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**DIRECTORATE GENERAL FOR INTERNAL POLICIES**  
**POLICY DEPARTMENT B: STRUCTURAL AND COHESION POLICIES**

**FISHERIES**

**THE NORTH SEA BROWN SHRIMP FISHERIES**

**STUDY**

This document was requested by the European Parliament's Committee on Fisheries.

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**DIRECTORATE GENERAL FOR INTERNAL POLICIES**  
**POLICY DEPARTMENT B: STRUCTURAL AND COHESION POLICIES**  
**FISHERIES**

**THE NORTH SEA BROWN SHRIMP FISHERIES**

**STUDY**

**Abstract**

The purpose of the study is to provide Members of the European Parliament's Committee on Fisheries with a clear description of the North Sea Brown Shrimp (*Crangon crangon*) fisheries and markets in the Netherlands, Germany and Denmark.

The survey is conceived as an information document. It addresses production issues (economic and social relevance of the production, profitability of the fleets, environmental impacts) as well as marketing issues (organisation of the industry, role of major wholesalers and processors, prices and margins in the sector) and describes the application of the Common Market Organisation on the brown shrimp.



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## LIST OF ABBREVIATIONS

- AER** Annual Economic Report on the European Fishing Fleet
- Bft** Beaufort
- BLE** Bundesanstalt für Landwirtschaft und Ernährung (German Federal Agency for Agriculture and Nutrition)
- BMELV** Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (German Federal Ministry of Nutrition, Agricultural and Consumer Protection)
- BRC** British Retail Consortium
- CBb** College van Beroep voor het bedrijfsleven (Dutch Trade and Industry Appeals Tribunal)
- CFP** Common Fisheries Policy
- CMO** Common Market Organisation
- CVO** Coöperatieve Visserij Organisatie
- D/DE/GER** Germany
- DCF** Data Collection Framework, formerly DCR (Data Collection Regime)
- DFPO** Danish Fishermen's Producer Organisation
- DFS** Demersal Young Fish Survey
- DK/DEN** Denmark
- DKK** Danish Crown
- DYFS** Demersal Young Fish Survey
- EEC** European Economic Community
- EU** European Union
- EVKrEO** Europäische Vereinigung der Krabbenfischer-Erzeugerorganisationen (European Association of Shrimp Fishermen Pos)
- FAO** Food and Agriculture Organisation of the United Nations
- Hp** Horse Power
- ICES** International Council of the Exploration of the Sea
- IFS** International Food Standard
- IMARES** Institute for Marine Research, Wageningen University
- ITQ** Individual Transferable Quota
- kW** Kilowatt
- LLUR** Landesamt für Landwirtschaft, Umwelt und ländliche Räume, Kiel

- LPUE** Landings per Unit of Effort
- m** Metre
- Mio.** Million
- MS** Member State
- MSC** Marine Stewardship Council
- NGO** Non Governmental Organisation
- NL/NLD** The Netherlands
- nm** Nautical Mile
- NMa** Nederlands Mededingsautoriteit (Netherlands Competition Authority)
- NVB** Nederlandse Vissersbond
- PO** Producer Organisation
- TAC** Total Allowable Catch
- TBB** Fishing Gear Beamtrawl
- TPO** Transnational-PO (same as EVKrEO)
- UK** United Kingdom
- UN** United Nations
- UNCLOS** United Nations Convention on the Law of the Sea
- VEBEGA** Vereniging ter Bevordering van de Garnalenhandel
- VMS** Vessel Monitoring System
- vTI** Johann Heinrich von Thünen Institut
- WGCRAN** Working Group on *Crangon* Fisheries and Life Cycle

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## EXECUTIVE SUMMARY

### Background

The brown shrimp sector currently deserves specific attention for at least four reasons:

- the economic and social importance of the sector: in three Member States (Netherlands, Germany, Denmark), which represent 95% of the total North Sea production of brown shrimps the fishery industry has a significant economic and social importance (more than 500 fishing vessels are concerned);  
Brown shrimp fisheries have a long tradition and a considerable economic value in the countries' fishing sector; furthermore they play a significant role in the tourism and the identity of the regions concerned.
- the social and ecological debate: nature organizations such as the WWF and the North Sea Foundation have put the North Sea brown shrimp in the green column of their fish-purchase guide for the stock assessment part, considering that the species is not under threat and is relatively insensitive to the fishing effort; but these NGOs are concerned about bycatch (young flatfish in particular) and the damages done to sea bottom by beam trawls.
- the ongoing reform of CFP and CMO: the Common Market Organisation of the fisheries products offers some tools (producer organisations, interbranch organisations, intervention mechanisms, guide prices, trade regime), some of which have been used by the stakeholders; some of these instruments proved to be little effective or ineffectively used;
- the Netherlands Competition Authority (NMa) considered that the agreements on fish quotas and minimum prices for North Sea shrimps as well as the agreements to exclude a new trader did not fall within the scope of CMO regulation and constituted infringements of Article 81 of the EC Treaty and section 6 of the Competition Act. NMa imposed fines on POs in the three member States and on wholesalers. The case has not been settled for good yet.

### Aim

The aim of the present study is to provide Members of EP's Committee on Fisheries with a clear description of the North Sea brown shrimp (*Crangon crangon*) fisheries and the North Sea brown shrimp market in the Netherlands, Germany and Denmark.

The study is conceived as an information document for Members and is organized in two parts.

The first part describes the fisheries, in particular:

- the evolution of the North Sea brown shrimp production by country,
- the economic and social relevance of the industry by country,
- the economic performance of the fleets in this fishery (and especially the beam trawler fleets),
- the environmental impact of demersal beam trawling in the North Sea,

- the brown shrimp fishery management.

The second part describes the markets and provides a description of the application of the Common Market Organisation on the brown shrimp, including:

- price and intervention measures,
- possible impact of the autonomous suspension of tariff duties for another shrimp species (*Pandalus borealis*),
- producer organisations,
- extension of rules,
- possibilities for the creation of an interbranch organization.

The second part also describes the organization of the industry and the proceedings initiated by NMa. Information on the status and perspectives for MSC certification on North Sea brown shrimp fisheries is provided as well.

## Findings

The three Member States under review represent 95% of the total European production. The Netherlands is the biggest producer (47% of total EU production), followed by Germany (38%) and Denmark (9%).

The Netherlands has the most powerful vessels, which furthermore fish mainly continuously, reaching the highest average landings per vessel (105 t in 2010). Denmark has a very effective fleet due to most modern vessels and effective fishing schemes. The German fleet counts a high share of smaller and older vessels with a strong seasonal fishing pattern and very little winter fishery.

The brown shrimp is amongst the top 5 species (in terms of value) for the Dutch and German fleets. Dutch and German beam trawlers in the 12-24 m length category are almost entirely depending upon revenues from brown shrimp, whereas Danish beam trawlers also primarily target brown shrimp but go partly on flatfish and have the option of changing towards sandeel.

Dutch and German vessels are distributed along the entire coast line, playing an important role for tourism in providing picturesque harbour scenery.

In the present configuration of the fleet (500 vessels), shrimp fishing cannot be profitable with a shrimp first sale price under 2,75 €/kg (under the hypothesis of a gasoil price at 0,60 €/kg). With a fleet reduced to 375 boats, the break-even point would be a shrimp price of 2,31 €/kg.

The present stock sizes are very high and show no sign of overfishing.

In the framework of the MSC certification process management plans have been developed in the three MS. They are not yet finalized and still likely to undergo some changes.

The EU market is controlled at more than 80% by two Dutch companies, HEIPLOEG and KLAAS PUUL, which buy about 30 000 tonnes of brown shrimp a year. Brown shrimp appears to be a profitable activity for processors.

The brown shrimp makes a 14 day trip to Morocco for peeling. The heavy use of preservatives (benzoic acid, sorbic acid) ensures a longer product life.

Belgium is the main consumer market (more than half of the total EU market for brown shrimp), followed by the Netherlands and Germany. More than 90% of the market is composed of peeled shrimps. The main market for unpeeled shrimp is France, followed by Belgium.

## Conclusions

In the last months **the situation on the brown shrimp market clearly deteriorated**. The low price of fish (sole, plaice, cod, flounder, ...) in the auction has urged fishermen to go to shrimp instead of fish, which has led to overproduction of brown shrimp and low prices, all the more so as these fishermen licensed for both shrimp and fish fishing have a bigger catching capacity. Some actions (blockades of processors' plants) have shown in 2010 that fishermen are concerned about the power of processors. CMO tools have not allowed to avoid the worsening of the situation and the price paid to fishermen in the beginning of 2011 makes **most shrimp vessels unprofitable**.

The overproduction has also a negative impact on the quality of the final product: big quantities of brown shrimps are frozen and later on defrosted and mixed with fresh shrimps.

**The application of the CMO has had very little impact** on the brown shrimp market. The price regime (guide price, withdrawal price) did not prevent prices from decreasing sharply at the end of 2010-beginning of 2011.

The withdrawal tool has been very little used by POs involved in brown shrimp fishing, and almost exclusively by the Danish PO. In 2009 withdrawals have represented 0,66% of landings at EU level.

The regulations opening and providing for the management of an autonomous Community tariff quota for the cold water prawn (20 000 t/year at 0%) do not have any impact on the brown shrimp sector since market segments for *pandalus* and *crangon* shrimps are quite independent.

The organisation rate of brown shrimp fishermen is quite high (88% at EU level) but differs between POs (in Germany as well as in the Netherlands) and the fear of NMa considerably limit POs' action.

At the retail stage brown shrimp in small packaging reaches price levels which make **processors' and retailers' business profitable**. For the major processors brown shrimp represents about 25 to 30% of the total activity, the rest being made mostly with tropical shrimps, but brown shrimp is for them the product which offers the bigger margin possibilities.

The **brown shrimp stock remains in good state**, as it is recognized by NGOs which focus their criticism on by-catches and "bottom touching" fishing techniques. The catching level of the last years (around 35 000 t) does not jeopardize the stock.

Main solutions considered by fishermen's organisations to go out of the economic crisis are the MSC certification and the TAC and quota system.

Management plans are being developed in the three MS under review but as all fishermen or at least most of them should be under similar schemes, there will be no differentiation of the product on the market and thus a price increase linked to the label is dubious. But the label should guarantee the access to the market in the long run since major retailers plan to delist fishery products without MSC label in short/medium term. In the Netherlands the renewal of shrimp licenses by the Ministry will be linked to the holding of a MSC certification.

It should be easy to catch the same shrimp quantity with a fleet downsized by 25%.

## Recommendations

**Discard levels of brown shrimp can be reduced** by various methods:

- Adjusting mesh sizes to the commercial sizes of brown shrimp, i. e. much wider than the legally acceptable 16 mm, possibly 22 to 24 mm.
- Replacing traditional diamond meshes by square meshes in the cod end. Square meshes reduce by-catch of small round fish (gobies, gadoids, smelt, ...) and can help to reduce the number of small sole getting pinned in diamond meshes.
- Applying veil nets most of the time (less or no exemptions).
- Survival of discards can be improved.
- Avoiding shallow waters (0 – to 3 m e.g.).
- Reducing fishing effort from June to August.

**The TAC issue** is under debate among fishermen and POs and **should be deepened**. In particular we recommend that social and economic consequences are studied in detail.

The economic difficulties of the sector are linked to the level of the price paid to fishermen, which does not allow in the last period to make shrimp fishing activity profitable, and to the size of the fleet, which is deemed too big, especially in the Netherlands, where most fishing areas have to comply with Natura 2000 principles. With a **reduction of the fleet by 25%** the first sale price necessary to reach the profitability level for fishermen would be 43 eurocent lower.

**There is still room for improvement of quality of the shrimp** caught (hygiene on board, optimization of cooking time, use of food grade grease, ...) and the leading processor has started a quality related payment (with a premium of 0,50 €/kg for the best quality). The **development of simple codes of conduct for fishermen** should be a good way to secure better prices.

**On-going MSC certification processes should be completed** in the course of 2011 or in the beginning of 2012 and secure the downstream actors of the sector.

# 1. DESCRIPTION OF THE NORTH SEA BROWN SHRIMP FISHERIES

## Key Findings

- European brown shrimp production has been more or less continuously rising since 1990 and reached 33 000 t in 2009.
- The Netherlands, Germany and Denmark represent 95% of the total European production.
- The Netherlands is the largest producer due to most powerful and mainly continuously fishing vessels, reaching highest landings per vessel.
- Denmark has a very effective fleet due to most modern vessels and effective fishing schemes.
- The German fleet counts a high share of smaller and older vessels with a strong seasonal fishing pattern and very little winter fishery. That results in lowest mean landings per vessel compared to the other fleets.
- LPUE is presently not comparable due to different effort measures per country.

Brown shrimp (*Crangon crangon*, Linnaeus 1758, compare Fig. 1-1) is a highly reproductive crustacean with a short life time of about one to possibly three years. Its distribution ranges from the North Atlantic (Norway, Iceland) to North African waters and the Mediterranean. However, only the shallow coastal waters as the Southern North Sea give abundance rates that form the basis of an intensive fishery. The highest densities of that species may be found in the very shallow Wadden Sea (Tiews 1970, ICES 2010). It is caught though down to about 40 metres depth all along the southern North Sea coast.

**Figure 1-1: Brown Shrimp (*Crangon crangon*)**



**Photo:** vTI (© v. Klinkowström)

A commercial fishery on the Brown shrimp developed not earlier than in the 1880s (Neudecker and Damm 2010). An industrial motorized shrimper fleet came up after the Second World War in the 1950s, especially in Germany, with initially more than 850 boats

and a maximum production of 60 000 tonnes (Gubernator 1992, Neudecker 1999, ICES 1993).

The following paragraphs describe the evolution and production of this fishery in recent years.

## 1.1 The Evolution of the Production

The production of North Sea brown shrimp fisheries is dominated by three countries: Denmark, Germany and the Netherlands, which account for 95% of the total landings.

**Table 1. Landings of North Sea brown shrimps in the EU in 2009**

| MS          | t      | %       |
|-------------|--------|---------|
| Netherlands | 15 512 | 47,20%  |
| Germany     | 12 567 | 38,20%  |
| Denmark     | 3 096  | 9,40%   |
| Other MS    | 1 709  | 5,20%   |
| TOTAL       | 32 884 | 100,00% |

Source: WGCRAN

For that reason, the focus will lie on those nations. Belgium, France and the United Kingdom contribute to a smaller extent and will be included in the European overview. Data sources are the national databases combined by the national scientific representatives of the ICES Working Group on Crangon Fisheries and Life Cycle (WGCRAN) to their nearly annual meeting reports.

### 1.1.1 Development of EU Landings, Effort and Landings per Unit of Effort (LPUE)

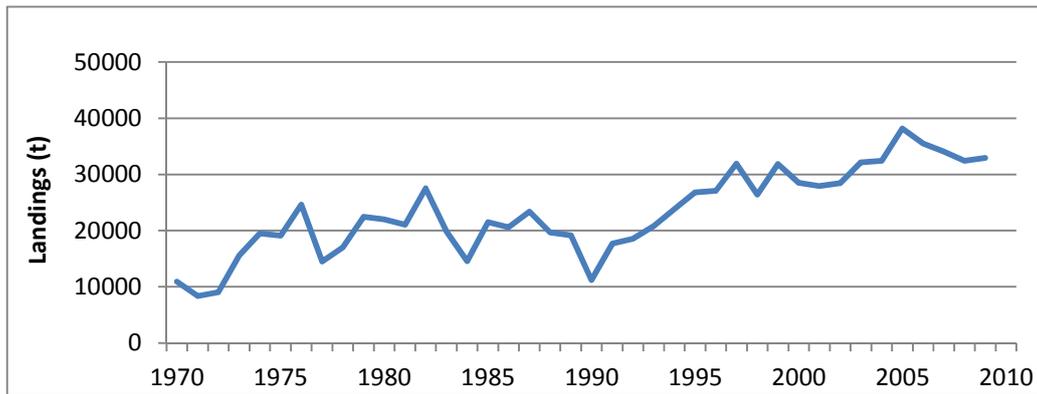
#### Landings on annual basis

Contrary to post-war situation when especially in Germany, industrial shrimp landings were much more important than consumption shrimp catches, the main fraction since the 1970s is composed of shrimp for human consumption.

All data presented here refer to consumption shrimp. Shrimp landed, but too small for human consumption, are sieved out and are recorded as crushed shrimps. They have a share of approx. 7% of the annual landings (Neudecker 2001) but with a strong seasonal pattern, which will be dealt with later (compare chapter 1.4.3).

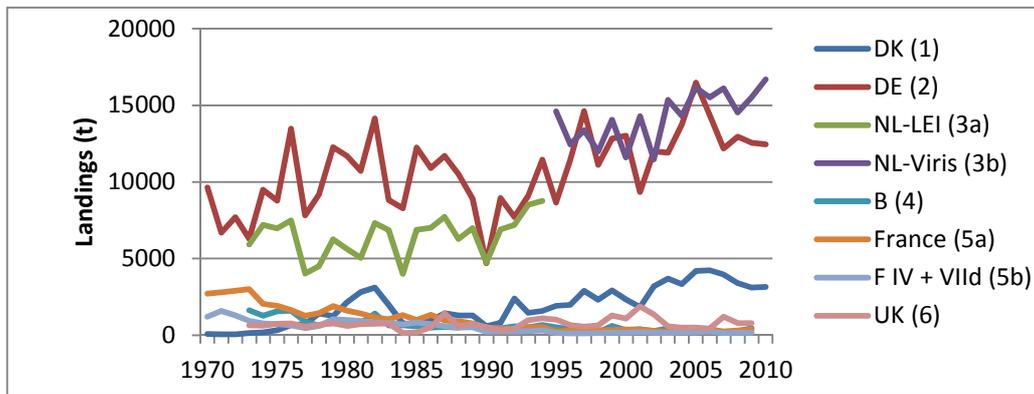
Starting with about 10 000 tonnes around 1970 landings of consumption shrimp have shown considerable ups and downs over a range from 15 000 to 25 000 tonnes in the first two decades. Since 1990, a year that shows a sharp decrease of landings to a level of about 11 000 tonnes, an almost continuous increase occurred with peak landings of 38 000 tonnes in 2005 (Fig. 1-2). The increase of landings over the decades parallels the increase in vessel size and engine power (Neudecker and Damm 2010). Recent landings levelled off a bit. Data for 2010 are not available for all countries. However, very high landings may be assumed for 2010.

**Figure 1-2: Landings of Brown shrimp caught in the European Union since 1970**



Source: WGCAN (2010)

**Figure 1-3: Landings of the EU Brown shrimp Fisheries by Country**



Source: BLE, Danish Directorate of Fisheries Sales Notes Register and ICES WGCAN (2010)

- (1) Official statistics 1970-85 as in previous report, 1986-99 log-book data
- (2) Official statistics
- (3a) From Producer organizations (inclusion of foreign landings unclear)
- (3b) VIRIS log book data (1995-2003) including landings in foreign ports
- (4) Official statistics
- (5a) Official statistics (France total)
- (5b) Official statistics (France IV+VIId)
- (6) Official statistics, including Irish Sea landings

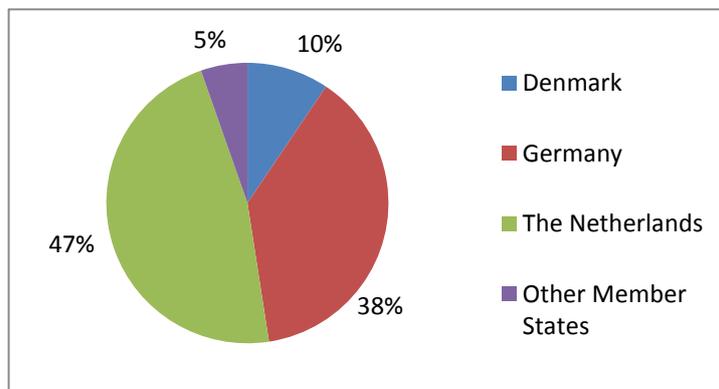
The Netherlands and Germany have an almost equivalent share in recent years (Fig. 1-3). Germany's former dominance in brown shrimp fishery ended in the 1990s and the Netherlands took over. In 2005 both landed an all-time record of 16 000 tonnes each. While Germany's landings decreased in the most recent years, partly due to effort restrictions of POs and different sieving practices, the Netherlands remained at that high level making it the leading country.

The third important North Sea brown shrimp country is Denmark. The Danish fleet started experimentally in 1963 and then developed in the 1970s with landings rising slightly up to about 4 000 tonnes annually. The increase in the last decade has certainly also to do with the modernisation of the fleet (Larsen pers. com. 2010).

The United Kingdom, Belgium and France together contributed 1 700 tonnes (5.2%, compare Fig. 1-4) to the total landings in 2009 and are of no further concern to this study. Their shrimp fisheries differ considerably from the other countries, not only by landing

volume but also in fleet structure and statistical reporting (van Marlen et al. 1998, ICES 2010).

**Figure 1-4: Composition of Annual Catches in the North Sea Brown shrimp Fisheries by Member State in 2009**

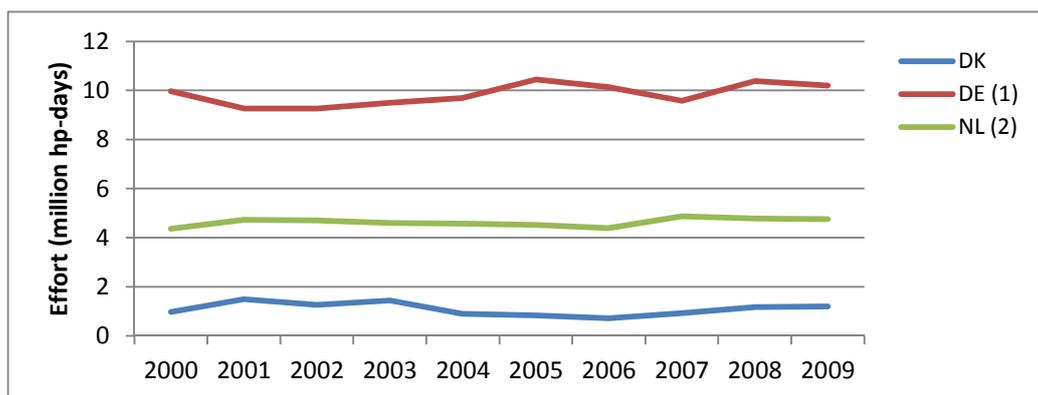


Source: WGCRAN (2010)

### Fishing Effort on annual basis

Several parameters may be used to quantify fishing effort. The main parameters are the number of fishing vessels, their engine power (in hp or kW) and the duration of fishing (in days). They are easily available and therefore accepted as a comparable metric in hp-days (Fig. 1-5). Nevertheless the basis of calculating differs by country and WGCRAN has not been able to standardize it for several years. Germany uses departure date from port minus arrival date at port plus one day according to ICES standard and raising to a full 24 hour day. The Netherlands subtract one day, except for single-day trips, to account for steaming time to the fishing grounds and calculate 24 hours per fishing day (ICES 2010). Conformity in calculation is anticipated on basis of hours at sea (difference of hours of leaving and returning to port) in soon future.

**Figure 1-5: Effort in the Danish, German and Dutch Brown shrimp Fisheries (compare text for interpretation of data)**



Source: WGCRAN (2010)

(1) Including harbour days

(2) Logbook data without harbour days and steaming periods

This leads to quite a substantial difference when comparing both fleets and gives reason for misinterpretation as both fleets are not very different in size and engine power, which is limited to 221 KW (300 hp) per vessel for coastal fishery in the Plaice Box (EU [EG] 850/1998 and VO [EG] 24/2001).

Fleet size, however, explains the differences seen when comparing fishing effort of the Netherlands and Germany to the Danish data. The Danish fleet comprises 27 vessels in 2009, while Germany had 228 and the Netherlands 201 (compare Table 1-1).

The EU logbook system provides more detailed information: number of hours at sea (given by departure and arrival times), number of fishing hours (start and end of fishing), number of hauls. The ideal effort measure would be the fished area, which is difficult to achieve; fishing effort has been calculated by using aggregated beam lengths and towed distances. That has been assessed EU-wide only once by an EU project (van Marlen et al. 1998, Beare et al. 2010).

With its 27 brown shrimp vessels Denmark accounted for about 1.6 million hp-days in 2009. There was a decline from 1.5 million hp-days to less than 1 million hp-days from 2003 to 2006, then effort slowly increased again.

The Dutch fishing effort remained fairly constant between 4.2 and 4.9 million hp-days, while the German brown shrimp fishery showed an effort of about 10.1 million hp-days, which is about twice the Dutch figure due to difference in calculation. Mentioned differences in calculation methods between Denmark, Germany and the Netherlands, give a bias to the true situation making the effort levels presently incomparable.

Another obstacle in comparing fleet efforts is the fact that some vessels may occasionally shift to other target species and vice versa, when availability or quota are no longer given, e.g. in flat fish fisheries. This flexibility may be important to some fishermen for economic reasons.

### **Landings per Unit of Effort (LPUE) on annual basis**

Landings per Unit of Effort (LPUE) may be considered as a measure of fishing power and stock size. It is a weak measure though as several factors can influence LPUE: individual design and technical equipment of the vessel, skill and experience of the captain, timing of fishing activity during seasons (which affects fishing efficiency).

From the biological side catchability and thereby LPUE are affected by side dispersion or concentration of the stocks and by behaviour of the shrimps due to environmental factors (season, habitat type, temperature, currents, weather etc.).

So LPUE data on single haul basis may show extreme variation and can be used as indicators for stock size. Catchability and thereby LPUE data pooled over a certain range of hauls may give hints towards the efficiency of a vessel and of the fleet; spread over a geographical part of the sea, they also are an indication of the relative stock size given there.

WGCRAN has calculated these LPUE data on annual basis for all fleets. The results are given in Fig. 1-6.

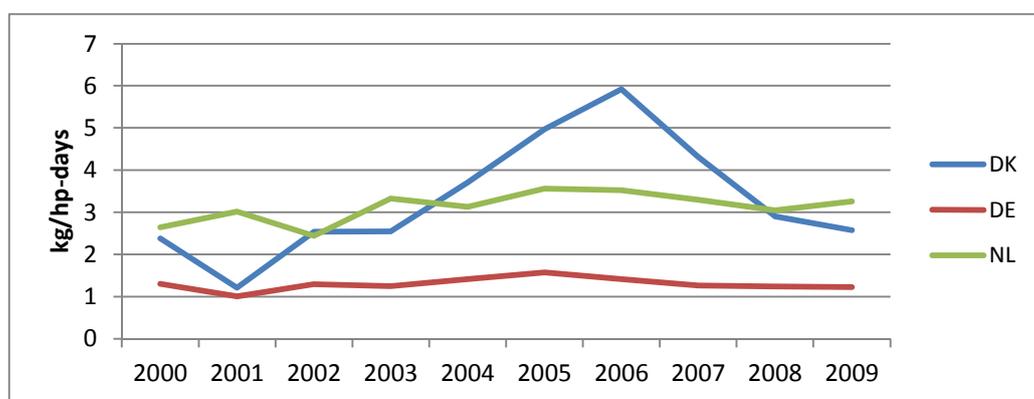
Correspondingly to the differences in effort data, data for the Netherlands and Germany deviate considerably, suggesting that Dutch fishermen are about twice as efficient as German shrimpers. This is certainly not realistic. The mentioned effort discrepancy is the main cause for the high difference in LPUE. By that, real differences occurring between the fleets are camouflaged.

Both curves – for Germany and the Netherlands – are relatively stable over the years with a slight increase around 2005. This LPUE increase may indeed be an indication of a stock increase as annual landings went up as well. The poor quality of effort data reduces the reliability of that information.

The Danish LPUE data show a high variation, starting with approx. 1 kg/hp-day in 2000 and reaching a maximum of 6 kg/hp-day in 2006. Here both factors, fishing efficiency and stock size, seem to coincide as smaller cutters have been replaced by larger and more efficient ones in the last decade.

At the same time shrimp stocks have increased in Danish waters (ICES 2007). Therefore the intense increase of LPUE until 2006 may have two explanations.

**Figure 1-6: Landings per Unit of Effort (LPUE) in the Danish, German and Dutch Brown shrimp Fisheries**



Source: WGCAN (2010)

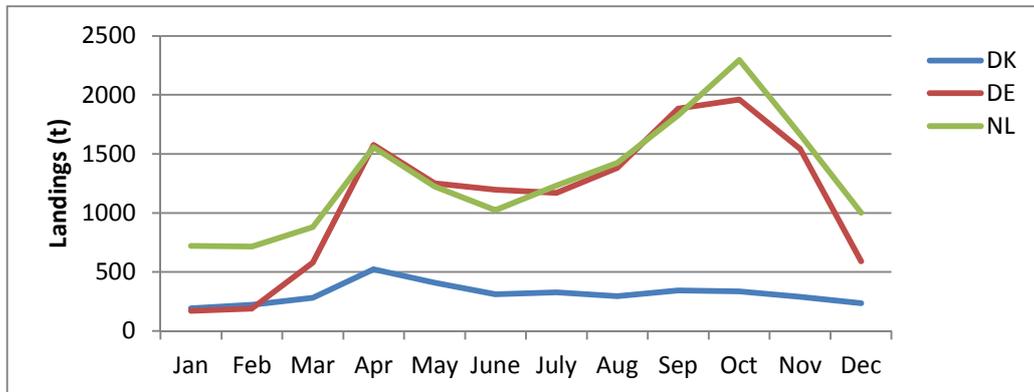
The decrease starting in 2007 may be explained by a reduced stock in Danish waters as the Danish shrimping fleet remained at a technical high level with larger boat sizes and a shift in distribution was also reported from German waters (ICES 2010).

### 1.1.2 Seasonality of brown shrimp Landings, Effort and LPUE in Denmark, Germany and the Netherlands

#### Seasonality of landings in brown shrimp fisheries

The seasonal landing pattern varies between the three countries (Fig. 1-7). While Germany and the Netherlands have two maxima in spring and autumn, indicating stable stocks of brown shrimp, Denmark seems to have only one peak in spring. However, variability between years can be high as can be seen from the monthly data presented in Figs. 1-8, 1-9 and 1-10. Data on different years from 2005 to 2009 for Denmark and 2005 to 2010 for Germany and the Netherlands are represented by different coloured bars.

**Figure 1-7: Average Seasonal Landings by major brown shrimp countries 2005-2009**



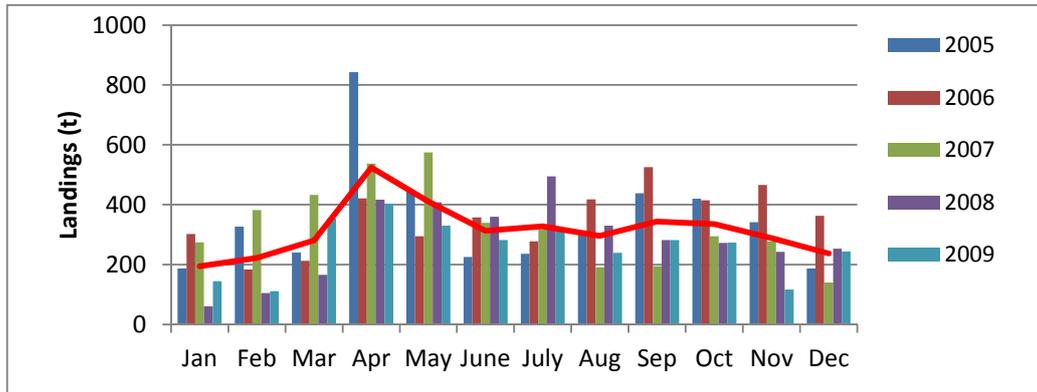
Source: WGCAN (2010)

The Danish fleet lands shrimp during the entire year with smaller amounts in winter and peak landings in spring (especially in 2005) while the rest of the year gives a fairly stable supply of 200 to 400 tonnes per month with annual variations (Fig. 1-8). Denmark seems to have highest stability in continuous market supply, however on lower level compared to Germany and the Netherlands due to a smaller fleet.

