Economic Data Collection of the Fishing Fleet: What are we aiming for?

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Abstract

Despite the common fleet segmentation in the DCR, it is still quite difficult to compare economic figures among countries. The reason behind this is that some member states are using thresholds based on the activity level of the fleet and some are not. From 2004 onwards, each EU member state is obliged to collect economic information on their fishing fleet, which is defined as all vessels registered in the EU fishing fleet register. This implies that Member States also have to submit data about a large number of vessels that show little or no fishing activity. This paper questions whether the goal of the DCR is served by including these commercially inactive vessels.

This paper investigates the economic importance of the commercially inactive fishing fleet in The Netherlands and shows that for this large group of vessels (55% of the registered fleet) the economic importance is negligible. In addition to this investigation, this paper shows that it is relatively easy to estimate the main economic indicators from readily available data sources. This data should be enough to have a general idea on the economic potential of the non-commercial fishing fleet.

Based on these conclusions, it is proposed that a distinction be drawn between commercially active and inactive vessels based on a minimum income from fishing, as is already done in the agricultural data collection system. Collection of economic data by Member States should primarily focus on commercially active fleet segments; data about the commercially inactive fleet can be estimated. In an additional survey only once every few years to check whether the economic estimators are still correctly calculated.

Keywords: inactive vessels, DCR, sampling methods

1 Introduction

In the ongoing developments in fisheries science in Europe, there is a growing awareness of the importance of economic research and particularly the importance of economic data. An important goal of economic research is to provide economic incentives for the development of fisheries that are sustainable in ecological, economical and social terms. However, within the European fishing fleets, both large-scale economically oriented fishing companies, and non-commercial small-scale fishermen operate. For these two extreme groups and all others in between, incentives to either join the fishing fleet or change fishing behavior might be very different and therefore different economic and social paradigms should apply. In addition, although the non-commercial small-scale fishermen might not have a large impact on the ecological sustainability of many fisheries, or on national economic performance, they are of importance to many local economies. As of 2002 the European Commission has defined the fishing population as all vessels included in the vessel register, which resulted in a doubling of the number of vessels for which data had to be gathered. Since then, several discussions have since been held on the distinction between the so-called fully active and less active fishermen, or commercial and noncommercial fishermen; however, this definitional problem remains unresolved (Anon, 2005a, 2005b, 2006), although in practice countries are allowed to distinguish between active and less active vessels (JRC, 2006).

The requirement of the European commission to include all vessels of the fishing registry in the data regulation poses some serious problems. The fishing registry in most countries is not a reflection of the active sea-fisheries population but rather an inventory of all fishing vessels in that country. Thus a fishing population based on the fleet registry will included vessels that hardly fish but are mainly used for quota storage, transport, etc. The economic importance of these vessels that do not fish on a commercial bases is negligible and the goal of the DCR ‘to provide data to determine possible economic consequences of management measures’ is not served as these vessels will not contribute to the economic welfare of a region/country.

In this paper we will investigate for the Netherlands the economic importance of the non-commercial vessels in the fleet registry. These are the same vessels that in the DCR are called less active and non active (JRC, 2006). In the Netherlands the law prescribes that only licensed fishing vessels may carry commercial fishing gear (trawls, seines, fixed nets and other such gears) (Anon, 1977a). All sea going fishing vessels are obliged to have a fishing license and are to be registered in the National fishing vessel register (Anon, 1977b). In order to get a fishing license, the vessel has to be included in the National fishing vessel register. Thus, the license is suspended whenever the vessel is not included in the vessel register anymore (Anon, 1977b).

Many vessels that are not fishing on a commercial basis have always been included in the Dutch fishing vessel register. In 1994, a bill was passed to deal with this problem and to clear the vessel register from non-commercial fishing vessels. Each vessel owner was obliged to submit a statement on the commercial activities of the vessel together with an audit certificate on the activities of the vessel. In order to stay in the vessel register, these certificates had to be submitted to the ministry annually before the 1st of April. In case of transfer of vessels, the new owner had to submit a statement on the commercial activities and the former owner an audit certificate of the year before. This action resulted in a deregistration of 600 vessels, approx. 35% of the total number of vessels registered at the time.

In the years after this event it became clear that a tailor-made audit certificate could not be made for each vessel, and that the distinction between commercial and non-commercial vessels could also be based on the on catch statistics in the official catch database. Having concluded this, and taking into consideration the financial burden of the annual audit certificate for the sector, the ministry decided to drop the requirement for the audit certificate. Nowadays, a vessel remains in the vessel register for the present year, as long as any landings of the vessel have been registered in the landings database during last year. In case no landings have been registered, the vessel owner has to provide evidence that the vessel has been operated by means of e.g. sale notes of fish.

Although vessels less than 10 meter do not have a European obligation to fill in a logbook, these vessels have to provide evidence for their commercial activities at the end of each year to remain registered. Therefore, the ministry obliged owners of vessels under 10 m to register all their landings, including those under 50 kg in logbooks from 2003 onwards.

