

# **SMALL SCALE VERSUS TRAWL FISHERIES IN COASTAL WATERS. THE CASE OF THE GERMAN BALTIC HERRING FISHERY.**

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## **Abstract**

The Griefswalder Bodden at the German Baltic Sea coast is the main spawning area of the western Baltic herring (*Clupea harengus membras* L) stocks. Before 1990 both trawlers and boats with static gear had been fishing there during the spawning season. After Germany's reunion only the coastal fishermen with static gear continued fishing for herring because for bigger vessels only fishing for cod (*Gadus morhua* L) was economically feasible. Declining cods stocks and a recently built processing plant for herring on Ruegen Island changed the situation. In 2002, after ten years absence, trawl fishermen have now resumed herring fishing leading to competition between small-scale operations and the trawl fishery. Coastal fishermen depending on local fish stocks are more aware of moderate exploitation methods. Because of less negative impacts on ecosystems, the importance to the increasing tourist and the tight job market, the position of the coastal fishery with their smaller scale should be strengthened. To avoid further competition with the trawl fishermen a recovery plan for cod is necessary. By means of a community-based fishing model the present situation is discussed. Although in theory different solutions seem to be easy to realise, there are various practical problems to be considered.

## Introduction

Around Ruegen Island off the German Baltic coast, fishing has a long tradition. In the Middle Ages the wealth of this region depended on the herring fishery and was one of the main reasons for the foundation of the famous trade organisation in the Baltic, the Hanseatic League. After World War II the herring fishery was shared out between the fleet using pelagic trawl nets and the coastal fishermen who used static gears. Owing to the subsidised fish prices it was possible for both groups to obtain a very good income in comparison to other jobs. After German reunification in 1990 the situation changed: fishermen with static gear continued the herring fishery because of the cancelled subsidies. The fishermen with pelagic trawls switched to fishing for cod.

In the spring of 2003 a new fish processing plant in Neu-Mukran on Ruegen Island began filleting herring, cod and flounder (*Platichthys flesus* L). As a result, fishermen using pelagic trawls may be able to earn their living from herring once again. In 2002 they fished for herring for the first time since 1990, but it is questionable if this can provide a long-term perspective. Lower catch quotas for herring will cause increasing competition between mobile and static gear fishermen.

The coastal fishery is very important for the whole area. On the one hand the fishery offers jobs and on the other the stocks are usually exploited in a moderate way derived from centuries of tradition. In addition local fishermen with their small cutters and their fresh fish products are a tourist attraction. All these factors taken together make it necessary to preserve the small scale fishing sector. One solution might be to allot the fishing rights exclusively to the small-scale fishers so as to improve their

economic situation and to secure the future of the moderate exploitation system.

The aim of the paper is to outline a sustainable approach to the exploitation of fish stocks in the Baltic coastal region. It begins with an historical description before offering an explanation for the increasing competition and a possible model for resolving the competition on a sustainable basis.

### **The history of the fishery in northeast Germany.**

Herring fishing around the island of Ruegen was mentioned for the first time in a chronicle about the Slavs written in the 12<sup>th</sup> century (Peesch 1961, Klinkhardt 1996). The fishery had of course played an important role in earlier times. When the Germans arrived in the area in the 13<sup>th</sup> century, the villagers became vassals. Property in terms of both land and fishing rights were in the hands of the landowners. The numbers of fishermen were limited and only when an older fisherman retired could a younger man gain access to the fishery. Therefore the number of fishermen remained constant for centuries. With the end of bondage in 1806, local people were able to buy their own land as well as fishing rights. Nevertheless the trap nets had to be leased from the government and were therefore limited (Fraude 1925). In order to cope with the big trap nets during the herring season, local fishermen formed so-called 'Kommünen', which consisted of 4-5 members. As the population increased at the end of the 19<sup>th</sup> century the coastal fish stocks were inevitably exploited more intensively and fishing became a full-time occupation for some fishermen.

