

# **Industrialized Fisheries in Arctic and Antarctic Waters:**

## **Selected Atlantic Fishing Industries and Arctic Regions in a Historical Perspective**

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*Fisheries in the high latitudes were, up to the middle of the 20<sup>th</sup> century, largely a domestic affair of the Arctic societies. Only technological innovations of the 20<sup>th</sup> century, most notably the introduction of factory-freezer-trawlers to the fishing fleets of a number of industrialized and in particular European countries, enabled low to mid-latitude nations to participate in these fisheries. After the introduction of highly sophisticated fishing vessels to the distant-water fishing fleets, a number of conflicts between coastal nations and distant-water fishing nations occurred in the North-Atlantic basin that resulted in short time in the extension of national fisheries jurisdiction of Arctic and Subarctic nations and finally in a more or less complete nationalization of the Arctic fisheries. An unintended side effect of this nationalization was the transfer of fishing conflicts from an international to a domestic level within these nations. Now there are large-scale industrialized domestic fisheries operating for shareholder value on the one side, and subsistence fisheries on the other side. After the exclusion of the former distant-water fishing nations from fisheries in the Arctic parts of the Atlantic, some fishing companies of the nations formerly active in the North Atlantic Arctic region developed a fishery in the Southern Ocean off Antarctica. With no national jurisdiction but only a somewhat weak international treaty system in existence, new fishing conflicts arose in the South. But unlike the conflicts in the Arctic, these conflicts were between multinational groups interested in the protection of the marine ecosystem and national/multinational companies directly interested in shareholder value. While it seems that the domestic conflicts of the Arctic and the international conflicts of the Southern Ocean are completely different, they are in fact the two sides of the same coin. Fisheries in the high latitudes have been, throughout the 20<sup>th</sup> century, a mirror of the wider socio-economic question if natural resources are a common good or an exploitable resource.*

### **Origins of Non-Domestic Fisheries in High Latitudes**

Despite the rapid increase in international distant water-fisheries after the introduction of the first steam-trawlers at the end of the 19<sup>th</sup> century, Arctic and Antarctic waters saw

comparably little non-domestic fishing activities up to the end of WWII (Baartz, 1991). The fisheries of industrialized fishing nations like the UK, Germany, and other European nations that had established industrialized fishing fleets, focused on fishing grounds not too far away from their respective landing ports and areas of consumption. Arctic and Antarctic waters and even the high latitudes of the North Atlantic remained outside of their interests for two main reasons: on the one hand it simply made no economic sense for them to send their fishing vessels to high latitudes as long as desired species were available in short distance from the landing ports; and on the other hand as long as the main preservation method for the catch was storage on ice, the durability of the catch remained limited to a period of up to only 20 days after the first haul (Walter, 1999). Consequently the fishing grounds of the high latitudes could not be harvested by industrialized fishing nations as the fish caught in these areas would have been no longer suitable for human consumption, due to the sheer distance between the Arctic and Antarctic waters and the main consumption centers in the dense populated areas of Europe, the Americas or Australasia. Up to a certain degree this situation was different when it comes to the fisheries of the Iberian Peninsula, France, and Northwest-Atlantic nations like Canada and the US, as the fisheries of these areas continued with traditional fishing methods and the production of salt-fish and consequently had no need to worry about the quick decay of their catch. Anyhow it needs to be stated that these fisheries were not industrialized fisheries and had little effect on the developments discussed in this article.