Since 1946, LEI has gathered economic data of the Dutch fishing fleet for the Ministry of Agriculture, Nature and Food Quality. The extent to which the data have been gathered (fleet segments involved) has depended on the questions asked by the ministry and the co-operation of the fishermen, which has been good for most of the fleet and decades. In all these years the basic assumption of the data collection programme has been that the population from which the data were gathered and which the LEI figures represented were the vessels that were commercially fishing. However, the question which vessel is 'commercially fishing' and which is not has been a struggle for many years. Many different criteria have been used to define the activity level; vessel type, effort, landings, income, and in many cases the decision on the level of activity of an individual vessel was mainly based on expert knowledge on the fishing operation. As from 2003 onwards a threshold of 50.000 gross annual revenue is used to distinguish between commercial large-scale and non-commercial small-scale fleet.

According to the official fleet registry, the Dutch sea fishing fleet consisted of 725 vessels in 2005. Table 1 shows which part of the fleet belongs to the commercial and the non-commercial part of the fleet according to the LEI-definition.

Table 1: Number of vessels in the total fleet and the non-commercial small-scale fleet per segment

	Commercial fleet	Non-commercial fleet
Beam trawl	296	48
Demersal trawls and seines	25	26
Pelagic trawls and seines	16	16
Passive gears <12 meter	8	208
Drift and fixed nets	5	14
Pots and traps	0	10
Polyvalent gears	2	9
Dredges	3	39
Total	355	370

Most of the vessels fishing with passive gear, pots and traps, polyvalent gears and dredges belong to the non-commercial small-scale fleet. Almost half of all the demersal trawls and seiners and the pelagic trawls and seiners belong to the non-commercial small scale sector. Only a small percentage of the beam trawlers are considered to be part of the non-commercial

small-scale fleet. Note that dredges are not required to register catches and therefore are missing in the logbook database. These vessels were not taken into account in this study.

To get some idea of the economic importance of the non-commercial fleet, LEI has gathered economic data about vessels that are left out of the regular data collection routine, by means of a survey. The survey has been send to all owners of vessels that according to the LEI definition fall into the category non-commercial small-scale. The main results of these survey will be presented in this paper.

No studies have been done on the effects of including or excluding commercially inactive vessels in the economic data collections programs. The purpose of this paper is to facilitate this discussion by:

1. Characterizing the group of so-called non commercial vessels in the Netherlands.
2. Calculating the main economic indicators of the non-commercial vessels and determining the economic importance of this group of vessels.
3. Determining whether data of these vessels can also be collected or calculated from already available data resources.

2 Materials and methods

2.1 Data sources

Economic information on the non-commercial fleet was obtained by sending out a survey to all vessels that according to the LEI definition belong to the noncommercial fleet. The survey was sent in may 2006 and use together data for he years 2004 and 2005. Only results from 2005 are used in this study. The survey was answered by about 34% of the vessels in the non-commercial fleet. The response rate was acceptable in all segments except of the segment 'dredges'. Some of the results of the survey will be shown in section 3. More extensive results of this survey can be found in Bartelings and van Oostenbrugge (2006).
Information on effort and landings was retained from the official landings database (VIRIS). In The Netherlands, every seagoing fishing vessel has to fill in a logbook to prove that they are operating on a commercial basis. For these vessels, even landings under 50 kg have to be reported, in contrast with the EU logbook regulation that requires only landings over 50 kg per species and trip to be recorded. In order to be able to calculate revenues, average monthly auction prices were used provided by the Dutch Fish Product Board. The official vessels register was used to get technical details of the vessels, and to valuate the material assets.

2.2 Methods used

2.2.1 Fleet segments and stratification

Data analyses were carried out for all vessels that were in the official vessels register on 31st December 2005. Vessels were classified according to their fishing activities in 2005 as recorded in the logbook database, following the DCR classification. In case vessels used more than one gear and none of the gears was used in more than 50% of the fishing days, vessels were classified as using polyvalent gears. Total landings value was estimated, from logbook landings and monthly average prices.

Table 2: Classification of vessels according to EU classification (EU regulation 1639/2001) based on gear used, official gear, MAGP segment and EU fishing license.

Main gear used/ registered gear	MAGP segment	EU-license	Classification
Beam trawl , shrimp trawl	n.a.	1	Beam trawl
Bottom otter trawl, bottom pair trawl, Danish seine, Scottish seine	n.a.	1	Demersal trawls and seiners
Pelagic otter trawl, pelagic pair trawl, purse seine	n.a.	1	Pelagic trawls and seiners
Longlines, set lines, drifting lines, Hand-lines and pole-lines (hand operated	n.a.	1	Gears using hooks
Gillnets (not specified), Encircling gillnets, drift nets, fixed gillnets (on stakes), set gillnets (anchored)	n.a.	1	Drift nets and fixed nets
Pots	n.a.	1	Pots and traps
No main gear	n.a.	1	Polyvalent gears
n.a.	4J7	1	Aquaculture
n.a.	4J7	0	Inland fisheries

To enhance the precision of the estimates a distinction was made between inactive vessels and vessels that displayed at least some fishing activity. However, stratification based on activity level revealed some inconsistencies between the survey results and the results as found in the official logbook dataset. Table 3 shows a comparison between activity in logbook database and in the survey. Noticeable is that 31 respondents called themselves active in 2005 but no landings were registered in the official logbook database. Thus estimates of activity based on the official logbook data may underestimate the activity level.

