it were just an old vessel made of wood or iron with no fishing rights.

Table 29. Total invested capital and debt in the Icelandic fisheries industry from 1985 to 2008. (In billions of Kronas)

Year	Invested capital [251]	Debt
1985	30	28
1986	41	37
1987	49	46
1988	63	71
1989	79	88
1990	89 / 90 [252]	87
1991	92	94
1992	95	94
1993	98	102
1994	104	96
1995	104	94
1996	110	116
1997	113	123
1998	115	140
1999	117	160
2000	132	165
2001	132	195
2002	129	192
2003	126	186
2004	125	208
2005	119	245
2006	136 [253]	277
2007	137 [254]	249 [255]
2008 [256]		416 [257]

Sources:
(1) Invested capital: Statistics Iceland (2009).
(2) Debt: Central Bank of Iceland (2009). The debt estimation is based on a collection of inputs from the (former) National Economic Institute and Statistics Iceland. The debt figures should be seen as a guideline and may not be complete.

[251] Of this amount approximately ¾ is fishing and ¼ is fish processing industry.
[252] The database was changed in 1990. 89 billion refers to the post-1990 database and 90 billion to the pre-1990 database.
[253] Preliminary figure.
[254] Idem.
[255] Estimated. The actual debt figure for 2007 could be higher.
[256] In October 2008, at the time of the collapse of the main Icelandic banks.
[257] Estimated. The debt figure for 2008 could be higher. We should draw attention to that this figure corresponds to approximately 1/3 of the Icelandic annual GDP. We should also note that in 2008 the Icelandic Krona lost about half of its value compared to major foreign currencies, leading to foreign currency nominated loans doubling in value measured in Krona.

7 – 4 Ecological and Biological Aspects of Fisheries

The earth's resources fall essentially into two categories: renewable and exhaustible (see e.g. Turner et al. 1994, and Rotillon 2005). The difference is fundamental. Examples of non-renewable resources are minerals, which require man to recycle used things, with all its expenses and complications, and oil and coal, which will burn up. Some resources like hydroelectric energy and wind power are naturally renewable, and still other resources are renewable as long as they are not totally destroyed. Examples of naturally renewable resources that need themselves in order to regenerate are the forests, which require trees to produce seeds in order to replace felled ones, and fisheries in the high seas which require a minimum of fish stocks to ensure reproduction. Concerning fisheries, biological knowledge about marine life is the basis for responsible fisheries management. Without biological knowledge it is impossible to calculate or estimate sustainable exploitation. The purpose of this sub-chapter on ecological and biological aspects of fisheries is to show the difficulty in constructing modern fisheries models. Land based agriculture is much easier to manage than fisheries. For instance, trees are easy to count and measure, but fish stocks are evasive. Despite modern technology, what happens to fish stocks at the depths of the oceans is based on estimates. Often, there are large errors (see e.g. Flaaten et al. 1998) and unscrupulous fishermen and politicians use this to demand increased fish catches. Strip-logging in forests causes uproar amongst environmentalists, but the oceans are just endless water to the human eye. The difficulties in estimating fish stocks are not an excuse, but an important part of the explanation of why overfishing is common.

There is always a problem with global commons without a specific owner (Gordon 1954, Scott 1955, Arnason et al. 2000 and many others). Some individuals will try to exploit them to their maximum for their own benefit before somebody else takes it all. This certainly was the case with fisheries until 200 nautical miles exclusive economic zones became an almost worldwide rule some 25 years ago. Fish stocks are like capital. Well managed capital can provide a handsome interest, but if there is no owner of the capital, the one who grabs the most wins, but at the expense of future generations. If overfishing depletes fish stocks, they will not recover, but collapse and become extinct like so many other species eradicated by man. The same applies if the delicate marine life biological chain is disrupted. The species in the sea live on each other and extensive research is needed to determine how much fisheries the different

species will support without reducing the balance and total quantity of fish. According to the laws of nature, when one species multiplies excessively, food becomes scarcer for them and they die naturally of starvation and diseases. In such a case humans can intervene and in some cases eat what would otherwise be wasted. But fishing methods are also an ecological issue. Trawlers that scrape the bottom are efficient fishing tools, but they can damage the ecosystem at the bottom of the sea and caution is required concerning both the quantity of fish caught and the fishing methods used. Within the scope of this study, it is fair to state that Europeans, both EU and Iceland, are aware of the need to protect the environment, although care amongst fishermen and implementation by the authorities varies.

As noted in the European Commission's Green Paper on the future of the CFP (2001), the development of a fish stock is dependent of four basic biological factors: recruitment, growth, natural mortality and fishing mortality. A fish stock, counted as a number of fish, will increase by the number of incoming recruits, and the stock biomass will increase by the combined effect of numbers of new recruits and the individual growth of all fish in the stock. Stocks will decrease by the quantity that die of natural causes (such as old age, being eaten by other marine animals, or through disease) and by fishing, the latter generally being the main reason for the decrease of most stocks. The net balance between factors that promote the increase of a stock, such as recruitment and growth on the one hand, and factors that cause the stock to decrease, such as natural and fishing mortality on the other hand, will determine the development of the stock over time. If the removal is consistently higher than the recruitment and growth, the stock will decline and vice versa. ICES (International Council for the Exploration of the Seas) provides yearly assessments of these factors, along with assessments of landings for a large number of stocks. There is a clear relationship between spawning stock and recruitment, as large numbers of spawners provide a better chance of good recruitment and good recruitment will boast the spawning stock in subsequent years. Recruitment and spawning stocks are therefore often presented in the same graph in fisheries models. Likewise there is a clear relationship between landings and fishing mortality and these are also often shown in one graph when biological fisheries models are constructed.

* *Recruitment (R)* is the number of new fish produced each year by the mature part of the stock. R is normally assessed as the number of a specific age, normally 1 to 2 years old, being added to the stock at a specific time each year.

* The mature part of the stock is labelled *Spawning Stock Biomass (SSB)*. This is a measure of the cumulative biomass of all fish that will spawn in a given year.
* *Fishing mortality (F)* is an expression of the proportion of the fish stock that is removed by fishing activities within one year.
* *Landings* correspond to ICES's estimate of the most likely removal from the stock. These figures can deviate from the official statistics as the scientists try to correct for misreporting by area and species and in some cases an estimate of the amount of fish discarded (legally or illegally) is included.

As further discussed by the European Commission (Green Paper, 2001), a fairly reliable picture of stock development can be derived from comparing trends over time in recruitment, SSB, landings and fishing mortality. However, the assessment of these factors is subject to considerable uncertainties (Flaaten et al. 1998) as it is dependent on accurate catch statistics, good sampling of catches and results from survey activities (Green Paper, 2001). The largest uncertainties are associated with the most recent estimates of SSB and fishing mortality, but the mid to long-term trends of these factors are more reliable. With the introduction of the precautionary approach (pa) ICES has proposed "reference points" for fishing mortality and spawning stock biomass. The most important reference points are those that are associated with recruitment failure or stock collapse. These reference points are labelled biomass limit (Blim) and fishing mortality limit (Flim). The Blim defines a SSB level where recruitment may be impaired and threaten the sustainability of the stock.