Germany shows a stronger seasonality in landings. Only few tonnes are landed during the winter months (between 100 and 700 tonnes from December to March). End of March landings rise and show sometimes a spring peak in April around 1 500 tonnes. The early summer months (June to July) give fewer landings, around 1 000 tonnes, while the main landing season comprises months August to November with sometimes more than 2 000 tonnes per month. One could split the year into trimesters: a "pre-season" in spring to early summer, a "main season" in late summer and autumn and a "winter season". The monthly calendar does not represent the correct boundaries of the "seasons". According to prevailing weather conditions, annual conditions in shrimp availability and fishing abilities of the individual vessels, fishery stops or starts individually or by port one to two weeks earlier or later if not continuing over the winter season.

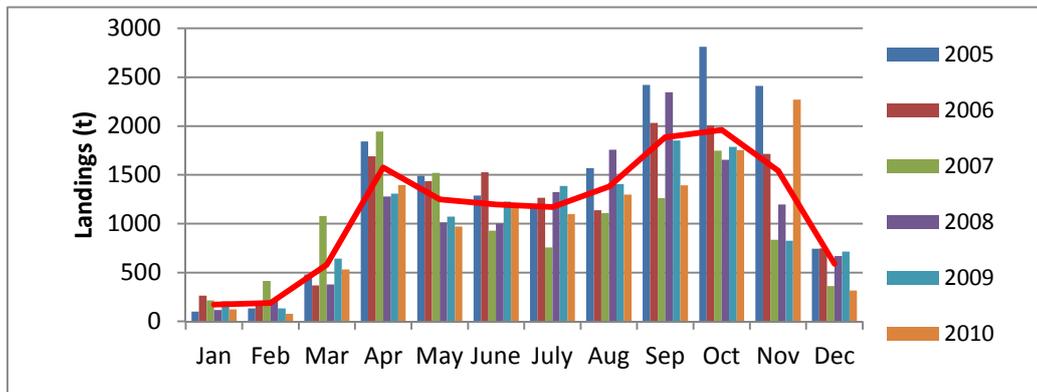
The Dutch fishing year shows a pattern which combines the Danish and the German ones. Generally most of catches are retrieved between September and November. From March to May there are relatively high landings (up to 1 500 tonnes). Specialities of the Dutch fleet are comparatively high landings in winter. They rarely fall below 600 tonnes, even in January and February and therefore give a continuous market supply.

**Figure 1-8: Monthly landings of brown shrimp in Denmark from 2005 to 2009**



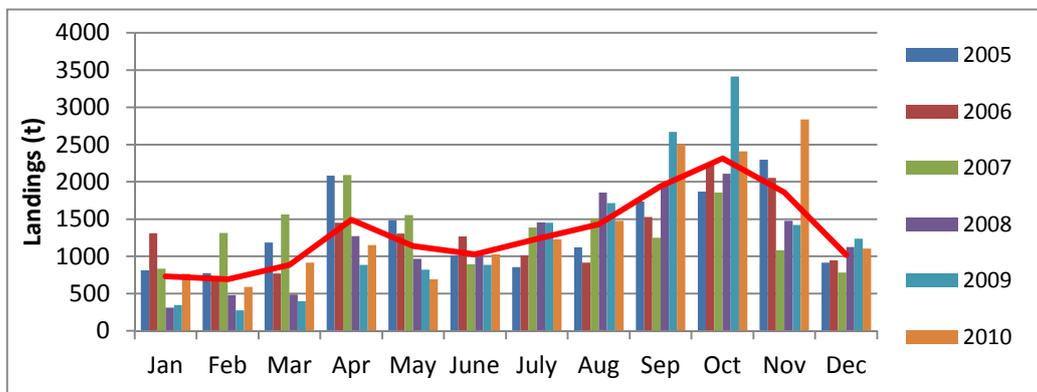
Source: WGCRAN (2010)

**Figure 1-9: Monthly landings of brown shrimp in Germany from 2005 to 2010**



Source: BLE and WGCRAN (2010)

**Figure 1-10: Monthly landings of brown shrimp in the Netherlands from 2005 to 2010**



Source: BLE and WGCRAN (2010)

## Seasonality of effort in brown shrimp fisheries

The same conditions are valid for effort seasonality as in the overview of the annual effort data. Differences in calculating effort and some biases affect the effort levels of the countries in monthly and yearly data. The monthly pattern, however, is probably hardly affected by that and reflects the relative activity of the fleets. Similar to the landings the differences are obvious (Figs. 1-11, 1-12 and 1-13).

The Danish fleet operates over the entire year with a peak in spring and sometimes another one in autumn and – most likely due to weather conditions – less fishing days in the winter period. A limited effort reduction is also seen in the summer months sometimes starting in May but especially in June and July, probably reflecting the availability of the target species.

The German fleet shows a very traditional activity pattern known from decades of data: formerly no, now very limited activity in the winter period which lasts from mid-December to mid-March, then very high fishing intensity in April slowly decreasing to June and July and an increase again due to the main fishing season in autumn. This pattern has its reasons mainly in the fishing ability under adverse weather conditions which normally prevail in winter. As still many of the German vessels are older types and comparatively small, they are bound to stay in harbour over stormy periods, which reduce the amount of hp-days spent at sea.

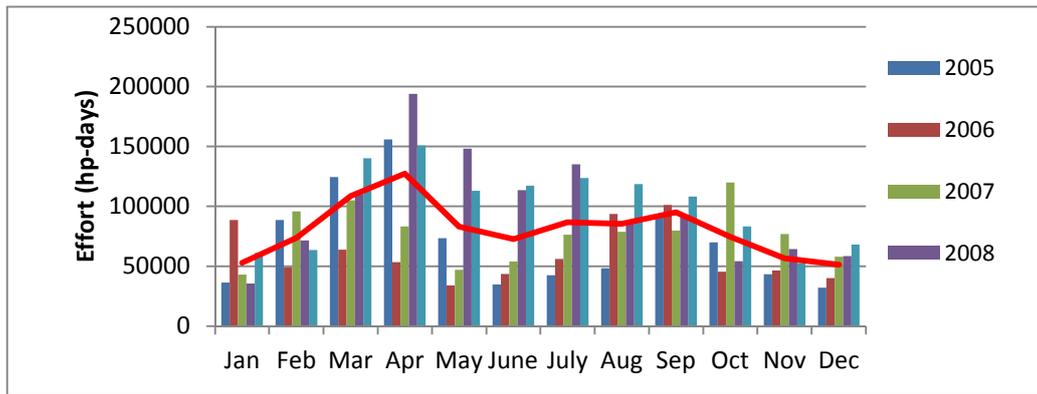
As the fishermen tend and need to go out for fishing when the target species is available, the amount of fishing time spent increases at those periods. In spring search trips may add to the high number of hp-days at sea while diminishing numbers of shrimp of the previous year-class and higher by-catch rates and repair or rewarded lay-days contribute to fewer hp-days in June and July.

A new development in the last decade with high autumn landings is, however, the fact of landing limitations by Producer Organisations (POs) in all three countries. Due to low landing prices for shrimp, fishermen decided to stop fishing after reaching some self-imposed quota. This led to a decrease of hp-days, even during peak fishing periods.

A special example of that was the year 1998 when fishing effort of the German fleet dropped by 25% in the autumn season (Neudecker 2000). The same was valid for a part of the Dutch fleet within the agreement between Danish, German and Dutch POs. This agreement was criticized by the Dutch NMa. Since then such an agreement was never in force and only local landings have been voluntarily reduced by some POs which had a minor reducing effect on the level of hp-days compared to 1998. This is especially the case at the end of 2010 when a large number of fishermen prefer to continue fishing despite low prices.

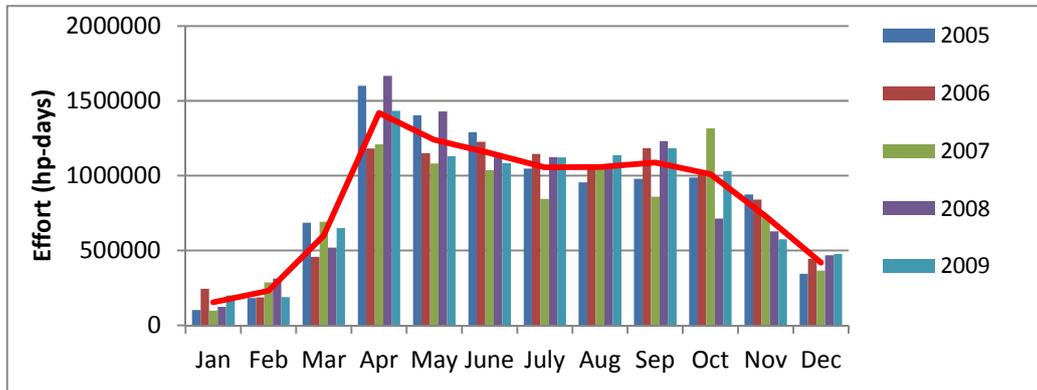
The Dutch seasonal effort pattern clearly shows that fishing is a year-round profession for Dutch fishermen. There are two peaks in spring and autumn. Similarly to the other fleets search trips in April-May add up to the number of hp-days after the harsher and stormy winter season for smaller vessels. The autumn season has again higher hp-days due to the recruitment of the new year-class of shrimp becoming available to fisheries. The amount of bias due to uncertainty in the Dutch effort data (ICES 2010) is unknown.

**Figure 1-11: Monthly effort in Danish brown shrimp fisheries from 2005 to 2009**



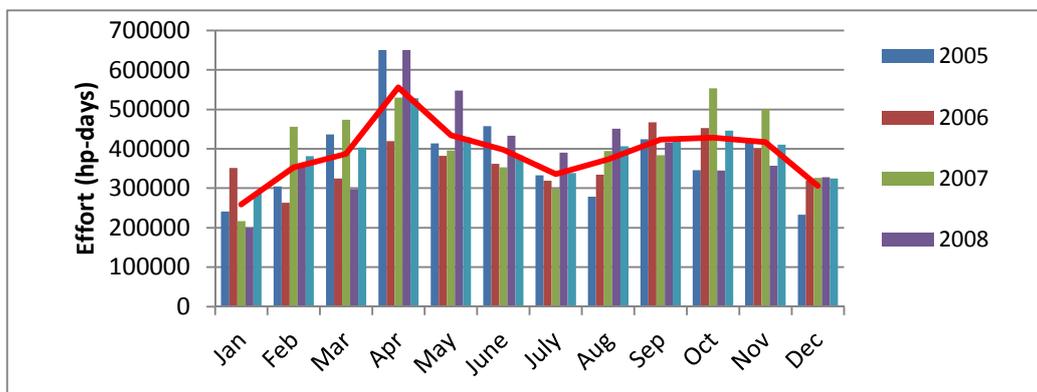
Source: WGCAN (2010)

**Figure 1-12: Monthly effort in German brown shrimp fisheries from 2005 to 2009 (incl. harbour days)**



Source: WGCAN (2010)

**Figure 1-13: Monthly effort in Dutch brown shrimp fisheries from 2005 to 2009**



Source: WGCAN (2010)

### Seasonality of Landings per Unit of Effort (LPUE)

The same uncertainties of effort data acquisition and calculation affect LPUE data as in the overview on the annual scheme.

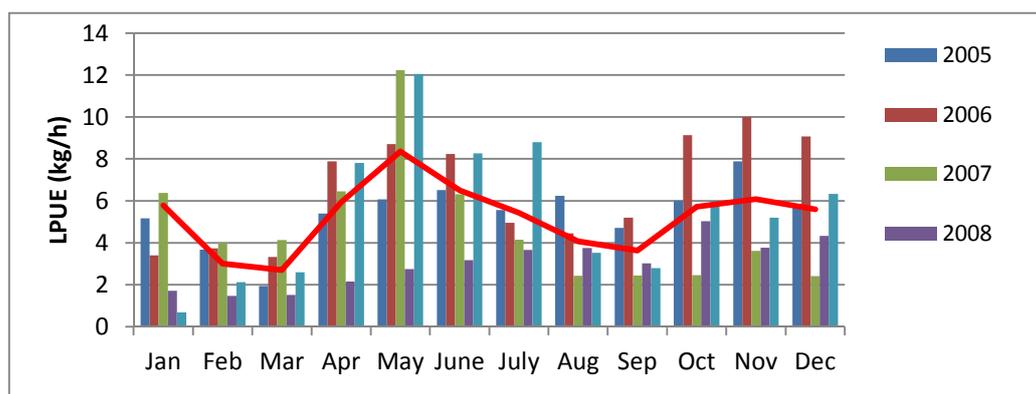
The seasonal pattern of the Danish LPUE data (Fig. 1-14) shows two peaks, one during the spring time from April to June and the other one from October to January, the year 2008 being an exception. There is no scientific proof behind this pattern as surveys in that area and by time are not conducted. Fishermen claim that there are times, when shrimp move to or from the Wadden Sea where no fishing is permitted in Denmark and become available for the fleet (Larsen pers com 2011). Taking for granted that there has been no substantial changes in the fishing capacity in the fleet during the course of the year, increases in LPUE must be correlated to stock densities of brown shrimp in the operational area of the Danish fleet.

The seasonal pattern of the German LPUE data (Fig. 1-15) lacks the “Danish spring peak”. The autumn peak is present but seems to occur one month earlier, i.e. from September to December.

The high values for 2007 may have their basis in the remaining stock from the previous year still available to the fishery. Changes in fleet structure or capacity are unlikely to have influenced these seasonal patterns. It must be a biological or environmental reason.

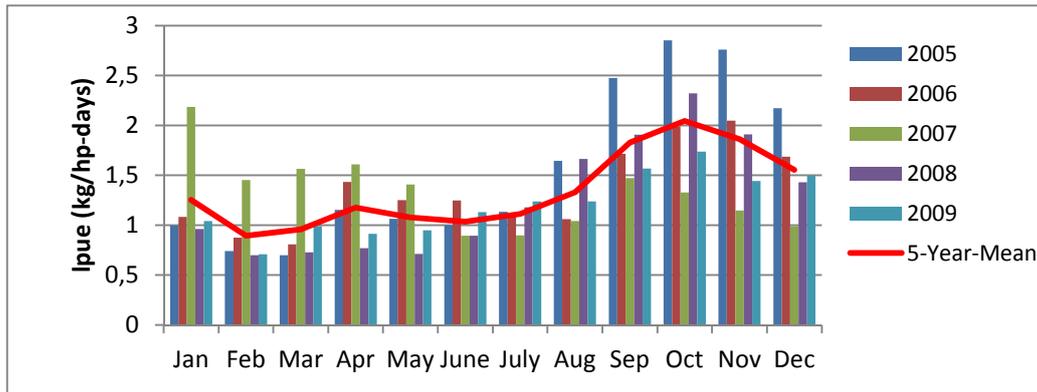
The seasonal pattern of the Dutch LPUE data (Fig. 1-16) lacks the “Danish spring peak” as well and follows widely the German LPUE pattern. However the autumn peak seems to be less pronounced. Spring LPUEs seem to be higher if the preceding autumn season showed high LPUE values. This can be seen nicely for the autumn season 2006 and the spring season 2007. As effort calculation is consistent within years any bias in the data may affect the LPUE levels in a given year but not their seasonality.

**Figure 1-14: Monthly LPUE data in Danish brown shrimp fisheries from 2005 to 2009**



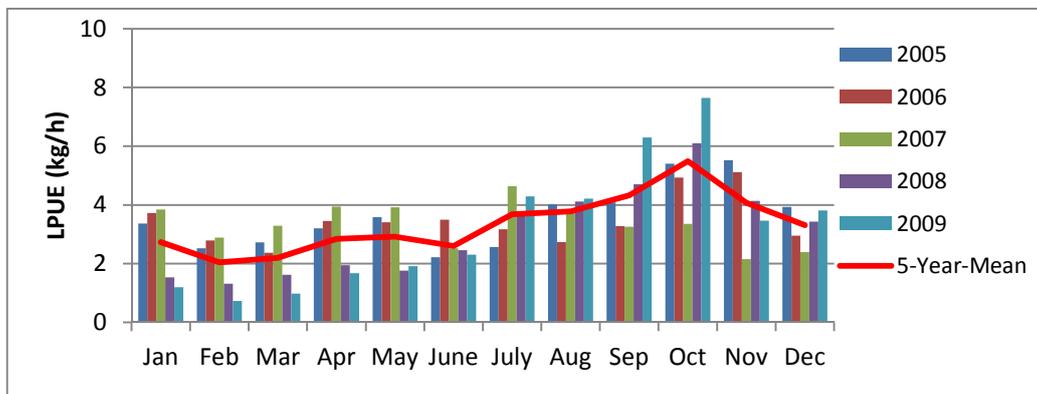
Source: WGCAN (2010)

**Figure 1-15: Monthly LPUE data in German brown shrimp fisheries from 2005 to 2009**



Source: WGCRAN (2010)

**Figure 1-16: Monthly LPUE data in Dutch brown shrimp fisheries from 2005 to 2009**



Source: WGCRAN (2010)

### 1.1.3 *Distribution of shrimping effort in the Southern North Sea*

#### **Fleet structure and fishing grounds**

- Denmark has the youngest and presumably most up-to-date fleet, fishing entirely off the Denmark and northern Germany coasts.
- Germany has a high share of smaller and older vessels fishing often day trips within the vicinity of home ports. The more powerful vessels fish along part of the Dutch coast and all along the German and Danish coasts, in Danish waters outside the 6 nm zone.
- The Dutch fleet has comparatively few older and low-powered vessels fishing within Dutch waters. A high share of powerful and well equipped vessels fish most parts of the German and Danish coast, outside the 3 nm (Germany) and 12 nm zone (Denmark).
- While VMS data give a very good overview of the regional and seasonal activities of the fleets there is no recent fleet inventory available giving details on equipment and efficiency of the vessels.

#### **Methods of VMS data handling**

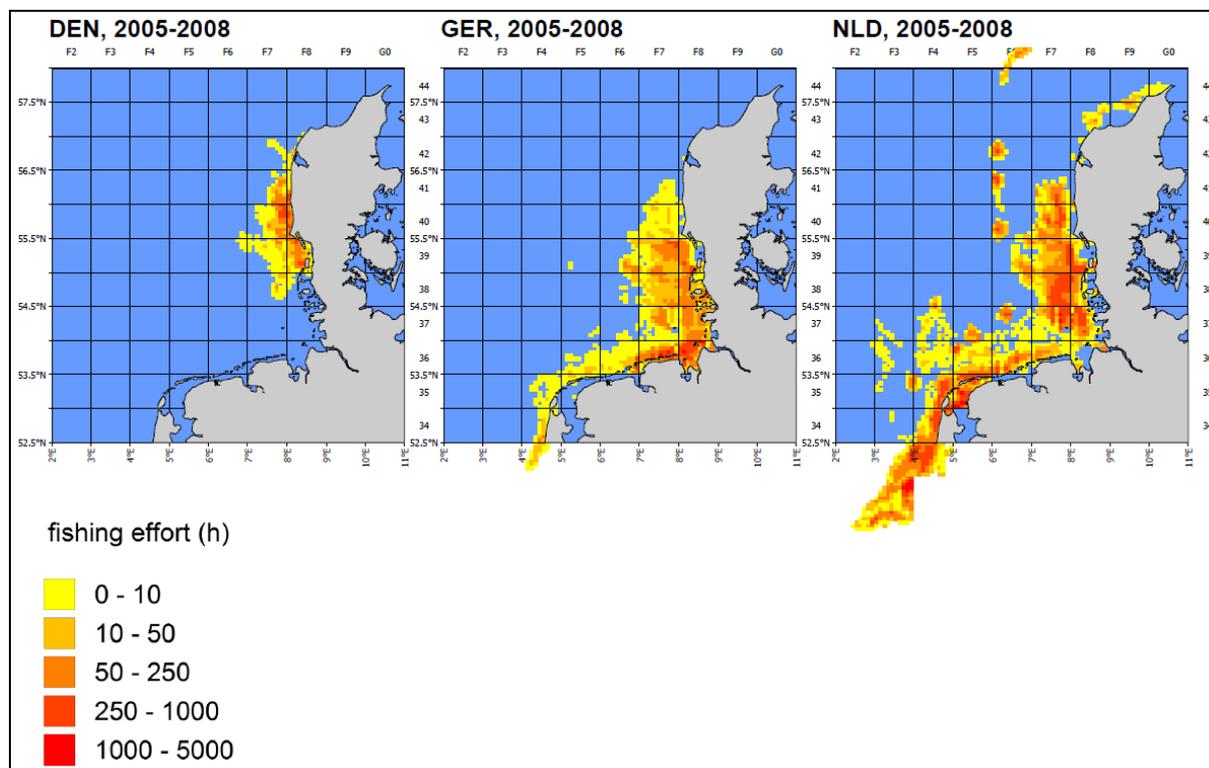
VMS data are available since 2005 for part of the shrimp fleets (total length of vessels > 15m - EU regulation 2244/2003). Original VMS (Vessel Monitoring System) data consist of vessel identification number, position, speed over ground and heading. As only part of VMS data of the Dutch fleet (16 to 25 % between 2005 and 2008) are available (Schulze and Fock 2010), the Dutch effort and power class data have been corrected by the proportion of effort in terms of kW-hours covered in the VMS data with the kW-hours-effort covered by logbook data.

During the project "Study for the Revision of the plaice box" (see Beare et al. 2010 for further details), funded by the European Commission, partners submitted VMS data for Denmark, Germany and the Netherlands. These data were used for the present analyses. For each position a flag indicating "fishing" or "not fishing" was computed from the speed of each vessel, i.e. a certain range of low speed was labelled "fishing" whereas higher speed and standing still were labelled "not fishing". The position of the boat was then allocated to a 3 times 3 nm miles rectangle (i.e. 100 fine rectangles per ICES rectangle) and the time interval between two positions was summed up to the amount of fishing effort spent in a specific 3 by 3 nm rectangle (hours fishing, Fig.1). Since the time interval between each position can be up to two hours there is a considerable portion of 'unseen' activity for each vessel. The method applied for VMS data analysis takes account of this uncertainty by substituting each registration with discrete sets of positions with high probability of vessel presence (Fock 2008). Error for this method to analyze VMS was assessed to be ca. 5 % (Fock 2008).

To identify the métier of the vessels (shrimper or other) log-book information on the used gear, mesh size and power category for each vessel and trip was used. However, misclassification due to wrong logbook data might occur (e.g. see effort by Dutch shrimpers in offshore areas). The data were aggregated so that no individual boat or fisherman may be identified.

The distribution of the total fishing effort (hours) per 3 x 3 nm rectangles of the Danish (DEN), German (GER) and Dutch (NLD) shrimp fleets for the entire period 2005 to 2008 is presented in Fig. 1-17.

**Figure 1-17: Distribution of fishing effort (hours) of the Danish (DEN), German (GER) and Dutch (NLD) shrimp fisheries in 2005 to 2008**



Source: WGCAN (2010)

The Danish fleet is almost exclusively fishing off the Danish coast and in some parts of the northern coast line of Germany.

The German fleet covers not only German but also Danish and Dutch coasts. The reasons for that are based in the seasonal distribution of the shrimp, the legal situation allowing foreign vessels to fish in neighbouring countries up to a certain distance from the base line (compare chapter 1.1.4) and the fact that some of the German registered vessels are Dutch-owned with Dutch crews on board. Therefore these vessels may partly fish in the waters as well where the fishermen are “at home” and feel familiar with, i.e. in Dutch waters. A close up look at the Danish coast shows that German vessels do not fish directly at the coast where they are not entitled to. VMS signals from close to the coast reflect movement to the harbours where they are landing their catch.

The distribution pattern of the Dutch fleet is very similar to the pattern of the German fleet, extending further to the North, the South towards the Channel and the Belgian coast as well to the more open North Sea (Fig. 1-18). These latter data are most likely errors in the data base. Errors occur if the vessels shift from shrimping to flatfish fishery and if change is not properly marked in the log books suggesting shrimping activity where it did not take place. For the Dutch fleet it can also be seen that the fishing activity is outside the 6 nm and 12 nm zone respectively along the Danish coast. Due to the way of calculating effort distribution and scale the distance towards the 3 nm zone along the Germany coastline can hardly be seen.

**Figure 1-18: Dutch vessels for shelter from storms in Helgoland harbour (January 2011)**



**Photo:** vTI (© Neudecker)

As can be seen in Fig. 1-19 showing the seasonal distribution of fishing effort by quarter for 2008, the Danish fleets sticks more or less to the national waters. Fishing takes place mainly close to the coast line. Only in winter the fishing area moves further out to the sea into deeper waters. In 2008 German waters have hardly been touched.

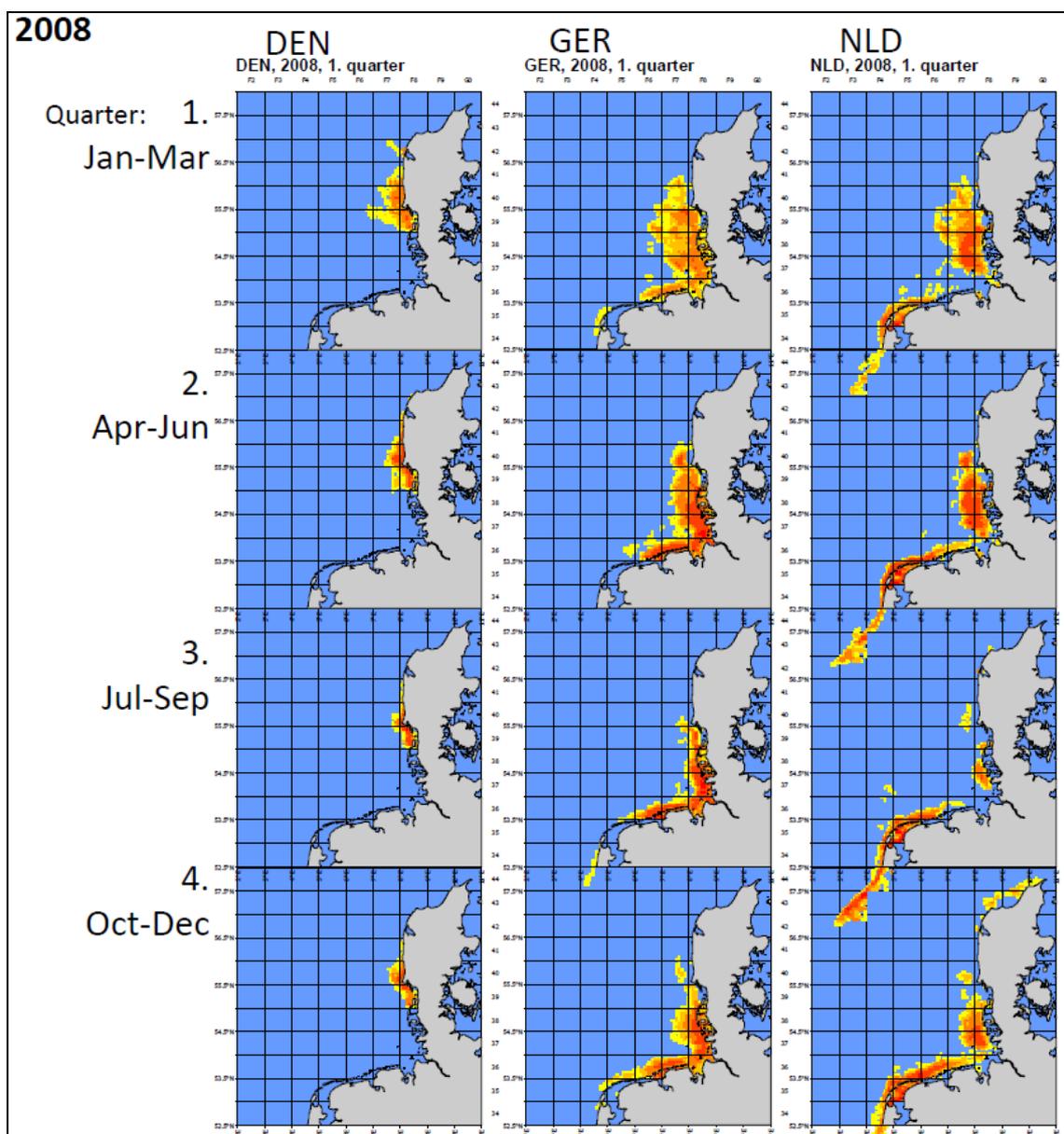
The same is valid for the German fleet. However the "off shore fishing" occurs up to the second quarter and is visible also partly for the fourth quarter due to the seasonality of shrimp distribution. Only during the warm summer period the shrimping is more confined towards the coast and the Danish coast is frequented almost only during the first two quarters.

The Dutch VMS signals follow the same pattern as those from German vessels. The differences are only the extension of the general range of fishing areas and the lack of activity of Dutch vessels off the East Frisian coast in the first and third quarters.

More recent evaluations of VMS data are not available yet. Data for 2005 to 2007 and monthly resolutions show very similar distributions and have not been included for reasons of space.

Improvements in the coverage of VMS data from the vessels of the fleets seem necessary to reduce problems by raising existing data to the entire fleets. Errors by allocation of wrong metiers may be eliminated by improving log book data and crosschecking VMS data and metiers to records of landings of the major species in log books.

**Figure 1-19: Distribution of fishing effort of the Danish (DEN), German (GER) and Dutch (NLD) shrimp fisheries in 2008 for the first to fourth quarter**



Source: WGCAN (2010)

#### 1.1.4 Legal Framework in shrimp fisheries

##### Key findings

- There is no maximum allowable catch for the North Sea brown shrimp.
- The stocks are surveyed and evaluated by the ICES Working Group on Crangon Fisheries.
- There is until now no sign of overfishing which could make a restriction necessary.

Important to brown shrimp fishery is mainly the jurisdiction valid for coastal areas since it is carried out in depths rarely exceeding 30 m and mainly within offshore distances of 30 nm.

In 1982 the United Nations Convention on the Law of the Sea (UNCLOS) constituted the territoriality of the seas. Since then the territorial waters of every state that ratified the treaty were set to be within a distance of 12 nm off the coastal baseline (low-water line). The section between the shore and the baseline is called internal waters. Here the state has complete jurisdiction. Between baseline and 12 nm boundary there is the 3 nm line. Like the internal waters, the 3 nm zone is entirely reserved to national fishing vehicles. Within the 12 nm boundary member states have taken specific “non-discriminating” measures allowing foreign vessels to fish (EU (Com) 2371/2002). The same regulation also limits access to the particular national waters. For the important brown shrimp nations Denmark, Germany and the Netherlands following access rules are valid for shrimp according to Annex I of EU (Com) 2371/2002:

#### **Coastal Waters of Denmark**

*Germany:* North Sea coast (Danish/German frontier to Hanstholm): 6 to 12 nm – unlimited

*The Netherlands:* North Sea coast outside 12 nm

#### **Coastal Waters of Germany**

*Denmark:* Danish/German frontier to the northern tip of Amrum at 54°43 N: 3 to 12nm – unlimited

*The Netherlands:* North Sea Coast (All coasts): 3 to 12nm – unlimited

#### **Coastal Waters of The Netherlands**

*Denmark:* not specified

*Germany:* North Sea Coast (All coasts): 3 to 12nm – unlimited

In 1995 the UN Food and Agricultural Organization (FAO) created a legal framework for sustainable fisheries. At European level the Common Fisheries Policy (CFP) is the relevant legal framework. The first common measures were agreed upon in 1970. Every fisherman should have equal access to all waters of the EU member states. To maintain economic and ecological sustainability in fisheries for local, traditional fishermen with smaller boats a certain part of the coast was reserved only for these small vessels (COFAD 2004, EU (Com) 2371/2002).