Table 3: Comparison between the active number of vessels in survey and in the official logbook data (VIRIS)

Survey	**VIRIS**	**Number of vessels**
Not active	Active	7
Active	Not active	31
Active	Active	65
Not active	Not active	6
Total		**109**

Table **4** shows the underestimation of the active vessels per segment. For example, according to the official logbook database, about 40% of the vessels in the segment Beam trawl 0-12 meter are active. According to the survey results however, about 60% of the vessels in this segment should be considered active. The underestimation of the activity level is especially high in the segments ‘Beam trawl 0-12 meter’ and ‘Pots and traps 12-24 meter’. However the number of vessels in these fleet segments is quite low.
Based on the activity levels as presented in table 4, the number of active vessels in each segment have been recalculated. These numbers differ slightly from the number of active

vessels as calculated by the official logbook database. The corrected number of active vessels have been used in the calculation of the results presented in this section.

Table 4: Comparison between activity level according to the survey and to the official logbook data (VIRIS) per fleet segment

Segment	Length	Active according to survey (%)	Active according to logbook database (%)
Beam trawl	0-12 meter	57.1	38.1
	12-24 meter	68.2	63.6
Demersal trawls and seiners	0-12 meter	84.2	63.2
Pelagic trawls and seiners	12-24 meter	93.8	87.5
Passive gear (<12 m)	0-12 meter	80.1	72.8
Drift and fixed nets	12-24 meter	64.3	50.0
Pots and traps	12-24 meter	40.0	20.0
Polyvalent gears	12-24 meter	100.0	100.0
Total	**All**	**68.9**	**60.5**

2.2.2 Estimation of key indicators

Of all characteristics described in the next sections, average values were calculated for each group (survey results and estimated results) and where possible differences between survey results and estimated results were tested using simple t-tests. Besides, total effort, revenue, invested capital and employment were calculated to show the importance of commercial and no-commercial vessels for the Dutch fishing fleet.

Total effort

The length of each trip is reported in the official logbook database in 24-hour days. Thus the total effort of the non-commercial fleet could be easily estimated by aggregating the total number of seadays used by each vessel.

Total revenue

Total gross annual revenue was estimated based on landings per species as reported in the official logbook database. These landing were multiplied by average monthly auction prices per species to obtain the gross annual revenue.

Table 5: Methods and constants used to valuate the invested capital

Constant	Value
Value of hull < 20 gt (Euro)	10,000 * gt + 16,000
Value of hull 20 – 70 gt (Euro)	12,118 * gt + 31,887
Value of hull > 70 gt (Euro)	3,006 * gt + 538,090
Value of engine room (Euro)	1,133 * kw
Depreciation hull (small vessels)	3.2% degression, 27 yr
Depreciation hull (large vessels)	3,0% degression,20 yr
Depreciation engine (small vessels)	4,9% degression, 15 yr
Depreciation engine (large vessels)	9.3% degression, 10 yr

Invested capital

The total invested capital was estimated, based on the value of the vessel. The total value of the hull and the engine (room) was used as a proxy for the value of the vessel. Replacement

values were estimated normatively (**Table 5**). The norms used to calculate the value of the hull and engine, were based on regression analyses of actual prices and technical characteristics of vessels for all categories except for hulls < 20 GT (Davidse et al., 1993). For this last group, norms were based on expert knowledge of fisheries technologists. Both hulls and engines were depreciated digressively to estimate their actual value using the age as recorded in the official vessel register.

Employment
Total employment in the fishing fleet was expressed both as the number of people involved in the fishery and the number of man days made on board of the vessels. Since no accurate information on the number of fishermen per vessel was available for the non-commercial fleet in the official logbook database or the vessel registry, this number was estimated, based on the minimum number of crewmembers required by the safety regulations for seagoing vessels (Anon, 2001) (see Table 6).

Table 6: Minimum number of crew members, required by the safety regulations for different categories of seagoing vessels (Anon, 2001).

Length over all (m)	Engine power (kw)	Crew members
<24	<750	3*
24-45	<1125	5
24-45	1125-3000	6
24-45	3000-6000	7
45-60	1500-3000	8
45-60	3000-6000	9
60>	<3000	9
60>	>3000	10

* vessels that fish for less then 18 hours per trip and in area 1a may ask for an exemption of this minimum number of crew members, and are then allowed to fish with 2 crewmembers on board

3 Results

3.1 The non-commercial fleet: some characteristics

3.1.1 Technical characteristics

The vessels in the non-commercial fleet are mostly older, smaller, lighter and have a smaller engine. This holds for almost all segments of the fleet as Table 7 shows. The vessels fishing with passive gears are relatively young compared to the rest of the non-commercial fleet. These segment also contains the smallest vessels with the smallest engine. The other segments in the non-commercial fleet are quite comparable to each other based on the technical charateristics.