Despite the technological difficulties and in particular the issue of preservation of catch, some European fishing nations that had introduced mechanized and up to a certain degree industrialized fisheries began, as early as the 1890s, to explore Arctic regions. In particular Germany was interested in exploring new fishing grounds after the first signs of stock depletion have been observed in the North Sea region, while other European nations that had introduced steam-trawlers, most notably the UK, intensified their fishing effort within the North Sea as a reaction to decreasing catch per unit efforts, a.k.a. relative over-fishing. The main target areas for the German fishery's expeditions into the Arctic were Spitsbergen and most notably Bear Island. Bear Island was not only widely considered as *Terra Nullius*, but also offered with the coal deposits on the island at least a theoretical chance to establish coaling stations for the trawlers, without which re-coaling would not have been able to return to their respective landing ports. Although three expeditions of the German Sea-Fisheries Association (*Deutscher Seefischerei-Verein*), partially supported by the German Imperial Navy, in the years 1898, 1899, and 1900 to Bear Island proved the possibility of fisheries and coal mining (Henking, 1901), the project was not continued for two main reasons: 1) there was the still unsolved issue of preservation of catches caught far from the German landing ports; and 2) the German Empire no longer supported the efforts which were, from the point of view of the government, largely a cover for a colonial expansion into the Arctic (Barthelmeß, 2000). Consequently the whole Bear Island project needs to be considered much more as being part of the history of Arctic colonialism than of fisheries history of the high latitudes.

After the end of the Bear Island project, the situation remained structurally largely unchanged for several decades. The nations interested in the development of industrialized fisheries gradually expanded their operational range to the North, but even with new technologies available, like for example the Bauer-Wach exhaust turbine system or the Maierform bow-

design for fishing vessels, the high latitudes of the Atlantic remained outside the operational range of the trawlers of nations like the UK or Germany. Only the vessels of the traditional, non-industrialized fisheries of nations like Spain, France or Portugal were able to embark on extended journeys, due to their salt-fish production. While the US and Canada would definitely have been able to introduce modern fishing technology and in particular steam-trawling, their fleets hesitated or even rejected the new technology (Balcom, 1996) and thus no industrialized fishing vessels of these nations showed up on the fishing grounds of the Atlantic Arctic.

## **After World War II**

This situation changed really for the first time only, when after the end of WWII and the reconstruction period of the international distant-water fishing fleets, competition on the near-by fishing grounds of the main consumption areas reached such levels that overfishing became a reality, and more importantly the catch per unit effort began to decrease dramatically. In addition, the changes of the political map of the North Atlantic which included sovereignty for Iceland, Newfoundland joining Canada and giving up close ties to the UK, and in particular the first steps of the extension of national fisheries limits of these nations, caused the European industrialized distant-water fishing nations to lose access to their traditional fishing grounds (Thor, 2000). If these fishing nations wanted to continue distant water fishing activities and thus ensure the supply of their domestic markets with fish caught by their own fleets, the options available to them were limited.

Basically all of them faced a situation very similar to the situation that made Nazi Germany one of the most technologically advanced fishing nations during WWII. Any increase of landings required the development of fishing technology and in particular fish preservation technology that allowed harvesting of fishing grounds not used up to that point: fishing grounds much further to the main areas of consumption, most notably Arctic and later on Antarctic areas (Janssen, 1939).

The use of such fishing grounds required new technologies for the preservation of the catch onboard the fishing vessels. The most promising technological approach seemed to be deep-freezing technology. Fishing companies in Nazi Germany had spent a lot of effort on developing technical solutions for onboard freezing of the catch and finally developed two experimental factory-freezer vessels. While the HAMBURG, a former cargo vessel, was converted into a floating frozen fish factory that should process the catch of traditional trawlers on the fishing grounds, the other ship, the WESER, was a real factory freezer, meaning a vessel that combined catch and deep freezing technology onboard a single vessel (Hilck & Auf dem Hövel, 1979). Both vessels finally failed to operate on Arctic fishing grounds due to WWII, but at least it has been proven that the concept of the factory freezer trawler could become a reality (Heidbrink, 2008b).