The European Commission's Green Paper on the future of the CFP (2001), states that the estimates of fishing mortality (F) and SSB are uncertain and even if, as an example, the SSB is estimated as being 30 % higher than the Blim, it might in fact be at the Blim level. In order to allow for this inaccuracy, ICES has proposed that managers who formulate the fisheries policy and recommend catch quotas, apply a safety margin or a buffer zone. The corresponding reference points are labelled Bpa (biomass precautionary approach) and Fpa (fishing rate precautionary approach). The differences between these reference points reflect the uncertainties in the fish stock and exploitation assessments. The difference between the Blim and Bpa and between Flim and Fpa is generally in excess of 30 % for many stocks. It should be noted that although these differences appear to be large they might still be underestimated, as all sources of uncertainty are not included (Green Paper, 2001 and Flaaten et al. 1998). By comparing the stock

development against the precautionary approach reference points, the best available information and knowledge is utilized. The Bpa and Fpa can therefore be utilized to judge if the stock is in a sustainable state. These reference points should not be regarded as targets for biological or economic optimisation of yield, but as signposts for sustainability.

Models used in fisheries can be classified in several ways according to the size and complexity of the model. This includes various models used for stock estimation, interactions, predictions, and risk analysis, in particular their place within the hierarchy of models from very simple (e.g. Karpoff 1987) to the most complex models. As discussed by Stefansson, (Marine Research Institute, Iceland, 1996), a typical simple model can be built up around a curve based on catches and implemented on a single species virtual population analysis (VPA). Such a VPA-based approach also yields a forward projection in time. Correlation analysis can be used to estimate important relationships, e.g. a positive correlation between the biomass of a prey species and the mean weight of a predator species at a certain age, or a negative correlation between the abundance of a predator species and the recruitment of a prey species. Including the resulting relationships in the projections can now augment the ordinary single-species VPA-based projection. Given that there are now more than one species in the model, some economics have to be entered into the model if alternative harvesting strategies are to be considered. At a minimum, prices of the various species have to be used in order to compute total benefits from different harvesting strategies.

According to the Marine Research Institute of Iceland (Stefansson, 1996), a more global model of an ecosystem is constructed differently than the simple models described above. The large-model definition starts with listing the various components of interest; the species, fishing fleets, areas, and time scales to be used. After this, the model structure must be defined, i.e. an estimation model or a simulation model. The next step is to obtain the data needed to run such a model. In the case of several species which live, grow, mature and get fished in several areas, this is not an easy task. After the model has been implemented as a computer program, there is a long phase of repeated testing, model evaluation and running of the program. The main virtue of this approach is that an overview of the ecosystem is kept in mind during all steps of the modelling exercise. If a simpler approach is taken at the outset, then the resulting model needs to be overturned in order to accommodate such questions later. With a simulation model, it is possible to run individual simulation with a given set of parameters and observe the resulting migrations, abundance in each region, growth of the different

species etc. Given a simulation, the next step is to compare the results to actual data, using some likelihood functions as criteria for the quality of the model and parameters. The simpler approach will allow for a development phase which is clear and the net effect of each model addition is clear, whereas the larger, all-encompassing approach allows for the inclusion of all major factors in the system right at the outset, and also allows testing for effects which cannot be described within any simple model. (Stefansson, 1996).

In a fisheries model, landings and fishing mortality are important factors. Besides landings and natural mortality, discarding of good and edible fish is an unfortunate and negative sustainability factor. After being pulled out of the sea, fish die quickly. Nevertheless, many fishermen discard their catches, - dead -, back into the sea, which is a complete waste of the resource. Discarding is not only an economic issue, but also an ecological one. Discarding freshly caught fish can be legal or illegal. Legal discarding happens in the EU when fish are accidentally caught which are below a minimum size, or if fish are caught in a larger than allowed bi-catch outside set quota limits. The idea behind this rule is to prevent fishermen from deliberately catching smaller fish or other species than allowed (EC DG Fisheries 2008). In Iceland discarding edible and useable fish is illegal (law no. 57 of 1996). However, illegal discarding is a different issue from legal discarding and takes place both in the EU and in Iceland. Illegal discarding is based on an economic incentive of fishermen when the quantities of their catches are limited by regulation, but there is plenty to catch. In this case the fishermen just retain the most valuable of their catches and secretly throw overboard the less valuable fish. Then they keep on fishing until the maximum quantity allowed is filled with the most valuable fish and the less valuable is left dead in the sea. Estimations on discarding vary from a low of 1-5% (e.g. studies published by the Icelandic Marine Research Institute) and up to that every second fish is thrown out (e.g. Lochhead (2008), stating that every second cod in the North Sea is discarded). The legal framework invites more waste in EU waters than in Iceland. Nevertheless, there are persistent rumours on large quantities of illegal discard in Iceland.[258] Concerning legal and obligatory discarding, we find it unacceptable that perfectly edible fish is thrown out in EU waters. Illegal discarding is a different issue and is a subject of law enforcement. It can be solved through surveillance cameras on fishing vessels in a similar manner as

[258] Recently we had ourselves a discussion with a person who resigned from a fishing vessel in disgust over illegal discarding.

many large cities have surveillance cameras on the streets and on the motorways. Coast guard access to military surveillance satellites can also reveal onboard activity which cannot be seen from land, - that is if there is a political will to do so. Fishermen certainly do not like surveillance cameras any more than car drivers like speed cameras. We are also sceptical about the policy of always catching the largest fish of a given species, because the theory of evolution indicates that after a few generations of always eliminating the largest individuals from the natural gene pool, future generations will become smaller. This is counter-productive and will require more individual fish to be caught in order to fill the catch quotas, which are based on weight rather than on individual fish count.

We believe that a part of the explanation for dwindling catches in both the EU and in Iceland (and in many other parts of the World as well) are caused by four main factors:

- The Total Allowable Catches (TAC) are too high,
- The largest fish (not the oldest fish) are regularly harvested, eventually leading to genetically smaller individuals,
- Overfishing caused by discarding edible fish, which means that total catches are larger than reported,
- Industrialisation of fishing by using trawlers that scrape the bottom and disturb the ecosystem.