Table 7: Average technical characteristics of a vessel by fleet segment

	Age		KW		Length		Tonnage	
	C	NC	C	NC	C	NC	C	NC
Beam trawl	27	36	702	146	29	14	203	36
Demersal trawls and seines	20	32	343	94	26	11	143	23
Pelagic trawls and seines	13	35	5,295	81	101	12	4,952	13
Passive gears <12 meter	17	16	121	41	9	6	6	2
Drift and fixed nets	27	39	225	135	20	17	54	29

Pots and traps		34	0	123	0	17	0	29
Polyvalent gears	32	42	343	148	23	20	132	51

Note: C stands for commercial fleet, NC stands for non-commercial fleet

3.1.2 Activity level

The non-commercial fleet can be divided into two parts: a part that goes to sea quite often and a part that hardly goes to sea at all. **Figure 1** shows that about 40% of the respondents who were active in 2005 have been to sea more than 51 times. However another 40% of the vessels went to sea less then 20 times per year. The length of a sea trip was relatively short, Most of the respondents (about 70%) answered that the trips they made were short (0-4 or 4-8 hours).

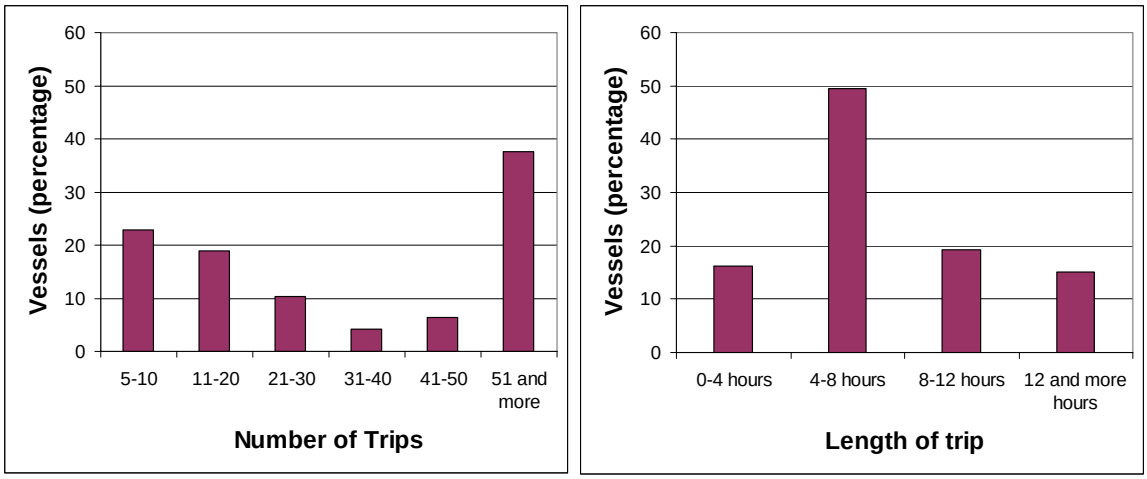

Figure 1: Number of trips and length of a trip in the non commercial fleet

Based on the number of trips of a vessel and the average length, the number of seadays per vessel can be calculated. In al segments the average number of seadays used by the non-commercial fleet is quite low (Table 8). On average a vessel in the non-commercial fleet goes to sea 11 days per year.

Table 8: Average number of sea-days per vessel for the various fleet segments.

Segment	Length	Number of sea-days
Beam trawl	0-12 meter	2
	12-24 meter	9
Demersal trawls and seiners	0-12 meter	5
Pelagic trawls and seiners	12-24 meter	14
Passive gear	0-12 meter	12
Drift and fixed nets	12-24 meter	19
Pots and traps	12-24 meter	14
Polyvalent gears	12-24 meter	34
Total	**All**	**11**

3.1.3 Gross annual revenue

The average gross annual revenue was equal to €20.000 and ranged from less than €5.000 to more than €100.000 (

Table **9**). The lowest average annual revenue is found in the segments 'beam trawl 0-12 meter' and 'demersal trawls and seiners 0-12 meter'. The standard deviation for the average gross annual income is large, which means that there are large differences between the vessels within a segment.