After the end of WWII a number of European distant water fishing nations, most notably the UK, West Germany and the Soviet Union, revisited the concept of the factory freezer trawler and began to develop factory freezer trawlers that combined the idea of the floating fish processing factory with deep freezing capability and the stern ramp design used by the factory ships of the whaling fleets of the 1930s. The result of this development was the stern-

ramp factory freezer trawler. The first ships of this type were built during the 1950s in the UK for Salvesen, a fishing company that had close ties to the whaling industry. But the concept became most accepted only after the Soviet Union ordered their first factory freezer trawlers with stern ramps at a German shipyard, and other nations, for example East and West Germany, also built their first series of factory freezer trawlers (Heidbrink, 2011). Interestingly enough Canadian fisheries experimented with factory freezer trawlers, but due to a number of organizational difficulties never introduced them in large scale to the fleets of their Atlantic fishing ports (Canada. Dept. of, Oceans, Steering Group for Monitoring Socio-Economic Impacts of the Factory Freezer Trawler, Gardner Pinfold Consulting, & Griffiths-Muecke, 1987). Nevertheless it can be stated that the introduction of the factory freezer trawler was one of the most important changes that ever happened in the context of the North Atlantic and the related Arctic fishing industries. But despite the importance of this change it needs to be mentioned that only a limited number of nations participated in this change, most notably the UK, the Soviet Union and its satellite nations, as well as smaller Western European fishing nations, with West Germany by no means the most relevant nation in this context, but up to a certain degree at least the technological leader (Heidbrink, 2011).

Arctic nations also modernized their fishing fleets after WWII, but did not introduce factory freezer trawlers due to a variety of factors, most notably the comparably small size of their operations. The most important fishing vessels of the Arctic nations became relatively small fishing boats that were equipped with diesel engines but still largely limited to operations in coastal waters (Sverrisson, 2002).

An ever increasing demand for fish in the main European and American markets, combined with the building-up of large scale fishing fleets by some of the European distant water fishing nations and the newly achieved complete or partial sovereignty of Arctic nations, led more or less automatically to severe international conflicts on access to fishing grounds off Arctic and sub-Arctic regions, in particular the fishing conflicts between Iceland and the UK and West Germany. The story of this conflict is well known and a number of recent historical studies suggested that besides the political dimension and the economic decolonization of the North Atlantic region another major reason for the conflict had been the different levels of fisheries technology available to the fishing companies of the nations involved in the conflict (Heidbrink, 2004; Jón Þ, 1995). On the one side of the conflict were the industrialized European distant water fishing nations using highly sophisticated factory freezer trawlers with electronic fish detection equipment, while on the other side the Icelandic fisheries were widely depending on less sophisticated technology and comparable small and often open vessels for coastal operations (Guðni Th, North Atlantic Fisheries History, & Fiske Icelandic, 2007).

During the course of the conflict that was often referred to as a 'Cod War', it became obvious for the European distant water fishing nations that access to the fishing grounds off Iceland would come sooner or later to an end (Gilchrist, 1978). At the end of the conflict in 1976 the UK needed to accept the Icelandic claim for a 200 nm fishing zone and thus the mid-Atlantic fishing grounds off Iceland were no longer available for European distant-water fishing fleets (Hannes, 1982).

While the Cod Wars marked an important step towards a complete economic sovereignty of Iceland, it left the distant-water fishing nations not only with a lost minor international conflict, but also with a severe problem. While the fish supply for the European markets could be widely secured by imports, there was also the problem of what to do with the factory freezer trawler fishing fleets that have been built up only a couple of years earlier. The obvious thing to do for the fishing companies owning and operating these trawlers was to look for new fishing grounds for these ships. These fishing grounds were finally found in the Arctic and a couple of years later also in the waters off Antarctica. Of course there were enormous technological challenges to operate the ships in the often ice-covered waters of the high latitudes, but due to a number of technological innovations these problems could be largely solved (Meeresforschung, 1994). European trawlers and in particular West German trawlers began to operate off Greenland, Newfoundland and up the Labrador coastline, and many other areas of the Arctic. Thanks to the deep-freezing technology onboard the vessels, the long distance between the new operational areas and the European landing ports did not matter (Heidbrink, 2011).