7 – 5 Economic Aspects of Fisheries

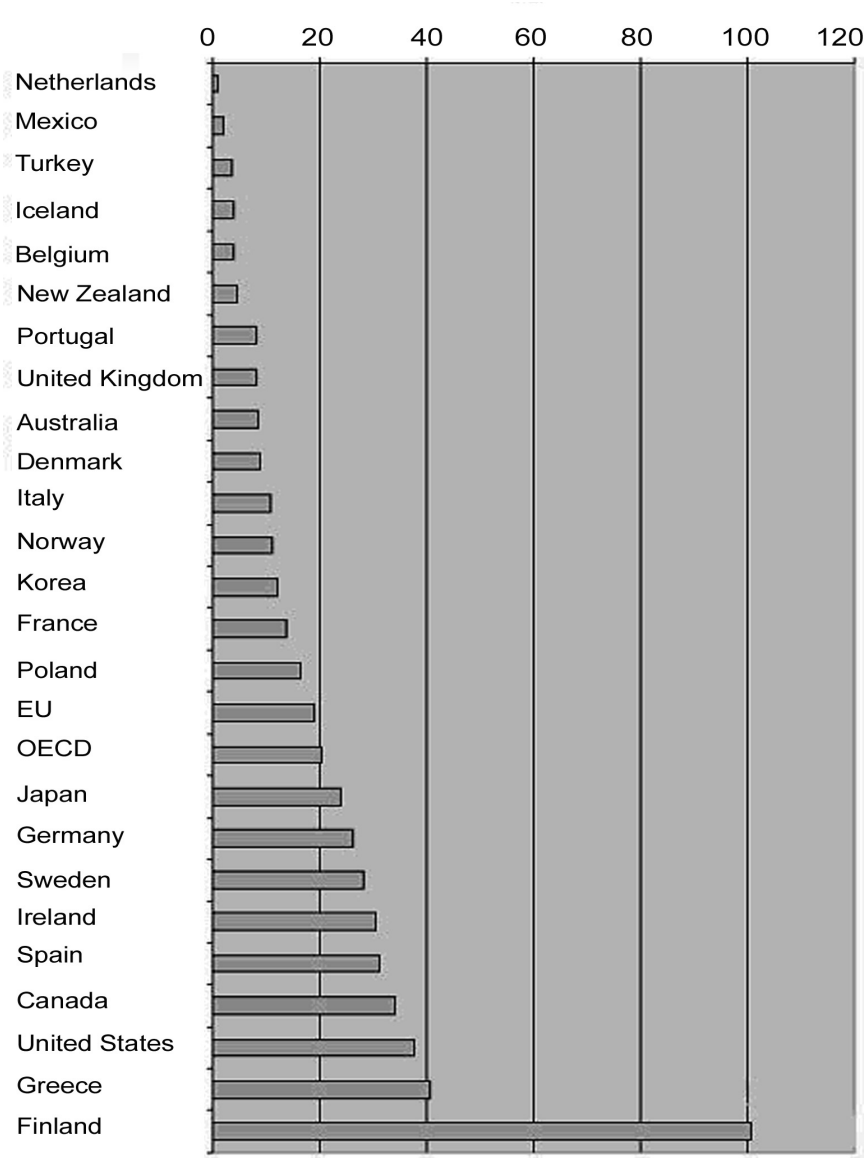
Fisheries, along with agriculture, are food production. Food is a necessity regardless of price. However, according to the laws of free markets, if price on fish goes up, the consumers will change over to other kinds of food and vice versa. But when minimum prices on fish are fixed (like in the EU) and fish is removed from the market if the prices fall below a certain minimum, the laws of the free market don't apply any more. Such measures may guarantee fishermen's wages, but may also push consumers to buy other food cheaper and consequently reduce the number of jobs in fisheries.

Fisheries are certainly a factor in local and national economies and provide employment. If fish were not be available in the oceans, those employed in fishing on the high seas, or at least a comparable number of people, would either have to work on fish farming (aquaculture) or in agriculture. To simply claim that without fisheries the fishermen would be unemployed is only true within the scope that they would not be forced into other jobs, which sometimes is a problem due to the overgenerous social security system and unemployment benefits in Western Europe. A certain amount of food is needed to feed the world population, and without fishing, that food would have to be produced by other means and perhaps by other people than fishermen. That EU fishermen (and agricultural workers) are below the average worker in productivity does not change the fact that some world citizens have to do the job, either domestically or through imports. Financial income in society is usually based on skills and status, but fisheries (and agriculture) require for the most part unskilled labour. If European fishermen would move over to more profitable jobs, their places would certainly be filled with unskilled labour from less developed countries (LDC).

In chapter 6 on agriculture we mentioned how important food is and that a certain overproduction has to be in place. The food surpluses caused by overproduction are like an "insurance premium" against natural or man made disasters and is encouraged by direct or indirect aid and protective measures for food producers. The one who finally pays this "insurance premium" is of course the consumer, either through higher prices or through taxation. However, this "insurance premium" may also be considered by some as throwing money away by supporting an uneconomical and wasteful industry, rather than let the laws of the free market dictate food production. Figure 25 (on next page) shows governments' financial transfers to the fishing industry in OECD

countries as a percentage of landed fish value and Table 30 on the following page shows a more detailed overview of where the money goes.

Figure 25. OECD Governments' Financial Transfers to the Fishing Industry as a Percentage of Value of Landings in 2003



Source: OECD (2006)

Table 30. Government financial transfers to marine capture fisheries in OECD countries in 2003 (in millions of USD)

	Management, research and enforcement	Infrastructure expenditure	Access payments	Decommissioning payments	Investment and modernisation	Income support	Other transfers	TOTAL
Australia	11	0	0	0	0	0	70	81
Canada	162	68	0	0	0	254	61	524
EU [b]	474	57	194	299	179	157	173	1532
Belgium	2	0	0	0	1	0	1	4
Denmark	62	1	0	17	11	0	0	92
Finland	10	2	0	0	0	2	6	20
France	36	1	0	5	11	16	109	179
Germany	40	0	0	2	5	0	0	47
Greece	45	18	0	0	35	0	21	118
Ireland	59	0	0	0	6	0	3	68
Italy	32	0	0	116	0	0	0	148
Netherlands	0	0	0	4	0	0	2	6
Poland	10	0	0	0	0	0	0	10
Portugal	26	0	0	0	0	1	0	27
Spain	69	30	0	142	108	137	17	504
Sweden	24	1	0	1	1	2	2	31
United Kingdom	67	3	0	0	0	0	0	70
Iceland	19	0	0	0	0	16	0	36
Japan	560	1708	0	13	26	5	0	2312
Korea	22	395	0	18	1	0	59	495
Mexico	21	0	0	0	0	0	0	21
New Zealand	19	0	0	0	0	0	0	19
Norway	125	0	0	3	0	1	13	142
Turkey	2	17	0	0	0	0	0	19
United States	1094	18	0	100	0	1	78	1290
OECD	**2508**	**2263**	**194**	**432**	**206**	**435**	**454**	**6472**

a. Includes OECD estimates for some countries. b. Sum of all EU countries plus access payments.

Source: OECD: Financial Support to Fisheries: Implications for Sustainable Development. (2006). ISBN 9264036636.

It is worth noting that according to the OECD data, governments' financial transfers in the EU, as a percentage of value of landed fish, is almost 4 times higher than in Iceland, although there is a large difference between member states.[259] It is open to discussion if this is just the food supply "insurance premium" or if this is governments' way to support an unprofitable industry and to create jobs, the theory being that an unprofitable job is better than no job at all. It is also worth noting that it is not only the EU countries that spend much on supporting fisheries, but USA and Japan do the same.

Just like in agriculture, government support to an industry creates a certain deadweight loss. Using taxpayers' money to support an industry will be at the expense of other non-supported industries. As noted in chapter 6 (on agricultural policy), estimations on deadweight losses vary, but there is a (almost) consensus that it is there. European and Icelandic fisheries quotas are as a general rule distributed free of charge. Since fisheries are theoretically a renewable resource like wind power, this may seem reasonable, although exploitation of non-renewable resources like oil might be different. However, in sake of fairness of distribution, because of the limited regulatory access to the fisheries resources, auctioning off the yearly quota may seem more fair than giving it gratis to selected fishermen or fishermen's organisations.

In the European Union there are approximately 250 000 fishermen, including several thousand part time fishermen. (Shown in Table 27 on pages 193-194 and Figure 18 on page 194). This represents almost 1 % of all jobs in the EU. Aquaculture (fish farming) provides another estimated 50 000 full and part time jobs[260]. In 2005 the value of the whole production chain, including fishing, aquaculture, processing and marketing reached approximately 24 billion Euros or close to 0.25% of GDP.[261] In 1998 the figure was close to 20 billion Euros, i.e. 0.28% of EU GDP and in 1990 the value of production was 18 billion Euros, also 0.28% of EU's GDP (EC Green Paper on the Future of the CFP, Volume

[259] We would like to draw attention to that Hauksson (1998), estimates Iceland's transfers to the fishing industry per fisherman as almost comparable to the EU, mainly because of tax reductions to fishermen in Iceland.