In 1983 the member states decided to hand over their interests in their territorial waters to the EU Commission for fisheries management and representation within the 200 nm zone (EU (Com) 2371/2002).

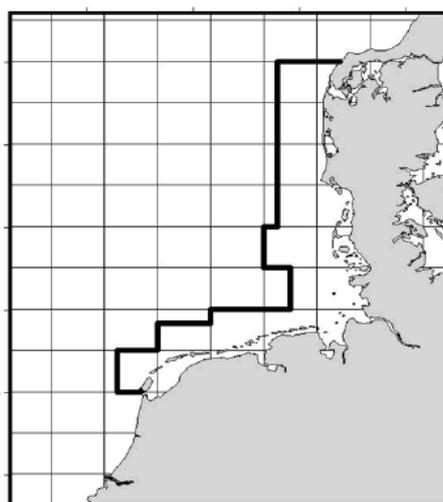
Concerning the brown shrimp fishery, there is one important legal restriction valid for the North Sea coastal areas: the Plaice Box. In 1986 the EU enacted a restriction area (Regulations (EEC) 3094/86 and 55/87) to protect juvenile plaice.

The regulation specifies that all beam trawlers (TBB) between 8 and 24 m total length and with less than 221 kW / 300 hp engine power have to be listed in a “beam trawl list” (3084/86 and 55/87). This list is not extendable, but it is possible to change list places when another vessel leaves the fleet. Without being listed in the beam trawl list fishing is not allowed within the Plaice Box.

This Plaice Box covers a zone along Dutch, German and Danish coasts up to the lighthouse Hirtshals in Denmark (Map 1) within the 12 nm maritime boundary. Bigger vessels are excluded in that area because of their heavier gear and therefore increased potential to harm benthos and especially young plaice. Most of local fishermen have smaller fishing boats anyway and benefit from this regulation.

The North Sea Brown shrimp has no restriction concerning a maximum allowable catch. The stocks are surveyed and evaluated by the ICES Working Group on Crangon Fisheries and Life Cycle (WGCRAN). Since the species has a very short life cycle, reliable stock estimates have not been achieved yet. According to recent studies however, there was no sign of overfishing which would make a restriction necessary (Neudecker et al. 2007, ICES 2010).

**Map 1: Plaice Box**



Source: EU Commission

## 1.2 The Economic and Social Relevance of the Industry

### Key Findings

- About 500 vessels and 1 000 fishermen are involved in brown shrimp fishery.
- Beam trawlers 12-24 m are the most important segment within the Dutch and German coastal fleet. These segments offer a comparatively large number of jobs (around 500-600 each) and generate revenues in an order of magnitude of around 50 Mio. €/year. For the Danish fleet, beam trawlers are of minor importance.
- Beam trawlers 12-24 m are in most cases organised as small personal enterprises, operated by the owner. The owners have been able to make a living from their business, but at least for the Dutch and German case they have faced years with losses.
- Landings and prices are only loosely correlated. Poor catches might not necessarily be compensated by higher prices and vice versa, indicating an imperfectly competitive market with an increased uncertainty for the vendor (=fisherman).

### 1.2.1 Social relevance of the Industry

About 500 vessels and 1 000 fishermen are involved in brown shrimp fishery.

**Table 2. Number of shrimp licenses in Denmark, Germany and the Netherlands in 2010**

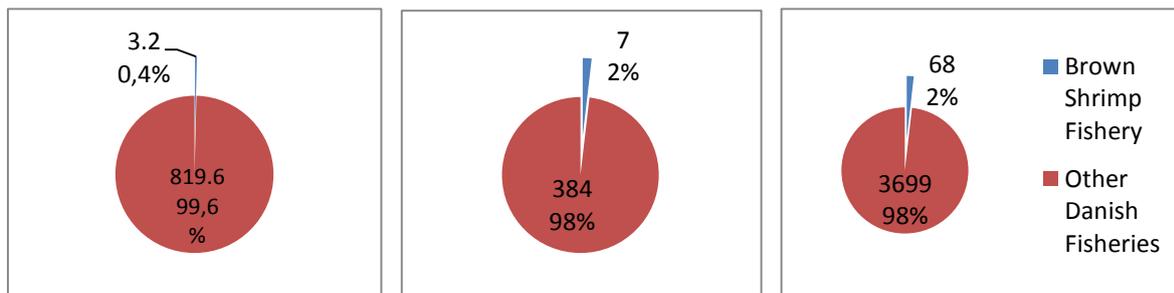
|                     |            |
|---------------------|------------|
| <b>Netherlands</b>  | <b>225</b> |
| Waddensea           | 92         |
| Other coastal areas | 133        |
| <b>Germany</b>      | <b>253</b> |
| Lower Saxony        | 137        |
| Schleswig-Holstein  | 116        |
| <b>Denmark</b>      | <b>28</b>  |
| <b>Total</b>        | <b>508</b> |

Source: NVB

### 1.2.2 Denmark

Brown shrimp fishery is of minor importance for the Danish marine fishery. It accounts for about 2% of total revenues. Onboard employment related to brown shrimp fishery is in the range of 70 people (Fig. 1-20).

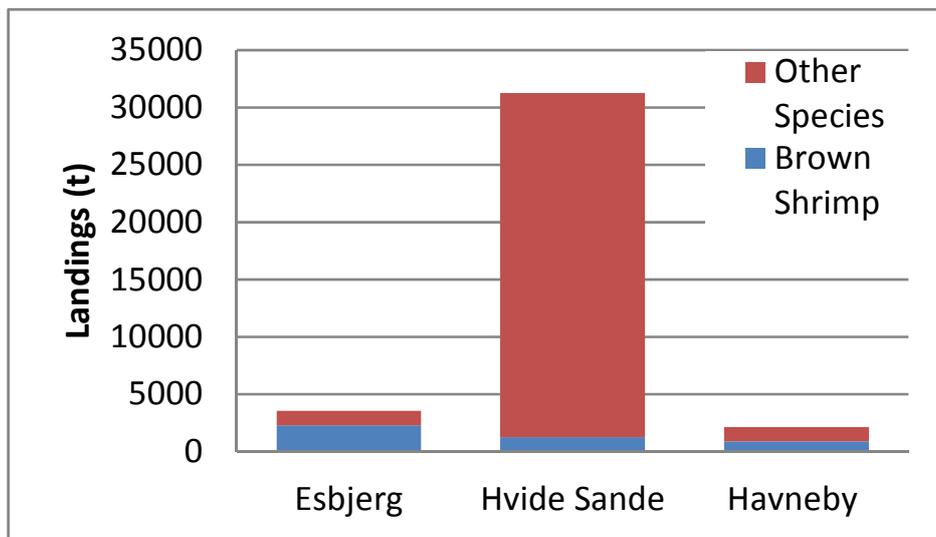
**Figure 1-20: Key Values of Danish brown shrimp Fishery compared to other fisheries (left: Landings in 1000 tonnes, centre: Revenues in Mio. €, right: Employment in number of direct employed people) in 2008**



Source: Danish Directorate of Fisheries Sales Notes Register

Denmark has three ports with major brown shrimp landings, which are all located at the Southwestern coast (Map 2). In Esbjerg, brown shrimp is the major species by weight, whereas in the other two ports other species play an important role as well. Hvide Sande is dominated by other species, especially sandeels for industrial purposes (Fig. 1-21).

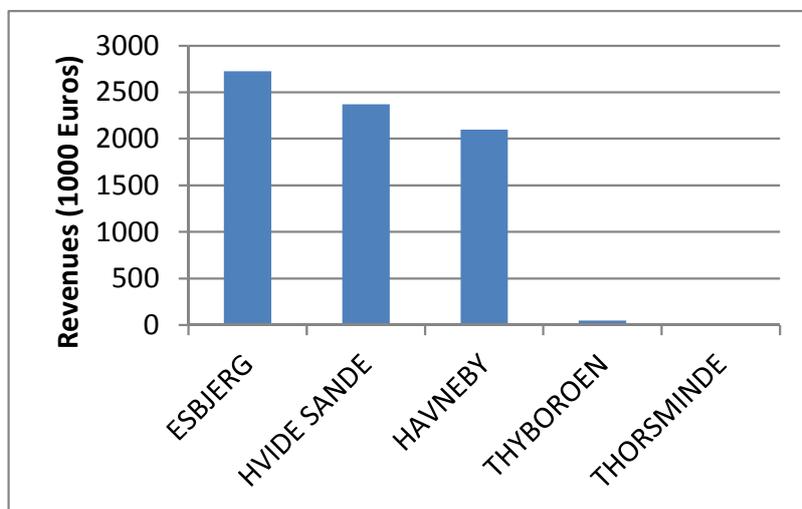
**Figure 1-21: Landings of brown shrimp in Denmark by harbour (2010) compared to landings by other fisheries**



Source: Danish Directorate of Fisheries Sales Notes Register

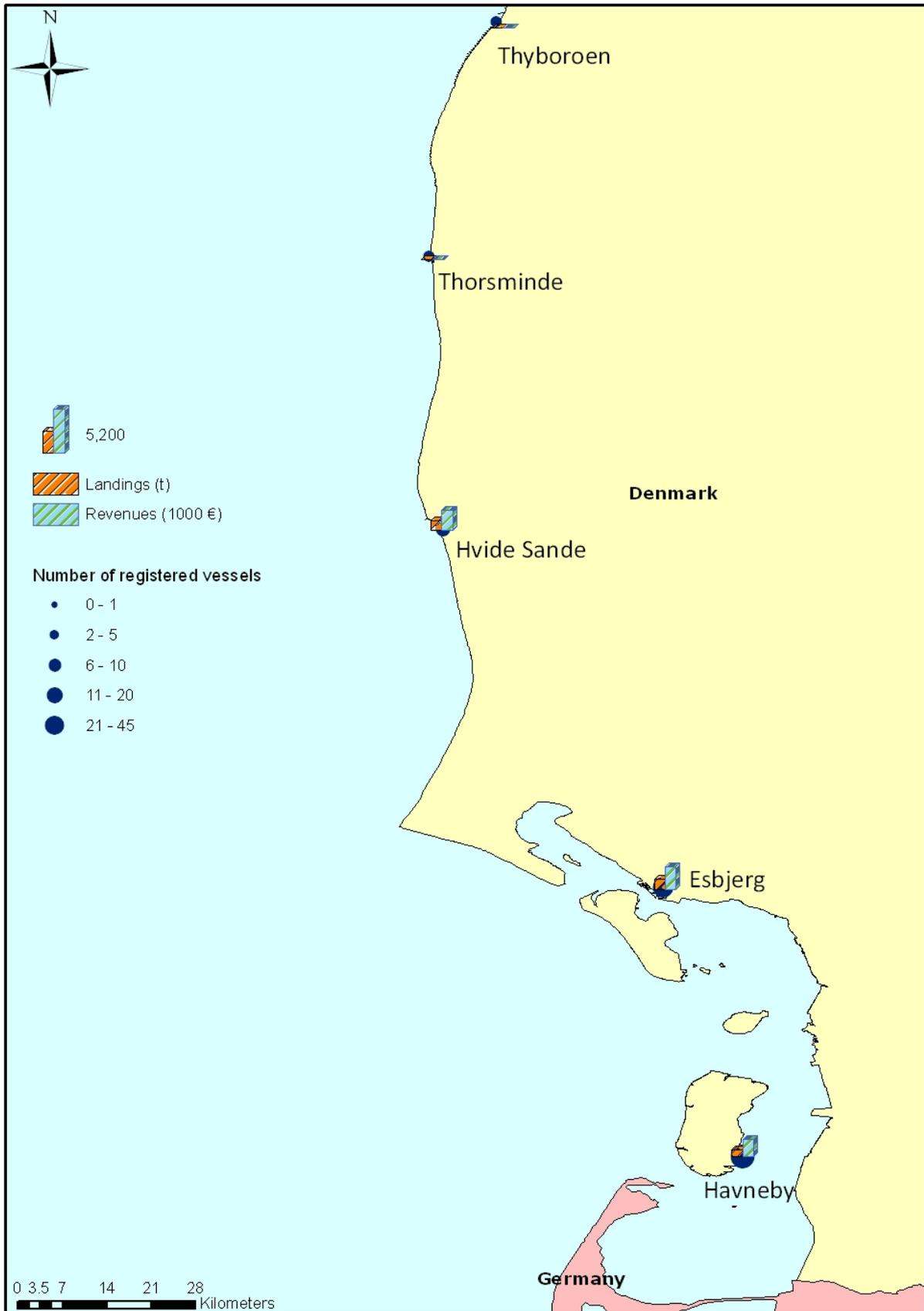
Figure 1-22 shows the importance of Esbjerg, Hvide Sande and Havneby for the Danish brown shrimp fishery by revenues: between 2 and 2,7 mio. € per harbour. The geographical distribution of the harbours and their importance by number of registered vessels, landings and revenues are given in Map 3.

**Figure 1-22: Revenues by brown shrimp fishing in Denmark by harbour**



Source: Danish Directorate of Fisheries - Sales Notes Register

**Map 2: Danish brown shrimp harbours: Landings, Revenues and Number of registered Vessels**

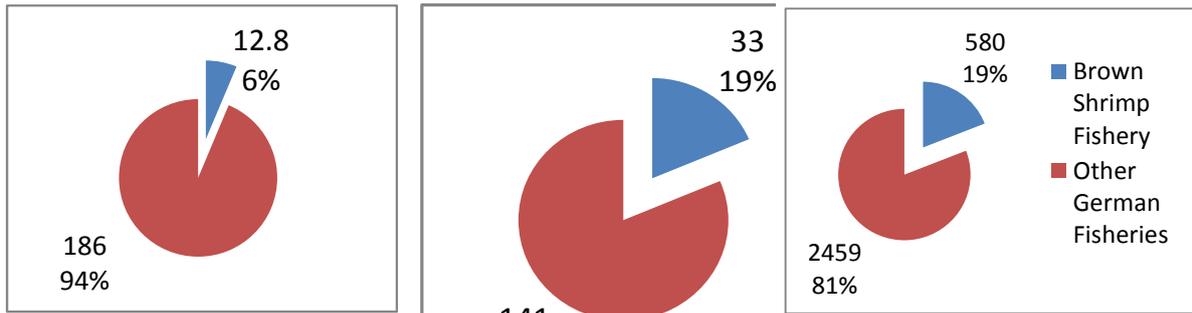


**Cartography:** vTI (M. Müller)

### 1.2.3 Germany

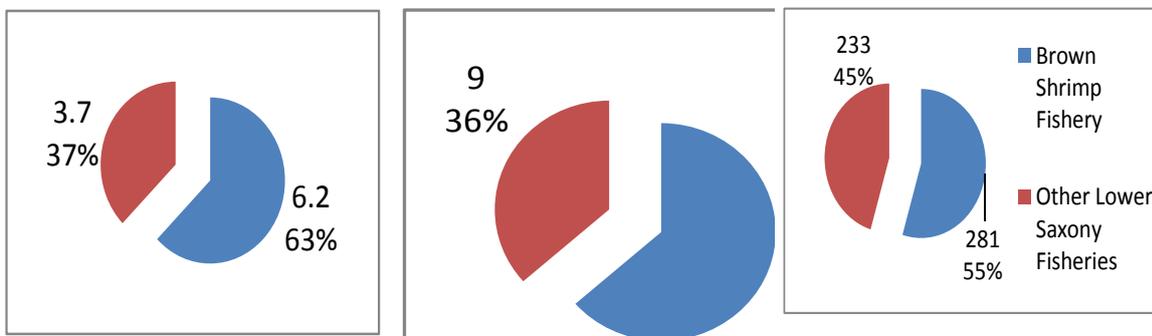
Brown shrimp fishery is an important sector within the German marine fishery. It accounts for about 20% of total revenues and employment (Fig. 1-23). As the fishery is limited to the North Sea, it is related only to the states of Lower Saxony and Schleswig Holstein, where its contribution to revenues and employment is accordingly higher (Figs. 1-24 and 1-25).

**Figure 1-23: Key Values of German Brown shrimp Fishery compared to Other Fisheries (left: Landings in 1000 tonnes, centre: Revenues in Mio. €, right: Employment in number of direct employed people) in 2009**



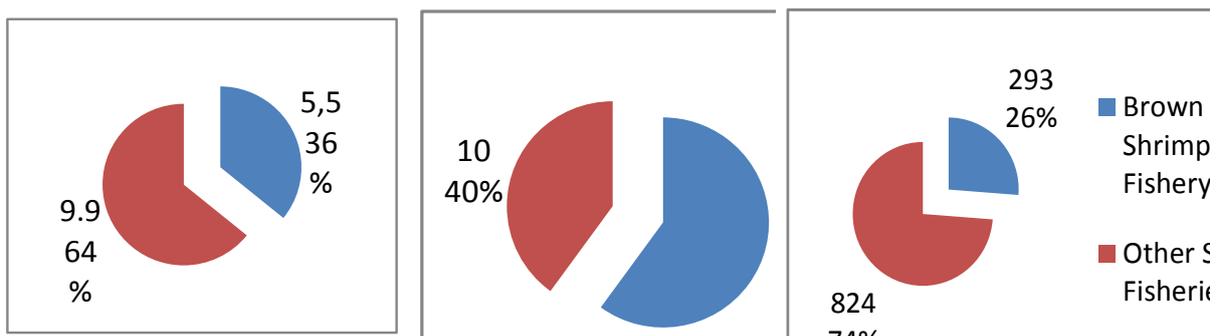
Source: BMELV fleet statistics and BLE

**Figure 1-24: Key Values of Lower Saxony Brown shrimp Fishery compared to Other Fisheries (left: Landings in 1000 tonnes, centre: Revenues in Mio. €, right: Employment in number of direct employed people) in 2009**



Source: BMELV fleet statistics and BLE

**Figure 1-25: Key Values of Schleswig-Holstein Brown shrimp Fishery compared to Other Fisheries (left: Landings in 1000 tonnes, centre: Revenues in Mio. €, right: Employment in number of direct employed people) in 2009**



Source: BMELV fleet statistics and BLE

The importance for employment is less in relative numbers in Schleswig Holstein, as many Schleswig Holstein fishermen are involved part-time in the fixed net fishery, which is in Germany almost exclusively performed in the Baltic Sea.

Shrimp have to be landed shortly after the catch. As shrimp fishing grounds extend along the entire North Sea coastline, the catch can be unloaded at several sites in Germany. The most important stations are Büsum in the Northeast, Cuxhaven in the centre and Greetsiel and Norddeich in the West (Figs. 1-27, 1-28 and Map 3).

The economic importance of brown shrimp for the landing locations is, however, quite limited. The absolute values of landings are of minor importance to the total revenues generated within the city community. However the attractiveness of fishing vessels in the harbour to tourists is of extreme significance to local economy as tourism creates up to 60% of the local primary source of income (NIT/COFAD 2010, in prep.). Landing sites are a tourist attraction due to both the imaginary freshness of products and the picturesque harbour scenery with vessels showing fishing nets (Fig. 1-26).

The total number of employees onboard and in the processing sector is about 800 (BMELV 2010 and Amadeus Database).

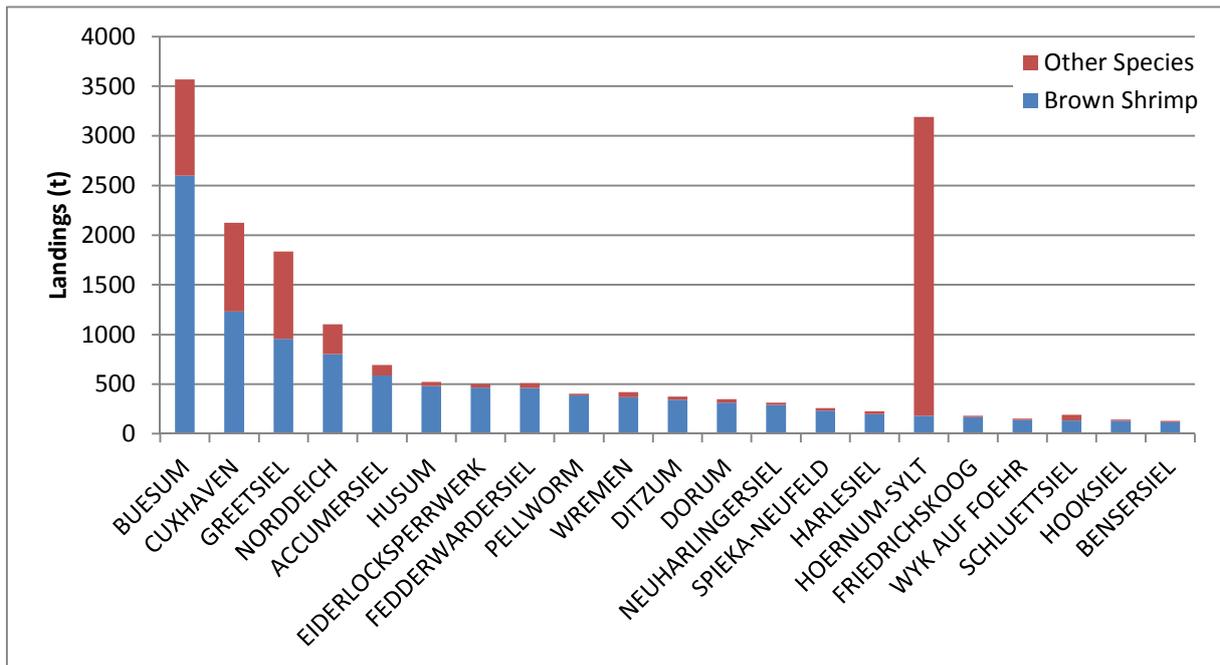
**Figure 1-26: German Shrimp vessels in Fedderwardersiel harbour dressed up for traditional “Kutterregatta”**



**Photo:** vTI (© Neudecker)

In Germany in fact four states (Länder) are bordering the North Sea coast: Schleswig-Holstein, Hamburg, Bremen and Lower-Saxony. Shrimpers are mostly registered in Schleswig-Holstein and Lower-Saxony, where they have their home ports, POs and official institutions. There are many home ports along the coast hosting from 1 to 34 shrimpers, BÜsum being the outstanding centre for shrimp landings, sieving and revenues (Figs. 1-27, 1-28 and Map 3).

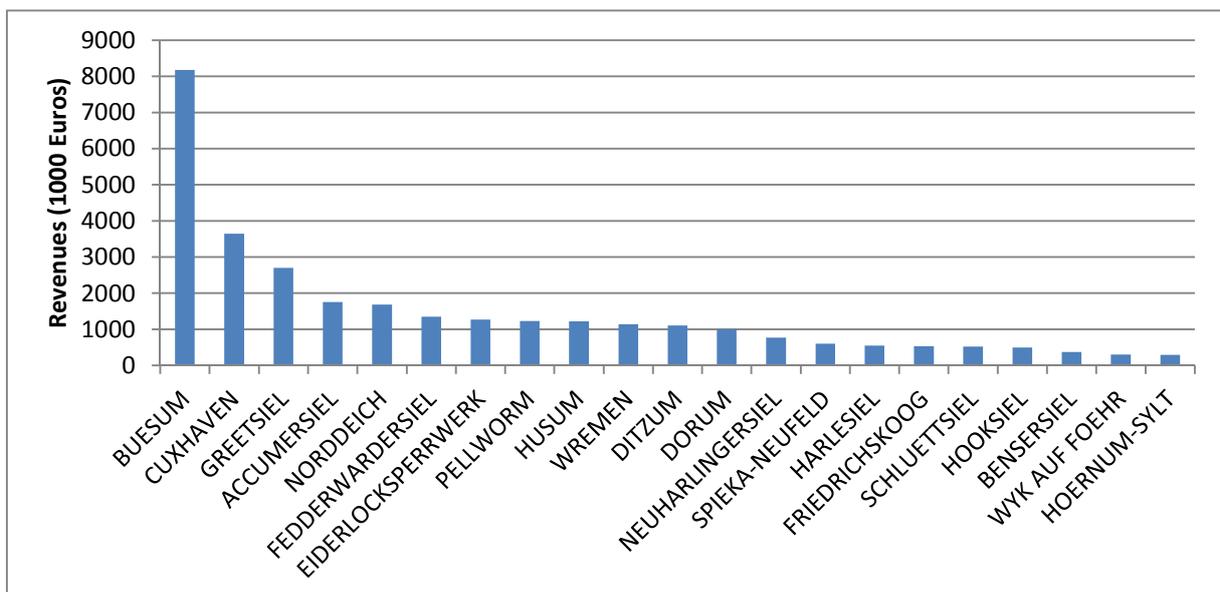
**Figure 1-27: Landings of brown shrimp in Germany by harbour with more than 100 t annual landings (2010) compared to landings by other fisheries**



Note: The high "other landings" in Hoernum-Sylt are due to mussel landings

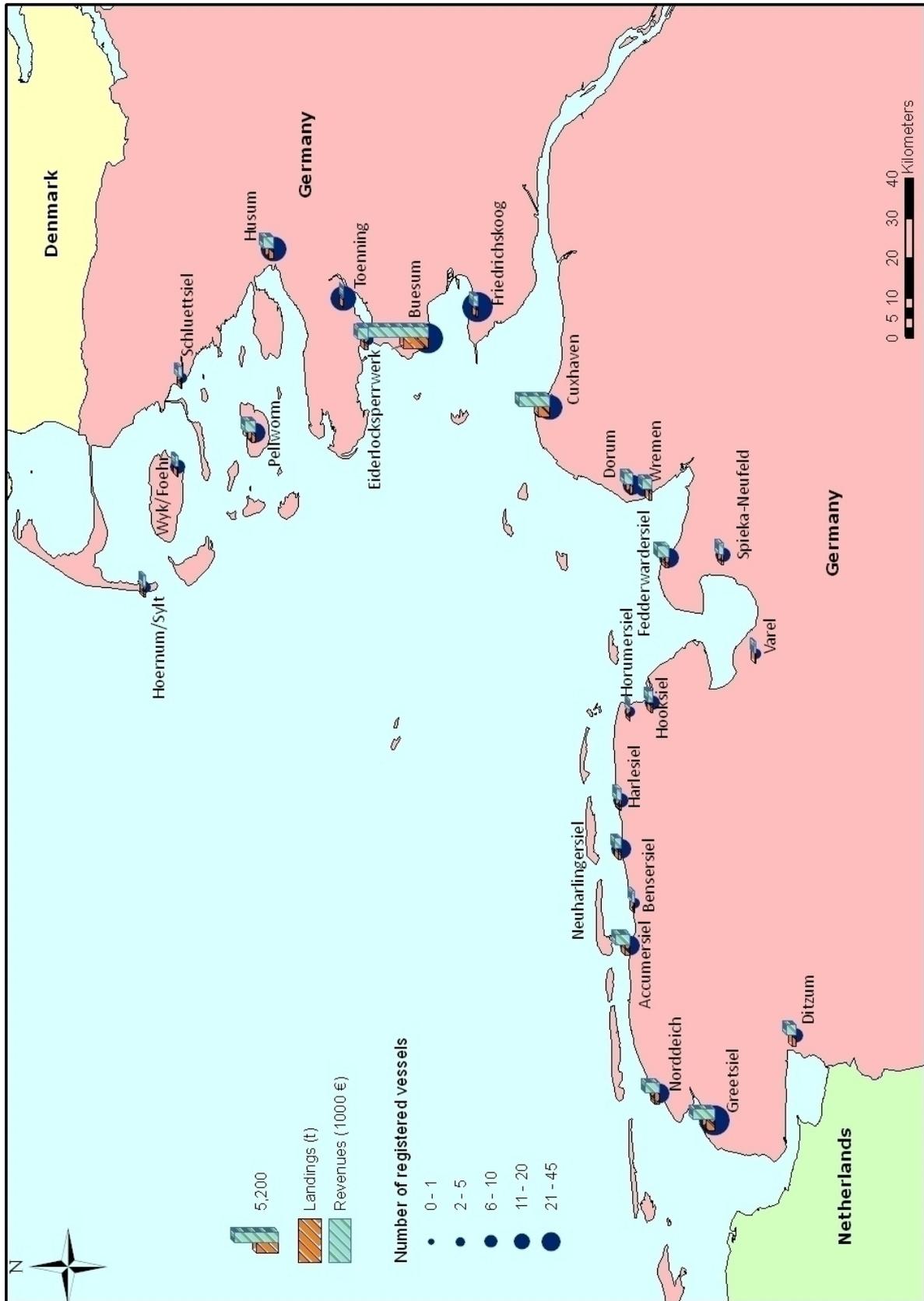
Source: BLE

**Figure 1-28: Revenues by brown shrimp fishing in Germany by harbor**



Source: BLE

**Map 3: German Brown Shrimp Harbours: Landings, Revenues and Number of registered Vessels**



Cartography: vTI (M. Müller)

### 1.2.4 The Netherlands

Brown shrimp fishery is an important sector in the Dutch fisheries, especially if we consider the cutter fishery and the small-scale coastal fishery.

Brown shrimp fishery counts for 22% of the revenues of the cutter fishery (70% of the fleet below 300 HP) and 14% of the total revenues of the whole Dutch fishing fleet.

**Table 3. Economic importance of brown shrimp fishery in the Netherlands in 2009**

| Fleet category                | All fisheries | Brown shrimp |           |
|-------------------------------|---------------|--------------|-----------|
|                               | mio€          | mio€         | %         |
| <b>Coastal fishery</b>        | <b>205</b>    | <b>44</b>    | <b>22</b> |
| 1-260 HP                      | 11            | 11           | 100       |
| 261-300 HP                    | 52            | 34           | 65        |
| > 300 HP                      | 141           | 0            | 0         |
| <b>Large high sea fishery</b> | <b>115</b>    | <b>0</b>     | <b>0</b>  |
| <b>Small high sea fishery</b> | <b>7</b>      | <b>0</b>     | <b>0</b>  |
| <b>Total</b>                  | <b>327</b>    | <b>44</b>    | <b>14</b> |

Source: LEI - Visserij in cijfers 2010

In the last years the relative importance of the brown shrimp fishery has strongly increased: whereas the revenues of the overall coastal fishery remained about the same (around 250 mio €) in the years 2003-2008, the turnover of the brown shrimp fleet has doubled.