The next social change occurred after World War II when the coast between

Swinouscje and Lübeck became part of the German Democratic Republic (GDR). For years nothing had been changed in the distribution of fishing rights and fishermen had worked as private businessmen. Because of the settlement of many fishermen from former parts of Germany such as East Pomerania and East Prussia, there was a bigger demand for fishing opportunities. As these new immigrants were not admitted to the existing 'Kommünen' the government decided to allocate new zones for trap nets and in 1954 some of the fishers organised themselves into the first fishery cooperative society. More and more fishermen were forced to join this new type of cooperative society. Only within such an organisation could then continue to fish commercially because public authorities only allowed trade through these co-ops. In those days the fishermen had above-average incomes profiting from guaranteed fish prices. The herring catches rose to 40-50, 000 t per year in 1988/89 (Kruse 1991), a quantity that was divided approximately 50:50 between the coastal and trawl fishers. After the closure of some fishing grounds through the EEZ established in 1977, some larger trawlers with on-board fish processing facilities stayed in coastal waters. It was now possible to transfer the catch from the trap- and gill nets to the processing chain directly. This situation lasted until Germany's reunion in 1989/90, when landings from coastal waters stood at 66,000 t per year, a figure including both fresh and saltwater fish.

As a result of the political upheaval in 1989, the economic framework changed drastically. Nevertheless the allocation of the fish fishing rights remained the same. The maximum number of gill nets was fixed and the sites for the trap nets had to be leased from the government each year. But with the end of the GDR's economic system guaranteed prices were abandoned and most of the primary processing plants

closed, leaving only some of the canning factories in business (e.g. Neue Ruegenfisch GmbH in Sassnitz and Ruegen Feinkost in Lauterbach on Ruegen Island). The fishermen had to adjust to the new circumstances of free enterprise. Some of the fish species could be sold for high prices, including cod and sole (*Solea solea* L), but for others, such as herring and sprat (*Sprattus sprattus* L), prices fell sharply. For some species there was no market at all.

Another big problem was the age of the fleet. Most of the middle sized and smaller fishing vessels had been built at the beginning of the 1950s. Afterwards little investment had been undertaken and the fishing gear was in a desperate condition. After the reunion the fishermen were hesitant about investing in new boats because of the uncertainties over future fishing opportunities (Scharmann 1994).

The co-ops survived and remained responsible for setting the catch. Although recently more and more fishermen have decided to renew their vessels and equipment – some buying new ships- the average age of the fleet is still greater than 30 years. But these investments were only possible with subsidies from the government and the EU, because the fishermen's earnings and savings were insufficient. Negotiations over bank credits are difficult because of the short-term perspective with the quota system. None of the fishermen can really forecast how much he might be able to catch in the following years and how the prices will develop. During recent years the cod quota in the Baltic has declined, further depressing profit margins. Switching to herring was not an alternative because of the very low prices, especially for mixed catches. So the trawl fishermen concentrated on fishing for cod and flounder, while the coastal fishermen with their smaller vessels had to continue with the herring fishery, as they

had no alternative. Low prices, high costs and the need to cover transport costs to the nearest processing facilities in Denmark led to low incomes and a lack of a long-term perspective. Due to this special situation and the exhaustion of the herring quota, the coastal fishery had more or less the same catch levels each year. The last five years' reduction of the herring quota from the nearly 100, 000 t down to around 25, 000 t per year deepened the investment crisis. Moreover the new framework regulations for the Common Fisheries Policy which were adopted in December 2002, and the end of subsidies for investment in 2004, added to the fear of bankruptcy among the fishermen.

### **Fisheries management.**

One of the most controversial issues in fisheries management concerns the nature of fishing rights. On the one hand there are individual exploitation rights (Individual Transferable Quotas or ITQs as in New Zealand and Iceland) and on the other had the so-called community-based management in which a group of members holds the fishing rights. Both systems are able to secure an efficient allocation of fishing rights and quotas.

Today, open access to the fishing grounds occurs only in theory. In practice such a possibility rarely exists. When exploitation systems in use before the introduction of the 200 mile EEZ are analysed, the results show that many systems limited the fishing effort: the situation in NE Germany was no exception.