[260] Eurostat / FAO 1995 data published by the EC in 2001. Annex 3 on pages 252-253, based on figures from the European Commission in 2005, is not complete. The figures vary somewhat as not all member states report yearly or use slightly different criteria. For comparison, aquaculture in Iceland is very limited, which is not surprising, considering the abundance of wild fish.

[261] Approximately 18 billion Euros in processing and 6 billion in catches, with some variations in figures reported. (EU DG Fisheries 2007).

II). In addition, the EU fishing fleet of around 90 000 vessels also requires services and provides several jobs in coastal areas.

According to the EU Green Paper on the future of the CFP, the economic and financial situation and the performances of the EU fishing fleet during the period 1994 - 1999 can be summarised according to certain general characteristics, which have then to be specified in view of the differences between countries and fleet segments:

* High capital intensity. Invested capital per job in the fisheries sector in general is very high. Invested capital in the EU fisheries sector is on average ten to twenty times the average 1999 gross fixed capital formation;[262]
* Very high value added per job. There is a close relation in this sector between the level of the invested capital per job and the value added per job. With some exceptions, the value added per job in fishing is higher not only than in agriculture but also than in industry or in the economy as a whole, despite the relatively low qualification levels for jobs in the fisheries sector. In general, however the higher the invested capital, the less relative value added is generated;
* Poor financial profitability. Over the period 1994-1999, the net profit of many EU fishing fleets, often negative or very weak, did not allow to remunerate the capital normally. In other words, despite the high level of value added per job, it often remained insufficient to cover at the same time the crew's share and the financial costs related to high capital-intensive equipment.

In Iceland the economic impact of fisheries is larger than in most parts of the EU. In the early 1990s fisheries used to provide about 15% of the GDP, in 2000 about 12% (National Economic Institute of Iceland, 2002)[263] and in 2007 about 6%, although as noted earlier, the 2007 figure is not so much due to decline in fisheries per se but more due to a large "bubble" increase in the GDP within other sectors. Fisheries employ about 5-6% of the Icelandic workforce, which correlates very well with the percentage of the GDP they directly provide. Without fisheries, the more than 2/3 of the Icelandic economy that provides various services

[262] The overcapitalisation is a legacy of earlier policies to increase fishing capacity. Despite ongoing reductions in fleet capacity, it takes a long time to wind down the investments. This applies both to EU and to Iceland. Overcapitalisation of a certain industry contributes to society's deadweight losses.

[263] Industry (other than fisheries industry) and construction is about 25% of current Icelandic GDP, agriculture 2%, Government services 19% and services by private companies and individuals is 43% (year 2000 statistics, National Economic Institute of Iceland).

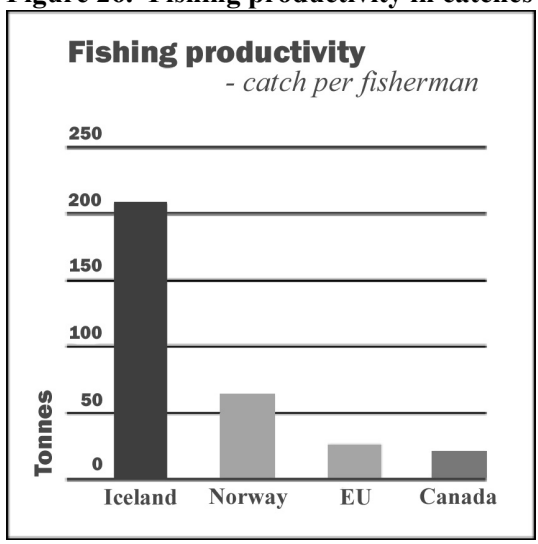
would likely be worse off. A service economy can only thrive if there is some underlying production. In an open economy, such as Iceland through its participation in the EEA, it is less critical if the production is domestic or foreign, than in a closed economy, as there is not only a free flow of goods in the EEA, but also a free flow of services. However, not all services can flow freely because of their very nature. It is easy to open a foreign bank account, but not very practical to travel abroad for e.g. a haircut.

As discussed in chapter 5, Iceland is not a part of the Euro-zone. Fisheries in Iceland provide about 1/3 of the foreign currency earnings. It should be noted that until Iceland joined the EEA there were restrictions on foreign currency dealings in Iceland and the Icelandic Krona was not freely convertible. The black market price of foreign currencies was higher than the official bank rate. Although the Krona was artificially strong, devaluations were also frequently used to help the fisheries industry pay their domestic expenses. However, the devaluations were always a last resort measure and the official exchange rate remained abnormally high. After joining the EEA, the exchange rate of the Krona was first based on a basket of currencies and then it floated. Until 2008 there was sufficient foreign currency to maintain free foreign currency dealings, imports and exports to and from Iceland. Nevertheless, the banking crisis in 2008 caused serious imbalances in foreign currency supply and large fluctuations of the exchange rate, leading the Icelandic Central Bank to impose foreign exchange restrictions in accordance with the emergency clauses on capital markets specified in the EEA agreement. Without the fisheries as a large export industry, foreign currency earnings would be even more critical than they are now, leading to import restrictions, or alternatively serious imbalances in the external trade, which is not sustainable in the long term, or a much lower value of the Krona, which would affect the economy as a whole through more expensive imports.

In the EU Mediterranean countries there are still several small-scale fisheries with very small vessels. These are labour intensive but cheap to operate and maintain, and often more ecologically sound than the large trawlers. In the Atlantic, and that applies both to EU and to Iceland, the proportion of large expensive vessels is much higher. These larger vessels are capital demanding but cheap on labour in relation to their capacity. In many parts of the European Union, fisheries are a way to provide jobs in coastal areas. In contrast, Icelandic fisheries are a large industry of great importance to the country's economy. The same can also be said for some local areas within the EU such as the Atlantic coast

of Spain, east coast of Italy and in Scotland, but not for the EU as a whole. EU catches are about 5 times larger than Icelandic catches (see e.g. Figure 20 on page 197, Figure 22 on page 204, and Table 31 on page 227), but with a much higher effort-result ratio. On average a EU vessel caught around 60 tons per year[264] and an Icelandic vessel caught around 900 tons per year[265], or close to 15 times more per ship. Average catches per fisherman in Iceland is between 200 and 250 tons per year. In the EU the average catches per fisherman is 20 to 25 tons per year. This means that the Icelandic fisherman catches on average about 10 times more quantity than his EU counterpart. Figure 26 (below) shows fishing productivity in catches per fisherman.

Figure 26. Fishing productivity in catches per fisherman



Source: Close to the Sea, 2nd edition, published by the Ministry of Fisheries in Iceland (1998).