**Table 4. Evolution of the importance of the brown shrimp fishery in the Dutch coastal fishery**

|      | Overall coastal fishery | Brown shrimp fishery |     |
|------|-------------------------|----------------------|-----|
|      | mio€                    | mio€                 | %   |
| 2003 | 262                     | 32                   | 12% |
| 2004 | 241                     | 32                   | 13% |
| 2005 | 240                     | 39                   | 16% |
| 2006 | 246                     | 37                   | 15% |
| 2007 | 270                     | 52                   | 19% |
| 2008 | 250                     | 61                   | 24% |
| 2009 | 204                     | 44                   | 22% |

Source: LEI - Visserij in cijfers 2010

Major landings take place in the ports of the Wadden Sea (Zoutkamp, Lauwersoog, Harlingen, Den Oever).

**Map 4: Dutch Brown Shrimp Harbours: Landings, Revenues and Number of registered Vessels**



Cartography: vTI (M. Müller)

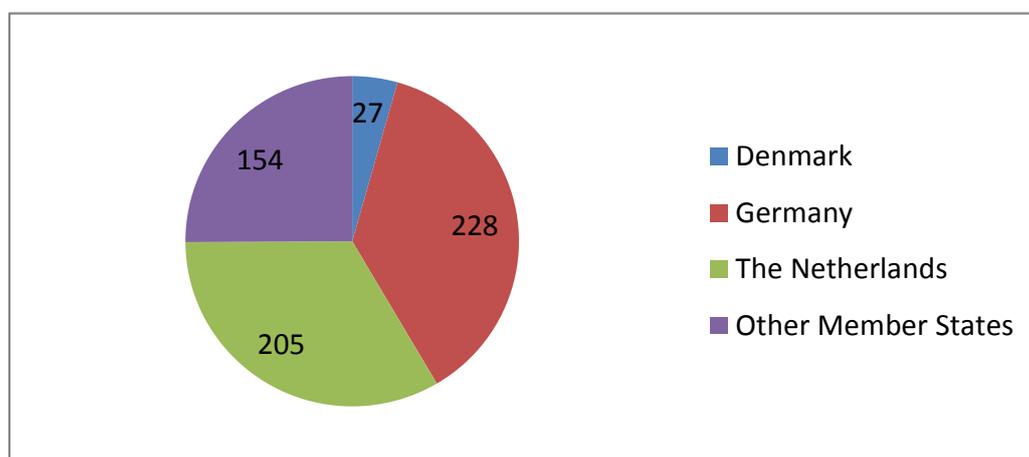
### 1.3 The Evolution of the Economic Performance of the Brown Shrimp Fleets 2000-2010

#### Key Findings

- Brown shrimp is amongst the top 5 species in terms of value for the entire Dutch and German fleets. Within the Danish fleets, brown shrimp are less important.
- The total shrimping fleet comprises about 500 vessels fishing all along the coasts of Denmark, Germany and the Netherlands.
- Dutch and German beam trawlers 12-24 m are almost entirely dependent upon revenues from brown shrimp. Danish beam trawlers also primarily target brown shrimp but go partly on flatfish and have the option of changing towards sand eel.
- Dutch and especially German vessels are old, and very few have been replaced by new ones in the last decade, whereas Danish vessels are relatively new and modern.
- In the present configuration of the fleet (500 vessels), shrimp fishing cannot be profitable with a shrimp price under 2,75 €/kg (under the hypothesis of a gasoil price at 0,60 €/kg). With a fleet reduced to 375 boats, the break-even point would be a shrimp price of 2,31 €/kg.
- It should be easy to catch the same shrimp quantity with a fleet downsized by 25%.
- Dutch and German vessels are distributed along the entire coast line, playing an important role for tourism in providing picturesque harbour scenery.

Fig. 1-29 compares the EU brown shrimp fleet by member state. Germany and the Netherlands have the largest share with about 200 vessels per country, whereas Denmark has only 27. The high number of vessels in other member states is explained by the small size and capacity of the fleets of Belgium, France and the UK.

**Figure 1-29: Fleet Composition of the EU Brown shrimp Fishery by Member State (Number of Active Vessels in 2009)**



Source: WGCRAN (2010)

The analysis of the catching performance shows a mean landing of 105 tonnes per Danish vessel in 2010, which is the double of the average landing of a German vessel and also much higher than the mean Dutch performance. This performance is partly explained by the age of the fleet: Denmark has a modernized fleet, with vessels having a mean age of 23 years and the maximum allowed engine power of 221 kW (Table 5). Very few old and low-powered vessels are remaining; the oldest vessel was built in 1963 (EU Fleet Register). Biological and environmental reasons may also contribute to the outstanding catching performance of the Danish shrimpers (Table 6).

**Table 5. Structure of Major European Brown shrimp Fleets in 2010**

| Country                | Number of Vessels | Engine Power (kW) | Gross Tonnage | Average Overall Length (m) | Average Age (years) |
|------------------------|-------------------|-------------------|---------------|----------------------------|---------------------|
| <b>Denmark</b>         | 27                | 5.020             | 1.259         | 17                         | 23                  |
| <b>Germany</b>         | 228               | 42.534            | 10.279        | 17,43                      | 34                  |
| <b>The Netherlands</b> | 201               | 39.877            | 12.482        | 21,21                      | 27                  |

Source: BLE, EU Fleet Register and IMARES

**Table 6. Catching Performance (tonnes per year) by vessel and fleet in 2010**

| Country                | Mean  | Max   | Min  |
|------------------------|-------|-------|------|
| <b>Denmark</b>         | 105,2 | 161,0 | 55,8 |
| <b>Germany</b>         | 52,6  | 181,6 | 1,5  |
| <b>The Netherlands</b> | 83,0  | 243,3 | 2    |

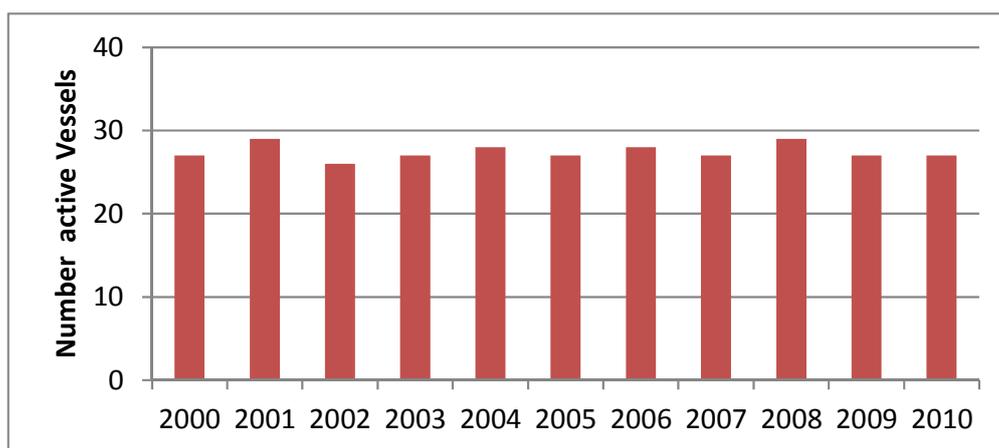
Source: ICES WGCRAN (2010), Kristensen (pers. Com.) and vTI

Income, cost and profit numbers have been derived from the 2010 Annual Economic Report (AER 2010) on the European Fishing Fleet (Anderson and Guillen 2010). These are the latest data available and they cover the years 2002-2008. In the AER 2010 an imputed value for unpaid labour of the owner has been applied to calculate total cost and depreciation cost had been estimated, based upon the assumption that all assets have been replaced after their fiscal life time.

### 1.3.1 Denmark

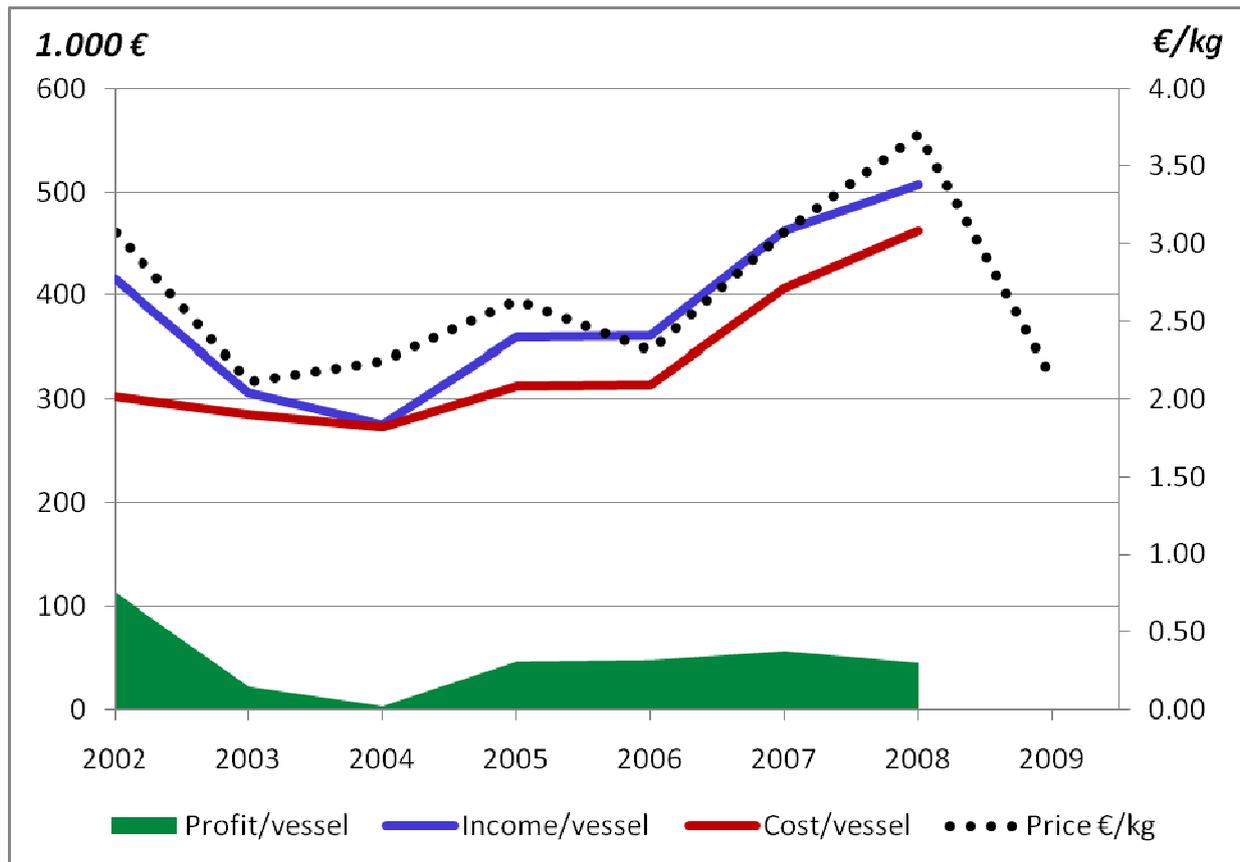
As Denmark has only 27 vessels active in shrimping at present (Fig. 1-30) - many of them had been replaced by new types around 2006 (Beare et al. 2010) - and as only one single PO exists for that fishery sector, management is less difficult than in Germany and in the Netherlands (Larsen pers. com. 2010). Having more than 65% of the shrimp fishermen as PO members the agreements of the PO are also valid for the rest of the national shrimping fleet according to Commission Regulation (EC) 1812/2001.

**Figure 1-30: Number of vessels active in shrimping in Denmark (2000-2010)**



**Source:** Danish Directorate of Fisheries Vessel Register and Fishing Permit Register

Danish beam trawlers targeting brown shrimp have managed to operate profitable business during all years between 2002 and 2008 (Fig. 1-31). It is obvious that, generally speaking, costs develop basically parallel to the income; and the price and income time series show some similarity, even though the volume of landings varies from year to year. It has to be kept in mind that some Danish beam trawlers primarily target flatfish (Anderson and Guillen, 2010), and costs exclusively for shrimp fishing are not available. Therefore profit data are not solely assigned to brown shrimp fishing either. However it appears quite evident that the higher versatility of the vessels due to the alternative options of fishing brown shrimp or flatfish contributes to the constantly positive profit of the related fleet segments.

**Figure 1-31: Profit History of Danish Shrimpers per Vessel - mean (2002-2009)**

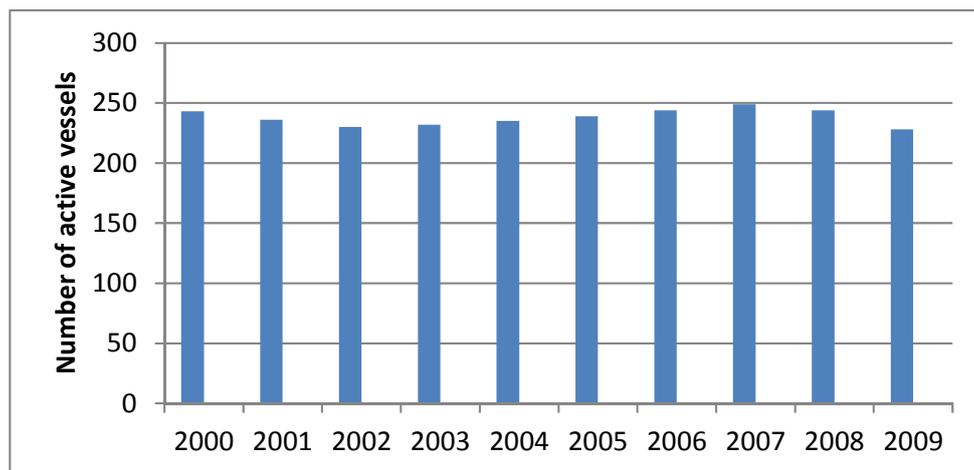
Source: Anderson and Guillen (2010)

### 1.3.2 Germany

In the German fleet, beam trawlers < 24 m almost exclusively target brown shrimp. Therefore data which refer to these fleet segments can be entirely related to fishing for brown shrimp.

On January 1<sup>st</sup> 2009, 1 858 fishing vessels were registered under the German flag, 256 of them having beam trawl as main gear. 228 vessels had reported shrimp landings in 2009. Most of the inactive vessels were less than 12 m in length. The number of active beam trawlers has fluctuated over the last ten years: from 2002 to 2007 a constant increase could be observed, while from 2007 to 2009 a 10% decline occurred (Fig. 1-32).

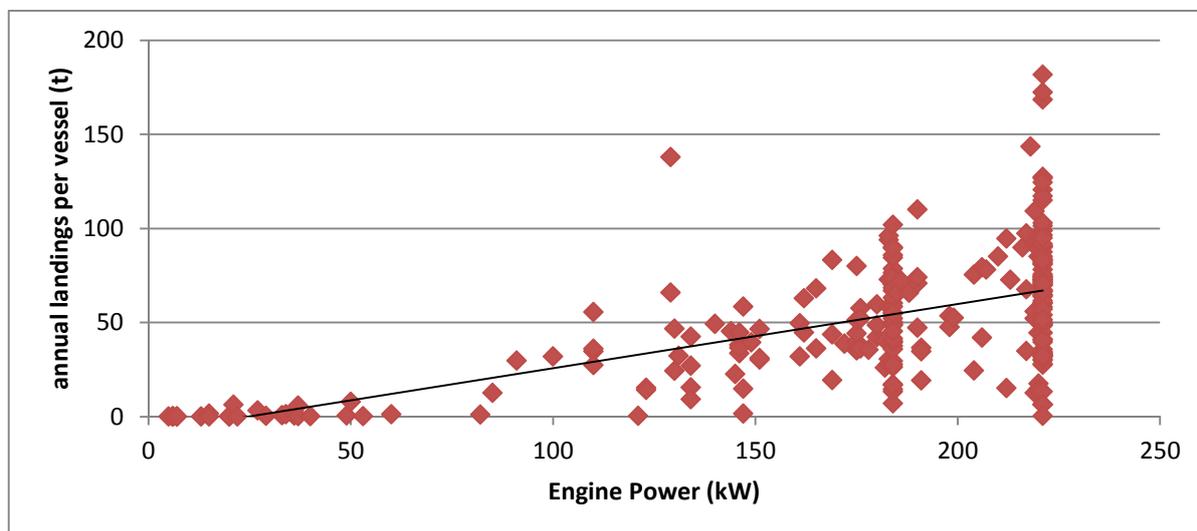
**Figure 1-32: Number of vessels active in shrimping in Germany (2000-2009)**



Source: BLE (2010)

Fig. 1-33 shows the dispersion of annual catches and engine powers per vessel in the German fleet and the clear relationship between both of them. All vessels with low engine power (below 100 kW) are most likely part-time shrimpers with landings of only a few tonnes. Those above 100 kW often seem to fish also to quite an extent not full time and seem to be older types of vessels with landings of less than 50 tonnes with only one outlier having an outstanding catch. Only those with the maximum engine power allowed (221 kW) reach shrimp landings of 100 tonnes and more (with a maximum of 181 tonnes).

**Figure 1-33: Catching Performance of the German brown shrimp fishery in 2009: Relation between engine power (x-axis) and landings per vessel**



Source: BLE and vTI

German beam trawlers are almost exclusively operated as family-owned small businesses. The profit appears when the owner’s labour is accounted for as imputed cost. For the owner the income generated is sufficient to make a living. Investment activities are scarce: very few new beam trawlers have been built in the last decade. Therefore the average age of the vessels is about 34 years (Fig. 1-34). Retiring fishermen can usually sell their business to a successor, which means that the number of employed persons does

not change much. It also allows the conclusion that owning and operating a beam trawler targeting shrimp is a feasible working option.

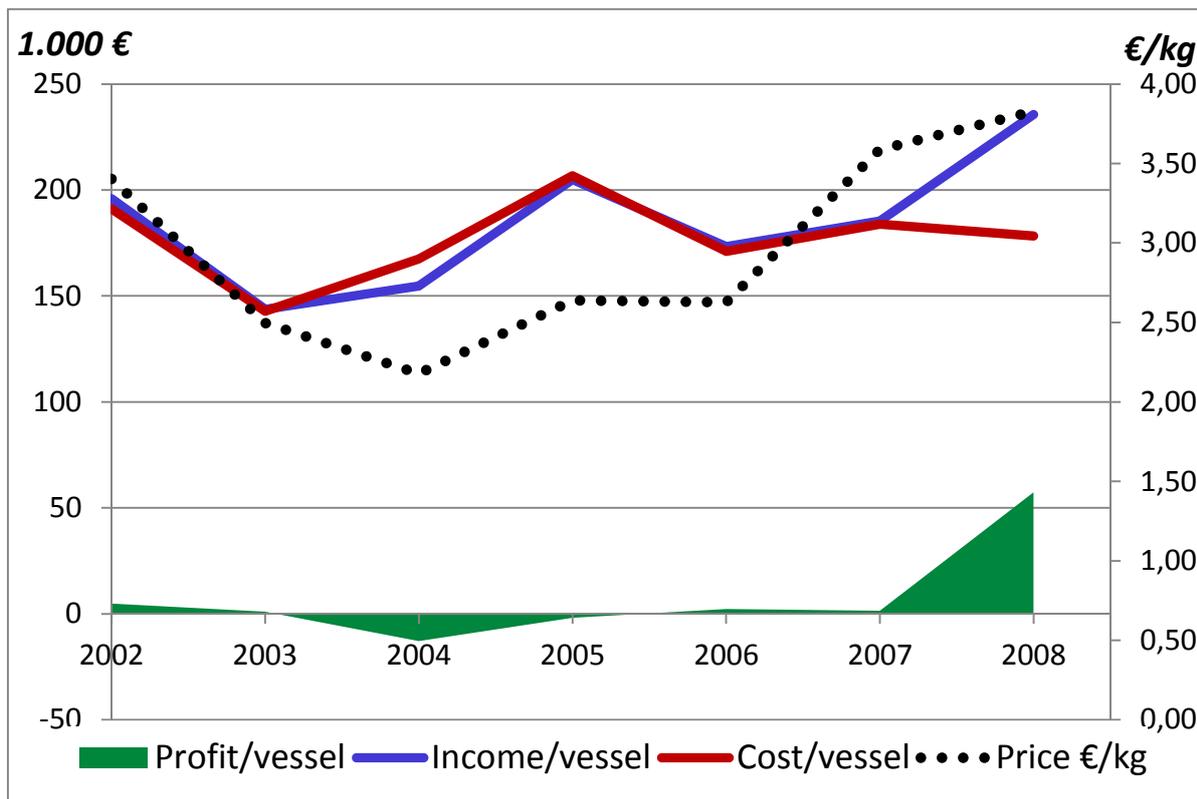
**Figure 1-34: Well kept, 50-year-old wooden cutter in Cuxhaven harbour**



**Photo:** vTI (© Neudecker)

German beam trawlers targeting brown shrimp have been more or less profitable between 2002 and 2008 (Fig. 1-35). These vessels are almost entirely dependent upon this single targeted species and therefore their profit is closely related to brown shrimp price and catch. Income and cost were almost identical during the period of observation allowing for little profit, if any. 2008 was exceptional, as both catches and prices were relatively high, while cost remained stable. Prices had been lower in preceding years. In 2004 the lowest price was observed and that was also the only year which brought losses on average.

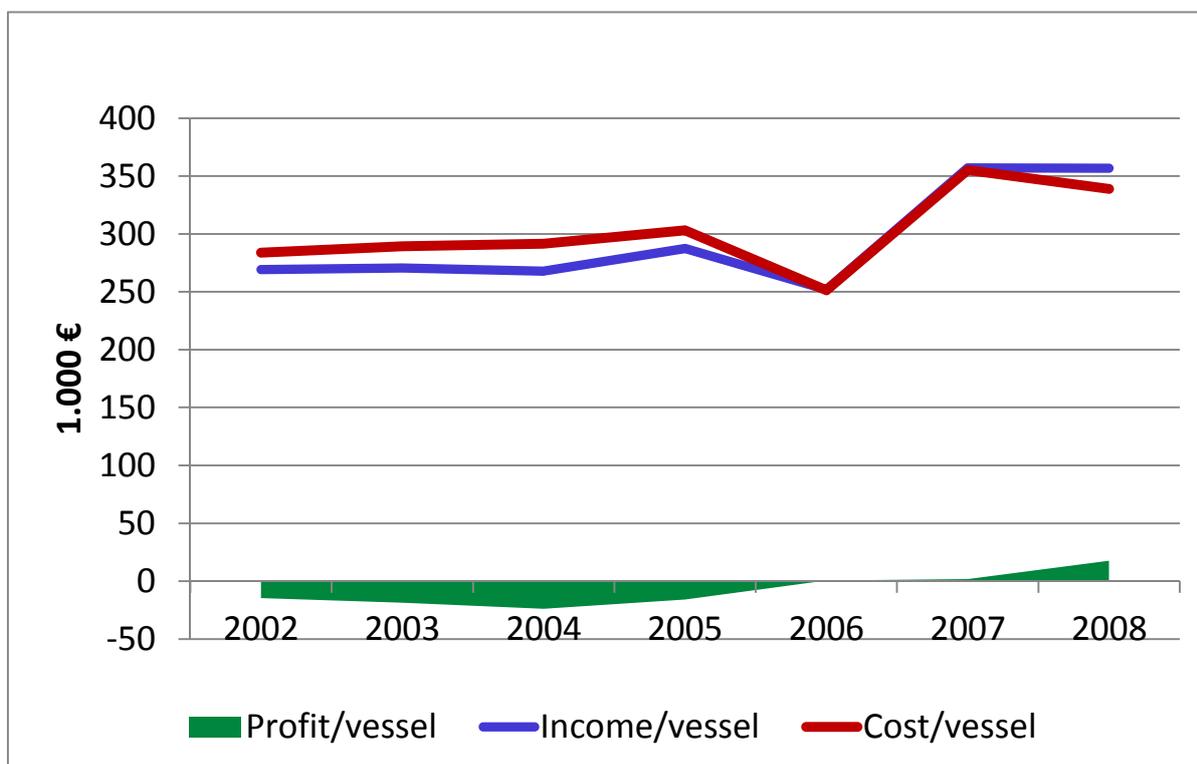
**Figure 1-35: Profit History of German Shrimpers per Vessel - mean (2002-2008)**



Source: Anderson and Guillen (2010)

### 1.3.3 The Netherlands

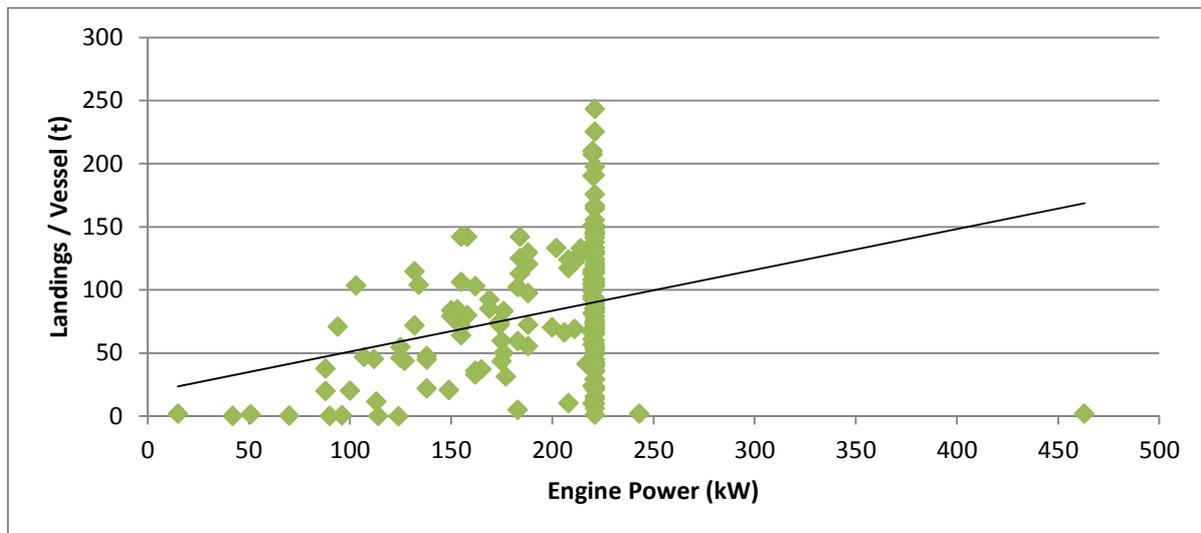
**Figure 1-36: Profit History of Dutch Shrimpers per Vessel mean (2002-2008)**



Source: Anderson and Guillen (2010)

In the Netherlands like in Germany there is a clear relationship between annual catches per vessel and engine power in the fleet (Fig. 1-37). However there are very few vessels with engine power below 100 kW and the number of part time shrimpers with landings of only few tonnes is also very low. There is some scatter of vessels with engine powers between 90 and around 200 kW, which seem partly fishing also not full time. A high number of vessels with maximum engine power allowed (221 kW) is the backbone of this fleet but also with great variability in landings. The average landing per vessel is 83 tonnes of shrimp but the number of landings above 100 tonnes is much higher than in the German fleet - with the outstanding maximum of 241 tonnes.

**Figure 1-37: Catching Performance of the Dutch brown shrimp fishery: Relation between engine power (x-axis) and landings per vessel in 2010**



Source: IMARES

### 1.3.4 Conditions of profitability of the brown shrimp fleet

Calculations made by the Knowledge Circle "Sustainable Shrimp Fishery" and based on data covering the period 2005-2008 result in the following conclusions concerning the price level necessary to guarantee a profitable activity:

- price < 2,25 €/kg: money-losing activity,
- price between 2,25 and 3,50 €/kg: insufficient,
- price > 3,50 €/kg: long-term profitability.<sup>1</sup>

Knowledge circles have been established in the Netherlands by fishermen with the assistance of scientific institutes (LEI/IMARES). The aim of knowledge circles is to look for alternatives offering better fish products at a reduced cost price and meeting social demands. Cost reduction, increase of revenues and reduction of ecological impact are the three issues tackled.

Other calculations can be made using the following assumptions:

- shrimp catches: 30 000 t,
- gasoil consumption: 1,67 liter per kg of shrimp caught,
- gasoil price: 0,50 €/kg,

<sup>1</sup> Source: Wageningen UR (Knowledge Circle Sustainable Shrimp Fishery).

- crew: 2 men/boat,
- labour: 35 000 €/man,
- operational costs: 55 000 €/boat.

Two cases have been analysed concerning the fleet size:

- the present situation with 500 boats in the three countries analysed,
- a situation with a fleet reduced to 375 vessels.

**Table 7. Profitability of the crangon fishery under various assumptions**

|                           | Present situation: 500 boats |             |             | Hypothesis: 375 boats |             |             |
|---------------------------|------------------------------|-------------|-------------|-----------------------|-------------|-------------|
|                           |                              | Unit (€)    | €           |                       | Unit (€)    | €           |
| Revenues (shrimp catches) | 30 000 000 kg                | <b>3,50</b> | 105 000 000 | 30 000 000 kg         | <b>3,50</b> | 105 000 000 |
| Gasoil consumption        | 50 000 000 ltr               | 0,50        | 25 000 000  | 50 000 000 ltr        | 0,50        | 25 000 000  |
| Labour costs              | 1 000 men                    | 35 000      | 35 000 000  | 750 men               | 35 000      | 26 250 000  |
| Operational costs         | 500 boats                    | 55 000      | 17 500 000  | 375 boats             | 55 000      | 13 125 000  |
| Gross profit              | 500 boats                    | 55 000      | 27 500 000  | 375 boats             | 108 333     | 40 625 000  |
|                           |                              |             |             |                       |             |             |
| Revenues (shrimp catches) | 30 000 000 kg                | <b>2,75</b> | 82 500 000  | 30 000 000 kg         | <b>2,75</b> | 82 500 000  |
| Gasoil consumption        | 50 000 000 ltr               | 0,50        | 25 000 000  | 50 000 000 ltr        | 0,50        | 25 000 000  |
| Labour costs              | 1 000 men                    | 35 000      | 35 000 000  | 750 men               | 35 000      | 26 250 000  |
| Operational costs         | 500 boats                    | 55 000      | 17 500 000  | 375 boats             | 55 000      | 13 125 000  |
| Gross profit              | 500 boats                    | 10 000      | 5 000 000   | 375 boats             | 48 333      | 18 125 000  |
|                           |                              |             |             |                       |             |             |
| Revenues (shrimp catches) | 30 000 000 kg                | <b>2,50</b> | 75 000 000  | 30 000 000 kg         | <b>2,50</b> | 75 000 000  |
| Gasoil consumption        | 50 000 000 ltr               | 0,50        | 25 000 000  | 50 000 000 ltr        | 0,50        | 25 000 000  |
| Labour costs              | 1 000 men                    | 35 000      | 35 000 000  | 750 men               | 35 000      | 26 250 000  |
| Operational costs         | 500 boats                    | 55 000      | 17 500 000  | 375 boats             | 55 000      | 13 125 000  |
| Gross profit              | 500 boats                    | -5 000      | -2 500 000  | 375 boats             | 28 333      | 10 625 000  |
|                           |                              |             |             |                       |             |             |
| Revenues (shrimp catches) | 30 000 000 kg                | <b>1,75</b> | 52 500 000  | 30 000 000 kg         | <b>1,75</b> | 52 500 000  |
| Gasoil consumption        | 50 000 000 ltr               | 0,50        | 25 000 000  | 50 000 000 ltr        | 0,50        | 25 000 000  |
| Labour costs              | 1 000 men                    | 35 000      | 35 000 000  | 750 men               | 35 000      | 26 250 000  |
| Operational costs         | 500 boats                    | 55 000      | 17 500 000  | 375 boats             | 55 000      | 13 125 000  |
| Gross profit              | 500 boats                    | -50 000     | -25 000 000 | 375 boats             | -31 667     | -11 875 000 |
|                           |                              |             |             |                       |             |             |
| Revenues (shrimp catches) | 30 000 000 kg                | <b>1,57</b> | 47 100 000  | 30 000 000 kg         | <b>1,57</b> | 47 100 000  |
| Gasoil consumption        | 50 000 000 ltr               | 0,50        | 25 000 000  | 50 000 000 ltr        | 0,50        | 25 000 000  |
| Labour costs              | 1 000 men                    | 35 000      | 35 000 000  | 750 men               | 35 000      | 26 250 000  |
| Operational costs         | 500 boats                    | 55 000      | 17 500 000  | 375 boats             | 55 000      | 13 125 000  |
| Gross profit              | 500 boats                    | -60 800     | -30 400 000 | 375 boats             | -46 067     | -17 275 000 |

**Source:** AND International from data communicated by Internationale Garnalen PO

According to these calculations, the breakeven point corresponds to a shrimp price of 2,58 €/kg in the present situation (500 boats in the three countries analysed) and 2,15 €/kg in the hypothesis of a fleet reduced to 375 boats.