Before the introduction of the 200-mile zone, no official management of fishing

practice in the coastal waters of EU Member States was necessary. But with the declaration in the late 1970s, the fishing sector became a major political field for the governments owing to the responsibility of the Council of Ministers for the whole of EU waters. Today the 12-mile inshore zones are under the jurisdiction of the individual Member States. Outside this zone the EU is solely responsible for fisheries management. With the introduction of the EEZ the EU Commission developed a common fisheries policy and created a special Directorate General for fisheries (DG Fisheries). The main instruments for management are catch quotas and technical conservation measures (Holden 1994).

On the advice of the International Council for the Exploration of the Sea (ICES) and Scientific, Technical and Economic Committee on Fisheries of the EU (STECF) each year the Commission develops proposals for TACs for each major species, to be decided by the Council of Ministers at the December Council meeting. This meeting often involves long and sometimes acrimonious discussion with decisions reached on the basis of political compromise rather than what is best for the sustainability of the stocks. The agreed TACs are allocated to the Member States by means of fixed percentage shares, agreed in 1982, which form the basis of the principle of relative stability. The German quota allocation for the Baltic is based on this system. Within the Member States different systems of allotment to individual fishermen are in use. In Germany the co-ops receive a share of the quota and re-allocated it to their members. The advantage of such a procedure is that fishermen receive quotas of species which they can catch cost effectively, taking account of the fact that some fishermen are able to move further offshore with their boats while others are not. These quotas are also transferable among co-op members to achieve a better balance

between fishing opportunities and fishing capacity.

The problem of present fisheries management lies not in the allocation of catch quotas within a country but the decision taken at a higher level over the size of the TAC. A problematic development has occurred in recent years as a consequence of the politicians' fear of unemployment within the domestic fishing industry, they have often decided to fix quotas at a higher level than that recommended by the scientists, which leads to over-fished stocks. An acute example has been the cod crisis in the North Sea and ICES' recommendation for a zero quota in 2003 was followed by a decision to reduce the quota by only 45% which was not enough to secure the stock's recovery.

(See press release:

[http://europa.eu.int/comm/fisheries/news\\_corner/press/inf02\\_61\\_en.htm](http://europa.eu.int/comm/fisheries/news_corner/press/inf02_61_en.htm)).

Together with the latest CFP-framework regulations (Council Regulation No 237/2002) the Council of Ministers introduced some new instruments that may eventually lead to a better stock management including multi-annual management plans for all major commercial species. At present these only apply to a very limited number of stocks including the cod recovery plan for the North Sea. Such plans could open upon new long-term vistas for the fishing industry. Although the industry would pay the price of much lower catch quotas, which would include the imposition of 'days at sea' restriction, in the beginning, given the success of the recovery plan, it should be able to look forward to the prospect of long term stability and security based on more abundant stocks.



Studies of community based management systems suggest that coastal fishermen – depending exclusively on local fish stocks – are much more aware of the need not to over-fish the stocks. In 2002 for example, coastal fishermen off Germany did not exhaust the cod quota, as they knew that the stock was at low ebb.

### **The competition between small scale and trawler fishermen.**

Presently, most of the fish for German canning factories comes from Scotland. This may possibly change after the new processing plant starts production, when the herring fishery should again be profitable for bigger vessels. In 2002, a trial fishery was made to find out whether the resumption of herring fishing would be economically feasible.

Because of the special situation after 12990 only 10-15% of the catch quota for herring was taken up.