Part of this large difference in catches is of course explained by small individual enterprises run by local fishermen with small boats, having limited capacity, e.g. in the Mediterranean, but partly it is the size of the EU fleet that is too big for the fish left in the sea. Nevertheless, quantity of fish does not mean quality. Different species fetch different prices, e.g. a kilogram of lobster is generally worth more than a kilogram of cod. Consequently, we shall proceed to compare the value of the fish,

[264] Almost 6 million tons / approximately 90 thousand vessels.
[265] Approximately 1 ½ million tons / approximately 1600 vessels.

but not just the total tonnage caught. As noted above, the value of the whole production chain in the EU, including fishing, aquaculture, processing and marketing is close to 24 billion Euros (close to 0.25 % of the total GDP). The value of the fisheries and fisheries industry in Iceland is close to 850 million USD[266] (close to 6% of GDP). Comparing this with the number of fishermen, an Icelandic fisherman brought approximately 50% more total value out of the sea and into the production chain than his average EU counterpart, although the value per tonne caught in Iceland is under the EU average:

(1) Iceland: 850 million USD[267] / 6000 fishermen = 142 000 USD / fisherman.

(2) EU: 24 000 million Euro[268] / 250 000 fishermen = 96 000 Euro / fisherman.

It must also be noted that within the EU there are large differences in productivity based on geographical areas. The EU has a common fisheries policy for all its members and we have elected not to go into internal area analysis in this study, but only to compare the CFP to the Icelandic fisheries policy. Table 31 on next page shows the distribution and evolution of fish production in EU member states and EU candidate countries, the EEA, Iceland, and the World. Obviously, both EU member states and Iceland can be further broken down into regions, which can be appropriate when discussing social issues of fishermen.

[266] For the purpose of this comparison, we will state that one US Dollar equals one Euro. Early last decade the dollar was about 25% less than an ECU, in 2002 it was 15% higher than the Euro, late 2002 the exchange rate was about one for one, and as of this writing it value is about 2/3 of the Euro. Based on fluctuations in freely floating currencies we believe that a one to one is a reasonable long run comparative value, especially taking into account the price of goods on both sides of the North Atlantic.

[267] Idem.

[268] Idem.

Table 31. Evolution of fish catches in EU, EEA, and The World, from 1990 to 2006 (in tonnes live weight)

	1990	1995	2000	2005	2006*
EU-27	:	8 054 070	6 794 180	5 632 045	:
EU-25	:	8 034 291	6 779 810	5 620 543	:
EU-15	6 250 260	7 237 012	6 150 037	5 056 326	:
BE	41 470	35 631	29 807	24 569	22 519
BG	49 254	8 012	6 998	5 433	7 514
CZ	:	3 929	4 654	4 242	4 646
DK	1 475 716	1 998 908	1 534 074	910 650	867 844
DE	326 316	238 829	205 249	285 667	279 040
EE	131 178	132 030	113 159	99 581	86 902
IE	215 485	389 646	276 237	262 482	210 670
EL	132 381	151 717	99 344	92 026	96 707
ES	1 126 318	1 178 941	1 069 868	768 267	710 897
FR	689 662	675 134	703 439	595 275	582 846
IT	371 873	396 797	302 155	298 459	312 047
CY	2 584	9 320	67 482	1 880	2 098
LV	162 827	149 194	136 403	150 618	140 389
LT	137 598	57 368	78 989	139 785	153 111
LU	0	0	0	0	0
HU	16 234	7 314	7 101	7 609	:
MT	787	4 635	1 074	1 336	1 348
NL	404 816	438 110	495 774	549 208	433 235
AT	533	404	439	370	:
PL	448 292	429 372	217 686	156 246	:
PT	324 776	263 871	191 118	211 767	229 094
RO	92 784	49 275	7 372	6 068	6 664
SI	:	2 167	1 856	1 227	1 133
SK	:	1 950	1 368	1 693	1 718
FI	123 024	154 529	156 422	131 737	146 045
SE	250 985	404 591	338 540	256 356	269 255
UK	766 904	909 904	747 570	669 493	615 780
IS	1 521 877	1 624 100	1 999 980	1 661 139	1 344 516
NO	1 603 073	2 524 355	2 699 535	2 392 528	2 245 222
EEA	:	12 202 526	11 493 695	9 685 711	:
HR	:	16 268	21 068	34 683	:
MK	:	208	208	246	:
TR	379 093	633 971	503 355	426 496	:
World	85 469 034	93 352 040	96 684 034	93 813 943	:
For 2006, captures from Inland Waters may be missing from the total for some countries					

Source: Eurostat (2007). (List of abbreviations is on pages 13-15).

We wish to draw attention to that the EU CFP does not distribute the national catch quota within a member state. The EU, under its CFP programme, is only involved in distribution of catch quotas between member states and in the decision on the total allowable catch (TAC). The internal distribution of catch quotas within a EU member state remains a national prerogative. The EU does not catch fish, but individual fishermen and fisheries companies do. The EU does not meddle in how individuals run their businesses compared to others in the same sector, as long as Community rules are respected. Based on this, it is rather unlikely that Icelanders and the Icelandic "quota barons"[269] would have to fear that the EU would change their controversial ITQ[270] system or confiscate the "owners" rights, or meddle in their domestic financial dealings using the ITQ as an object of value or collateral. The EU will, however, monitor how EFF[271] money is used and decide on the size of the TACs. The rest would up to the Icelanders themselves to decide upon. The only open question is if the "owners" of the Icelandic ITQ want to sell their quota to non-Icelandic fishermen. When member states want to move quota between themselves, it is not a domestic affair any more.

[269] As referred to earlier, "quota baron" refers to the de facto owners of the Icelandic Individually Transferable Quota (ITQ), regardless of if they use it themselves, rent it out, sell it, or use it as a collateral for business loans or other investments.
[270] Individually Transferable Quota.
[271] European Fisheries Fund, which replaced FIFG in 2007.

7 – 6 Political and Social Issues in Fisheries

As much as the environmentalist wants to protect the earth and the economist wants maximum yield, the politicians want to stay in power. The politicians in democratic countries stay in power by being popular and doing what the people like. Fishermen want jobs in fisheries and cuts in fisheries are unpopular. It can be difficult for a politician to go against the wishes of his electorate. As noted by Townsend (1995), fishermen and the regulator seem rather indifferent about the future. The CFP's unwritten but overriding objective seems to be social peace (Boude et al. 2001). We would also like to add that most politicians in democratic countries have a very short lifespan as powerbrokers and consequently are more indifferent to the long-term effects of their policies. This is very evident in the case of the CFP when EU fisheries ministers repeatedly agree to allow higher TACs than marine biologists suggest. Obviously the question must be asked why Iceland is different and follows biological-scientific advice better than the EU in developing TACs. The answer is most likely the difference in size. The EU is huge, and under the CFP with 250 000 fishermen scattered over most member states, fisheries fall under the common property theory, where as Icelandic fisheries fall much better under a private property theory with only 5000 fishermen. As discussed in chapter 6 on Agriculture, political psychology is also an explaining factor, along with the cultural attitude of the EU as an institution, where there is an effort to avoid confrontation and to keep every member happy, even if it means agreeing on a compromise. The EU decision-making process is often a legacy of the Union's early years, where there was a substantial effort made to make unanimous decisions rather than to use simple or qualified majority decisions. Thorhallsson and Wivel (2006) draw attention to the "consensus culture" in the European Council of Ministers. The results are often a compromise based on the lowest common denominator. Although it may not help the fish, the reader may wish to reflect upon if democracy is that the majority decides, or if it is that everybody has a say in a compromise decision.