But of course as the Cod Wars did not only result in an extension of the Iceland fishing zone up to 200 nm, but the introduction of 200 nm Exclusive Economic Zones all along the Arctic coastlines and ultimately the Third United Nations Convention on the Law of the Seas (UNCLOS III), the operations of factory freezer trawlers needed to be done on the basis of quota negotiations between the respective coastal nation and the distant-water fishing nation. At any rate, as the regulations of UNCLOS III required that fishing quotas should be made available to foreign fishing fleets if the domestic fisheries could not utilize the whole amount of the maximum sustainable yield for the respective areas, distant-water fishing nations could continue operations on Arctic (and Antarctic) fishing grounds (Stokke, 2001).

Thus the situation for most parts of the Arctic were during the 1980s as the following: domestic fisheries of the coastal nations operated on the inshore grounds with fishing boats and equipment of a low technological level, while the offshore grounds were worked by factory freezer trawlers of distant-water fishing nations on the basis of quotas made available to these nations.

### **After the Re-Organization / Extension of Fisheries Limits**

This situation could not last long for a variety of reasons. First and foremost was the simple fact that the domestic fisheries of Arctic nations should not only contribute to domestic consumption, but for the development of export markets. As these fisheries were charged with the task of generating revenue for sustaining the newly reached sovereignty and supporting the related societal changes, they needed to be transformed from a domestic industry into an export-oriented industry (Canada. Dept. of, Oceans, & Crosbie, 1985). Second and of nearly equal relevance, the distant-water fishing fleets of the European nations lost a good deal of their former economic importance as the European fish processing industry began to import the majority of their raw material supply, and at the same time operations in the remaining areas open to European distant-water fisheries became somewhat uneconomic due to heavily increased fuel costs. The time was ripe for a change.

Ending the differences in the level of technological advancements between the domestic fishing fleets of the Arctic and sub-Arctic nations on the one hand, and the distant-water-fishing nations on the other, largely achieved this change. Nations like Iceland and Norway invested in a modernization of their fishing fleets, which soon became as equally sophisticated as their distant-water fishing nations counterparts (Hersoug, 2005). Still other nations, for example Canada, could not make this transition due to a number of domestic factors, most notably a certain kind of resistance to new technology by Canadian fishermen (Balcom, 1996; Canada. Dept. of et al., 1987). The modernization in nations like Iceland and Norway became mainly possible as the opening of the markets of the traditional distant-water fishing nations for fish imports, markets that were widely closed to imports due to various mechanisms of protectionism up until then, provided such positive economic returns for the fisheries of the coastal nations of the Arctic and the sub-Arctic that the technological change could be sustained. In addition, new actors like the government-owned Greenlandic fishing fleet successfully entered the markets. Despite the fact that the fishing vessels employed by the domestic fishing fleets of the Arctic- and sub-Arctic nations during the 1980s and 1990s were smaller in size than the vessels typically used by the distant-water fishing fleets during the 1960s and 1970s, the vessels had a very similar level of technology or even surpassed them. Electronic fish finding equipment, mid-water trawls, onboard automated processing equipment etc., quickly became the standard for the trawlers of the Arctic and sub-Arctic coastal nations. In fact the technological lead for research and development of fishing technology and fish processing equipment moved from places like Bremerhaven to places like Reykjavik (International conference on fishing vessels, fisheries, & Royal Institution of Naval, 2005).

But of course the main markets for fish caught on Arctic and sub-Arctic fishing grounds remained widely the same, meaning the European and North American markets. The development described up to now might be summarized mainly as a move of the profit-centers from places like Bremerhaven, Cuxhaven, Grimsby, Hull and Gloucester, MA to northern Norway, Iceland and Greenland.