At the time of writing the gasoil price is rapidly increasing. In the hypothesis of a price of 60 eurocent/kg, all other things being equal, the breakeven point would be 2,75 €/kg for a 500 boat fleet and 2,31 €/kg for a fleet reduced to 375 boats.

Should the gasoil price reach 70 eurocent/kg, the breakeven point would be reached only with a shrimp price of 2,92 €/kg in the present fleet situation and 2,48 €/kg in the fleet reduction hypothesis.

It is clear that the prices paid in the end of 2010 and the beginning of 2011 are far from the profitability level.

## 1.4 Environmental Impact of Shrimp Beam Trawling in the North Sea

### Key Findings

- No reliable stock assessment has been achieved by fishery science due to the short life cycle of brown shrimp, extreme variability of occurrence and unknown catchability of the species.
- The present stock sizes (until 2010/2011, based on landings) are extremely high and show no sign of overfishing.
- Year class strengths can be extremely variable and depend mainly on environmental factors as cold or warm winters, the latter having a negative effect.
- High predator presence such as concentrations of whiting (in previous times also cod) can bring abundance down resulting in poor shrimping success in autumn and the following spring.
- The effect of shrimp trawls on the sea bed is negligible.

There is continuous concern expressed by NGOs and subsequently by press organs about an intense impact on the benthos by heavy fishing gear used by beam trawlers. But there is a confusion between two different types of beam trawls: the flat fish trawl and the shrimp trawl.

The flat fish trawl is a very heavy and extremely rigid beam trawl equipped with about a dozen or more heavy chains to stir up flat fish from the bottom and trawled at speeds of about 6 knots by large and powerful vessels.

The much lighter shrimp trawl has no chains but a roller gear that hops and rolls over the sea bed stirring up shrimp mainly by the hydrostatic pressure in front of it.

This confusion results in misinformation of the public, who believes in detrimental effects done to the sea bed and the habitat by shrimpers which cannot be seen in reality.

### 1.4.1 Impact on the Ecosystem

The comparatively light shrimp beam trawl is towed over the sea bed at about 3 knots. Some vessels with newly developed net types of light and thinner yarn may fish at speeds of 5 to 6 knots (Stührk pers. Com. 2010, Andersen pers. Com 2011).

There are no recent investigations available on the impact of shrimp trawls on sea bed and environment. However, intensive studies had been made during the Ecosystem Research

Program in the 1980's in Germany (Berghahn and Vorberg 1993). They clearly show by videos the hopping and rolling of the shrimp gear which only partly touches the bottom (Vorberg 1997). This is of course not the case with the iron "shoes". They are heavy and together with the weight of the iron beam they keep the entire gear and net down to the bottom while fishing. Their width is about twenty to forty cm and may leave a temporary track on softer sea bed like muddy sand. The currents of the sea of up to 3 knots will, however, in most cases wipe out these tracks fairly soon. This is especially the case in the channels and creeks of the Wadden Sea where strong tidal currents prevail about four times per day. Additionally, storms stir up the entire sea bed and lead to enormous sand transfers altering sometimes the entire topography by metres, shifting creeks to different places.

Only the outer rollers of the roller gear do not fully roll in parallel to the trawling direction (Fig. 1-38) which results in some scratching of the sediment on both outer parts of the gear track stirring up bottom organisms and some sediment.

In that respect shrimp trawling must be considered as having minimal and only temporal effects on the sea bed.

#### **1.4.2 By-catch and Discard of Non-Target Species**

##### **Key Findings**

###### *Catch, by-catch and discard situation*

- There are only very limited data available on the catch of the fleets by time and space.
- Catch, by-catch and discards vary extremely by area, season, time and other factors.
- Sampling of brown shrimp fisheries as currently performed under the EU DCF is not sufficient with respect to the high variability of catch, by-catch and discards of the fleets and by vessel types as only 0,01% of the hauls are investigated (67 DCF hauls (2010) versus approximately 500 000 hauls in EU brown shrimp fisheries).
- Brown shrimp comprise between 50 to 80% of the total catch.
- 30% of shrimp is marketable on annual basis.
- 40 to 50% of shrimp are discarded alive with survival rates of approx. 80% on average
- Approximately 10% is discarded as cooked but small and not marketable size at sea and could be taken ashore for animal feeds.
- Lowest by-catch rates occur in the main season, i. e. September to October.
- No data on by-catch are available for the winter fishery.
- The high level of plaice discards has not hindered the plaice stocks to develop to their highest stock levels (calculated by ICES).

###### *By-Catch reduction is achievable by:*

- square meshes, which reduce by-catch of small round fish (gobies, gadoids, smelt,...) and can help to reduce the number of small sole getting pinned in diamond meshes,
- applying veil nets most of the time (less or no exemptions),
- avoiding shallow waters (0 – to 3 m e.g.),
- reducing effort from June to August.

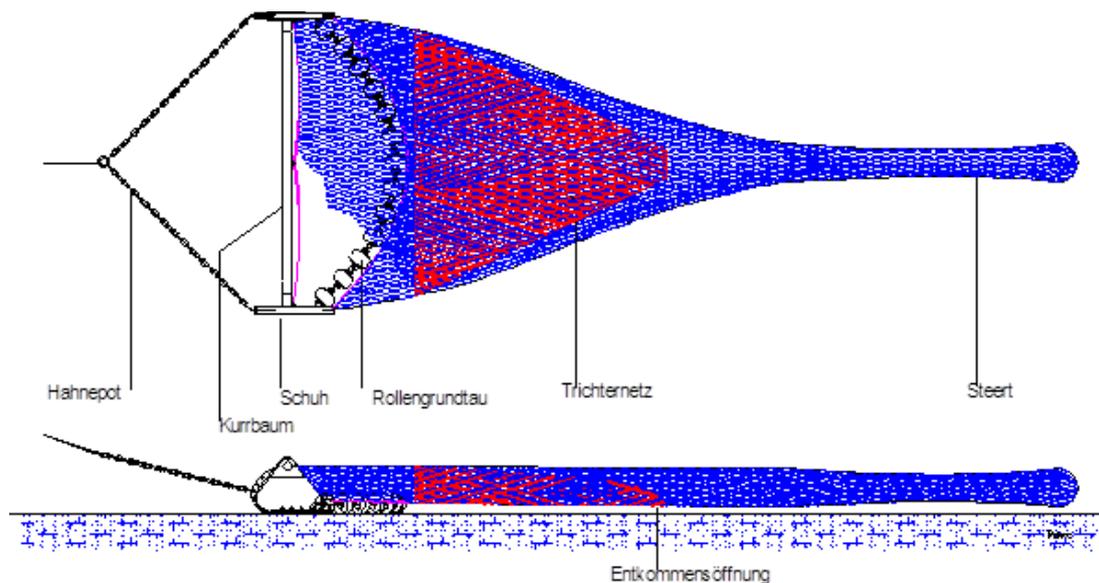
The terms “by-catch” and “discards” are often wrongly used. It is therefore important to remind that:

- “by-catch” is principally everything that does not belong to the target species. It may be sold and used but also rejected and discarded. In the present study brown shrimp (*Crangon crangon*) is the target species, while all fish, crabs, debris etc. are “by-catch”;
- “discard” is everything that has been caught and rejected, i.e. given back to the sea; that includes fish, crabs, debris and also small shrimp, the target species (Ehrich and Neudecker 1996, Ulleweit et al 2010).

### Nets and sieving processes in respect to by-catch

Because of the small size of the target species shrimping needs to be done with small meshed nets. This implies that everything about the same size of shrimp and bigger will also be caught by the net. Therefore, at the very beginning of shrimp fishery development, by-catch was high and was used entirely for animal feed or even as fertilizer in agriculture (Neudecker and Damm, 2010). Mortality was 100% at that time when fish traps, stow nets and trawls with approx. 7 mm mesh sizes were used.

**Figure 1-38: Layout of a shrimp veil net**



Source: vTI

(Kurrbaum = beam, Schuh = shoe, Rollengrundtau = roller gear, Trichternetz = veil net = additional inner separating net, Steert = cod end, Entkommensöffnung = outlet hole)

In recent years the situation has changed, due to changes in legislation and to public demand. The legally accepted mesh sizes range from 16 to 32 mm. “Sieve nets” or “veil nets” (Fig. 1-38), alternatively sorting grids (woven into the tunnel of shrimp nets, but rarely used) are compulsory to all shrimping activities in EU waters (EEC Nr. 3440/84, EC Nr. 146/2007). They sort out larger animals already during fishing. Therefore flatfish like plaice, starting at sizes of approx. 8 to 12 cm, are - increasingly by size - sieved out and no longer appear in the by-catch (Wienbeck 1993, Neudecker and Damm 2010). All remaining animals, which are still caught and are emptied into the hopper of the vessel,

are transferred to rotating sieves (20 mm openings, Larsen pers. com 2011) operated with high amounts of running sea water to increase survival rates.

This first sieving and separation process on board separates the target species (and equally sized objects) from everything that does not fit through the holes designed to let shrimp pass and keep other larger material and animals out. This larger fraction (by object size) may contain some very large shrimp as well, since shrimps with their legs are not as smooth and slender as most fish, which is slipping through the holes more easily. Fishermen are therefore sometimes tempted to retain that fraction to pick out large shrimp and useable fish before discarding.

Further small sieves incorporated (5,8 mm to 6,2 mm) let very small shrimp and fish pass through again. That small fraction (by object size) is washed overboard directly with the water flow.

So only the centre fraction contains the targeted shrimp - and few small fish or crabs of a similar size as the shrimp - to be boiled in the cooker (Neudecker et al. 2006).

There is, however, an exemption for the compulsory use of veil nets from May 1st to September 30st because of clogging due to algae and debris in summer time. Extension may be exceptionally granted by sound reason. Clogging of separation panels would lead nearly all catch out of the net ruining landings and economy for the fishermen.

The Dutch fishermen may make use of that rule as their colleagues in Germany. In both countries exemption rules are under negotiation and are about to be dropped by the fishermen for MSC reasons (Nooitgedagt pers com 2011). There are no exemptions needed in Denmark as the entire inner Wadden Sea is free from fisheries for nature protective reasons.

NGOs claim that the exemptions were excessively used and extensions granted too liberally by the authorities harming ecology. They overlook that the exemption, though valid for the entire summer period and the entire fleet, cannot always be used by the fishermen. The benefit of using standard nets without separation panels to gain a better catch is often cancelled by the extra amount of work due the caught material. Therefore fishermen - having the general exemption - still mostly fish with veil nets off the Wadden Sea island chain.

There is no scientific information available on the temporal or regional use or non-use of this exemption regulation.

Another aspect would be the application of square meshes in the cod end of shrimp nets: their use could lead to a substantial reduction of by-catch of small round fish like gobies and smelt (Wienbeck 1992).

### **Seasonality and amount of by-catch**

Investigations on by-catch date back for about eighty years in Germany. They were most intense between 1954 and 1990 when the time-series, that had reached 12 693 samples in total and comprised up to 450 samples per year, was terminated in Germany. Other by-catch investigations were short-lived and regionally confined (Neudecker und Damm 2010).

Following EU regulation EC 1639/2001 and EC 1581/2004, the Data Collection Framework (DCF) was established and started sampling and observing shrimp fishing in 2006 (Table 1-3) for all shrimping fleets (Stransky et al. 2008, Ulleweit et al. 2008). Germany started as early as 2006. The Netherlands followed in 2008. Data from Denmark are available for 2010.

No special sampling scheme was set initially for properly sampling by region or season. That has been changed to some extent. But the number of DCF samples is still extremely low compared to the number of hauls completed by the fisheries (ICES 2010, Ulleweit et al. 2010), which can be estimated at about 500 000 hauls annually, and in no way adjusted to the relative importance of the different fishing grounds (Tulp et al. 2010). The present sampling scheme is therefore scientifically disputable.

**Table 8. Number of DCF Samples by country**

|      | DK   | DE | NL   |
|------|------|----|------|
| 2006 | n.a. | 9  | n.a. |
| 2007 | n.a. | 11 | n.a. |
| 2008 | n.a. | 18 | 16   |
| 2009 | n.a. | 37 | 41   |
| 2010 | 32   | 20 | 15   |

**Source:** Egekvist, Kristensen and Ulleweit pers. com. 2011; ICES WGCAN 2010, Tulp et al. 2010

Nevertheless by-catch and discard levels are within the range of older studies. There are 30% of "other discards" for German DCF investigations (including more than 10% small fish) and 35% of "undersized shrimp". 35% were shrimp of marketable size (Ulleweit et al. 2010). The first Dutch investigations from the western Wadden Sea gave 40 to 50% undersized shrimp, 5 to 12 % small fish, the rest being commercial shrimp and other material. It was stressed that the period of higher by-catch rates in spring had not been sampled as were not sampled regions out of the Wadden Sea where a very high proportion of fishing activity takes place (ICES 2010, compare also VMS data in Chapter 1.1.3).

An EU-Project named "RESCUE" (van Marlen et al. 1998) sampled all European shrimping fleets to a limited extent from 1996 to 1998 but was partly biased (e.g. Dutch Wadden Sea not sampled). Despite this methodological bias it is the most recent and fairly intensive study attempting to cover seasonal by-catches in shrimp fishery.

A more recent evaluation of the discard rates of juvenile plaice can be found in the "Study for the Revision of the plaice box" by Beare et al. (2010). Further information is given by ICES (2011) pointing out the present very high level of plaice spawning stock biomass. This must be seen as an indication that plaice discards from shrimping are no obstacle for developing excellent plaice stocks.

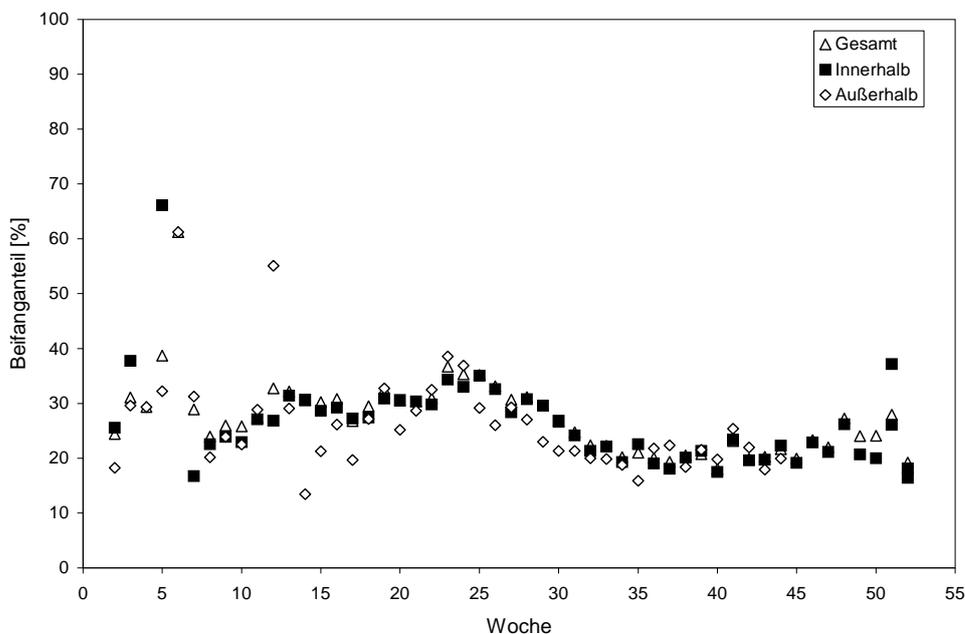
It would be useful to repeat this project and to intensify the DCF sampling as more detailed data are needed by regions and seasons. An application for a European-wide update study for effects of technical improvements in shrimping (ASTEC) was not granted by the EU Commission (Revill pers. com. 2000).

Therefore the old German by-catch investigation still seems to remain the best information available on by-catch, especially on seasonality (Tiews 1990, Tiews and Wienbeck 1990, Neudecker et al. 1999). Figures 1-39 and 1-40 give the gross by-catch by

week in two different areas, one in the East Frisian region (Fig. 1-39), the other for Schleswig-Holstein (Fig. 1-40). The use of veil nets was not standard at that time. So the current volume of by-catch in shrimp fisheries should be considerably lower. Presence and abundance of species may also have changed over time as variability is very high by region, season and year, according to the re-investigation of the old data (Neudecker et al. 1999). The by-catch species listed in by Tiews (1990) are almost identical with the species listed in the Dutch DFS and German DYFS surveys.

These surveys are conducted since 1969 and 1974 respectively to give indications of year class strength of commercial fish species. Non-commercial species caught by the survey gear, which is equivalent to the commercial shrimping gear except for beam width, are also listed. Denmark has not participated in the Wadden Sea investigations concerning young fish and crustacean abundance and distribution, except for one campaign in September 2008 giving data for 8 hauls (Kristensen 2009).

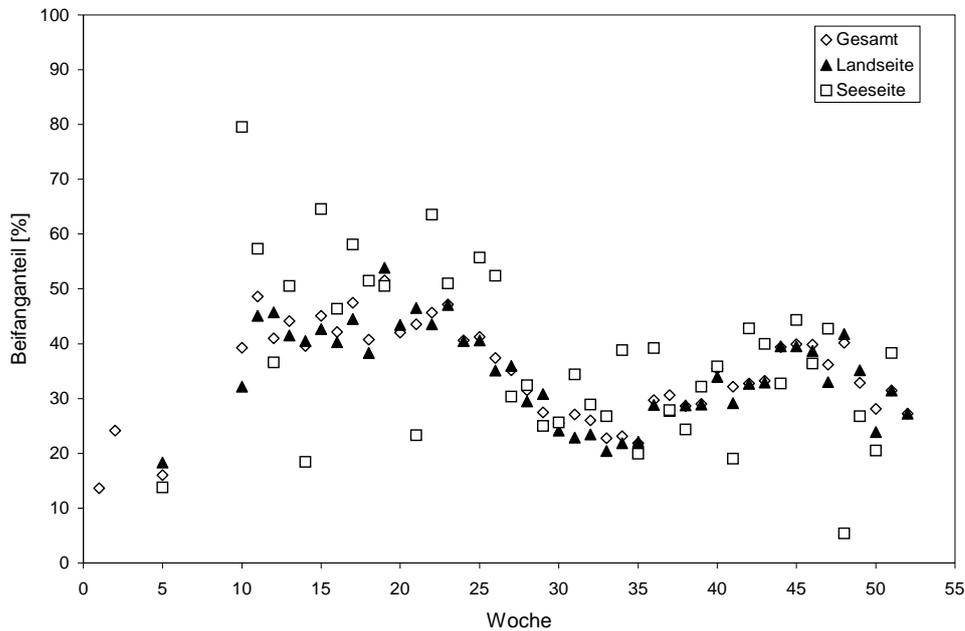
**Figure 1-39: Seasonality of the share (%) of by-catch in shrimp fishery for the period 1954 to 1993 in the region *Büsum*, Schleswig-Holstein, by week (Woche).**



**Symbols represent regional sampling from inside the island chain of the Wadden Sea (■), outside of it (◇) and total (Δ)**

**Source:** Neudecker et al. (1999)

**Figure 1-40: Seasonality of the share of by-catch in shrimp fishery for the period 1954 to 1993 in the region *Norddeich*, Lower Saxony by week (Woche).**



**Symbols represent regional sampling from inside the island chain of the Wadden Sea (▲), outside of it (□) and total (◇)**

**Source:** Neudecker et al. (1999)

### 1.4.3 Amount and Seasonality of Discards of Shrimps

#### Key Findings

Discard levels of **brown shrimp** can be reduced by various methods:

- Mesh sizes need to be adjusted to the commercial sizes of brown shrimp, i. e. much wider than the legally acceptable 16 mm, possibly 22 to 24 mm.
- Traditional diamond meshes need to be replaced by square meshes in the cod end.
- Survival of discards can be improved.

A small-meshed shrimp net holds inevitably high amounts of small shrimps.

Neudecker et al. (2006) made an attempt to quantify the tonnages at different steps of the catch and sorting processes. The results for their assessment for 2005 data are given in Table 9.

**Table 9. Total European brown shrimp catches in 2005 and their fate**

| <b>Fraction</b>    | <b>Tonnes</b> | <b>Share on Total</b> |
|--------------------|---------------|-----------------------|
| Life discard       | 123 000       | 68                    |
| Cooked             | 58 700        | 32                    |
| Cooked discard     | 17 600        | 10                    |
| Landed             | 41 100        | 23                    |
| Crushed            | 3 100         | 2                     |
| Consumption        | 38 000        | 21                    |
| <b>Total catch</b> | <b>182000</b> | <b>100</b>            |

**Source:** Neudecker et al. (2006)

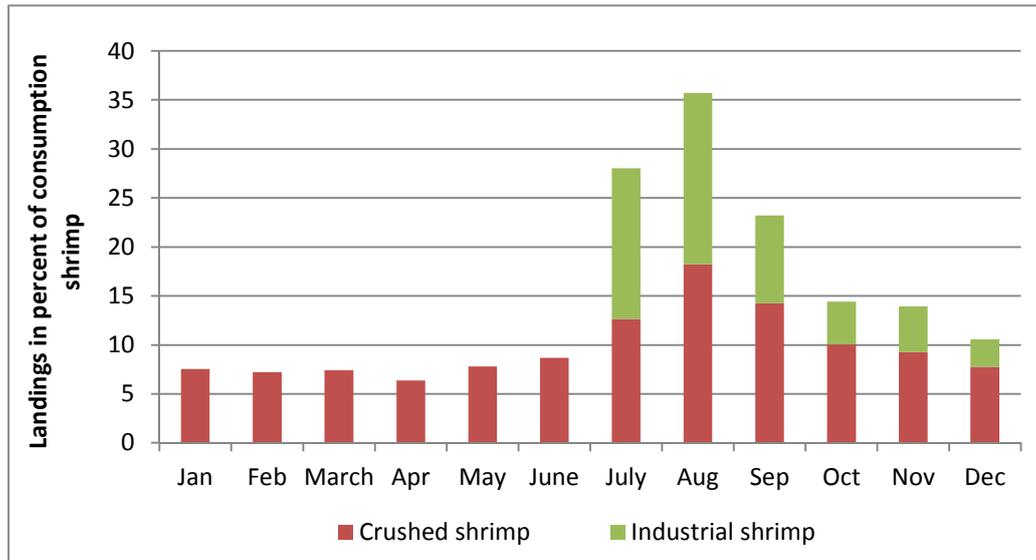
From the calculated total European catch of 182 000 tonnes (live weight) in 2005 about 123 000 t (68%) are discarded alive with the first sieving process. 87 to 99% of them may survive according to Lancaster and Frid (2002), which means in return that 1% to 9% of the original catch does not survive the first sorting process. Therefore 32% of the catch is cooked. Consequently 59% to 67% of the total catch is assumed to have survived the fishing process under 2005 conditions.

The second sieving process after cooking comprised 17 600 tonnes, i.e. 10% of the original catch, which was discarded at sea. A final sieving ashore by the receiving and processing companies result in further losses of small shrimp of 3 100 tonnes, equivalent to 2% of the original catch, not marketable for human consumption. This part is used as "crushed shrimp" for animal feeds and cannot be named "discard". The calculations do not take into account detailed information on mesh and sieve sizes and are based on very few samples for the cooked discard fraction difficult to assess on board of the vessels. More thorough investigations are needed in that direction, possibly under DCF.

According to the life cycle of brown shrimp, the new year-class, grown up mainly in shallow waters of the Wadden Sea, recruits to the fishery in summer as young (about half a year old) shrimp. Accordingly the amount of small shrimp in the catches is very high at that time which is despite all sieving action at sea reflected also in the fraction of "crushed shrimp" ashore. This part of the landings is separately recorded by the statistics besides the human consumption. According to German data the annual mean is about 7%, with a maximum of 9% from August to October (Neudecker 2001). It may be assumed that data from Denmark and the Netherlands are similar as similar sieving is supposed to happen at the sieving stations.

The amount of "industrial shrimp" is a speciality to Germany and only to one harbour and one company by now (B&C, in preparation). These shrimp are used for animal feeds and are only allowed to be fished from 1<sup>st</sup> of July per year. That fraction is of minor importance and will not further be dealt with in this study (Fig. 1-41).

**Figure 1-41: The share of "crushed" and "industrial" shrimp compared to "consumption shrimp" in German landings 2009 by month**



Source: vTI

As these data of "crushed shrimps" are monthly mean values one must assume that much higher values occur for single landings of cutters at certain times and regions due to the seasonal cycle and to the tendency of some fishermen to try – within legal frames - to achieve a larger catch by using shall meshed nets and narrow sieves on board of their vessels (compare chapter 1.5.2).

## 1.5 Brown shrimp Fishery Management

### Key Findings

- In the framework of the MSC certification process management plans have been developed in the three MS. They are not yet finalized and still likely to undergo some changes.
- Gear technology research is needed for optimal mesh sizes for traditional diamond meshes, for optimal mesh sizes for square meshes and for optimal net material.
- Technological research is needed for reducing fuel consumption of vessels by applying new designs of beams, by applying new designs of shoes of beam trawls (wheels) and by applying parallel rollers in traditional roller gear.
- Biological research is needed to improve the data base for temporal, regional and species dependent data on by-catch and discards, either by intensifying DCF or by a special program.

Brown shrimp fishery remains to be one of the least regulated fisheries within the EU. There are no limitations in landings, no quota, no limitations in sizes of shrimps, no limitations in fishing effort or vessel size and a freely developing market.

Regulations exist, however, due to the limitation of licenses, which are bound to conditions belonging to "Beam Trawl Lists" (EU regulations 850/98 and 1922/1999), range of aggregated beam lengths (24 m maximum), range of mesh sizes (16 – 32 mm) and restriction of access to areas used by oil platforms, pipelines, shipping routes, wind power, etc..

Degradation of fishing grounds can also occur due to river deepening and sediment deposits with wide spread silting of adjacent areas (Steinmacher pers. com. 2011). Within these frames fishermen can only regulate and manage their own equipment and activities in view of an optimal use of the existing shrimp stocks.

There are no maximum catch restrictions that apply to the North Sea brown shrimp, which means there is no European quota scheme.

However, there are various other management measures. Most of those measures are European regulations, but the Member States themselves are responsible for fishery policy in the coastal waters.

The European legislator has established a minimum commercial size for marketing shrimps after landing. For shrimps, the width of the shell must be at least 6.8 mm for size-1 shrimps and at least 6.5 mm for size-2 shrimps (Council Regulation n°104/1996).

### **1.5.1 Denmark**

#### **Current Situation: Good Practices, Problems and Obstacles**

The Danish shrimpers had set harvest control rules. Limits for landing of shrimps were set to quantities varying (sometimes only 2 or 3 t per week) according to market situations for 10 years. The last limit was 6 t per vessel and week. However, as free fishing was the rule in Germany and in the Netherlands in 2010 and as prices had dropped considerably, the Danish fishermen also decided to skip their limit to compete with the other fleets via higher amounts landed.

The mean landings for Danish vessels in 2010 were 105 tonnes per vessel, ranging annually from 68 tonnes (2000) to 157 tonnes (2006). The maximum value by vessel achieved was 161 t.

The nets used have initially 26 mm stretched mesh size which will shrink over a few weeks to 20 to 22 mm reducing the catch of smaller shrimp and fish (Larsen pers. com. 2010). Cod ends with 16 mm legal mesh openings are not in use in Denmark.

Veil nets are compulsory and fishing within the Wadden Sea is prohibited.

The sieving on board will be set from 5,8 mm to 6,5 mm width between bars depending on type of rotary sieve and water flow for a good quality shrimp to be landed. The shrimp formerly handled in boxes and stored in cooling rooms will be given into bags at 23 kg each for better cooling on ice and reducing the risk of contamination.

The Danish fishermen are convinced that their future economic success will depend on a successful MSC certification. This certification process was started together with the Netherlands and Germany but was split up due to different approaches and Denmark will have its own MSC certification process.

Problems arose due to the fact that Danish shrimp grounds are not exclusively used by Danish shrimpers. Access to Danish waters is given to foreign vessels due to old agreements within CFP. German vessels may fish in the area outside 6 nm off the base line of the Danish coast, while Dutch vessels have access only outside the Danish 12 nm zone (EU (Com) 2371/2002 ANNEX I). Danish fishermen hope for mutual respect by the fleets which should stick to the respective national MSC rules despite different legal regulations.

The Danish PO is only a political instrument and does not interfere with the trade which is entirely up to the single fisherman selling his catch freely to trading and processing companies.

### **Measures of Limitation of Catches**

For the Danish fishermen the best possible regulation is a result based system, which means that fishermen cannot sell their shrimp if their catch does not meet the standards set by their PO. One of these standards is the share of too small shrimp in the landed catch which should not exceed 15 % at the beginning of the process and could lead, by time and experience, to lower values.

### **Extension of Rules**

As Danish shrimpers have agreed upon having one PO which has membership of more than 65% of the vessels and/or landings, the rules set up by the PO are also binding for the rest of the shrimping fleet according to Danish and EU regulations.

These rules are not relevant to foreign vessels fishing in Danish waters. That might give problems and tension between the fleets.

## **1.5.2 Germany**

### **Current Situation: Good Practices, Problems and Obstacles**

Important in the context of the present study are the regional POs which are not confined to one harbour and may have members from different ports. But not all fishermen are associated to the POs.

In 1997 an international cooperation had been started, similar to a trilateral PO but without legal status. This cooperation was combining interests of the POs from Denmark, Germany and the Netherlands which tried to manage the shrimp fishery across the borders. But the success was very limited in consequence of the NMa intervention (see 2.3.7). Nevertheless the "Europäische Vereinigung der Krabbenfischer-Erzeugerorganisationen e.V." (European Association of Shrimp Fishermen's Pos) was founded in 2005 and German POs joined it.

Numerous opposing opinions and interests have resulted in steady conflicts between German shrimp fishermen inside and outside the POs, entailing changes in memberships and chairmen. Finally some POs collapsed in 2010.

In late 2010 the Schleswig-Holstein POs have partly reorganised themselves and an organisation was formed, the "Sparte See- und Krabbenfischerei der Nordsee" designed to act as a political branch for the local shrimpers within the "Landesfischereiverband

Schleswig-Holstein" (fishery organisation of the Federal State of Schleswig-Holstein). By that - almost formerly existing - structures have been (re-)established in Schleswig-Holstein comparable to existing ones in Lower Saxony.