The saying "out of sight, out of mind" applies to fisheries. It is easy to see a destroyed rain forest, but it is not so easy to see a ruined ocean floor. The state of the fisheries resources is a highly controversial issue. Fish scientists can make mistakes (Flaaten et al. 1998)[272] and

[272] Also confirmed verbally to the author by a Ministry of Fisheries official in Iceland.

politicians know that. This is the reason why precautionary approach (pa) is taken in developing harvesting models. Economists can also differ in their opinions and politicians can exploit that. But the social issue (Charles 1989) is also a decisive factor. An example is a minister of fisheries in Iceland a couple of decades ago who said, "The economy cannot withstand that we follow the advice of the fisheries experts".[273] He directly advocated overfishing. The reader may wish to reflect upon if it was wise or unintelligent to suggest that the capital (capital meaning fish stocks) be touched until the economy got out of a recession. Sometimes it may be justified to touch the capital and sometimes it is the beginning of the end. Fish scientist and marine biologists try to establish facts, but how the resources are managed is up to political, social and economic managers, not up to fish scientists themselves.

Some economists have argued for fishing less than the fisheries scientists suggested as allowable sustainable catches. This would avoid shocks to the economy if catches fail between years. Since fisheries are about 6% of Iceland's GDP, a possible 50% fall in catches one year would have drastic chain reactions in the service economy. In the EU, however, fisheries are only 0.25 % of the GDP so if all EU fish disappeared, the chain effect on the economy would be minimal (while large fish exporting nations would be delighted for this new and "hungry" market). The fisheries policy in Iceland in recent years has essentially been to follow the advice of the fisheries experts. But it is now turning out that some of the fisheries advisors may have overestimated the fish stocks, and thus the scientific advice was in reality inadvertently overfishing. Here we might recall the discussion on the precautionary approach when developing fisheries models. Obviously the catches will then have to be reduced if the fish stocks are not to be depleted. This is an issue for managers to decide upon. The reaction could be one relatively large cut in catches with an economic shock, or a gradual reduction in catches, allowing smoother economic adjustment. But a gradual change requires some continued overfishing, which will have to be compensated for by even further reductions in future catches.

Following the publishing of the European Commission's Green Paper in 2001, there is absolutely no questioning that EU waters have been overfished for years. There is scientific consensus on that and dwindling catches to prove it, despite better technology in catching the

[273] Note Karpoff's discussion in 1987 on that biologist should also know some economics.

few fish that are still left. As mentioned above, the overall economic impact of fisheries on the EU is low, but many local areas are as dependent on fisheries as Iceland. The European Commission has for years argued for reducing the catches to prevent collapse of fish stocks, but EU fisheries ministers have always supported overfishing. Reducing fishing quotas drastically is not done because it provokes revolt from fishermen. Since fish stocks take years to disappear, we have to ask ourselves if the average fisherman would be willing to lower his income in order to have a job in 20 years time? The answer is almost certainly no, because by then he will have retired or be in a different job anyway. A typical news headline in December following the annual meeting of EU's fisheries ministers setting the catch quotas is: "European Union fisheries ministers have agreed to cut next year's national catch quotas, but less drastically than the European Commission wanted. EU's fisheries ministers battled through the night with representatives of the Commission."[274] The European Commission knows that the CFP is heading for possible irreversible problems, but the EU fisheries ministers have not reacted sufficiently. For the last few years, the EU fisheries ministers have agreed on further measures to accommodate the European Commission's suggestions to reduce fishing efforts, and although many suggestions have been adopted, it still lacks a lot to be desired. A possible solution is that the fish in the high seas becomes private property as suggested by Scott in 1955, or if possible, transferable dynamic stock rights could be tried as suggested by Townsend in 1995. This means that governments would simply lease or sell (or even give free of charge[275]) the resource to a private industry and relinquish their right to influence its use. However, since fish stocks interact with each other and move freely around, such an arrangement could be difficult to settle internationally, or even between different exploiters of the resource (e.g. cod eating the capelin and shrimp stocks, or in the case of migrating fish stocks).

The way politics involve fisheries in Iceland is much less a struggle between protecting the resource on one hand, and keeping fishermen happy by letting them catch as much as they wish on the other hand. Rather, it is a question of export and marketing while at the same time protecting the ownership of the resource from the CFP common

[274] This particular verbatim quote is from CNNI text TV on 19th December 2001.
[275] Needless to say, we do not agree to give away valuable public property free of charge to some individuals. However, this is commonly done when fish catch quotas are distributed.

property attitude.[276] Fish and agriculture is not a part of the agreement on the European Economic Area (EEA), but covered by special provisions in protocols to that agreement, which turns the fisheries aspects of the EEA into little but a bilateral agreement on trade in fish between the EU on one hand and Iceland and Norway on the other hand. Protocol 9 specifies abolition of customs duties on certain species of fish, and reduction in duties on other. There is no totally free trade as with industrial goods, and as much as Iceland would like completely free access to the EU markets with fish, it is not on the agenda with the EU, and neither is a revision of the EEA agreement on EU's agenda. However, Iceland has been free to apply for EU membership. A membership of the EU may provide advantages, but at the price of being subject to the CFP. Iceland has aligned the veterinary and sanitary requirements on fish to the EU regulations, which prevents those rules under normal circumstances to be used to restrict or delay imports. Iceland would like a completely free market access for fish into the EU, and the EU wouldn't mind fishing rights in Icelandic waters in exchange. But as always, it is not possible to both keep and eat the cake. Consequently, for the time being, there is no major political change about fisheries agreements between Iceland and the EU underway.

According to the theory of free trade, with no restrictions, every country produces what it does best at the lowest price. There are, however, arguments for and against protectionism and for and against globalisation. The EU wants to keep employment in the fishing industry, but there is not enough fish to support all the fishermen's jobs. This difference is solved by contracts with third countries for fishing rights, and by overfishing in EU waters. In contrast, Iceland depends on fisheries to a much larger extent than any EU member does and in Iceland there is still sufficient fish to support large exports. Owners of Icelandic fisheries companies must be Icelandic citizens (Report of the Icelandic Minister of Foreign Affairs on the position of Iceland in European Cooperation April 2000). This excludes EU citizens from ownership. At the same time Icelanders want completely free access to EU countries with their fisheries products, just like there is free access to Iceland with EU industrial products. The difference is, however, that Icelandic citizens are not excluded from being owners of EU industrial companies, if they wish to

[276] Lately, as previously mentioned, there is an increasing political controversy in Iceland over how the Icelandic TACs are distributed between local fishermen, where some individuals have claimed ownership of the catch quota based on tradition, don't use it themselves, and sell it to others for a profit.

invest their money there. But it could also be argued that European industry is still a free enterprise compared to fishing, which is severely regulated with catch quotas and vessel restrictions in both the EU and in Iceland. The question may of course be asked if the EU would be better off by importing more fish, e.g. from Iceland and other countries, at lower prices than it can produce it domestically, and at the same time transfer fishermen into other industries. This would depend upon other jobs being available and the problem of immobility of fishermen discussed by Gordon in 1954 still applies. From a macroeconomic perspective, if EU fishermen occupy almost 1 % of all EU jobs and the value of the whole production chain, including processing, is only 0.25 % of the Unions GDP, it seems quite obvious that the Union's fisheries are rather unprofitable.

7 – 7 Comparison of EU and Icelandic Fisheries Policies

7 - 7. a. Purpose.

The purpose of the EU fisheries policy is to preserve fish stocks, to guarantee fishermen's livelihood by letting them catch fish, and to ensure a steady flow of fish to consumers at "reasonable" prices.