Table 9: Average total gross annual revenue (in 1000 Euro) per vessel for the various fleet segments

Segment	Length	N	Revenue	Std. Dev.
Beam trawl	0-12 meter	3	2.5	0.0
	12-24 meter	4	17.5	1.7
Demersal trawls and seiners	0-12 meter	6	5.8	6.1
Pelagic trawls and seiners	12-24 meter	7	36.1	47.1
Passive gear	0-12 meter	57	18.3	20.6
Drift and fixed nets	12-24 meter	4	35.6	27.2
Pots and traps	12-24 meter	2	53.8	30.1
Polyvalent gears	12-24 meter	2	100.0	35.4

The total gross annual revenue of the non-commercial fleet is quite low. Most of the respondents are also not dependent on the income of obtained with the vessel. About 55% of the respondents indicated that fishing with this vessel was not their main source of income. Figure 2 shows the income distribution of the respondents. Of the respondents that indicated that fishing with this vessel was just a side job, more then 60% earned less than €5.000 per year. Of the respondents that indicated that fishing with this vessel was their main occupation, still 20% earned less than €5.000 per year.

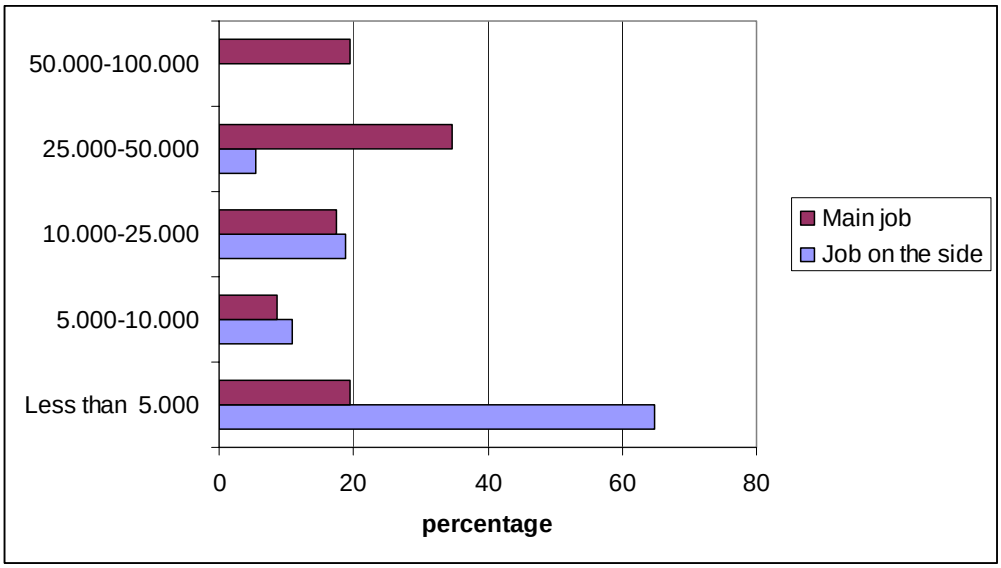

Figure 2: Distribution of the Gross annual revenue in the non-commercial fishing fleet

3.1.4 Total economic cost and employment

Finally, Table 10 shows the total costs in the non-commercial fleet. About 60% of the total costs are contributed to crew costs. The crew costs are relatively low in the segment 'demersal trawls and seiner' and very high in the segment 'polyvalent gears'. In the segment 'beam

trawl 0-12 meter' none of the respondents answered to question about crew costs, making it impossible to estimate the total crew cost in the segment.

The other operational costs are good for 20% of the total costs. The fuel costs are relatively low for the non-commercial fleet, only 8%. This holds especially for the segment 'polyvalent gears', in this segment the share of the fuel costs is only 4%.

Table 10: Total costs in the various fleet segments of the non-commercial fleet (in 1000 Euro)

Segment	Length	N	Fuel	Repair	Crew	Other	Total
Beam trawl	0-12 meter	12	2.5	8.6		13.5	24.6
	12-24 meter	15	32.6	32.5	226.0	43.1	334.2
Demersal trawls and seiners	0-12 meter	16	42.1	40.8	16.0	22.8	121.7
Pelagic trawls and seiners	12-24 meter	15	30.9	130.5	600.0	167.6	929
Passive gear	0-12 meter	165	203.4	227.8	756.2	551.1	1,738.5
Drift and fixed nets	12-24 meter	9	22.7	74.4	140.6	48.0	285.7
Pots and traps	12-24 meter	4	11.2	8.0	80.0	24.0	123.2
Polyvalent gears	12-24 meter	9	56.3	148.5	1,080.0	216.0	1,500.8
Total	**All**	**245**	**408.5**	**749.2**	**3,049.3**	**1,086.2**	**5,293.2**

The number of people working in the non-commercial part of the fleet is quite high; 434 persons in 2005 (Table 11). However, since the number of FTE's are calculated based on the average number of sea-days and the average number of crew on a vessel, the employment in the non-commercial fleet is much lower, only 68.1 FTE in 2005.

Table 11: Total employment in the various fleet segments of the non-commercial fleet

Segment	Length	Number of persons	FTE
Beam trawl	0-12 meter	16	0.5
	12-24 meter	26	2.7
Demersal trawls and seiners	0-12 meter	30	1.3
Pelagic trawls and seiners	12-24 meter	21	4.1
Passive gear	0-12 meter	290	47.9
Drift and fixed nets	12-24 meter	18	3.3
Pots and traps	12-24 meter	6	1.0
Polyvalent gears	0-24meter	27	7.5
Total	**All**	**434**	**68.1**

3.2 Estimation of economic indicators

The previous section showed some results of the survey and the economic costs and revenues involved in the non-commercial fleet. In this section, we will show how key economic indicators can be estimated using ready available data sources and we will compare the estimation with the survey results.