The most stable PO in Germany with the highest number of members is the "Erzeugergemeinschaft der Küstenfischer im Weser-Ems-Gebiet e.V." (PO Weser-Ems) in Lower Saxony. The second largest PO in Lower Saxony, "Erzeugergemeinschaft Elbe-Weser e.V.", covering traditionally the region between Elbe and Weser, lost its members in 2010 to PO Weser-Ems and POs located in Schleswig-Holstein, the neighbouring federal state.

Main reasons for these difficulties were problematic market conditions with low prices due to exceptionally high landings. The POs did not show any capacity to stabilize the market and could only play an administrative role for gaining compensations and financial aids.

Management options developed by the POs were also problematic since not organised fishermen, sometimes even members of POs, undermined agreements reached by the POs on mesh sizes of nets, sieve sizes aboard, limitation of weekly landings and weekly effort limitations (no weekend fishery) aiming to reduce landings in order to stabilize prizes. The self-imposed limitations of effort and landings per week did not result in stabilizing prices but may have contributed among other reasons to the low level of annual production per vessel (53 tonnes per year in the period 2000 to 2009). This value is half of the production of shrimp vessels in Denmark and 30% less than the Dutch performance for the same period.

### **Analysis of Management Options**

As number of licenses and engine power are limited, management measures can only focus on additional equipment, fishing gear, effort and volume of landings. Here individual interests may be contradictory to common interests, especially the need of optimizing fishing efficiency and increase landings to improve individual profitability while the common interest is to improve the price situation for shrimp by keeping landings down in a situation of sufficient or high shrimp stocks.

- *Additional equipment*

It could be of interest to fishermen to increase the power of the vessel which could be possible by – illegally – having higher active engine power than nominally given. A high number of German vessels however is old and has not yet the maximum engine power allowed. Another way would be to have extra aggregates on board to supply - parallel to fishing or steaming with full engine power - machines that take energy to process the catch. Extra electrical aggregates are standard to modern well-equipped fishing vessels. Navigational equipment and modern echo sounders with new specifications could increase the ability to better reach and locate shrimp grounds and thereby increase fishing efficiency.

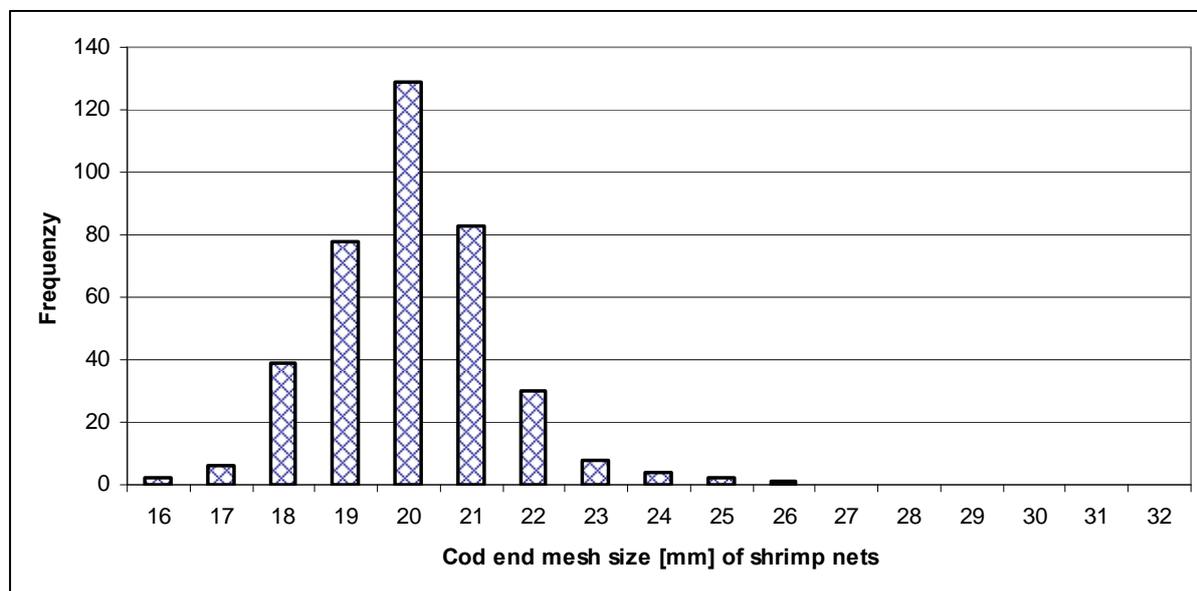
- *Fishing gear*

There are several possibilities to alter the fishing gear employed. Cut, design and types of yarn used for the net do affect fishing results. The weight of the beams, shoes and roller gear keeps the net to the ground during fishing process. It needs more engine power and has a higher fuel consumption.

Though aggregated beam widths are limited to 24 m per vessel most vessels have beams of only 8 to 9 m at their sides adapted to the engine power of their vessels and to optimal fishing performance and fuel consumption.

Concerning the nets there are no studies available to show the differences in specifications of net types. A wide range of possible alternatives could be the focus of gear technological research. Mesh sizes, especially of the cod end, are of interest to the EU control organs as the legal range is fixed between 16 and 32 mm of stretched mesh size. Control measurements done between 2008 and 2010 by the German control authorities are given in Figure 1-42. They show that all meshes were within the legal frame with a maximum at 20 mm.

**Figure 1-42: Mesh sizes of stretched meshes in shrimp net cod ends from control measurements on vessels from different nations (n= 382) in the period 2008 to 2010**



Source: LLUR, Fishery Department, Kiel, Germany

Modern nets have a much thinner yarn compared to older ones in order to enhance water flow and catchability while reducing towing resistance and fuel consumption.

Further investigations seem necessary to enhance the knowledge on effects of mesh sizes and types (e.g. standard mesh versus square meshes) on selectivity of shrimp in order to reduce discards of small shrimps and optimize shrimp catches. Former preliminary studies indicate a reduction of discards of non-marketable shrimp of 42% (Rauck and Wienbeck 1992, Wienbeck and Rauck 1992).

The beam trawl seems to be the most appropriate gear and is the established gear type in shrimping, though otter trawls could also be used. Other gear like stow nets, push nets and traps are only of historic and part time interest.

- *Effort*

Fishing effort is one means for regulating fishery. It may be unlimited within the general restrictions of an area (traffic, oil platforms, etc.) or confined regionally or in time. The POs have introduced limitations of effort at different periods in a week, requesting vessels not to leave harbour before a certain time and to return to a set time respectively. By that also a certain rhythm in the whole system was developed delivering the catch to the

harbours during the week days up to a set time, normally on Friday, according to agreements with the buying companies.

Modernising vessels entails increase in fishing efficiency and fishing effort. Therefore NGOs (Fischer 2009) suggest a general fleet reduction as overcapacities are assumed. This seems to be the case at present time as too high landings is noticed resulting in minimum prices and even interventions (in Denmark). Even fishermen accept overcapacities in their metier (Conradi 2010).

### **Measures of Limitation of Catches**

Another management option is the limitation of landings. In case of low levels of shrimp stocks fishermen will fish as long as they can to use up their fishing hours to achieve the maximum catch (and income) within the limited time. In case of high abundance of shrimps they may reach their limited catch amount within a much shorter time and it is up to their decision and luck whether it takes them one or two trips to reach the maximum allowed.

However their problem is that non PO members do not stick to the PO self-imposed rules of catch limitations. These fishermen profit in several ways by not adjusting themselves to the PO rules: they can fish a longer time and land higher amounts of shrimp and they achieve a higher income. Additionally they take advantage of the possibly increased prices due to the limited landings by the PO members or they create further price decreases by the amount of excessive landings. Surplus landings even led to interventions and withdrawal of shrimp from the market.

That situation creates tension between PO members and non-PO members which even may result in heavy disputes and other actions (Ostfriesen-Zeitung 21.09.2010 and Fischerblatt 10/2010).

#### **1.5.3 The Netherlands**

There are no stock estimates for the Dutch shrimp. The EU does not set any TACs, which means that shrimp fishermen do not have restrictive quota for their catch. Fishery researchers in the Netherlands have never expressed concern about the size of the stocks or the fishing effort. Fishermen need a license to be able to fish for shrimp, and currently 225 licenses are in use. Of those, some 60 vessels only fish for shrimps, whilst the other fishermen also carry out other fishery (in particular plaice and sole). The type of license, GK (shrimp fishery coastal waters) or GV (shrimp-fishery fishery zone) determines where you may fish (Wadden Sea/North Sea or the waters around Zeeland). In order to grant a license, the government ascertains that the shrimp cutter has adequate catch-sorting equipment onboard.

The Dutch brown shrimp fishery fleet may be split into three segments:

- the smaller vessels fishing mainly closer to shore and in the Wadden Sea areas, - the larger vessels mainly fishing in foreign waters of Germany and Denmark,
- the large vessels which are normally active in finfish fisheries but go to shrimp fishery because of low flat fish prices e.g. or exploited quota.

The latter ones, however, may have the problem of possibly too much engine power which prohibits them from fishing within the plaice box where brown shrimp normally occur. On the other hand they are entitled to fish for brown shrimp as there are no further

restrictions like quotas. With their landings of shrimp on top of the landings by traditional shrimp fishermen these fishermen give pressure to shrimp prices and create tension with shrimp fishermen and their POs.

As some German fishermen have sold their cutters to Dutch companies there is no longer a clear distinction between Dutch and German vessels. Though having a German license the capital and crew is Dutch and behaves like a Dutch vessel. Therefore VMS signals from German vessels may untypically appear way out of the normal range of German shrimpers along the Dutch coast.

### **Current Situation: Good Practices, Problems and Obstacles**

As already stated in Chapter 1.1.2 on landings and effort, the Dutch fleet is active nearly all year round. Having many modern and rigid cutters Dutch fishermen are to be found even in rough weather conditions around Bft 7 fishing off the Danish and German coasts, depending on seasonality of shrimp distribution. These long distance trips result in slightly different fishing patterns. Dutch vessels fish approximately 9 days and over one weekend with landing stops in-between to make a longer break every other weekend depending on weather situation as well. By that they reduce their days and hours at sea according to their PO's regulation. Their vessels remain in foreign harbours during that time to avoid long steaming trips back home. In that way they may remain away from home port for long periods, sometimes complete seasons.

Some of the Dutch vessels show new inventions for reducing fuel consumption by applying more hydrodynamic beams (Fig. 1-43).

**Figure 1-43: New hydrodynamic beams on board of Dutch cutter at Helgoland (January 2011)**



**Photo:** vTI (© Neudecker)

In 2009 the Dutch government has launched a project called "Sustainable Shrimp Fishery", with the ambition to bring fishermen and representatives of Natura 2000 organisations together. In the second half of 2010 a lot of progress has been achieved and the parties should come to an agreement in the first months of 2011: a part of Natura 2000 areas will be closed for all types of fishing and another part will be closed to vessels practicing fisheries with impact on the sea bottom. A research programme has been launched to bring more knowledge on the impact of fishing.

### **Brown Shrimp Management Plan**

The entire shrimp sector is working on gaining the MSC Certificate. Carrying an MSC Certificate means that the fishery is:

- carried out on healthy stocks,
- has a minimum effect on the ecosystem,
- is carried out as part of a good management plan.

The Coöperatieve Visserij Organisation (CVO) has established a management plan for the North Sea brown shrimp fishery for the period 2009-2014, but this plan has been modified several times and is not in operation yet.

The stakeholders involved in this plan are, besides CVO (of which all POs are members), the Productschap Vis, VEBEGA, the Ministry in charge of Agriculture and Fisheries, the North Sea Foundation, the Waddensea Foundation and WWF. A fund (Crangonfonds) has been established for financing the running costs of the implementation of this management plan, the inspections and the activities in support of this management plan.

The management plan (version 3 February 2011) includes in particular the following points:

- weekend prohibition and fishing times:
  - o the shrimp fishery in the Dutch waters and in the Ems area will be closed from Friday 12:00 hours until Monday 0:00 hours,
  - o the shrimp fishery outside Dutch waters, excluding the Ems area, will only be permitted during 9 days per fortnight;
- catch reduction rules are set (they will be monitored by CVO through the logbooks):
  - o every fourth week an average LPUE is calculated from data transmitted by 5 Danish, 30 German and 35 Dutch randomly selected boats,
  - o for weeks 1 to 24:
    - if the average LPUE > 20 kg/h, there is no danger for the stock and thus no further restrictions concerning fishing times,
    - if  $15 < \text{LPUE} \leq 20$  kg/h, there is no direct danger for the shrimp stock, but, in order to increase the stock, the fishery is limited to maximum 72 hours per week (measured from the departure from the port to the entrance to the port),
    - if  $\text{LPUE} \leq 15$  kg/h, there is a danger for the shrimp stock, the shrimp fishing time is limited to maximum 24 hours per week (measured from the departure from the port to the entrance to the port),
  - o for weeks 25 to 52:
    - if the average LPUE > 30 kg/h, there is no danger for the stock and thus no further restrictions concerning fishing times,

- if  $25 < \text{LPUE} \leq 30$  kg/h, there is no direct danger for the shrimp stock, but, in order to increase the stock, the fishery is limited to maximum 72 hours per week (measured from the departure from the port to the entrance to the port),
  - if  $\text{LPUE} \leq 25$ , there is a danger for the shrimp stock, the shrimp fishing time is limited to maximum 24 hours per week (measured from the departure from the port to the entrance to the port),
- bycatch:
  - o the maximum percentage of shrimp residue (sieavage) is 15% for every landing,
  - o the sieve used in authorized landing sites shall be of the standard type as described in the directive "Code 2006: 190/57.8.1" of the Shrimp Advisory Committee", with a sieve width of at least 6.8 mm,
  - o the minimum mesh size of a shrimp net is 20 mm or "22 mm including the twine", stretched mesh,
  - o participants will use the sieve net with a mesh size of maximum 70 mm, in conformity with the EU regulation (EC) n°254/2002 with technical measures;
  - o a waiver of the use of the sieve net can only be granted by CVO when an alternative technique is applied, of which a scientific authority has determined that the applied technique will lead to at least the same level of bycatch reduction as the sieve net;
  - o the waiver can be granted for a maximum of two weeks; the total period of waivers in one year cannot exceed eight weeks in the first year of the management plan being in force;
  - o the waiver rule for the use of the sieve net will be phased out in a period of three years after the management plan has come into force; the maximum period of a waiver in every given year will be:
    - year 1: 8 weeks
    - year 2: 4 weeks
    - year 3: 4 weeks

From the fourth year onwards of the management plan being in force, waivers of the use of a sieve net shall not be granted anymore.
  - o Participants shall sort their catches with a rinsing/sorting machine that is recognized by CVO; it is prohibited to adjust the sorting machine in a way that can impede its intended operation (neither adjustment of the sorting machine nor by using extra materials).
- Habitat and ecosystem
  - o vessel capacity: vessels shall have a maximum engine power of 221 Kw (300 hp); it is the ambition of the CVO to install a permanent monitoring system, to support the compliance of the maximum engine power.
- Inspection:
  - o the CVO shall appoint inspectors for the necessary auditing of an effective execution of the management plan, the contact details of the inspectors will be available on the website,
  - o inspection reports shall be published in full on the website within two weeks after having been received by the CVO,
  - o participants shall all observe the compliance of the agreements in the management plan, they also accept additional irregular and/or unannounced inspections of the compliance by inspectors.

- Governance: the management plan is governed by the CVO; with the signing of the management plan the participant authorizes the PO and the CVO to execute the management plan on his/her behalf.
- Communication: the freely accessible informative website [www.cranon.nl](http://www.cranon.nl) provides general information on the management plan.

### **TAC issue under debate**

The TAC issue is under debate among fishermen and POs.

According to some of them the main pros of the system would be to:

- stabilize landings and markets,
- stabilize impact on stocks and environment (ecosystem approach),
- stop impulses for a tragedy of the commons,
- settle the "fisherman's dilemma" (the fisherman is not able to take the decision to fish less and needs that the EU or the government regulates),
- stabilize and secure marketing and processing activities,
- increase and make durable the scientific interest for the brown shrimp stock and make research funds more easily available for surveys on stocks and impact of fishing gear on the environment,
- make easier the MSC certification process (catch control rule),
- give more responsibility to POs.

Some stakeholders, especially in the Netherlands, are very favourable to such a system. Furthermore the introduction of ITQs would improve the possibility of selling old vessels (and entail a natural reduction of the fleet) and providing pension funds for vessel owners. ITQs would also give more possibilities to grow or stabilize for vessels. There is presently a fleet of 500 vessels in the three countries for a production of 30 to 35 000 t. The ITQ could be 60 t maximum per ship. For a small family business, this individual quota would be enough. But for vessels which now catch 250 t/year it would be insufficient and these boats would have to buy another 3 ITQs of 60 t each to safeguard their profitability. The price of the quota would be decided by the market and this system would entail the decommissioning of small and old vessels whose ITQs would be bought by big vessel owners.

Stakeholders opposed to the TAC principle assert that:

- it would limit the freedom of the market and make entrance for newcomers more difficult,
- it would entail more administrative processes and control costs,
- there would be a problem of quota share-out: who gets what? which reference period shall be used ?
- with the introduction of ITQs there might be a risk of concentration of landing points and a possible negative impact on tourism (Germany is particularly anxious about that).

## 2. Description of the North Sea Brown shrimp Markets

### Key Findings

- Two Dutch companies (HEIPLOEG and KLAAS PUUL) control 80% of the EU market.
- Belgium is the main consumer market (more than half of the total EU market), followed by the Netherlands and Germany.
- More than 90% of the market is composed of peeled shrimps.
- The main market for unpeeled shrimp is France, followed by Belgium.
- The brown shrimp makes a 14 day trip to Morocco for peeling. The heavy use of preservatives (benzoic acid, sorbic acid) ensures a longer shelf life.
- Brown shrimp business appears to be a profitable activity for processors.

The European market for North Sea brown shrimp has an estimated volume of 35 000 t (landed weight equivalent). As the vessels are able to catch more than this amount there is an overcapacity, which leads to decreased first sale prices.

Once caught by specialised vessels and cooked aboard, the brown shrimp is landed and sold to first buyers who sort and weigh them. There are different grades which depend on the width of the carapax. Smaller shrimps are presently crushed and reduced to fishmeal in a facility in Cuxhaven. The marketable shrimps are sold to wholesaling/processing companies.

A small part is sold unpeeled to local fish mongers and tourists or exported to France and Belgium and the rest is transported to Morocco for peeling. Peeled shrimps are shipped back to the Netherlands, where processors pack them and deliver them to the EU markets (Belgium, Netherlands, Germany, France).

### 2.1 Denmark

#### Key Findings

- Denmark has no significant market and no companies involved in brown shrimp processing.
- All Danish brown shrimp fishermen are organized in one PO.
- The Danish production is bought by Dutch wholesalers and transported to the Netherlands.

In Denmark there is no domestic market for brown shrimp. Only small amounts are sold to the local gastronomy and to tourists. The majority of the landings (about 3 000 tonnes) are exported to the Netherlands. Nonetheless a part of the processing steps is done in Denmark. Noticeable is the fact that Danish shrimp fishermen do not leave for fishing when the price is too low. If the revenues are not likely to exceed 1-5 000 DKK (1950 €) per trip the vessels stay in harbour or might modify their fishing gear to catch other species (Larsen pers. com. 2010).

### **2.1.1 Role and Organisation of Producer Organisations**

The 27 Danish shrimp vessels are all members of one single PO, the *Danske Fiskeres Producent Organisation* (DFPO), which obtained official recognition as a producers' organisation in 1974. DFPO is just the political representation of the fishermen and has nothing to do with the market (Andersen, Pers. Com. 2010).

In the year 2000 the number of vessel owners in the DFPO was approximately 2 100, which corresponds to about 70% of the whole Danish fleet. For the brown shrimp sector the share is 100%. In its political structure, the DFPO has a members' council, consisting of 32 persons and a board with a chairman. The board consists of eight members. Its most important task is the fixing of the minimum price to which the official EEC guide prices can be altered within 10% in consideration of the current market situation. It also fixes the guarantee payment which is paid in case of withdrawal from the market, in consideration of the economic situation ([www.dfpo.dk](http://www.dfpo.dk), 9.2.2011).

Especially for the brown shrimp sector, the DFPO is a good example of cooperation within the sector. It seems to work efficiently and consistently, with a good ability to solve problems. Maybe the small size of the sector (27 vessels) makes it easier to find consensus.

### **2.1.2 Structure and Concentration of the Wholesaling and Processing Sector**

As there is almost no marketing of brown shrimp in Denmark, the wholesaling sector is negligible.

There is no brown shrimp processing; only weighing and sieving are carried out in Denmark. These activities are mostly undertaken by three Dutch companies (HEIPLOEG, POSEIDON and KLAAS PUUL), which have or have had subsidiaries in Havneby (KLAAS PUUL, POSEIDON).

Recently, HEIPLOEG closed its facility in Denmark in order to concentrate and optimize its production.

### **2.1.3 Evolution of Sales**

There are no Danish marketing or processing companies trading brown shrimp.

The Danish company ROYAL GREENLAND, the world's biggest supplier of cold water prawns (*pandalus borealis*), recently tried to extend its range of products by adding brown shrimp references. The crangon were supplied by the Dutch wholesaler TELSON. After

losing a contract with a Belgian retailer, ROYAL GREENLAND stopped the brown shrimp experience.

### 2.1.3.1 Domestic Market

As mentioned before, the Danish market for Brown shrimp is negligible and limited to sea-side restaurants and tourists.

### 2.1.3.2 Export

Danish exports of brown shrimps are made up of raw products: shrimps just landed, weighed and sorted in Denmark and then transported to the Netherlands by Dutch wholesalers.

**Table 10. Danish exports of fresh and frozen brown shrimps**

| <b>Total</b>          |                | <b>2005</b>    | <b>2006</b>    | <b>2007</b>    | <b>2008</b>    | <b>2009</b>    |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Main partner</b>   |                |                |                |                |                |                |
| <i>Fresh crangon</i>  |                |                |                |                |                |                |
| Total                 | <b>t</b>       | <b>7 049,8</b> | <b>5 931,8</b> | <b>7 284,3</b> | <b>6 678,6</b> | <b>4 361,7</b> |
|                       | <b>1 000 €</b> | <b>25 024</b>  | <b>19 169</b>  | <b>28 180</b>  | <b>30 909</b>  | <b>12 310</b>  |
|                       | <b>€/kg</b>    | <b>3,55</b>    | <b>3,23</b>    | <b>3,87</b>    | <b>4,63</b>    | <b>2,82</b>    |
| Netherlands           | t              | 7 047,1        | 5 931,7        | 7 284,2        | 6 678,6        | 4 361,7        |
|                       | 1 000 €        | 25 022         | 19 164         | 28 174         | 30 908         | 12 310         |
|                       | €/kg           | 3,55           | 3,23           | 3,87           | 4,63           | 2,82           |
| <i>Frozen crangon</i> |                |                |                |                |                |                |
| Total                 | <b>t</b>       | <b>3,9</b>     | <b>48,1</b>    | <b>0,1</b>     | <b>3,0</b>     | <b>43,2</b>    |
|                       | <b>1 000 €</b> | <b>29</b>      | <b>120</b>     | <b>2</b>       | <b>23</b>      | <b>261</b>     |
|                       | <b>€/kg</b>    | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>-</b>       | <b>6,04</b>    |
| Netherlands           | t              |                |                |                |                | 41,4           |
|                       | 1 000 €        |                |                |                |                | 247            |
|                       | €/kg           |                |                |                |                | 5,97           |
|                       |                |                |                |                |                |                |
|                       |                |                |                |                |                |                |

Source: Eurostat/Comext

Danish exports (e.g. 4 362 t in 2009) can be above the level of Danish landings (3 096 t in 2009) because vessels from the Netherlands, Germany and even from the United Kingdom and Belgium, land in Danish harbours (1 709 t in 2009) besides the Danish fleet. So all these shrimp from foreign vessels are exported from Danish territory and are on top of the Danish landings.

## 2.2 Germany

### Key Findings

- Germany has a big market for brown shrimp (5 600 t – landed weight equivalent).
- Many small wholesaling and processing companies are working in the sector, most of them sell only locally.
- There is a huge lack of organization's ability within the German brown shrimp fishery, which often leads to struggles. POs are restructuring constantly. The rules set up by the POs are often not obeyed by its members. About 25% of the German brown shrimp fishermen are not organized in a PO.
- The centre of the German brown shrimp activity is Büsum, Schleswig-Holstein. Various companies are located also in Greetsiel, Lower-Saxony.
- The turnover of the German brown shrimp companies is in the order of 100 Mio. Euros. There are about 250 people employed in the processing and marketing facilities.
- The two main actors operating in Germany are the Dutch leaders HEIPLOEG and KLAAS PUUL.
- An attempt to develop an automatic peeling capacity in Lower Saxony in 2010 failed due to economic and quality problems.

### 2.2.1 Role and Organisation of Producer Organisations

The role of the German POs has changed crucially in the 1980s.

In the beginning many small POs had in the same time a political role (representation of fishermen's interests) and an economic function (monitoring and management of landings and prices).

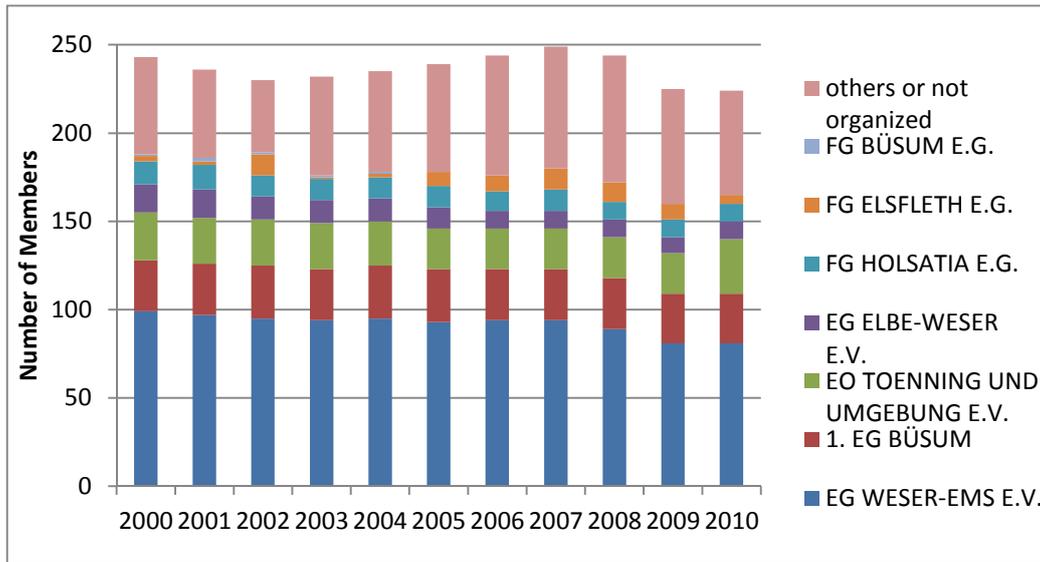
In the beginning of the 1980s the Dutch companies started to expand their activity to Germany and to deal with the marketing of brown shrimp. POs lost their economic role but maintained their political function.

The organisation of the German Producer Organisations is heterogeneous. The history of the POs is characterized by many changes throughout the years. Fusions and break-ups and closings are quite usual for POs.

Figure 2-1 shows the number of members of the major brown shrimp POs, Figure 2-2 shows the composition of landings by PO. The largest PO is the "Erzeugergemeinschaft Weser-Ems" in Lower-Saxony with about 40% of the vessel owners.

"1. Erzeugergemeinschaft in Büsum" and "Erzeugerorganisation Tönning und Umgebung" have each about 25 members. "Erzeugergemeinschaft Elbe-Weser", "Fischereigenossenschaft Holsatia" and "Fischereigenossenschaft Elsfleth" contribute with each about ten members. About 40-70 fishermen are in other POs or not organized.

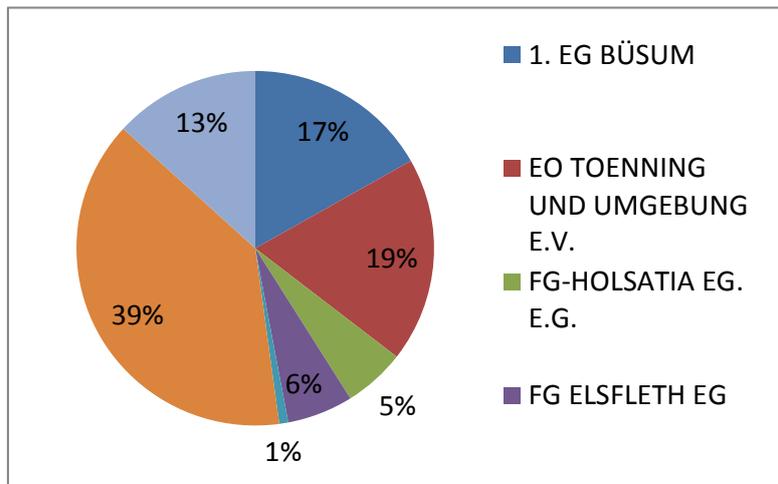
**Figure 2-1: German brown shrimp Producer Organisations and Number of Members**



Note: "Others or not organized" in 2010 estimated on mean 2000-2009

Source: BLE

**Figure 2-2: Catches by German Producer Organisation 2010**



Source: BLE

In late December 2010 there was again a restructuring of the German POs. "EG Elbe-Weser" and "EO Tönning" merged, as well as "FG Holsatia" and "1. EG Büsum". This had also to do with the court action of the Dutch competition authority NMa against several German POs. The fishermen feared the consequences of a penalty.

A new PO has also been built up in 2010: the "Erzeugergemeinschaft für Nordseekrabbten Büsum und Umgebung", which does not appear yet in the official landing statistics but currently includes ten members.

## 2.2.2 Structure and Concentration of the Wholesaling and Processing Sector

The German market of North Sea brown shrimp is very transparent and its structure can be presented quite clearly.

In 2010 the volume of shrimp sold to first buyers in Germany was 12 048 tonnes, from which 8 005 tonnes (66%) are first bought by German companies.

In Germany there are about 25 companies which buy shrimp. In total the turnover for the most important German companies in Brown Shrimp is about 90 Mio. € (Table 11). If the small companies, for which no data were available, are included, the total market can be estimated about 100 Mio. €. The total number of people employed is about 205-230.

It is difficult to draw lines between the first buyers and the processing companies. Often one of the large companies buys the brown shrimp from a first buyer, but the large companies also form part of the first buyers. Additionally, depending on freezing and storage capacity, there is an inner-branch trade, e.g. HEIPLOEG buys shrimp from a smaller German company and vice-versa.