The purpose of the Icelandic fisheries policy is also to preserve fish stocks and to guarantee employment in the sector and food supply. In Iceland, however, fish exports also provide extremely important foreign currency earnings, which is not an issue in the EU.

7 - 7. b. Structure.

The structure and management of the EU CFP is more rigid and formal with the common organisation of the market, MAGPs[277], FIFG[278], and EFF[279] (and to a certain extent also the European Regional Development Fund and the European Social Fund), than the Icelandic management. This is not surprising. The EU may be blamed for bureaucracy[280] but with 250 000 fishermen scattered throughout most member states, a structure is needed. In contrast, ad hoc management is very common with the Icelandic government and it is much easier because of the small population. For comparison, a structured and regulative approach like we see in the EU management also applies to large multi-national corporations. Large multinationals have and need more internal regulations and policies than small private companies require.

7 - 7. c. Management.

Managers can only take decisions based on available information. Consequently, fisheries managers depend heavily on fisheries scientists to decide how much fish there is in the sea and how much fishing the fish stocks can support without dwindling or collapsing. Marine biologists, just like economists, sometimes have different opinions and can be

[277] The term MAGP (Multi Annual Guidance Programme) is not used after 2002.
[278] Financial Instrument for Fisheries Guidance until 2007.
[279] European Fisheries Fund as of 2007.
[280] For those claiming that the EU are bureaucrats, we may wish to recall that the EU employs about 25 thousand civil servants, but the Soviet GOSPLAN (the state committee in charge of planning in the former Soviet Union) employed one million civil servants with much less success.

somewhat hand-picked by political decision makers based on what the politician wants to hear. However, we have no indication that there is any serious intentional manipulation of scientific data, neither in the EU nor in Iceland. In fact, international coordination in this field is good and the scientific basis to make informed decisions is quite clear in both places. The honesty and quality of work presented by the civil servants of the European Commission and Ministry of Fisheries officials in Iceland is also very good. These civil servants provide recommendations to the ministers of fisheries for approval. And that is where the quality of management ends and it becomes a political rough play.

It is not the fault of the European Commission that the EU fisheries policy has been managed in such a way that some fish stocks are close to collapsing. The only "fault" that can be found, - that is if it is a fault at all, - is the required discarding of non-unauthorised but edible fish, although this rule is set to prevent intentional catches of small fish and by-catches of other species outside set quota limits (discussed in chapter 7, part 4, on Ecological and Biological Aspects of Fisheries). The European Commission has repeatedly warned about the rapidly dwindling fish stocks, but the warnings always fell on deaf political ears. The EU fisheries ministers have always approved overfishing. Their motives seem quite obvious. They simply do not want a confrontation with unscrupulous fishermen, protests, blocked harbours and unemployment. If it means that sometime after the ministers' time in office there will be no fish left, they seem not to care. It would not be surprising either, that in the future the fishermen of today would be blamed for their "greed", although the regulators and politicians also carry a large responsibility.

In Iceland the quality of advice as a general rule has been just as good as in the EU. But within the last one or two decades there has been a much stronger political will in Iceland to follow the scientific advice on sustainable fisheries than has been the case in the EU. Iceland has much fewer fishermen than the EU. Most of the general public in Iceland seems to understand that a fisheries collapse is not the way forward and that such a collapse would have tremendous negative economic consequences both for themselves and for the country as a whole. In contrast, fisheries in the EU are such a small part of the economy that the public does not really care about it. In Iceland in the past it was more a lack of thought about how much fish could be taken out of the sea, rather than deliberate overfishing.

7 - 7. d. Economic Comparison.

There are several ways to study the economic aspects of the EU CFP: as a global EU economic factor; as a per country economic factor; or as a local fisheries village economic factor. Legally there is a free flow of workers within the EU and the EEA (EEA agreement). However, it is easier said than done to move to other jobs within the EEA, amongst other because of the language barrier. With the exception of the captain and the higher officers on large trawlers, fisheries, just like agriculture, depend essentially on unskilled labour. Lack of education often makes finding a new job more difficult. In many local coastal areas of the EU, e.g. Atlantic coast of Spain and parts of Scotland, fisheries are just as important as in Iceland, providing 10% - 20% of all jobs. If fisheries in those areas collapse, the fishermen may move to other work within their country, although there may be certain immobility as discussed by Gordon (1954). Since fisheries do not collapse in a few moments but dwindle over a number of years, there should be ample time for fishermen to move to other occupations. As discussed earlier, fisheries do not exceed 1 % of GDP in any EU member state and for the EU as a whole it is only 0.25 % of the GDP. Considering how small part of the GDP is from fisheries in the EU, it is obvious that fisheries have very little economic influence on member states, and even less on the EU as a whole. EU fisheries are only of significance in a few regional economies.

In Iceland, as mentioned earlier, fisheries contribute directly to approximately 6% of the GDP, and also contribute indirectly to a large part of the service economy. Furthermore, they provide 1/3 of all the foreign currency earnings, which is in stark contrast to how unimportant fisheries are in the EU. Fisheries in Iceland provide a substantial input into the country's economy, while in the EU fisheries are more a social policy to keep fishermen employed. Thus the economics behind fisheries in Iceland are quite different from the EU or any EU member state.

Table 32. Comparison of fisheries policies in the EU and Iceland

	European Union's Common Fisheries Policy (CFP)	**Iceland's Fisheries Policy**
Purpose (same)	Preserve fish stocks and produce food.	Preserve fish stocks and produce food.
Structure (different)	Relatively structured and centralised with a common fisheries policy for the Union.	Relatively flexible because of a smaller and simpler bureaucracy .
Management (different)	Good factual knowledge about the state of resources. Not very successful in its purpose to preserve fish stocks. Political decisions to maintain social peace amongst fishermen.	Good factual knowledge about the state of resources. Relatively successful in preserving fish stocks.[281] Maintained as a large export industry.
Economic impact (different)	Marginal in the Union as a whole. Considerable in some regions.	Large, both regionally and for the whole country.
Scientific advice (same)	Very good.	Very good.

[281] Sown in Annexes 4 and 5 on pages 254-257, Icelandic fish stocks have in general terms declined less than EU fish stocks. Some Icelandic fish stocks have even grown over the last two decades, e.g. the herring. However, the Icelandic cod stock, which is the most important stock, has declined.