For the coastal population of the Arctic the situation remained largely unchanged, as it was still the heavily industrialized trawlers that were utilizing the fishing grounds off the coast, regardless of if they were flying the flag of an Arctic or sub-Arctic nation or the flag of a distant-water fishing nation. In fact the situation may have become even worse for the coastal populations of the Arctic, as it was no longer the fisheries of a foreign nation that was responsible for the (over-) utilization of the fishing grounds off their coast, but fishermen of their same nation. An international problem had become a set of domestic problems for the Arctic and the sub-Arctic nations. During the struggles on the extension of national fisheries limits or the exclusion of distant-water fishing fleets from operations on the coastal fishing grounds of the Arctic and sub-Arctic territories, the Arctic and sub-Arctic nations were kind of united by fighting a common enemy, a.k.a. the highly sophisticated fishing fleets of the industrialized European fishing nations. Now, it had become a struggle between those fishermen who had been able to modernize and build up export-oriented fisheries comparable to the former distant-water fisheries, and those that were truly domestic and/or local fisheries.

As the fishing pressure on stocks continued to increase, and importantly severe overfishing and collapse of certain stocks became a reality, the struggles among the various fisheries continued as well, but were no longer primarily a fight on the international stage, but rather in the parliaments of the Arctic and sub-Arctic nations. With the disappearance of a common enemy, the differences between the various stakeholders and actors became more visible and more obvious, and the domestic struggles became at least somewhat analogous to the former international struggles.

A particularly interesting example in this context seems to be the struggle for modernization of the Newfoundland fisheries during the late 1970s and 1980s. While up to this point Canadian fishing industries had hesitated to introduce highly sophisticated factory freezer trawlers following a tradition reaching back to the first decades of the 20<sup>th</sup> century (Balcom, 1996), the Canadian government now tried to foster such a development by chartering West German factory freezer trawlers for trial fisheries in the late 1980s (Canada. Dept. of et al., 1985). However when a Newfoundland fishing company tried to establish a joint venture with a West German fishing company and gained support for the project by the Newfoundland provincial government, the federal government of Canada intervened and ended the joint venture before it became a reality (Heidbrink, 2004).

Nevertheless, many Arctic nations modernized their fishing fleets successfully and built up impressive technologically sophisticated industrial fishing fleets.

The ever increasing demand for fish in Europe and North America caused the now large and industrialized fishing companies of the Arctic and sub-Arctic nations to explore the fishing grounds further north and thus to get in direct competition with local small scale fisheries. Again, there were on the one side highly sophisticated fishing trawlers of large fishing companies like Royal Greenland or the Icelandic Samherji Group; while on the other side there were locally operated small scale fisheries with their comparably small and less sophisticated fishing vessels. Up to a certain degree it might be stated that history repeats itself at least when it comes to the competition between industrialized and traditional fisheries, even if the theatre of the conflict moved further north and the political conflict was fought within national parliaments and governed by domestic instead of international law.

## **The Markets**

Thus it might be interesting to look at the markets for the products of these fisheries and how they have changed during recent decades. When it comes to the market for the industrialized fisheries there can be no doubt that the main markets for these fisheries are the frozen-fish markets of Europe and North America, or in a very simplified approach the raw material markets for the frozen fish processing industries of these regions (Heidbrink, 2008a). With fish no longer an easily perishable good, but a frozen staple and industrial raw material, the market has become global with only large scale players surviving in the field. Thus only the highly modernized fisheries might be able to survive in a market that is characterized by global competition, with even Southeast Asian players being routinely involved. While it has become clear that companies like Royal Greenland, the Samherji Group, or other actors of the same size might be able to act successfully in this market, it has also become obvious that local fisheries of the Arctic regions cannot survive in this market.

But while this segment of the market is without doubt the most relevant when it comes to the volume of the trade, it needs to be noted that this is not the only segment of the European and/or North American main markets; there is also a high-price segment of the market that is not looking for the cheapest supply of raw-material for industrial processing of fish, but for at least somewhat exotic high quality products in comparably small quantities.