**Table 11. Overview of the German Brown shrimp Market**

| Major Companies   | Turnover (Mio. Euros) | Profit (Mio. Euros) | Employees    | Bought amount of Brown shrimp (t) |
|---|-----------------------|---------------------|--------------|-----------------------------------|
| Büsumer Fischerei (1)   | 55,00                 | 0,40                | 92           | 2 693*                            |
| De Beer   | 15,70                 | n.a.                | 39           | 1 309                             |
| Stührk (2)  | 9,00                  | n.a.                | 30           | 1 307                             |
| Krabben Bremer  | 3,70                  | n.a.                | 9            | 338                               |
| Rentel OhG  | 2,50                  | n.a.                | 8            | 712                               |
| Krabben Kock  | 2,00                  | n.a.                | 5            | 825                               |
| Jan Looden  | 1,20                  | n.a.                | 7            | 296                               |
| Hermann Rinjes  | 0,30                  | n.a.                | 15           | 525                               |
| Others and Klaas Puul   | x                     | n.a.                | x            | 4 003                             |
| <b>Total</b>  | <b>89,40+x</b>        | <b>n.a.</b>         | <b>205+x</b> | <b>12 048</b>                     |
| (1) part of Heiploeg Group, landings: Amount of Heiploeg in German landings |                       |                     |              |                                   |
| (2) estimated 25% of company´s turnover (Stührk, Pers. Com.)                |                       |                     |              |                                   |

**Source:** AMADEUS Database, BLE (2011)

A part of the Brown shrimp economy takes place in East Frisia, especially around the largest East Frisian port, Greetsiel. This little fishermen´s village is home to the companies DE BEER, JAN LOODEN and others. The entire East Frisian coast line is an important tourist region where little fishmongers have subsidiaries in every small port. The availability of brown shrimp is also an element of this touristic ideal. KRABBEN BREMER for example is located in Dorum.

Cuxhaven is the second most important brown shrimp landing station. HEIPLOEG has a landing and sieving station there. The fish meal plant processing the small crushed shrimps is also located in this port.

The majority of processors, at least the big ones, are located in Büsum, which has become the German centre for brown shrimp business with the largest landings and the presence of the biggest companies. Subsidiaries in Büsum are run by the Dutch BÜSUMER FISCHEREI (HEIPLOEG Group), KLAAS PUUL, STÜHRK DELIKATESSEN, KRABBEN KOCK and RENTEL. The market leader HEIPLOEG recently concentrated its activities in Büsum and closed its sieving stations in Denmark and in Husum.

It is obvious that the German market is very heterogeneously structured. This will be shown more detailed in the following paragraphs.

### ***2.2.3 Main Marketing and Processing Companies***

The biggest companies operating in the brown shrimp sector in Germany are the Dutch HEIPLOEG (BÜSUMER FISCHEREI) and KLAAS PUUL.

Main German-owned companies in the brown shrimp processing sector are the East Frisian DE BEER and STÜHRK DELIKATESSEN, located in Marne, Schleswig-Holstein.

DE BEER accounts for about 16% of the total turnover and employs 39 people. The company has 44 fishermen under contract and has subsidiaries along the East Frisian Coast in Greetsiel, Norddeich and Carolinensiel. The turnover of the company has been growing for the last three years, rising from less than 10 mio€ in 2006 to almost 16 mio € in 2008. Although it sells also fresh fish, the main business of the company is derived from the brown shrimp.

STÜHRK DELIKATESSEN processes more than 10% of the German landings and has a turnover of 9 Mio. €. Like most of German brown shrimp companies STÜHRK is a family-owned business. It has contracts with 15 supplying fishermen. The shrimps processed are landed and sieved in Büsum and carried on to the factory in Marne, where they are cooled and preserved with benzoic acid. The shrimps are either sold regionally, peeled abroad or frozen in Marne. STÜHRK brown shrimps are peeled by independent peeling companies in Poland and Belarus, together with other German shrimp companies.

The turnover stagnated from 2004-2007 at a level of 30 Mio. € and increased to in 2008 to total 36 Mio. € in the year 2009. STÜHRK deals with other products including caviar and smoked salmon. The share of brown shrimp is about 25% in the company's turnover. The company owns six peeling machines but finds more efficient to have the shrimp peeled manually in Poland. The machines are expensive and less efficient (the yield of a worker is about 33%, as the yield of a machine is only about 30%). Moreover the automatically peeled shrimps need to be checked by people to remove remaining shell fragments.

In 2010 a company specialized in the peeling of brown shrimp (KRABBENSCHÄLZENTRUM CUXHAVEN) has been set up in Cuxhaven (Lower Saxony). 24 shrimp peeling machines were installed with a total daily capacity of 7,5 t of raw material (processed in 2,5 t of peeled shrimp). The company should employ 60 people at full capacity. But after a few months the company went bankrupt.

## 2.2.4 Evolution of Sales

The evolution of sales in the brown shrimp sector is difficult to follow, because sales do not parallel the amount of landings. This is mainly due to freezing practices which make it possible to sell brown shrimp all over the year and to mix (de)frozen shrimps with fresh ones.

It is also difficult to analyse export and import statistics because they contain processed and unprocessed commodity. However, based on official German data, an overview of exports and imports can be given.

### 2.2.4.1 Export

Table 12 shows German exports and imports of *Crangon* for the period of January-October 2010. Obviously the Netherlands have the biggest share in the total value of imported frozen and fresh brown shrimp coming into Germany.

Germany has exports higher than imports, especially to the Netherlands, because of the market leadership of the Dutch companies HEIPLOEG and KLAAS PUUL which buy from the German fishermen and companies (compare 2.2.2).

German *Crangon* exports have a price between 2,50 €/kg (frozen) and 3,30 €/kg (fresh) whereas the imports have a price between 5,35 €/kg (frozen) and 7,15 €/kg (fresh). This leads to the conclusion that the imported commodity is already processed. Table 12 allows to understand the route followed by the German brown shrimp: the shrimps are caught in Germany, sold to the Netherlands, peeled in Morocco, then shipped back to the Netherlands where they are packaged, and sold to German discounters.

**Table 12. Exports and imports (weight and value) of Crangon (unspecified) from and to Germany - Jan-Oct 2010**

| Product                       | Export:<br>Weight | Export:<br>Value | Import:<br>Weight | Import:<br>Value |
|-------------------------------|-------------------|------------------|-------------------|------------------|
|                               | t                 | 1000 EUR         | t                 | 1000 EUR         |
| <b>Frozen Crangon - NL</b>    | 18,6              | 47               | 235,4             | 1 272            |
| <b>Frozen Crangon - Total</b> | 67,0              | 174              | 339,0             | 1 813            |
| <b>Fresh Crangon - NL</b>     | 6 759,0           | 22 778           | 531,2             | 3 733            |
| <b>Fresh Crangon - Total</b>  | 7 824,2           | 26 133           | 564,5             | 4 044            |

Source: Destatis

### 2.2.4.2 Domestic Market

Interviews with major German and Dutch stakeholders allow estimating the German market at 5 600 t (landed weight equivalent).

The German market is mostly supplied by the Dutch leading processors. German companies have their key market in regional areas, mainly Northern Germany.

### 2.2.5 Evolution and Structure of Imports of other Shrimps and Impact on the Brown shrimp Market

Other *Crangon* species can be found on the market, e.g. *Crangon affinis* or *Crangon japonicus*, especially when brown shrimp prices are high. It was also reported that the first Chinese cutter with automatic cooking street on board has entered the Chinese fishery. However, it is too early to evaluate the potential impact of these species on the North Sea brown shrimp market.

In the segment of processed and elaborated shrimp products (e.g. salads), the pink shrimp (*Pandalus borealis*) is a competitive product. Pink shrimps are generally cheaper than brown shrimp, but their taste is not as intense. Table 13 shows the exports and imports of *Pandalidae* into and from Germany for the period January-October 2010.

**Table 13. Exports and imports (Weight and Value) of Pandalidae from and to Germany. Jan-Oct 2010**

| Product                  | Export:<br>Weight | Export:<br>Value | Import:<br>Weight | Import:<br>Value |
|--------------------------|-------------------|------------------|-------------------|------------------|
|                          | t                 | 1000 EUR         | t                 | 1000 EUR         |
| <b>Frozen Pandalidae</b> | 616,7             | 3606             | 1139,4            | 4184             |
| <b>Fresh Pandalidae</b>  | 324,0             | 2804             | 215,5             | 2079             |

Source: Destatis

For the German market however, the potential impact of *Pandalidae* on the brown shrimp market seems to be limited. The brown shrimp has a specific circle of customers who consider it as a delicacy.

## 2.3 The Netherlands

### Key Findings

- The Dutch brown shrimp market is about the same size (5 700 t – landed weight equivalent) as the German market.
- The two leaders (HEIPLOEG and KLAAS PUUL) buy about 30 000 t of brown shrimp a year.
- Almost all the production bought is transported to Morocco to be peeled manually in big factories.
- The Dutch production is mainly exported: to Belgium first, then to Germany and France.
- Brown shrimp processing is a profitable activity for processors.
- Most Dutch brown shrimp fishermen are organized and members of a PO.
- The Netherlands Competition Authority (NMa) has carried out an investigation into possible infringements of the Competition Act and of the Treaty establishing the European Community in the brown shrimp sector by Dutch, German and Danish POs and Dutch wholesalers united in an association of wholesalers (VEBEGA). In 2003 NMa has imposed fines on these POS and wholesalers for a total of 13,8 mio € (then reduced to 5,4 mio €). The final ruling has not been given yet.
- NMa has decided to monitor the Dutch shrimp-fishing industry on a permanent basis.

### 2.3.1 Role and Organisation of Producer Organisations

Most Dutch shrimp fishermen are members of a producer organisation: 206 out of the 225 licences issued for shrimp fishing vessels, which means an organisation rate higher than 90%.

There are 7 POs involved in brown shrimp fisheries. The biggest one, CPO Nederlandse Vissersbond (NVB), has 110 vessels counting for about half of Dutch overall shrimp landings.

The other 6 POs joined together to form a POs' association, VisNed. Two POs of VisNed, PO Wieringen and Internationale Garnalen PO Rousant, land about 70% of VisNed's overall catches.

PO Rousant is the latest Dutch PO. It has been recognized in 2009 and includes vessels from Germany, Belgium and United Kingdom in addition to Dutch vessels. NVB is member of the transnational PO based in Oldenburg (Lower Saxony).

**Table 14. Dutch POs involved in shrimp fishing in January 2011**

| PO  | POs' Association | Location   | Date of recognition | Number of vessels involved in shrimp fishing | Part in shrimp landings |
|---|------------------|------------|---------------------|--|-------------------------|
| CPO Nederlandse Vissersbond   | TPO-Oldenburg    | Emmeloord  | 1987                | 110  | about 50%               |
| CPO Oost Nederland  | VisNed           | Urk        | 1971                | 8  | about 50%               |
| CPO Wieringen   | VisNed           | Den Oever  | 1986                | 44   |                         |
| CPO Texel   | VisNed           | Oudeschild | 1993                | 6  |                         |
| CPO Delta Zuid  | VisNed           | Yerseke    | 2003                | 11   |                         |
| CPO West  | VisNed           | Den Helder | 2003                | 2  |                         |
| Internationale Garnalen PO Rousant                                  | VisNed           | Lauwerzijl | 2009                | 25   |                         |
| total 225 licences for shrimp fisheries                             |                  |            |                     | 206  |                         |
| about 19 vessels are not organised or for sale and any other reason |                  |            |                     |  |                         |

**Source:** compiled by AND International.

### **2.3.2 Structure and Concentration of the Wholesaling and Processing Sector**

VEBEGA (Vereniging ter Bevordering van de Garnalenhandel), the Dutch Association for the Promotion of the Shrimp Wholesale Trade, has 7 members which are all active as wholesalers in the brown shrimp trade:

- HEIPLOEG (Zoutkamp),
- KLAAS PUUL (Volendam),
- MOOIJER-VOLENDAM (Volendam),
- HEYKO (Enkhuizen)
- TELSON (Leens)
- LENGER SEAFOODS (Harlingen)
- ROEM VAN YERSEKE (Yerseke).

FOPPEN EEL & SALMON (Harderwijk), mainly an eel and salmon smoker, recently entered the brown shrimp wholesale business.

Most shrimps landed by the Dutch vessels go through the auctions. Seven auctions are active in brown shrimp wholesaling. One of them (Zoutkamp), opened in 2003, wholesales exclusively shrimps and has experienced a big growth in the last years.

**Table 15. Evolution of brown shrimp sales in Dutch auctions (t)**

| Auction      | 2002         | 2003          | 2004         | 2005         | 2006          | 2007         | 2008          | 2009          |
|--------------|--------------|---------------|--------------|--------------|---------------|--------------|---------------|---------------|
| Lauwersoog   | 3 328        | 3 373         | 3 795        | 4 022        | 3 287         | 2 878        | 3 038         | 4 046         |
| Zoutkamp     | 0            | 254           | 709          | 943          | 914           | 654          | 1 479         | 2 024         |
| Harlingen    | 1 327        | 2 087         | 1 860        | 1 464        | 2 769         | 2 184        | 2 041         | 2 834         |
| Den Oever    | 1 683        | 2 823         | 2 042        | 2 124        | 2 769         | 2 514        | 2 800         | 3 840         |
| Stellendam   | 279          | 309           | 143          | 222          | 495           | 268          | 323           | 503           |
| Colijnsplaat | 507          | 614           | 458          | 383          | 700           | 374          | 483           | 584           |
| Breskens     | 339          | 940           | 676          | 703          | 832           | 648          | 921           | 1 691         |
| <b>TOTAL</b> | <b>7 463</b> | <b>10 400</b> | <b>9 683</b> | <b>9 860</b> | <b>11 765</b> | <b>9 520</b> | <b>11 085</b> | <b>15 521</b> |

Source: Dutch Ministry of Agriculture

Most Dutch fishermen have a contract with the major wholesalers. These contracts signed between the processors (HEIPLOEG and KLAAS PUUL) and the fishermen are often called "Las Vegas contracts" because they are not a legal and binding document. In this kind of contact the fisherman commits himself to supply the processor with his whole catch, but there is no quantity set and no price set. The price is set afterwards (by the buyer). However this contract can be used as guarantee by the fisherman in the bank.

### 2.3.3 Main Marketing and Processing Companies

The Dutch brown shrimp sector is dominated by two companies, HEIPLOEG and KLAAS PUUL, which purchase, directly or through other wholesalers, about 80% of all brown shrimps landed in Europe. Both companies have landing and sieving facilities in Germany, Denmark and in the Netherlands as well as peeling factories in Morocco.

Other important actors are HEYKO (which sells only to HEIPLOEG), TELSON and MOOIJER-VOLENDAM.

LENGER, ROEM VAN YERSEKE, both mussel processors, and FOPPEN, salmon and eel specialist, entered the shrimp business more recently.

**Table 16: Main brown shrimp wholesalers in the Netherlands**

| Company    | Crangon purchases (t/year) | Part of crangon in company's overall turnover | Turnover 2010 (mio€) |
|------------|----------------------------|---|----------------------|
| HEIPLOEG   | 17 - 20 000                | 30  | 213*                 |
| KLAAS PUUL | 11 000                     | 30  | 143                  |
| HEYKO      | 2 500                      | 100   | 11                   |
| TELSOON    | 2 400                      | 95  | 5,5                  |
| *2008      |                            |   |                      |

Source: own investigations

**HEIPLOEG** is by far the market leader and the largest supplier of shrimps in Europe. It buys annually 17 to 20 000 tonnes of North Sea brown shrimps from Dutch, Danish, German, British and Belgian fishermen. In the Netherlands HEIPLOEG buys from contract fishermen (for 80 to 90% of the total) and in the auctions for the rest.

HEIPLOEG has been acquired in 2006 by GILDE, a private equity investor specialized in management buy-out investments. HEIPLOEG Group includes, besides HEIPLOEG B.V., the following companies:

- HEIPLOEG B.V. (Zoutkamp, Netherlands): in Zoutkamp, in the north of the Netherlands, close to Lauwersmeer and not far from Groningen, HEIPLOEG has a large factory which is the largest shrimp processing factory in Europe, this factory became operational in 1999 and employs 250 people.
- HEITRANS (Zoutkamp, Netherlands): the own transportation division of HEIPLOEG specializes in chilled and frozen transportation and has a fleet of 43 lorries and 59 trailers which transport whole shrimps to and from the peeling plants in Morocco and packaged products to most countries in Europe,
- BÜSUMER FISCHEREI-GESELLSCHAFT (Wöhrden, Germany): processing factory specialized on shrimps and value added products under "BÜSUMER FEINKOST" label,
- GOLDFISH (Volendam, Netherlands): shrimp processor based in Volendam (Netherlands), the Volendam factory has been closed in 2010 and the production transferred to Zoutkamp,
- MORUBEL (Ostend, Belgium): supplier of frozen tropical prawns and value added products,
- FGT (HEIPLOEG Deutschland) (Husum, Germany): HEIPLOEG has recently closed its brown shrimp sieving station in Husum to concentrate the activity in Büsum,
- DANSK HEIPLOEG (Rømø, Denmark): the sieving station has been recently closed,
- TK FISH (Tetouan, Morocco): shrimp peeling factory.

HEIPLOEG is export-oriented, the Dutch market accounts for only 10% of total brown shrimp sales. Main destinations are Belgium (approx. 70% of sales), Germany (10%) and France (10%).

Total sales of HEIPLOEG Group exceed 300 mio € (out of which more than 200 mio € for HEIPLOEG B.V.).

**KLAAS PUUL** buys yearly 11 000 tonnes of shrimps in Denmark (where it has a plant for collection and sieving of shrimps), in Germany (where it also has a big plant for collection and sieving, in Büsum) and in the Netherlands, where it buys in the auctions. In Germany KLAAS PUUL buys through contracts signed with German fishermen on a yearly basis, contracts were also used in the Netherlands a few years ago but no longer today.

Unlike Heiploeg KLAAS PUUL is still a family business, with one majority holder, Evert Mooijer, son of the company's founder.

KLAAS PUUL has brown shrimp processing facilities:

- in Edam (Netherlands): processing and packaging (all processes are certified to adhere to the food safety standards of BRC and IFS),
- in Havneby (Denmark): sorting and packing for transportation to the Netherlands,
- in Büsum (Germany): sorting and packing for transportation to the Netherlands,
- in Tanger (Morocco): peeling (2 500 employees).

KLAAS PUUL has also sales subsidiaries in Belgium and France. The Büsum site also serves the North German market directly.

For KLAAS PUUL Belgium is also the main market (45% of sales), followed by Germany (23%), the Netherlands (22%) and France (4%).

Total sales reached 143 mio€ in 2009-2010.

**HEYKO** has been built in 2007 on collaboration between importer L. Kok International Seafood (Enkhuizen) and fish and shrimp specialist W.G. den Heijer & Zn. (Scheveningen). This joint venture was aiming to utilise their combined experience in shrimp at national and international level to penetrate the Benelux market.

HEYKO buys 2 500 t of raw brown shrimps per year in the Dutch auctions (Lauwersoog, Den Oever, Harlingen). The shrimps are then peeled in Morocco (Casablanca) by an independent Moroccan company. The unpeeled shrimps are often frozen in Enkhuizen before being transported in boxes to the peeling plant in Morocco, although fresh unpeeled shrimps can also be prepared for being transported fresh in plastic bags.

**TELSON** has been established in 2007 by an ex-chemical analyst of HEIPLOEG, Robert PIKKERT, who was then joined by HEIPLOEG's former owner, Mr. NIENHUIS, and the son-in-law of the latter.

TELSON acts as a service provider: it does not directly buy brown shrimp but organises the transport to Morocco, the peeling and the transport back to the Netherlands for some clients. TELSON works for two mussel processing companies recently entered in the brown shrimp business (ROEM VAN YERSEKE, LENGER SEAFOODS) and a few smaller clients. In 2010 TELSON has handled 2 400 t of crangon.

Some fishermen are anxious about the sustainability of the Dutch processing business since the two leaders do not offer undisputable guarantees of continuity: HEIPLOEG has no shareholders(it belongs to a private equity investor) and KLAAS PUUL is a family business but has no descendant coming in the business.

#### **2.3.4 Peeling operations**

Almost all peeling operations are now taking place in Morocco.

The peeling cannot be done using machines because brown shrimp is very small and it is, therefore, done manually. Shrimps are usually transported to Morocco (to Eastern Europe some years ago) in large lorries to be peeled there because manual labour is too expensive in the Netherlands. Next, they are brought back to the Netherlands. In the 90s shrimp was peeled in Eastern Europe (Poland, Ukraine, Belarus, Romania), but these operations have been stopped for quality reasons.

The full peeling process (transport to and from Morocco, peeling in Morocco) takes 10 to 20 days, 15 days on average. Most landings take place on Thursday and Friday and all the shrimps cannot be shipped in the same time (there are 6 to 14 days between the day of the purchase and the arrival in the peeling plant).

The shortest trip ist the following:

Thursday week 1: landings and sales in the auction,

Friday week 1: packing of shrimps in trays and departure of the truck,

Monday week 2: arrival in Morocco – customs clearance on Monday evening,

Tuesday week 2: peeling,

Wednesday week 2: shipping back,

Monday week 3: arrival in the Netherlands.

**HEIPLOEG** has its own peeling factory in Tetouan (TK FISH, 1 400 employees, capacity: 240 t of raw shrimps/week) and also uses 4 Moroccan contractors in Tanger (DETROIT SEAFOOD), Oujda and Nador. To transport the shrimps to Morocco HEIPLOEG uses the lorries of its own transport subsidiary, HEITRANS.

In the years 2006-2009 HEIPLOEG also sent smaller-size frozen brown shrimps to Asia (Indonesia and China) for peeling because of a lack in capacity in Morocco.

HEIPLOEG maintains a peeling activity in the Netherlands in another factory, where 24 peeling machines produce 2-3 t of shrimp meat per week.

**KLAAS PUUL** has a big plant in Tanger (KLAAS PUUL SHRIMPS INTERNATIONAL), which employs 2 500 people. Shrimps are transported to Morocco (10 to 15 trucks a week) by a Spanish haulier company specialized in the fruit transport. Shrimp meat is brought back to the Netherlands 3-4 times a week.

In the past KLAAS PUUL had a peeling activity in Volendam (Netherlands). In 1990 it bought 6 peeling machines, 3 for the smaller shrimps and 3 for the bigger ones. The yield was 3 kg per hour for each machine but 3 to 4 women per machine were necessary for the "after-peeling", because the quality of the machine peeled shrimps was not satisfactory. So KLAAS PUUL stopped this experience which was not interesting on a qualitative (quality of peeling but also bacteriological quality) and economic point of view.

**HEYKO** has a shrimp peeling plant in Morocco, which employs 250 women who mainly work full-time. HEYKO carries out one transport a week (to and from Morocco).

**TELSON** works with a peeling company in Tanger, belonging to the Group Seafood.

### **2.3.5 Evolution of Sales**

- **Export**

The following table shows the exports of brown shrimps from the Netherlands but must be looked at very carefully. Indeed most exports are counted twice, one time when they are exported unpeeled to Morocco and a second time when, once peeled, returned from Morocco and packed in the Netherlands, they are exported to the EU markets.

**Table 17. Evolution of Dutch exports of brown shrimps**

| Type of product              | 2005          |               |       | 2006          |               |       | 2007          |               |       | 2008          |               |       | 2009          |               |       |
|------------------------------|---------------|---------------|-------|---------------|---------------|-------|---------------|---------------|-------|---------------|---------------|-------|---------------|---------------|-------|
|                              | t             | 1.000         | €/kg  |
| <b>Fresh crangon</b>         | <b>23.880</b> | <b>77.153</b> |       | <b>24.655</b> | <b>77.863</b> |       | <b>25.578</b> | <b>83.993</b> |       | <b>18.965</b> | <b>75.028</b> |       | <b>20.291</b> | <b>80.263</b> |       |
| Belgium                      | 2.097         | 19.368        | 9,24  | 1.615         | 18.817        | 11,65 | 1.411         | 19.812        | 14,04 | 969           | 16.985        | 17,53 | 1.132         | 15.133        | 13,37 |
| France                       | 2.929         | 20.355        | 6,95  | 2.780         | 18.498        | 6,65  | 2.886         | 22.499        | 7,80  | 2.352         | 22.116        | 9,40  | 2.280         | 18.461        | 8,10  |
| Germany                      | 145           | 2.134         | 14,73 | 263           | 2.280         | 8,68  | 236           | 3.013         | 12,76 | 33            | 499           | 15,31 | 68            | 987           | 14,58 |
| Morocco                      | 18.430        | 34.293        | 1,86  | 19.725        | 37.338        | 1,89  | 20.642        | 37.334        | 1,81  | 15.283        | 34.077        | 2,23  | 16.567        | 44.721        | 2,70  |
| Other countries              | 278           | 1.003         |       | 272           | 930           |       | 404           | 1.335         |       | 329           | 1.351         |       | 244           | 961           | 3,94  |
| <b>Frozen crangon</b>        | <b>7.081</b>  | <b>20.029</b> |       | <b>6.689</b>  | <b>21.836</b> |       | <b>11.272</b> | <b>32.806</b> |       | <b>13.130</b> | <b>43.061</b> |       | <b>20.081</b> | <b>58.660</b> |       |
| Belgium                      | 535           | 3.135         | 5,86  | 841           | 4.865         | 5,78  | 2.240         | 10.323        | 4,61  | 5.047         | 16.958        | 3,36  | 5.884         | 17.363        | 2,95  |
| France                       | 372           | 2.762         | 7,43  | 889           | 6.125         | 6,89  | 1.971         | 8.800         | 4,47  | 2.329         | 10.959        | 4,71  | 2.842         | 10.542        | 3,71  |
| Germany                      | 16            | 89            | 5,46  | 9             | 143           | 16,63 | 746           | 1.668         | 2,24  | 819           | 2.273         | 2,77  | 979           | 2.497         | 2,55  |
| China                        | -             | -             |       | 64            | 160           | 2,50  | 332           | 966           | 2,91  | 134           | 430           | 3,22  | 1.417         | 4.320         | 3,05  |
| Morocco                      | 5.671         | 13.039        | 2,30  | 4.227         | 8.810         | 2,08  | 3.507         | 4.424         | 1,26  | 3.010         | 7.536         | 2,50  | 6.319         | 16.093        | 2,55  |
| Other countries              | 486           | 1.004         |       | 659           | 1.733         |       | 2.476         | 6.625         |       | 1.791         | 4.905         |       | 2.639         | 7.845         |       |
| <b>Live / salted crangon</b> | <b>60</b>     | <b>24</b>     |       | <b>205</b>    | <b>72</b>     |       | <b>765</b>    | <b>421</b>    |       | <b>1.339</b>  | <b>5.292</b>  |       | <b>1.290</b>  | <b>3.232</b>  |       |
| Morocco                      | 59            | 18            |       | 204           | 57            |       | 762           | 390           |       | 1.090         |               |       | 1.258         | 2.691         |       |

Source: Eurostat/Comext

The unit price allows to see whether the export is composed of whole shrimps or peeled ones.

### Exports for peeling

The export of shrimps to Morocco for peeling is about 24 000 t a year, out of which 17 000 t fresh and 6 000 t frozen.

**Table 18. Evolution of Dutch exports of brown shrimps to Morocco**

| Type of product     | 2005                     | 2006            | 2007            | 2008            | 2009            |
|---------------------|--------------------------|-----------------|-----------------|-----------------|-----------------|
|                     | <b>Quantity (t)</b>      |                 |                 |                 |                 |
| Fresh crangon       | 18 430,3                 | 19 725,4        | 20 641,5        | 15 282,7        | 16 567,2        |
| Frozen crangon      | 5 671,3                  | 4 227,0         | 3 506,7         | 3 010,3         | 6 319,2         |
| Live/salted crangon | 59,1                     | 203,6           | 761,7           | 1 090,4         | 1 257,8         |
| <b>Total</b>        | <b>24 160,7</b>          | <b>24 156,0</b> | <b>24 909,9</b> | <b>19 383,4</b> | <b>24 144,2</b> |
|                     | <b>Value (1000 €)</b>    |                 |                 |                 |                 |
| Fresh crangon       | 34 293                   | 37 338          | 37 334          | 34 077          | 44 721          |
| Frozen crangon      | 13 039                   | 8 810           | 4 424           | 7 536           | 16 093          |
| Live/salted crangon | 18                       | 57              | 390             | 2 917           | 2 691           |
| <b>Total</b>        | <b>47 350</b>            | <b>46 205</b>   | <b>42 148</b>   | <b>44 530</b>   | <b>63 505</b>   |
|                     | <b>Unit price (€/kg)</b> |                 |                 |                 |                 |
| Fresh crangon       | 1,86                     | 1,89            | 1,81            | 2,23            | 2,70            |
| Frozen crangon      | 2,30                     | 2,08            | 1,26            | 2,50            | 2,55            |
| <b>Total</b>        | <b>1,96</b>              | <b>1,91</b>     | <b>1,69</b>     | <b>2,30</b>     | <b>2,63</b>     |

Source: Eurostat/Comext

Some quantities of brown shrimps are also exported frozen to China and Indonesia to be peeled, especially smaller sized shrimp, which are then returned frozen again to the Netherlands.

**Table 19. Evolution of Dutch exports of brown shrimps to Asia**

| Country   | 2005 |    | 2006  |       | 2007 |         |       | 2008 |         |       | 2009 |         |        |      |
|-----------|------|----|-------|-------|------|---------|-------|------|---------|-------|------|---------|--------|------|
|           | t    | k€ | t     | k€    | t    | k€      | €/kg  | t    | k€      | €/kg  | t    | k€      | €/kg   |      |
| China     | -    | -  | 64,1  | 160   | 2,50 | 331,8   | 966   | 2,91 | 133,7   | 430   | 3,22 | 1 417,2 | 4 320  | 3,05 |
| Indonesia | -    | -  | 418,9 | 1 229 | 2,93 | 2 252,9 | 6 336 | 2,81 | 1 430,6 | 4 116 | 2,88 | 2 450,9 | 7 283  | 2,97 |
| Total     | 0,0  | 0  | 483,0 | 1 389 | 2,88 | 2 584,7 | 7 302 | 2,83 | 1 564,3 | 4 546 | 2,97 | 3 868,1 | 11 603 | 3,00 |

Source: Eurostat/Comext

The total quantity of brown shrimp exported by Dutch processors for peeling purposes had thus reached 28 000 t in 2009.

### Exports for the consumer markets

The exports of brown shrimps for the consumer markets are destined for Belgium, France and Germany. Belgium imports also whole shrimps which are peeled locally or sent to Morocco by Belgian processors (PRAET, VAN BIESEN).

- **Domestic Market**

The Dutch market can be estimated at about 5 700 t (landed weight equivalent).

It is supplied by KLAAS PUUL (about 2 200 t), which is very active in the Amsterdam area, HEIPLOEG (2 000 t) and various smaller size suppliers (1 500 t).

### ***2.3.6 Evolution and Structure of Imports of other Shrimps and Impact on the Brown shrimp Market***

Like in Germany the brown shrimp market is a market segment quite specific and independent from quantities and prices of other shrimp categories present on the market. According to HEIPLOEG only 5% of the brown shrimp consumers switch to pink shrimp when the crangon price is high.

### ***2.3.7 Description of Proceedings initiated by the Netherlands Competition Authority***

The Netherlands Competition Authority (NMa) carried out an investigation into possible infringements of Section 6(1) of the Competition Act and Article 81(1) of the Treaty establishing the European Community in the brown shrimp sector by Dutch, German and Danish POs and Dutch wholesalers united in an association of wholesalers (VEBEGA).

Section 6(1) of the Competition Act prohibits agreements between undertakings, decisions of associations of undertakings and concerted practices of undertakings with the purpose or consequence of impeding, restricting or distorting competition on the Dutch market or a part thereof.

Pursuant to Article 81(1) of the EC Treaty all agreements between undertakings, decisions of associations of undertakings and concerted practices, which may have an unfavourable effect on trade between Member States and have the purpose or consequence of impeding, restricting or distorting competition within the common market are prohibited, in particular those which consist of:

- directly or indirectly fixing purchase or selling prices or any other trading conditions,
- limiting or controlling production, markets, technical development or investment,
- sharing markets or sources of supply.