7 – 8 Effects of Icelandic EU Membership on the Icelandic Fisheries Industry

It is worth considering the effects on the Icelandic fisheries industry per se if the country joined the EU. Most Icelandic fish imported to the EU enjoys a very low tariff. Consequently, the net changes in fish sales and profits if becoming a EU member is likely to be rather small. We also have reservations about the benefits of EU funds directed towards the fisheries industry since there is little or no room to increase fishing capacity. With little room for additional investments, at least in the short term, the financial structure surrounding the fisheries industry is not expected to change drastically, although ownership of companies might change. The major change we see in Iceland stemming from EU membership would be the long-term decline of fishing as a resource and its associated industry if EU fisheries management would be accepted in its current form. Since the EU fisheries ministers accept that more fish is caught than fish stocks can support, leading to a large decline in catches, a collapse of fish stocks cannot be excluded. This will lead to a steady decline of the industry and possibly terminate with its partial or complete disappearance. Fisheries in Iceland are a production industry and if the production stops, a large part of the service industry that depends on the production industry will also run into difficulties. It is not straightforward to say that the approximately 5 % of the workforce currently employed in fisheries could change over to other professions. There would be a chain effect of unemployment in the associated service industry, but the adjustment would most likely be smooth because fisheries normally take years or even decades to disappear. In order to avoid confrontation in the EU Council of Fisheries Ministers or qualified majority voting on fish catch quotas, it is therefore important for Iceland that the subject of quota distribution be clarified beforehand in accession negotiations. An issue we would also like to mention is possible influence of the European Economic and Monetary Union (EMU). Iceland is currently not a member of the EMU and if becoming a EU member it is expected that Iceland would join the EMU in due time. There is no guarantee that fish catches would match the economic cycles in the Euro-zone. Since the Euro as a currency is controlled be the European Central Bank, it would be impossible to use a national currency to buffer profits and losses in the fishing industry and its related exports. (The effects of the EMU are analysed in chapter 5). Although the Icelandic Krona has been floating

for the last two decades,[282] devaluations were commonly used in the past to temporarily boost profits in the fishing industry, as every time the Krona was devalued exported fish would give higher returns in domestic currency. Participation in the EMU would exclude this option, although it can be argued that a stable currency is also an advantage for an export dependent industry such as the Icelandic fisheries. The Icelandic economy's dependence on foreign currency earnings would be removed if Iceland joined the EMU.

To summarize the likely short-term effects on the fisheries industry in Iceland stemming from EU membership, we believe that ownership of some vessels and fish processing factories could move to non-Icelandic EU investors, which might push the share price in fisheries firms upwards. We see little practical difference in that or if Icelandic owners of said companies invest their profits elsewhere in the EEA than in Iceland[283]. In any case, there is little room for additional investments given the current catch quotas. When entering the EEA, Iceland agreed to a free flow of capital with the other EFTA-EEA states and with the EU countries, with the exception of ownership of fisheries companies. Extending this free flow of capital to the fisheries companies cannot be a major issue, as long as the rule is maintained that a certain amount of landings must be processed in the country of the vessels' registration, which indeed is a measure to support local industry. As the current Icelandic catches and catch quotas are all "sold out", there cannot be a major change neither in the quantity nor price on the sales simply by joining the EU. The biggest and most likely change would be the steady decline of the resource, eventually leading to a collapse of the industry as a whole, - unless the current EU management practices are changed dramatically in line with the Icelandic management practice.

There have been suggestions that the Icelandic fisheries resource would be better utilized if fishermen (fisheries companies) had to pay a fishing fee (see e.g. Gylfason (1992), Gylfason (2001) p. 246-251, and Gylfason and Weitzman (2002)). Fishing fees are not incompatible with EU membership. As noted by Sigurjonsson (1991), based on tradition, the fisheries quotas in Icelandic waters would normally be allocated to those who used them in the most recent past, which for the largest part are the Icelanders themselves. This is in accordance with the principles of relative stability. Although decades and centuries ago other nations used to fish in waters which are today within the Icelandic exclusive economic

[282] Temporarily suspended after the economic crisis in 2008.
[283] E.g. tax shelters such as Luxembourg.

zone, the EU quota distribution is based on current fishing activities. Consequently, after the EU fisheries ministers decide on the yearly TACs, it would then be an Icelandic national affair how Iceland distributes its allocated quota internally, just as it is today. The scenario would most likely be that the EU TAC given to Iceland would be higher than suggested as sustainable yield by the Icelandic Marine Research Institute. Iceland would then have the option not to distribute the excess part, arguing that it would be counterproductive for future fisheries. Such an argument would likely fall on deaf ears amongst many of EU's fisheries ministers. This would then risk that some EU fisheries ministers at their next quota allocation meeting would rather see the quota unused by Iceland allocated to other nations in order not to "waste it". That would be a no-win solution as the excesses would still be caught and additionally not to the benefit of Icelandic fishermen. The other solution, which is the one we prefer, is that Iceland would sell its catch quotas on a gradual price scale. When the catches in Icelandic waters reach the limits suggested by marine scientific advise, the prices on the remaining quotas would be set so high that it would not be economically viable to use the marginal catch difference all the way up to the EU allocated TAC. In such a manner Iceland would offer all its allocated quota for distribution, but at the same time ensure that sustainable yield would not be exceeded as nobody would be willing to pay the "exorbitant" fees for the quantity passing sustainable yield. As mentioned above, it is important that the quota distribution is not left to chance, subject to yearly negotiations and the mood of those implementing the CFP, but pinned down in accession negotiations.

7 – 9 Concluding Remarks on Fisheries Policies

When considering whether the Icelandic fisheries policy is comparable to the EU CFP, and if not, what the differences might be, we can conclude that the management of Icelandic fisheries differs considerably from the EU CFP. There are similarities between the Icelandic and EU CFP scientific advice, although the political decision on Total Allowable Catches (TACs) are not based on the same ideas. In Iceland it is sustainable yield that decides the TACs, and in the EU CFP it appears to be more contemporary yield that influences the TACs, rather than the official line of long-term sustainability. In contrast to Icelandic fisheries policy, EU fisheries ministers always agree on catching more fish from the ocean than the fish stocks can support in the long term. Since wild fish stocks are currently one of Iceland's most important natural resources, contributing to about 6% of its GDP, damage to the fisheries as a resource would hurt its economy considerably more than it would hurt the EU, where fisheries are only 0.25 % of the GDP. Annex 4 on page 254-255 shows the negative evolution of fish stocks in EU waters over the last 3 decades. It is difficult to say where this will end, but a 50% reduction in fisheries is what the EU is facing right now. Therefore it cannot be excluded that the same might happen in Icelandic waters unless precautionary measures would be clearly specified in the accession treaty. We find that the EU practice of allowing constant overfishing year after year, because of local community and social needs of the current generation of fishermen, is very counterproductive for future generations. We also have to emphasize quite strongly our opposition to a possible destruction of the planets ecosystems through overfishing, especially when there is no need for it in order to produce sufficient food for everybody.

Fisheries policy is a politically sensitive subject in Iceland when discussing possible EU membership. Furthermore, as mentioned above, there is also an ongoing discussion in Iceland about the internal distribution of fisheries catch quotas. Some fisheries companies have claimed an almost ownership of the catch quota, based on tradition, and in some cases are not using it themselves, but selling or renting it to others. It is important to recall that the EU CFP does not distribute the national catch quota within a member state. As mentioned earlier, the EU under its CFP programme is only involved in distribution of catch quotas between member states and in the decision on the total allowable catch. Internal distribution of catch quotas within a EU member state is a domestic affair.

It is clear that fisheries contribute much to the Icelandic economy and to the service industry that depends on fishermen. A destruction of the fishing grounds would be a disaster. Nevertheless, it seems a mistake to simply exclude EU membership beforehand because of the Union's CFP, without trying to negotiate an acceptable deal, where strong emphasis would be on sustainable fisheries. It is not possible to tell in advance if an acceptable deal can be reached or not, but Iceland can demonstrate a considerably more responsible fisheries policy than the EU, which should give a good negotiating position. Clearly, in any EU accession negotiations political-legal issues would have to be worked out for the fisheries industry in order to protect the resource from overexploitation, i.e. that scientific advice on catch quotas be followed regardless of contemporary economic requirements. The facts on European fisheries are clear, both the marine-biology and the economics, but political-legal solutions acceptable to all remain to be worked out.

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