Although the competition between domestic fisheries and international distant-water fishing fleets is no longer the main issue when it comes to fisheries in high-latitudes, rather it is the competition between highly sophisticated large scale fishing fleets and comparably small-scale and less technologized fisheries, the structure behind the conflicts about fishing in Arctic waters remains basically the same. On the one hand there are large companies mainly operating for shareholder-value even if these shareholders might be citizens of Arctic or sub-Arctic nations, and on the other hand there are small-scale operations with comparably low levels of financing available for the implementation of modern technology. Thus the issue of how easily technology is available to certain fisheries remains one of the most important questions when it comes to recent developments within Arctic fisheries.

The larger trawling companies operating today in Arctic waters followed more or less the same approach as their predecessors flying the flags of the various now historic distant-water fishing nations. Every new technology available on the market has been adapted to their fleets as soon as the technology became available, and more importantly these fishing companies were often the main drivers behind the development of such technology. However levels of technology never experienced before have more recently characterized local fisheries throughout the last decade. GPS navigation, digitalized fish-finders, communication via cell-phone, internet-based data-exchange with the buyers on the main markets, etc. are technologies that are no longer only available for highly industrialized fishing vessels, but basically for any fishermen that can afford a smart-phone. Thus while differences in available technology may have been the characterizing feature for the fisheries and related conflicts throughout most of the 20<sup>th</sup> century, today there is largely an equilibrium when it comes to the technological standards of small scale subsistence fisheries and large scale industrialized fisheries. Whenever boarding a fishing vessel that is operating in high-latitudes, it is more or less certain that the digital revolution has already entered the vessel, regardless if one is talking about a trawler of up to 100m total length, or an open boat of less than ten meters. Does this mean that the fisheries of the Arctic today are fisheries with the same chances and opportunities regardless if they are small or large- scale fisheries?

In an ideal world, the answer to this question should be of course a simple yes. But unfortunately the answer is much more complex and basically tied to the legal systems that are in place for regulating the fisheries. While in the pre-UNCLOS III world, it was up to a certain degree who was friend or foe and thus the Arctic nations had a kind of common enemy – the distant-water fishing nations – the focus of Arctic fishing conflicts have now shifted to conflicts within the Arctic societies (Stokke, 2001). It is no longer a question of discourse and conflicts among different nations, but a question of political debate within the Arctic nations. The question is no longer if the coastal nation or the distant-water fishing nation should own the fish off the coast, but if local populations or larger (industrialized) corporations should.



## **Management Systems**

While it is obvious that the issue of access to the fishing grounds of the Arctic needs to be discussed within the Arctic nations, and it is also obvious that this is a task for the stakeholders directly involved, for a historian, this article would not be complete without some remarks on the various fisheries management schemes, their respective genesis, and maybe even some comments on their potential consequences for the future fisheries in the Arctic. In addition to the various stock collapses or more generally the issue of overfishing, the extension of the fishing limits to 200 nm has clearly shown that even in a period in which the stocks were no longer a global common or open access resource, there was by no means a guarantee that overfishing could be prohibited. There should be no need to refer to the impressive body of research on fisheries management and its development, but at least it should be mentioned that the mere existence of such systems would not save the fish stocks or the fisheries, especially as long as these systems do not include all actors (Jantzen, 2010).