3.2.1 Number of active vessels in the non-commercial fleet

As shown in section 2, the official logbook database shows a lower activity level of the non-commercial small-scale fleet. According to the results of the survey, the number of active vessels in each segment can be calculated as was done in section 2.

Table 12 shows the number of active vessels for each segment according to the survey and the official logbook database. The logbook database underestimates the total number of active vessels in the non-commercial fleet by 12%.

Table 12: Number of active vessels in the non-commercial small-scale fleet according to the logbook database and the survey

Segment	length	Total	Active (survey)	Active (logbooks)
Beam trawl	0-12 meter	21	12	8
	12-24 meter	22	15	14
Demersal trawls and seiners	0-12 meter	19	16	12
Pelagic trawls and seiners	12-24 meter	16	15	14
Passive gear	0-12 meter	206	165	150
Drift and fixed nets	12-24 meter	14	9	7
Pots and traps	12-24 meter	10	4	*2*
Polyvalent gears	0-24meter	9	9	9
Total	**All**	**317**	**245**	**216**

3.2.2 Seadays

The average number of sea-days (calculated as length of a trip multiplied by the number of trips) is quite comparable between the survey and the logbook database as **Table 13** shows. According to the logbook database the vessels that returned the survey fish more on average than vessels that did not return the survey.

The standard deviation of the average sea-days, however, is quite high indicating that there is a large variation in the number of sea-days between different vessels or segments, which makes it hard to show differences statistically.

Table 13: Average number of sea-days from the survey and from logbook database

Data source	Mean	Std. Dev.	N
Survey	11.5	11.6	90
Logbook database (total)	13.2	28.3	229
Logbook database *(only vessels in survey)*	14.1	21.3	65
Logbook database *(only vessels not in survey)*	10.5	27.5	151

The mismatch in sea days between survey and logbook data vary among fleet segments (Table 14); in case of beam trawlers from 12-24 meter the effort in the logbooks is twice the effort from the survey whereas in case of polyvalent gears the effort from the survey is much larger than the effort in the logbooks. Although these differences seem large, the standard deviation of the mean is also quite large. The differences between the survey and the logbook database are therefore not statistically significant (t-test).

Table 14: Average number of sea-days per segment (survey and logbook database)

Segment	Length	Survey results	Logbook data
Beam trawl	0-12 meter	2.3	1.1
	12-24 meter	8.5	19.6
Demersal trawls and seiners	0-12 meter	4.9	3.5
Pelagic trawls and seiners	12-24 meter	13.6	12.7
Passive gear	0-12 meter	11.5	15.2

Drift and fixed nets	12-24 meter	18.5	22.8
Pots and traps	12-24 meter	13.8	.
Polyvalent gears	12-24 meter	34.4	3.1
Total	**All**	**11.4**	**13.2**

3.2.3 Gross Annual revenue

Table 15 shows the total gross annual revenue of the non-commercial fleet based on the survey results and based on the official logbook data. There are evidently some differences between the two data sources. However as already mentioned the survey results are biased towards the active part of the non-commercial fleet. Therefore it may very well be that the survey results overestimate the gross annual revenue because the survey sample is biased towards vessels that fish relatively often in comparison to the rest of the non-commercial fleet. Overall the annual revenue based on the logbook estimates are 65% lower than the gross annual revenue based on the survey results. The gross annual revenue based on the logbook data is lower in all segments.

Table 15: Total gross annual revenue from the survey results compared with the total value of landings as found in the logbook database (in 1000 Euro)

		Survey		Logbook data	
Segment	**Length**	**N**	**Revenue**	**N**	**Revenue**
Beam trawl	0-12 meter	12	30.0	9	5.4
	12-24 meter	15	262.5	13	224.7
Demersal trawls and seiners	0-12 meter	16	93.3	12	33.6
Pelagic trawls and seiners	12-24 meter	15	541.1	14	209.9
Passive gear	0-12 meter	165	3,025.0	152	1,117.0
Drift and fixed nets	12-24 meter	9	320.6	7	108.2
Pots and traps	12-24 meter	4	215.0	2	0.1
Polyvalent gears	12-24 meter	9	900.0	11	153.7
Total	**All**	**245**	**5,361.2**	**220**	**1,852.6**

3.2.4 Invested capital

The investment value of the non-commercial fleet can be estimated using the method described in section 2. The investment value of the non-commercial fleet is calculated for the entire non-commercial fleet, not just the active part. Table 16 shows a comparison between the calculated investment values and the invest values based on the survey results. For most of the segments, the estimated value is a slight underestimation of the value calculated based on the survey results. The calculated investment values prove a very good approximation of the investment values as found in the survey results.