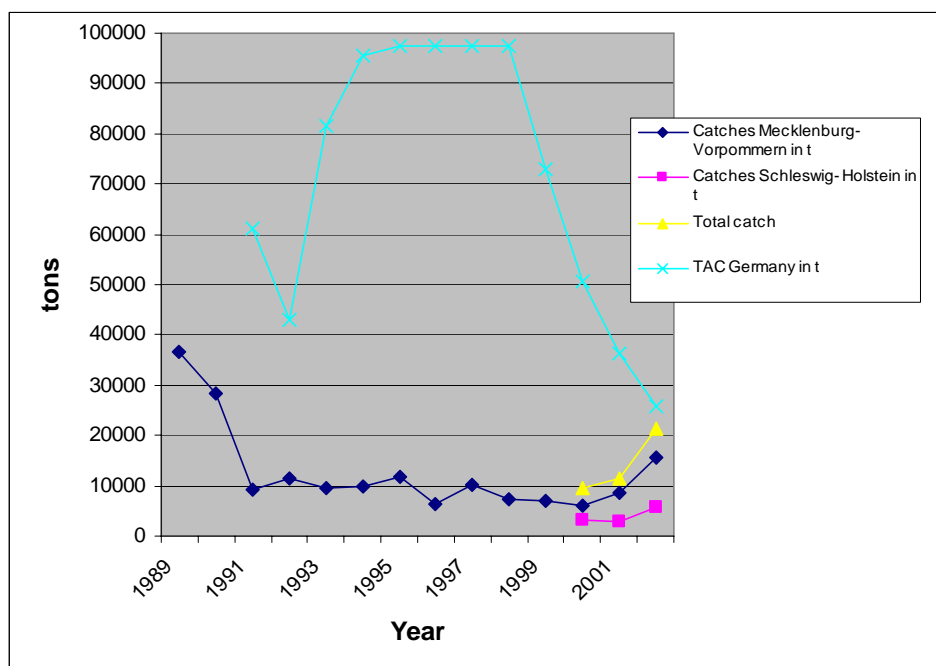


Figure 1: Baltic Herring Fishery in Germany (data from the IBSFC ([www.ibsfc.org](http://www.ibsfc.org)), BLE different years)

Therefore no further restriction to limit the catch quantity were necessary – quite the opposite of the cod fishery. Nevertheless, after the catch quota for herring had been cut to 25% at the end of the 90s, taking the catch from nearly 1000, 000 t to 25, 000 t, it was necessary to decide how to allocate the remaining fishing rights. The fishermen of Mecklenburg\_Vorpommern (the new state in the North of the former GDR) are now allowed to fish 16, 700 t of herring in 2003. The remaining part of the quota was transferred to the fishermen of Schleswig-Holstein, which was in the former West Germany. In 2002 the coastal fishermen already realised a catch of around 16, 000 t (BLE 2002 – Figure 1) and the bigger vessels are now competing with the coastal fleet.

A further pilot study in the Greifswalder Bodden (Mecklenburg-Vorpommern) examined the possibilities for the survival of the small coastal fleet. The main idea was to show that low inputs guarantee a moderate exploitation of the fish stocks. The following synopsis (Table 1) demonstrates that in terms of sustainable fisheries the use of passive fishing gear is to be preferred, as it tends to reduce the effects of fishing on the marine ecosystem. Coastal fishermen use trap and gill nets for the herring fishery, which have two main benefits: the selectivity of gill nets and the possibility of returning live by-catch to the sea. By contrast, bottom trawls which are often used together with good search equipment, lead to high by-catches of cod during the spawning season.

Table 1: Different fishing methods and their ecological consequences (translation from Döring 2001, p. 148 f.)

	Bycatch of undersized individuals of the target species	Bycatch of non-target species	By catch of birds and marine mammals	Negative consequences for the whole ecosystem	Use of fossil fuel
Gill net	Low	Low, if good fishing places chosen	Partially high – research with pingers hardly successful <sup>1</sup>	Low, because in open water	Low, mostly used in coastal areas
Trap net	Low, but higher than with gill nets	No real problem because by-catch survives	Traps must be covered, little informations about by catch of marine mammals	Low, because of fixed position	Low, used in coastal waters
Long-lines	Low	Low in most cases	In some fisheries a great problem (Albatross-by catch in the south pacific region)	Low	Low, if used in coastal areas
Pelagic Trawl	Depends on mesh sizes, problems with survival rate of escaped fishes <sup>2</sup>	Great problem in some areas, e.g. cod by catch in the Baltic Sea	Low	Low	High, because mainly used outside coastal waters
Bottom Trawl	High, because escape windows or mesh sizes are not adequate to avoid bycatch	High, because all fishes in front of the ground rope were startled (up to 95%) <sup>3</sup>	Low	High, destruction of seabeds, plowing up ocean floors, levelling of structural elements etc.	High, because of heavy equipment and fishing grounds far away from the shore

One aim of the pilot study was to investigate the feasibility of a new trawl where the fish are caught, as in a trap net, without forcing them into a cod end.