NMa has determined that the practices of the 8 POs (3 German POs, 1 Danish PO, 4 Dutch POs) and 8 wholesalers (all Dutch) involved, namely entering into agreements in relation to minimum prices and catch limits in respect of North Sea shrimps within the framework of the Trilateral Consultation which took place during the period from 1 January 1998 to 30 January 2000, constituted a very serious infringement of Section 6(1) of the Competition Act and article 81 (1) of the EC Treaty. NMa has also determined that the practice of the 4 Dutch POs and 8 Dutch wholesalers concerned, namely the agreement aimed at obstructing the entry of a new trader who wished to purchase North Sea shrimps on the Dutch fish auctions, which took place during the period from 1 October 1999 up to 16 November 1999, constituted a very serious infringement of Section 6(1) of the Competition Act.

In January 2003 NMa imposed fines on the 8 POs and 8 wholesalers for a total amount of 13,8 mio€ (4,0 mio€ for the POs, 9,8 mio€ for the wholesalers). HEIPLOEG and KLAAS PUUL were fined respectively 5,1 and 2,1 mio€. This was the first time that NMa imposed a fine for an infringement of European competition rules. This is also the first case ever in which the NMa has fined non-Dutch parties.

In the administrative appeal at the end of 2004 the fines imposed on the five smaller shrimp wholesalers were withdrawn because NMa could not prove with sufficient certainty that these traders had actually participated in the prohibited agreements and the exclusion of the new trader. NMa has upheld the fines imposed on the other three wholesalers (HEIPLOEG, KLAAS PUUL and GOLDFISH) because their involvement participated in the prohibited agreements and the exclusion of the new trader was confirmed in the administrative appeal but the fines have been reduced because the parties provided new evidence with regard to the turnovers on which the fine was based. This turnover, namely the procurement of North Sea shrimps, proved to be much lower than was previously assumed.

The fines of the 8 POs were also reduced, again on the basis of new turnover data. The fact that POs were given the impression that the government was not averse to measures aimed at limiting the supply of shrimps was also taken into account. As in the original decision to impose fines NMa also took into account the financial position of the POs involved.

In December 2006 NMa decided to reduce again the fines imposed on POs following a court ruling. The judge ruled that the infringements committed by the POs under the Competition Act had been established, though he qualified their participation in so-called trilateral meetings as a serious, not a very serious infringement of the Competition Act. As a result the NMa has adjusted the fines previously imposed (Table 20).

**Table 20. Evolution of fines imposed to POs and wholesalers by NMa**

| €                               | Decisions         |                  |                  |
|---------------------------------|-------------------|------------------|------------------|
|                                 | January 2003      | December 2004    | December 2006    |
| PO Vissersbond (NL)             | 909 000           | 797 000          | 629 000          |
| LV-PO's Schleswig-Holstein (DE) | 826 000           | 499 000          | 333 000          |
| PO Weser-Ems (DE)               | 737 000           | 445 000          | 297 000          |
| PO Wieringen (NL)               | 522 000           | 425 000          | 335 000          |
| PO West/PO Delta Zuid (NL)      | 396 000           | 374 000          | 301 000          |
| PO Danske Fiskeres (DK)         | 365 000           | 257 000          | 171 000          |
| PO Elbe-Weser (DE)              | 206 000           | 125 000          | 83 000           |
| PO Texel (NL)                   | 48 000            | 35 000           | 27 000           |
| Heiploeg                        | 5 090 000         | 1 662 000        | 1 662 000        |
| Klaas Puul                      | 2 090 000         | 1 129 000        | 1 129 000        |
| Goldfish                        | 1 236 000         | 428 000          | 428 000          |
| Van Belzen                      | 782 000           | 0                | 0                |
| Kok International               | 222 000           | 0                | 0                |
| Lou Snoek                       | 184 000           | 0                | 0                |
| Mooijer                         | 100 000           | 0                | 0                |
| Matthijs Jansen                 | 68 000            | 0                | 0                |
| <b>Total</b>                    | <b>13 781 000</b> | <b>6 176 000</b> | <b>5 395 000</b> |

Source: NMa

The NMa case has been settled for good only last 22<sup>nd</sup> of March 2011. The highest Dutch court in antitrust cases, CBb (College van Beroep voor het Bedrijfsleven) has upheld the fines but lowered them to a total amount of 4.4 mio€.

After hearing about reports in the media on blockades being put at several shrimp wholesalers and on a shrimp truck getting cornered in September 2010 the NMa wanted to know what was going on but found no evidence of involvement of POs in violations of the prohibition of cartels.

Anyhow these events, as well as those investigated in the past, have persuaded NMa to monitor the Dutch shrimp-fishing industry on a permanent basis.

Dutch stakeholders are now very cautious and take NMa's advice before taking a decision.

## 2.4 Synthesis: the EU market

Belgium is by far the biggest market and consumes more than half of all brown shrimps sold in the EU.

It is followed by the two big fishing countries, the Netherlands and Germany. France is the fourth market and has the particularity to be mainly interested by unpeeled shrimp ("crevettes entières").

A limited consumption also exists in some other countries (Denmark, United Kingdom, ...).

The table below gives an estimate of the EU market drawn up from data communicated by the main wholesalers.

**Table 21. EU market for brown shrimp in 2010**

| Market      | Share | t landed weight equivalent |
|-------------|-------|----------------------------|
| Belgium     | 54%   | 17 800                     |
| Netherlands | 18%   | 5 700                      |
| Germany     | 18%   | 5 600                      |
| France      | 7%    | 2 300                      |
| Others      | 3%    | 1 000                      |
| Total       | 100%  | 34 700                     |

**Source:** AND International from wholesalers' data

The brown shrimp market is mainly composed of fresh products and this is a major distinction with the tropical shrimp, which is usually proposed frozen. If the brown shrimp should end up in the frozen market it would be very difficult to keep the same image and the same retail price level.

## 2.5 Prices and margins in the shrimp sector

Price observations made in various retail chains in the major EU markets in January 2011 show that fresh peeled brown shrimps in small packaging units (100 gr to 250 gr) are sold to the consumer at a price between 21,90 and 39,90 €/kg, depending on country and shop category (Table 22).

Unpeeled shrimps (“crevettes entières”) are sold in France and in Belgium. In the French supermarkets they reach a consumer price of 26-30 €/kg. In Belgium “crevettes grises entières” can be found for 10 €/kg.

**Table 22. Retail prices in January 2011 for fresh cooked peeled brown shrimps in packs**

| Member state       | Product                          | Product                        | Unit   | Price  | Price |
|--------------------|----------------------------------|--------------------------------|--------|--------|-------|
| Retailer           | (local name)                     | (English name)                 |        | €/unit | €/kg  |
| Belgium            | Crevettes grises fraîches        | Fresh brown shrimps            | 100 gr | 3,55   | 35,5  |
| DELHAIZE Direct    | Crevettes grises fraîches        | Fresh brown shrimps            | 250 gr | 8,45   | 33,8  |
|                    | Crevettes grises épluchées       | Fresh brown shrimps            | 250 gr | 6,95   | 27,8  |
|                    | Crevettes grises épluchées       | Fresh brown shrimps            | 500 gr | 10,55  | 21,1  |
|                    | Crevettes grises fraîches Belges | Belgian fresh brown shrimps    | 100 gr | 3,75   | 37,5  |
|                    | Crevettes grises fraîches Belges | Belgian fresh brown shrimps    | 250 gr | 8,75   | 35    |
|                    | Crevettes grises entières*       | Whole brown shrimps (unpeeled) | 250 gr | 2,5    | 10    |
| Germany            | Stührk Nordsee Krabben frisch    | Fresh brown shrimps            | 100 gr | 3,29   | 32,9  |
| REWE Express Drive |                                  |                                |        |        |       |
| Germany            | Büsumer Nordseekrabben           | Fresh brown shrimps            | 100 gr | 3,49   | 34,9  |
| REAL               |                                  |                                |        |        |       |
| Germany            | Nordseekrabben                   | Fresh brown shrimps            | 100 gr | 2,19   | 21,9  |
| LIDL               |                                  |                                |        |        |       |
| Netherlands        | Hollandse garnalen               | Dutch brown shrimps            | 100 gr | 3,99   | 39,9  |
| ALBERT HEIJN       |                                  |                                |        |        |       |
| France             | Crevettes grises cuites*         | Whole brown shrimps (unpeeled) | 150 gr | 4,5    | 30    |
| AUCHAN             |                                  |                                |        |        |       |
| France             | Crevettes grises cuites*         | Whole brown shrimps (unpeeled) | 150 gr | 3,95   | 26,33 |
| CARREFOUR          | FRAIS EMBAL                      |                                |        |        |       |
| *unpeeled          |                                  |                                |        |        |       |
|                    |                                  |                                |        |        |       |

**Source:** gathered by AND International

Table 23 shows the route followed by the brown shrimp from the landing point to the retail shop. The second column concerns the first sale prices observed at the end of January 2011 when a price around 2,00 €/kg was reached in the auctions. Auction fees (0,33 €/kg) have been added, the average yield obtained in the Moroccan peeling factories (33%) has been used as well as the average peeling cost (5,20 € per kg of shrimp meat).

In the third column the same calculations have been made under the hypothesis of an auction price of 3,50 €/kg (auction fees not included).

**Table 23. Prices at the various levels of the shrimp sector**

|   | €/kg           | €/kg  |
|---|----------------|-------|
| Paid to the fisherman pro landed kg                   | 2,00           | 3,50  |
| Auction fees (NL)                                     | 0,33           | 0,33  |
| Purchase price whole shrimp by wholesaler             | 2,33           | 3,83  |
| 3 kg needed for 1 kg meat                             | 6,99           | 11,49 |
| Peeling cost (included transport to and from Morocco) | 5,20           | 5,20  |
| Cost peeled shrimp entrance Dutch processing factory  | 12,19          | 16,69 |
| Processor's selling price                             | 17,00 to 25,00 |       |
| Retail price (BE-DE-NL)                               | 21,10 to 39,90 |       |

**Source:** calculations AND International

## 2.6 Description of the Application of the CMO on the Brown Shrimp Market

### Key Findings

- The application of the CMO has had very little impact on the brown shrimp market.
- The price regime (guide price, withdrawal price) did not prevent prices from decreasing sharply at the end of 2010-beginning of 2011.
- The withdrawal tool has been very little used by POs involved in brown shrimp fishing, and almost exclusively by the Danish PO. In 2009 withdrawals have represented 0,66% of landings at EU level but accounted for 7% of overall Danish landings.
- The regulations opening and providing for the management of an autonomous Community tariff quota for the cold water prawn (20 000 t/year at 0%) do not have any impact on the brown shrimp sector since market segments for *pandalus* and *crangon* shrimps are quite independent.
- The organisation rate of brown shrimp fishermen is quite high (88% at EU level) but dissents between POs (in Germany as well as in the Netherlands) and the fear of NMa considerably limit POs' action.
- The transnational PO created in 2005 with the aim of limiting landings and regulating fishing groups together half of the total fleet operating in the three MS under review.
- A specific interbranch organisation does not appear necessary to the Dutch whose Productschap Vis already plays this role.

## 2.6.1 Prices and intervention

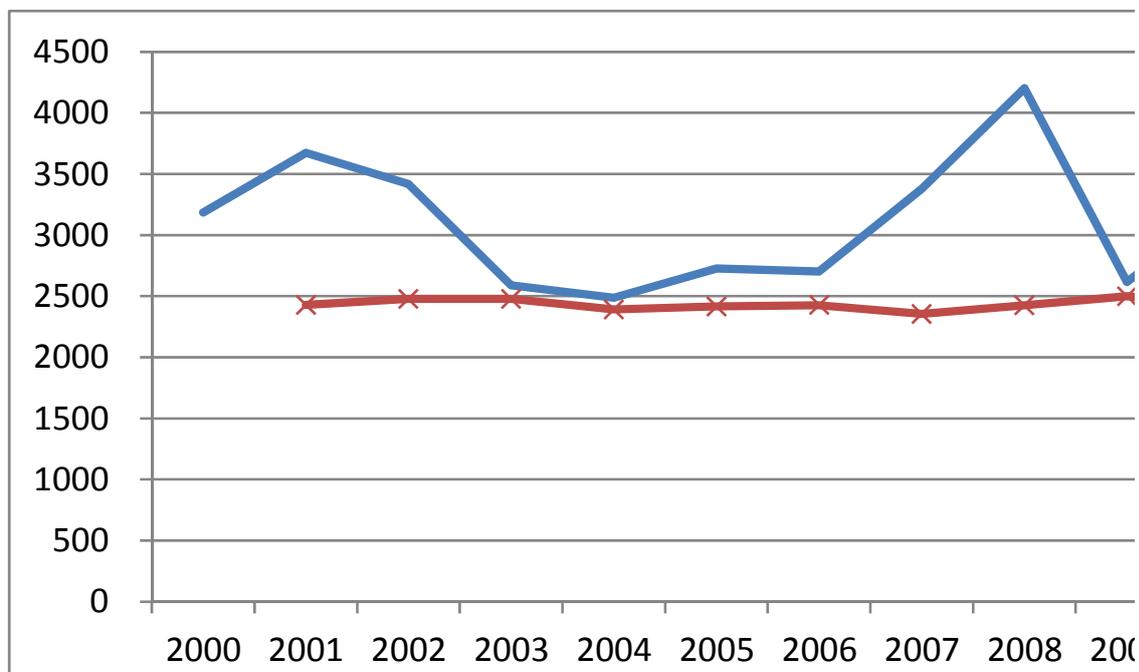
### Guide price

In accordance with regulation (EC) n°104/2000 a guide price before the beginning of the fishing year. This price is valid for the whole EU.

The guide price is based on:

- the average of prices recorded for a significant proportion of the EU output on wholesale markets or in ports during the three fishing years immediately preceding the year for which the price is fixed,
- taking into account trends in production and demand.
- In fixing the price, account has also to take account of the need:
  - to stabilise market prices and avoid the formation of surpluses in the EU,
  - to help support producers' incomes,
  - to consider consumers' interests.

**Figure 2.3: Evolution of the first sale price of the brown shrimp (€/t) – from 2000 to June 2010**



Source: EC – DG MARE

The guide price remained nearly the same during the whole decade 2000-2010. During almost the whole period the first sale price remained above the guide price but in the last months of 2010 the guide price did not prevent first sale prices from falling sharply. In the last week of January the auction price was around 1,90-2,00 €/kg.

### Withdrawals

Since the brown shrimp is listed in the Annex I of the CMO regulation, Member States can grant financial compensation to POs carrying out withdrawals. The EU fixes a community withdrawal price which shall in no case exceed 90% of the guide price and which is applied throughout the fishing year. Financial compensation can be granted only where products withdrawn are disposed of for purposes other than human consumption or in such a way as not to interfere with normal marketing of other products. Every year a regulation of the

European Commission fixes the withdrawal and selling prices. Withdrawal prices have posted very limited modifications in the last years.

**Table 24. Withdrawals and selling prices for *crangon crangon* shrimps (€/kg)**

| Fishing year | Regulation         | Size            |                 |
|--------------|--------------------|-----------------|-----------------|
|              |                    | 1<br>(6,8 mm +) | 2<br>(6,5 mm +) |
| 2005         | Reg (EC) 2258/2004 | 1,425           | 0,652           |
| 2006         | Reg (EC) 2176/2005 | 1,432           | 0,655           |
| 2007         | Reg (EC) 2032/2006 | 1,396           | 0,639           |
| 2008         | Reg (EC) 1570/2007 | 1,431           | 0,655           |
| 2009         | Reg (EC) 1309/2008 | 1,474           | 0,674           |
| 2010         | Reg (EC) 1277/2009 | 1,43            | 0,654           |
| 2011         | Reg (EC) 122/2011  | 1,43            | 0,654           |

**Source:** Commission Regulations

The withdrawal tool has been very little used by POs involved in brown shrimp fishing. In 2009 withdrawals have represented only 0,66% of total landings (Table 25).

**Table 25. Withdrawals of brown shrimps 2001-2010**

|                 | tonnes |
|-----------------|--------|
| 2001            | 2      |
| 2002            | 19     |
| 2003            | 251    |
| 2004            | 98     |
| 2005            | 11     |
| 2006            | 4      |
| 2007            | 1      |
| 2008            | 59     |
| 2009            | 219    |
| 2010 (6 months) | 56     |

**Source:** DG Mare

In the years 2006-2010 Denmark has been the only Member State to resort to withdrawals. In 2009, the year when the biggest withdrawals occurred, they accounted for 7% of the overall Danish landings (Table 26).

**Table 26. Structure of brown shrimp withdrawals by Member State**

|                 | MS             | Total withdrawn (t) |
|-----------------|----------------|---------------------|
| 2005            | DK 55%, NL 45% | 11                  |
| 2006            | DK 75%         | 4                   |
| 2007            | no withdrawals | 1                   |
| 2008            | DK 100%        | 59                  |
| 2009            | DK 100%        | 219                 |
| 2010 (6 months) | DK 100%        | 56                  |

**Source:** DG Mare

## 2.6.2 Autonomous Suspension of Tariff Duties

In order to guarantee appropriate supply conditions for the Community industry the European Commission has adopted regulations opening and providing for the management of “autonomous Community tariff quotas” for certain fishery products. Each regulation applies for a period of three years.

One shrimp species is covered by this suspension: the cold water prawn (*Pandalus borealis*). For the period 2010-2012 a quota of 20 000 tonnes can be imported with a quota duty of 0% (instead of 12%).

**Table 27. Autonomous Community tariff quotas for shrimps 2001-2012**

| Description of the product   | Council Regulation (EC) | Quota period | Annual amount of quota (tons) | Quota duty |
|--|-------------------------|--------------|-------------------------------|------------|
| Shrimps and prawns of the species <i>Pandalus borealis</i> , cooked and peeled, for processing | n° 2803/2000            | 2001-2003    | 5 000                         | 6%         |
|  | n° 379/2004             | 2004-2006    | 7 000                         | 6%         |
|  | n° 824/2007             | 2007-2009    | 20 000                        | 6%         |
|  | n° 1062/2009            | 2010-2012    | 20 000                        | 0%         |

Source: compiled by AND International

It is considered by all stakeholders interviewed that these tariff quotas do not have any impact on the brown shrimp sector since market segments for *pandalus* and *crangon* shrimps are quite independent.

It has to be noted that the brown shrimp has a higher protection than the other shrimp species.

**Table 28. Conventional rate of duty for shrimps**

| Product                       | Crangon crangon | Other shrimp species |
|-------------------------------|-----------------|----------------------|
| Fresh shrimps                 | 18%             | 12%                  |
| Frozen shrimps                | 18%             | 12%                  |
| Prepared or preserved shrimps | 20%             | 20%                  |

Source: European Commission

## 2.6.3 Producer Organisations

The organisation rate of brown shrimp fishermen is quite high, from 80% in Germany to 100% in Denmark, in average 88%.

While the situation remained the same in Denmark some changes appeared recently in the Netherlands and especially in Germany, as described above.

Besides national POs existing in the three countries, a transnational PO, the “European Transnational Brown Shrimp Producer Organisation”, has been founded in 2005 as a reaction to the action undertaken by the Dutch Competition authority against Pos and wholesalers. In February 2011 the TPO has 5 members, 1 Dutch and 4 German:

- NVB, Emmeloord (Netherlands),
- Erzeugergemeinschaft der Küstenfischer im Weser-Ems-Gebiet e.V. (Oldenburg),

- Erste Erzeugergemeinschaft für Krabbenfischer in Büsum e.V. (Büsum), joined by Fischereigenossenschaft – Holsatia Erzeugerorganisation eG (Husum) on 01.01.2011,
- Erzeugergemeinschaft Küstenfischer Eider, Elbe und Weser w.V., which succeeded Erzeugerorganisation der Küstenfischer Tönning und Umgebung w.V. (Tönning) in June 2010,
- Erzeugerorganisation für Nordseekrabben in Büsum und Umgebung w. V.

**Table 29. Membership of TPO in 2010**

| TPO Member   | Number of members |            |
|--------------|-------------------|------------|
|              | 01.01.2010        | 01.01.2010 |
|              | Members           | Vessels    |
| Vissersbond  | 87                | 87         |
| Weser-Ems    | 81                | 82         |
| 1. EG Büsum  | 25                | 25         |
| Tönning      | 26                | 26         |
| Holsatia     | 15                | 15         |
| EG Büsum     | 8                 | 8          |
| <b>Total</b> | <b>242</b>        | <b>243</b> |

Source: EVKreO

On 1st January 2011 246 vessels are organised in the TPO, they represent about half of the total fleet operating in the three MS.

The TPO aims at limiting landings and regulating fishing. The members limit their landings according to TPO's advice. It is difficult to say how successful that is and to which extent recommendations are followed. At least German landings are not increasing, and the sievings seem to be done at 6,8 mm.

#### 2.6.4 Extension of Rules

TPO intended to combine the interests of Dutch and German shrimp fishermen not having the needed number of members and landings to commit the requirements of Commission Regulation (EC) n°1812/2001 concerning the extension of rules. This regulation specifies that the production and marketing activities of a producers' organisation in the catch sector shall be considered to be sufficiently representative in the area within which it is proposed to extend the rules if:

- (a) marketing by the producers' organisation or by its members of the species to which the rules would apply accounts for more than 65 % overall of the quantities marketed, and
- (b) the number of fishermen aboard vessels operated by members of the producers' organisation is more than 50 % of the total number of fishermen established in the area to whom the rules which may be extended would apply.

The production and marketing rules shall include the following elements:

- (a) the quality, size or weight and presentation of products offered for sale;
- (b) sampling, receptacles used for sales purposes, packaging and labelling and the use of ice;

- (c) the conditions of the first placing of the market, which may include rules on the rational disposal of production in order to stabilize the market.

The Dutch government is not favourable to the extension of rules, because if they accept it for shrimp they will be then obliged to accept it also for tomato, cucumber, etc.

This position has an impact on prices and partly explains the price crisis. If a fisherman catches shrimp under 6,5 mm, the destiny of the small shrimp varies according to whether you are member of a PO (the shrimp shall be destroyed) or not (you can sell it at any price).

### **2.6.5 Marketing standards**

The Council Regulation n°104/1996 laying down common marketing standards for certain fishery products has set two size categories (based on the width of shell) for the brown shrimp *crangon crangon*:

- size 1: 6,8 mm and over,
- size 2: 6,5 mm and over.

### **2.6.6 Possibilities for the Creation of an Interbranch Organisation**

The Dutch consider that there is no need for an interbranch organisation since the Productschap Vis (Dutch Fish Product Board) already plays this role.

The Productschap Vis is indeed the public umbrella for the entire branch, including fish processing industry and trade. Fishermen, fish and shellfish farmers, wholesalers, processors, importers/exporters and retailers are members of the Productschap.

The Productschap also shelters the Shrimp Advisory Committee ("Garnalenadviescommissie"), whose members are fishermen's associations, VEBEGA (the shrimp wholesalers' association), the fish retailers' association and representatives of auctions.

## **2.7 Image and Future of the Brown shrimp**

### **Key Findings**

- The image of brown shrimp in the eyes of the consumer is positive.
- NGOs usually considered that the brown shrimp stock is in good state but condemn the high level of by-catch and the damages done to the sea bottom by beam trawls.

### **2.7.1 *Image of the Brown shrimp***

On its major markets (Belgium, Netherlands, Germany, France) the brown shrimp has a good image. Consumers are faithful to the brown shrimp and very few of them switch to the pink shrimp when the brown shrimp is expensive.

Consumers are generally not aware of the elements likely to affect the shrimp quality: the long “peeling trip” to Morocco, the mixing of fresh and frozen shrimps, the time passed between the catch and the purchase of a pack in the supermarket.

### **2.7.2 *Position of NGOs on brown shrimp fisheries***

The table of the following page collects the assessments of various NGOs active around the North Sea (Greenpeace Germany, North Sea Foundation, Seafood Choices Alliance) on the state of the brown shrimp stock and on the impact of fishing on the environment.

Globally the stock is deemed in good state and the species considered as not threatened. The bad points, stressed by all three organisations, are the high level of bycatch and the environmental damage caused by beam trawls.

The biggest Dutch retailer ALBERT HEIJN uses a four-level scale:

- four (blue): best choice (“beste keuze”), awarded to MSC products,
- three (green): first choice (“prima keuze”),
- second choice (orange): (“tweede keuze”),
- preferably not (“liever niet”).

The score of the brown shrimp is first choice (green). ALBERT HEIJN states that it encourages fishermen to use more sustainable fishing methods in order to reduce the bycatch of young plaice and sole and that it is working with its suppliers on a MSC certification of the brown shrimp fishery.

| NGO   | Stock/management  | Fishing practices<br>Environmental impact   | Assessment   | Overall assessment |
|---|---|---|--|--------------------|
| GREENPEACE<br>Germany                           | Stock in good state. But there is some danger of a latent overfishing, since Dutch winter fishing strongly decimates eggbearing females. There are no catch limitations.  | German fishermen use light beams with nets sliding on shoes.<br>Dutch fishermen use in part heavy gear, which can damage the sea bottom.<br>Catch also in the Wadden Sea National Parks.<br>Important bycatch of young flatfish and cod.  | Stock : green<br>Environmental impact : red  | Critical           |
| Stichting De Noordzee<br>(North Sea Foundation) | Brown shrimp is not threatened and relatively insensitive to fishing pressure.<br><br>Almost no management of the stock.<br>No catch quotas but trilateral agreements between NL, DE and DK.<br>The biggest management problem is the lack of reliable data on bycatches, bottom touching and discards.<br><br>First steps towards management are being taken the framework of the MSC certification process in progress and of the Nature Protection Act.        | High bycatch level (young flatfish, crabs, other invertebrates).<br><br>Impact of beam trawls on the sea bottom.  | Stock : green<br>Environmental impact : orange<br>Management : orange/red                                      | Orange             |
| Seafood Choices Alliance                        | Stocks not in danger.<br><br>No international or national assessment of shrimp stocks, only ad hoc investigations to evaluate interaction between shrimp fisheries and environment.<br><br>Natural predation of shrimp is responsible for as much mortality as fishing. Shrimp populations have high recoverability and low vulnerability to fisheries exploitation due to rapid maturation.<br><br>Currently undergoing MSC assessment as a sustainable fishery. | Beam trawling is a fishing method associated with damage to the seabed and discarding of immature fish.<br><br>Veil nets and separators are sometimes fitted to beam trawls (often on a voluntary basis) to exclude juvenile fish, such as plaice and sole from the shrimp catch. | Purchase can be recommended.<br><br>But increasing level of concern regarding environmental impact of fishing. |                    |

Source : compiled by AND International from NGOs' guides

It has to be noted that the peeling trip to Morocco, which is not relevant in MSC criteria, is not either an issue for NGOs, which consider that the amount of energy spent is low compared to the energy consumed for fishing.

## **2.8 Status and Perspectives for a MSC Certification**

The MSC certification is an on-going process for all three fleets in Denmark, Germany and the Netherlands. Though it was initially a common approach all three fleets have decided to apply for their own MSC label. Management plans for all three fleets have been developed but are not yet finalized. Some changes are still likely to occur. As an example the Dutch MSC management plan has been detailed in § 1.5.3.

All these plans propose efforts to improve fishing techniques and fishing operations; they include plans to reduce fishing effort in order to reduce by-catch and discards and to keep the stocks of the target species in a healthy state.

Details vary though and might lead to some problems and some disagreements between the three MS. For instance total fishing effort is not the same in the different management plans and differs a lot for the total number of hours at sea for the respective vessels. There are also differences in the acceptable shares of small shrimp in landings and in the sizes of sieves to be applied ashore in the sieving stations. One of the obstacles could also be the fact that – if MSC labels are granted to all fleets – members of different MSC rules are fishing under different conditions in the same areas, e.g. off the Danish and North German coasts where all three fleets meet.

All MSC regulations are designed to foster healthy stocks and reduced impact on the environment. But they do not regulate production and do not create conditions which guarantee the absence of overproduction and positive economic results for all fishermen and processing companies.

Market conditions will show whether the intended approach of improved acceptance of sustainably fished brown shrimp by the customers can be successful. In the present situation some fishermen who do not follow fishing effort and landing restrictions proclaimed by the PO as well as some of the buying and processing companies will stay outside the MSC system. The outcome of the competition between the MSC regulated and sustainably fishing parts of the fleets and those “MSC-free” fishermen is presently open. An officially set TAC and quota system could reduce the tension between these groups but would at the same time induce considerable amounts of regulations, which are favoured neither by fishermen nor by buying companies or governmental authorities.

### 3. Findings and Recommendations

In the last months the situation on the brown shrimp market clearly deteriorated. The low price of fish (sole, plaice, cod, flounder, ...) in the auction has urged fishermen to go to shrimp instead of fish, which has led to overproduction of brown shrimp and low prices, all the more so as these fishermen licensed for both shrimp and fish fishing have a bigger catching capacity. Some actions (blockades of processors' plants) have shown in 2010 that fishermen are concerned about the power of processors. CMO tools have not allowed to avoid the worsening of the situation and the price paid to fishermen in the beginning of 2011 makes most shrimp vessels unprofitable.

The organisation rate of brown shrimp fishermen is quite high but dissents between POs (in Germany as well as in the Netherlands) and the fear of NMa, which keeps a permanent eye on the sector, considerably limit POs' action.

At the retail stage brown shrimp in small packaging reaches price levels which make processors' and retailers' business profitable. For the major processors brown shrimp represents about 25 to 30% of the total activity, the rest being made mostly with tropical shrimps, but brown shrimp is for them the product which offers the bigger margin possibilities.

The overproduction has also a negative impact on the quality of the final product: big quantities of brown shrimps are frozen and later on defrosted and mixed with fresh shrimps.

The brown shrimp stock remains in good state, as it is recognized by NGOs which focus their criticism on by-catches and "bottom touching" fishing techniques. The catching level of the last years (around 35 000 t) does not jeopardize the stock.

Main solutions considered by fishermen's organisations to go out of the economic crisis are the MSC certification and the TAC and quota system.

Management plans are being developed in the three MS under review but as all fishermen or at least most of them should be under similar schemes, there will be no differentiation of the product on the market and thus a price increase linked to the label is dubious. But the label should guarantee the access to the market in the long run since major retailers plan to delist fishery products without MSC label in short/medium term. In the Netherlands the renewal of shrimp licenses by the Ministry will be linked to the holding of a MSC certification.

The TAC issue is under debate among fishermen and POs and should be deepened. In particular we recommend that social and economic consequences are studied in detail.

The current economic difficulties of the sector are linked to the level of the price paid to fishermen, which does not allow in the last period to make shrimp fishing activity profitable, and to the size of the fleet, which is deemed too big, especially in the Netherlands, where most fishing areas have to comply with Natura 2000 principles. With a reduction of the fleet by 25% the profitability level for fishermen would be 43 eurocent lower.

There is still room for improvement of quality of the shrimp caught (hygiene on board, optimization of cooking time, use of food grade grease, ...) and the leading processor has started a quality related payment (with a premium of 0,50 €/kg for the best quality). The development of simple codes of conduct for fishermen should be a good way to secure better prices.

On-going MSC certification processes should be completed in the course of 2011 or in the beginning of 2012 and secure the downstream actors of the sector.

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