Table 16: Estimated investment values compared with investment values based on survey results for the non-commercial fleet

		Survey		Calculated values based on characteristics	
Segment	**Length**	**N**	**Invested capital**	**N**	**Invested capital**
Beam trawl	0-12 meter	21	1,197.0	21	480.9
	12-24 meter	22	6,281.0	22	5,414.0
Demersal trawls and seiners	0-12 meter	19	1,314.3	19	605.2
Pelagic trawls and seiners	12-24 meter	16	1,701.3	17	1,258.5

Passive gear	0-12 meter	206	5,760.5	208	4,619.7
Drift and fixed nets	12-24 meter	14	888.8	15	2,554.9
Pots and traps	12-24 meter	10	750.0	9	2,079.5
Polyvalent gears	12-24 meter	9	1,170.0	11	2,873.9
Total	**All**	**317**	**18,307.4**	**322**	**19,886.4**

3.2.5 Employment

The survey showed that an average vessel in the non-commercial fleet fished with 1.8 persons on board. This is lower than the minimum number of crewmembers required by the safety regulations for seagoing vessels (Anon, 2001) which states that vessels smaller than 24 m should fish with at least 3 persons on board (see section 2). There is one exception on this regulation which states that vessels that fish close to the shore and that fish for no longer than 18 hours per trip may get an exemption to fish only with to crewmembers on board. Because most of the vessels in the non-commercial fleet go to sea for relatively short amount of time (less then 18 hours) most of the vessels can be expected to fish only with 2 crew members.

Based on the survey the number of people on board would be 1.7 for vessels smaller than 12 meter and 1.8 for vessels larger than 12 meter. Based on these averages and the number of seadays found in the official logbook database, the number of FTE's in the non-commercial fleet can be calculated. The results are shown in It seems that the legal requirements about the number of persons on board (2 crewmember on trips less then 18 hours and 3 on trips longer then 18 hours) are not a good measure to calculate the employment in the non-commercial fleet. However it is likely that several short trips by the same vessel are aggregated in the official logbook database. It may therefore be safe to assume that all vessels in the non-commercial fleet fish with 2 crewmembers on board, which is close to the survey results that so that vessel fish on average with only 1.8 persons on board. Thus the estimates based on the official logbook data may be a good approximation of the FTE's available to the non-commercial fleet.

Table 17. The estimated FTE's based on the legal requirements are much higher than the FTE's based on the survey results. On average the estimated values based on the survey averages and the survey results are quite similar.

It seems that the legal requirements about the number of persons on board (2 crewmember on trips less then 18 hours and 3 on trips longer then 18 hours) are not a good measure to calculate the employment in the non-commercial fleet. However it is likely that several short trips by the same vessel are aggregated in the official logbook database. It may therefore be safe to assume that all vessels in the non-commercial fleet fish with 2 crewmembers on board, which is close to the survey results that so that vessel fish on average with only 1.8 persons on board. Thus the estimates based on the official logbook data may be a good approximation of the FTE's available to the non-commercial fleet.

Table 17: Total number of FTE's in the various fleet segments from the survey results and as estimated using the legal requirements and the average number of crew members per size class of vessels from the survey.

Segment	Length	Survey	Estimates (legal requirements)	Estimates (survey results)
Beam trawl	0-12 meter	0.5	5.8	3.5

	12-24 meter	2.7	5.6	3.7
Demersal trawls and seiners	0-12 meter	1.3	0.7	0.6
Pelagic trawls and seiners	12-24 meter	4.1	4.8	3.4
Passive gear	0-12 meter	47.9	59.9	41.8
Drift and fixed nets	12-24 meter	3.3	5.1	3.2
Pots and traps	12-24 meter	1.0	0.1	0.1
Polyvalent gears	12-24 meter	7.5	2.1	2.1
Total	**All**	**68.1**	**84.1**	**58.4**

4 Discussion and conclusions

Economic importance
The main conclusion that can be drawn from the results is that the economic importance of the commercially inactive vessels is negligible. Although the inactive vessels represent over 50% percent of the total Dutch fleet, they add 6% or less to the total invested capital, employment and effort and even less than 2 % to the value of landings.

The total gross annual revenue of the non-commercial small-scale fleet is equal to 5.3 million Euros in 2005. In the same year the total gross annual revenue of the commercial large-scale fleet was equal to 382 million euro (Taal et al., 2006) as **Table 18** shows. Therefore the share of the gross annual revenue in the non-commercial small scale fleet is equal to 1.4%.

The total costs in the non-commercial small-scale fleet were equal 5.3 million Euros in 2005. The total costs in the commercial large-scale fleet were equal 391.5 million Euros in that year (Taal et al., 2006). The share of the total costs of the non-commercial small-scale fleet as compared to the total fleet is equal to 1.3%.