Later, the fishermen can pump the fish out of the net, keeping most of the fish alive and thus assuring high quality. The catch is a mixture of younger and older herrings, which is common for the Baltic herring stocks. From an ecological point of view this kind of fishery is not problematic. All three types of fishing gear used at the moment

<sup>1</sup> Gill nets have bad consequences for most fisheries all over the world. Therefore it is difficult to demand the use of gill nets because of ecological reasons. (Lien 1996: 219 ff.).

<sup>2</sup> Results from a research project in the Baltic Sea show, that 95% of the herrings smaller than 12 cm, who had escaped from a trawl net, died within 14 days. The death rate of the individuals between 12 and 17 cm was 62 % (see Suuronen 1995: 106 ff.).

<sup>3</sup> The FAO calculated a by-catch of about 27 Mio. t inside a worldwide catch (landed) of approximately 100 Mio.t (see Alverson 1997: 117).

are acceptable. But the small vessels should be preferred because of their importance for the region and also because the bigger vessels use less environmentally friendly fishing gear on other fishing grounds for the rest of the year.

The greatest advantage of community-based fishing management is the conservation of the marine environment by experienced fishermen who have considerable knowledge of the local circumstances and when, where and how to fish for different species with the best available technique. Because of their limited fishing range the number of fishermen in a co-op is a limiting factor for the fishing capacity in the region. For any particular area there is a specific number of fishermen able to make their living from the existing fish stocks. We can call such a group a *production club*.

Buchanan (1965) called goods, which are neither private or common, *club goods*. The benefit of these goods is restricted to the club members. If membership of the group is open more and more users are allowed to join the club, all benefits will eventually be dissipated. In such a case, a social planner – often assumed in theoretical models – has to reduce the number of members to the number that will take only the maximum economic yield (MEY). If we had sufficient information about the extent of the fish stocks, we could theoretically define the optimum number of club members. This optimum club size will be achieved automatically by a self-regulated system like the old community-based co-ops. In addition, coastal fishermen are not able to increase the fishing effort at will because they are using fishing gear which depends on the quantity of fish and only a certain number of gears can be used on any one day.

From these arguments we can draw the conclusion that the essential elements of

community-based management systems should be retained in the best interest of both the fishing communities and the fish stocks.

### **A new model for Germany's coastal fishery?**

It is possible to allocate part of the herring quota to individual coastal fishermen or to a co-op, who by subsequently pooling their allocations could achieve the advantages of 'quasi sole owners'. It was the idea of Scott (1993) to give fishermen more influence over the regulation system. The trawler fleet would have to negotiate with the coastal fishermen to gain access to the quota.

At first sight, such a solution seems fairly easy to implement but in practice there are several problems to be considered. The main problem for the coastal fishery is the uncertain outlook for the future. Even if problems of low fish prices, low stocks and poor recruitment can be solved, it is unclear whether the small-scale static gear fishery can survive. It could happen that the trawler fleet buys out all harvesting rights if they are able to work more cost-effectively, although cost-effectiveness may come at the price of producing negative ecosystem effects. If it is a question of cost effectiveness, regulations will need to be introduced to moderate the financial superiority of the trawler fleet operating in coastal waters. Thus the allocation of exclusive fishing rights to coastal fishermen may not solve the problems.

What would an alternative solution look like? From an economic point of view we have to face three main problems:

- The income of the coastal fishermen is not high enough to keep all fishermen

in business.

- Subsidies for further investments will favour bigger companies building bigger vessels to reduce their costs.
- External costs incurred particularly by the trawling sector are not included in the overall auditing of the sector.

The latter problem has in recent years led to a huge increase in fishing capacity within the EU, but not in northeast Germany. According to the revised CFP state aided investments will cease from the end of 2004. But funding for more selective fishing gear will remain available. On the other hand, more selective fishing means reduced fishing capacity and therefore lower incomes, so that the fishermen are unlikely to invest in such fishing gear on their own initiative. This is important for the larger trawlers because the herring fishery might not prove to be a realistic alternative in the long run. The present high prices for herring will not remain for long. If the herring stock in the North Sea continues to expand, it will lead to higher catch rates and lower prices. Therefore the recovery of the cod stocks, combined with the use of more selective fishing gear should be the aim of the trawler owners.