The most traditional approach of fisheries management is the extension of fishing limits of certain nations. This approach has dominated the Arctic fisheries for most of the 20<sup>th</sup> century with Iceland the forerunner as well as the most successful nation when it comes to this approach (Guðni Th et al., 2007). But once the fisheries limits were extended and consequently most of the fishing grounds nationalized, this approach came basically to an end as up until then the model of exclusive fishing rights for inhabitants of certain regions was only rarely broken down to the domestic level. Instead, a variety of quota systems were established in the Arctic nations, with many of them in favor of the approach of Individual Transferable Quotas (ITQ). In a simplified model ITQs transfer fishing rights into a commodity that can be traded within certain groups, normally the inhabitants or active fishermen of a certain nation (Finley, 2011; Jantzen, 2008). Thus, the fisheries in Arctic nations that have introduced ITQ based systems are up to a certain degree simply following the mechanisms of a capitalistic market, and according to a number of economic models and observations over the last decades it is more or less safe to assume that pure ITQ systems will result in a concentration of the fishing rights, and thus the fisheries, in the hands of a very small group of actors: the fishing companies that can not only afford to buy larger industrialized vessels, but to also buy the quotas. Individual small-scale fishermen might be tempted to simply sell their quota and give up the fisheries, and retire on the revenue generated by selling the quota. In the end it needs to be determined if the future of the fisheries in the Arctic should be dominated by a capitalistic microeconomic approach, or if and up to what degree macroeconomic perspectives should be taken into account. From a somewhat cynical view the question could also be asked if by a microeconomic point of view it makes sense to continue with any settlement in the Arctic or if it would be much more economical to move the whole population to Europe, the Canadian mainland or the continental USA in the case of Alaska (often nicknamed simply as the lower 48). Of course this is not an option, but if we take other reasons than economic reasons into account for the question why Arctic people should remain in the Arctic if they want to, these reasons also needs to be taken into account when it comes to a fisheries management system. Consequently it seems to be highly disputable if ITQs equally shared among the population/fishermen of an Arctic nation are really an option for the future of the Arctic.

Again, it is up to the Arctic nations and their citizens to make this decision themselves. But it should be considered at least that the economic and political centers of the Arctic of today sometimes operate in many aspects similarly to the economic and political centers of the distant-water fishing nations of the past, at least from the perspective of people living outside these centers.

## **Antarctica**

After the coastal nations of the North Atlantic area had extended their fishing limits up to 200 nm there were only very few options left for the traditional distant-water fishing nations. Many of them finally decided to leave the fisheries to the coastal nations, but not without exploring other options in high latitudes prior to selling or scrapping their trawlers. One of the options was the Southern Ocean or fisheries off Antarctica. While operating vessels in the remote Southern Ocean was not really new to many of the European distant-water fishing nations, as they had participated in the pelagic whaling activities of the 1930s (Tønnessen & Johnsen, 1982), the situation now was completely different, as they had never carried out commercial fisheries in the area before and more importantly their knowledge about potential target species and their physiology and biology was limited at best. Consequently, the beginning of commercial fisheries off Antarctica was highly experimental with only a small number of nations involved. The main target species was not even a real fish, but Antarctic krill that was considered a nearly endless protein supply and as such the answer to the question of global population growth and the related demand for food supplies (Grantham & Southern Ocean Fisheries Survey, 1977).

While at least some of the fishing nations involved could solve the technological problems of Antarctic fisheries, the krill fisheries remained to a certain degree a limited episode in global fisheries history, as krill was not easily digestible for humans and the original estimates for Maximum Sustainable Yield (MSY) were way too high. Anyhow, the Antarctic krill fishery had demonstrated that fishing in high latitudes was not limited to the Arctic, but could also be done in the Southern Ocean. But there was one major difference between the North and the South: while the fishing grounds off the North had more or less completely become nationalized between the end of WWII and the late 1970s, the fishing grounds in the South remained open access, and with the suspension of all national claims in Antarctica due to the Antarctic Treaty System, there were basically no national regulatory systems for the fisheries, but only a comparably weak international treaty system and some national regulations for the fishing zones of sub-Antarctic islands, such as South Georgia. There was another major difference between the Arctic and the fishing grounds off Antarctica: while competition between domestic and distant-water fisheries had always characterized fisheries in the North, there were no domestic fisheries off Antarctica.