The total employment costs were equal to 3.0 million Euros in 2005. This is about 50% of the total costs. The total labour costs in the commercial large-scale fleet were equal to 99.5 million Euros in 2005 (Taal et al., 2006). The share of the labour costs in the total costs was about 30% for the commercial large-scale fleet. The difference in the relative importance of the crew costs is mainly caused by the difference in fuel costs. These costs are deducted from the gross revenue before calculating the crew share. For the large-scale commercial fisheries these fuel costs comprise approximately 30% of the total revenue, whereas for the small-scale fisheries the fuel costs are much smaller (only 8%, table 8)

Table 18: Comparison of economic indicators of the non-commercial fishing fleet with those of the commercial fishing fleet (Taal et al., 2006).

	Commercial fleet	Non-commercial fleet	Share
Gross annual revenue (mln euro)	382.0	5.3	1.4%
Total costs (mln euro)	391.5	5.3	1.3%
Total employment (FTE)	2100.0	45.0	2.1%
Investment value (mln euro)	304.6	19.8	6.1%

Bias survey
Not all of the vessels in the non-commercial fleet are active in the sense that they go out to sea to fish. According to the official logbook database about one third of the non-commercial fleet

does not fish at all. The survey showed that about 85% of the respondents considered themselves active in 2005. This indicates that the survey results are biased towards the active part of the non-commercial fleet. Most of the totally inactive vessels did not bother to return the survey.

Further analysis of the number of seadays spend by the vessels in the survey sample shows a similar pattern. The official logbook database shows that the average vessel that returned the survey spends more days at sea than the average vessel that did not return the survey (see **Table 13**). This also indicates that the more active vessels were more motivated to return the survey. Therefore, it may very well be possible that the survey results overestimate the economic importance of the non-commercial fleet.

Besides that the variance between the different vessels, even within a segment is quite large. Therefore the uncertainty about the calculated economic indicators in most segments is too large, especially when taking into account the confidence limits as set in the DRC (Bartelings and van Oostenbrugge, 2006).

Estimating the economic indicators

Since the official logbook database contains detailed information about the landings of the non-commercial fleet, it is easily possible to estimate the main economic indicators. Section 3 showed that although there are differences between the estimations based on the logbook database and the survey results, most of the estimations, especially the investment value and employment, are a fairly good characterization of the economic importance of the different segments and the so called commercially inactive vessels.

The estimated gross annual revenue of the non-commercial fleet is somewhat lower in the estimations then in the survey results. Although the difference between the two data sources seems quite high, compared to the commercial fleet the difference is minimal. According to the survey the share of the revenue of the non-commercial fleet in the revenue of the total fleet is 1.4%, according to the official logbook database the share is 0.5%.

Policy recommendations

Like said in the beginning of this section, this paper shows that the economic importance of the non-commercial fleet is negligible. Including the non-commercial fleet in the data regulation however will have consequences for the quality of the economic advice. Over the last few years, the results of the Concerted Action have been used by STECF to estimate the effects of TAC measures on the economic performance of the major European fleets (ref AER, 2006, Anon, 2006). In the Concerted Action, national experts have defined the most relevant national fishing fleets and provided data for these on economic performance and fleet size. At least in some member states (Denmark, Finland, The Netherlands), only active vessels have been taken into account in the statistics so far, although there are no written guidelines on this. Taking into account the inactive vessels would therefore bias the outcomes for these fleet segments and introduce bias in the bio-economic models used (Anon, 2006). This would hold especially for models in which average economic indicators per vessel are used in the modelling process. Also in models which use the total economic performance of the fleet the bias would implicitly appear, as the proportion between income, variable and fixed cost would change.

Having said this, the question arises whether goal of the DCR is served by including inactive vessels into the Data Collection Programs. The Dutch example shows that it is important to, at

least, distinguish between active and inactive vessels and treat inactive vessels as a separate group and that sampling economic information from inactive vessels is highly inefficient. The official vessel register is a sound administrative basis for the data collection, but this register is for administrative purposes and in many countries vessel owners have several different arguments to stay in or out of the register as long as possible. Therefore it may not be the most efficient option to base the economic data collection on the vessel register without additional criteria to distinguish commercial from inactive fishermen. These criteria should of course be (1) simple, (2) transparent and (3) consistent and suitable over the EU member states. The experience from the agricultural data might be of good help here as in agriculture there is also a continuum between commercial farmers and non-commercial farmers. In the agricultural data collection system a farm is defined as a commercial farm if it is large enough to provide a main activity for the farmer and a level of income sufficient to support his/her family (Vrolijk, 2002). Implementing such a criterion in the economic data collection program would be reasonably easy and would enhance the efficiency of the programs and the quality of the outcomes considerably.

The question that remains is whether one should collect complete economic information from the non-commercial vessels, if these vessels are not taken into account in bio-economic models. This paper shows that for the Dutch case, the main economic indicators can be derived quite easily from available data sources as long as landings are available for this part of the fleet. This information should be enough to have a general idea on the economic potential of the fleet. If this information is not available additional surveys could be done once every few years.

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