After the summer closure of the cod fishery in 2003 a new, more selective fishing gear will have to be used. But the minimum landing size of fish was changed from January 1<sup>st</sup> 2003. We can imagine what will happen in the intervening summer: a lot of undersized cod, still caught with the old gear, will have to be discarded. The fishermen will lose a lot of money and incur debts in buying the specified fishing gear. Increasing bankruptcies may follow.

Category	Fiscal Year 2000	Prognosis*
Proceeds of fish sales	94.531 €	94.531 €
Additional proceeds	6.951 €	6.951 €
<b>Total Proceeds</b>	101.482 €	101.482 €
Running Costs		
Fuel costs	10.995 €	10.995 €
Other material	7.403 €	7.403 €
Labour costs	14.434 €	14.434 €
Additional costs of the business	23.551 €	23.551 €
<b>Total Running Costs</b>	56.383 €	56.383 €
Permanent Costs		
Depreciation	14.862 €	178.333 €
part for the engine (10 years)		118.000 €
part for the hull (30 years)		60.333 €
Interest	1.439 €	1.439 €
Taxes	49 €	49 €
<b>Total permanent costs</b>	16.350 €	179.821 €
<b>Profit/Loss</b>	28.749 € -	-134.722 €
*Costs for the Investment		
Engine	today: 0,8 Mio	
Hull	today: 1,0 Mio	
Costs for the investment in 10 or 30 years		
Engine	1,18 Mio €	
Hull	1.81 Mio €	

\*The depreciation is commonly calculated for the re-investment in 10 years (engine) and 30 years (hull)

Table.2: Possible Investments in the Trawler Fishing Fleet without Subsidies

An indication of the likely future balance sheet for the renewal of vessels over 26m is provided in Table 2, using data from the Federal Department of Statistics. The high financial losses are the result of depreciation normally remaining in the company and not having to be accounted for in real terms. However, it must be assumed that the next round of investments in 20 – 30 years time will have to be made without subsidies. There must be a change of the present fisheries policy because no bank is willing to give a vessel owner a loan under these circumstances.

The only possibility for improving the fishermen's economic situation seems to be higher catches of cod in the future or much higher market prices. Herring and sprat can only be short-term substitutes because the present market prices cannot be sustained. The improving North Sea herring stock will allow much higher catches in the coming years and prices will fall. So it is feared that many fishermen will quit the inshore fishery in the future, as they will not be able to increase catches from a limited stock to maintain their incomes.

An alternative to such a scenario might be the introduction of more selective fishing gear in the cod fishery with the help of public money. Fishermen could be paid to adopt new equipment and for the years of reduced income, providing the stock eventually recovers. In the meantime the herring quota should be shared fairly with the coastal fishery. With such a programme it would be easier to avoid a competition between small coastal and bigger vessels. Unfortunately there are no such plans with the framework regulation of the EU to cover these costs.

Environmental economists have considered two solutions to solve the problem of external costs. First, is the introduction of an *environmental tax* to increase the cost to the producer and therefore force him to think about possible alternatives. These might be to subsidise the more environmentally friendly fishing methods so as to place both competitors on the same level of costs. An equivalent system of remunerating ecological services is often used to favour low input land use systems in comparison to high input systems. A similar fisheries model might help the coastal fishermen to improve their situation. Because of the poor economic situation in most fishing fleets, taxation would be a change for the worse and would only lead to more bankruptcies.



Therefore the alternative of subsidies to assist the competitiveness of the users of less efficient but more environmentally friendly gear might be the only realistic solution.

A similar outcome might be reached by eco-labelling. Fish products certified by the Marine Stewardship Council would tend to command a higher market price. In the long run, it seems possible to certify the whole Baltic cod fishery providing that a workable recovery plan using highly selective fishing gear can be introduced. But if all cod fisheries are eventually certified, over a prolonged period the prices will again fall. Now is the best opportunity for improving the Baltic fisheries with the help of both market instruments and public money.

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International Baltic Sea fisheries Commission: <http://www.ibsfc.org>