Consequently the development of the fisheries off Antarctica followed completely different rules than fisheries in the North. Operating fishing vessels in the Southern Ocean required extremely sophisticated fishing vessels and during the first decades of these fisheries only the rich traditional fishing nations of the northern hemisphere participated in the fishery, with the fisheries of the Eastern Block nations being most active. After a very short time these nations realized that due to the different life cycles of target species in the Southern Ocean, MSY estimates were way too high for most species and a reduction of Total Allowable Catch

(TAC) was required. With the reduction of TACs for many species, combined with ever increasing fuel costs, a continuation of fisheries in the Southern Ocean made no economic sense for many nations, and the fisheries off Antarctica remained widely an unsuccessful experiment for them. Contemporary literature of the 1980s about Antarctic resources came to the conclusion that the effort required for the results obtained from an Antarctic fishery for any finfish species would never provide a reasonable return (Bonner, 1986).

Nevertheless, and in particular as some finfish species showed clear indications of overexploitation, the nations interested in Antarctic fisheries began negotiations around an international convention for regulating Antarctic fisheries. The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) became open for signature in 1980 and entered into force in 1982. CCAMLR was originally signed by fourteen nations, and is today ratified by 35 nations and the European Union. In contrast to other international fisheries conventions, CCAMLR is mainly an ecosystem-oriented scientific instrument and does not include specific operational targets for fisheries, such as quotas, TACs, MSY-figures etc. (Fernholm & Rudbäck, 1989). Consequently CCAMLR was a comparably weak instrument when it came to applied fisheries management, and fisheries like the Patagonian or Antarctic Toothfish fishery, with their substantial portion of Illegal, Unreported, Unregulated (IUU) fishery, clearly demonstrates that still today the problem of Antarctic fisheries needs to be solved by the international community (Dodds, 2000).

### **Arctic – Antarctic**

Any comparison between the Arctic and the Antarctic fisheries during the second half of the 20<sup>th</sup> century needs to come to the conclusion that fisheries in both high latitudes have changed dramatically due to the availability of modern fisheries technology. More importantly, any comparison will also come to the conclusion that the availability of modern fishing technology has not solved the problems of the fisheries, but rather contributed or in the case of the Antarctic fisheries even generated substantial issues and sometimes even severe international and/or national conflicts among the various stakeholders. But a second look reveals substantial differences between the high latitudes of the North and the South. While the increasing availability of technology in the North finally resulted in a nationalization of the fracture lines between stakeholders and/or even open conflicts, the increased level of technology available to the fisheries in the South resulted in an increased need for international solutions, which are still not to be found today. In the North, today's main conflict is between the heavy industrialized fisheries of the Arctic nations and the small scale subsistence fisheries which according to the existing legal frameworks solutions need to be negotiated within the individual Arctic nations, while in the South the conflict is between those groups interested in the preservation of the unique ecosystem of Antarctica and those groups that are mainly interested in making economic use of the 7<sup>th</sup> continent and the waters surrounding it, regardless of their nationality. In the end the fracture lines and conflicts in both areas seem to follow a very similar model. The basic question of any fisheries in the high latitudes is a simple one: are resources like fish a common good, which should be preserved or exploited for the common good of society; or should they be exploited for shareholder value.

Answering this question would be an answer to a question that is much broader than the question of fisheries in high latitudes. In the end the fisheries just mirror a question that is the basic question for socio-economic development all around the globe, regardless of if it is negotiated among various stakeholders within Arctic societies and nations, or if it is negotiated between international operating fishing companies and scientists, conservationists, ecologists or other groups with an interest in the protection of Antarctica and the surrounding Southern Ocean. Maybe the question should be raised if the nationalization of discussion on fisheries in the Arctic – as a result of the extension of national legislation now covering basically all relevant fishing grounds of the Arctic – should be considered a positive development, as the discussion between common good and shareholder value needs to be negotiated over and over again for each Arctic nation, instead of negotiating this question once and for all on a global level.

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