Fisheries & Conservation Science

SCIENCE UPDATE

Economic performance & fleet dynamic of the Welsh fleet: December 2014

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Funded by:

Y Gronfa Pysgodfeydd Ewropeaidd:
Buddsoddi mewn Pysgodfeydd Cynaliadwy
European Fisheries Fund:
Investing in Sustainable Fisheries

Llywodraeth Cymru
Welsh Government

Introduction

To assess impacts of fishing on species and how effective management options are we first need knowledge on the heterogeneity of the fishing practices within a given fleet. Indicators of the economic performance of fishing vessels are a useful tool for improving management strategies and are necessary for the implementation of the ecosystem approach to fisheries management. However, economic indicators alone are not enough to describe the complex fishing system of a given fleet that may exhibit different fishing practices. Biological, social and economic information on the Welsh fishing fleet is needed. Here we describe the economic performance of the main segments of the Welsh fleet and the different fishing tactics (strategies).

Data source and fleet segmentation

Data on technical characteristics (detail of boats and gear), landings and economic performance of 56 fishing vessels were collected from interviews with vessel owners between July and December 2013. The data collected during the interviews referred to fishing activity along the Welsh coast in the year 2012. Fishers were randomly selected from the main base ports of the Welsh coast (Figure 1).

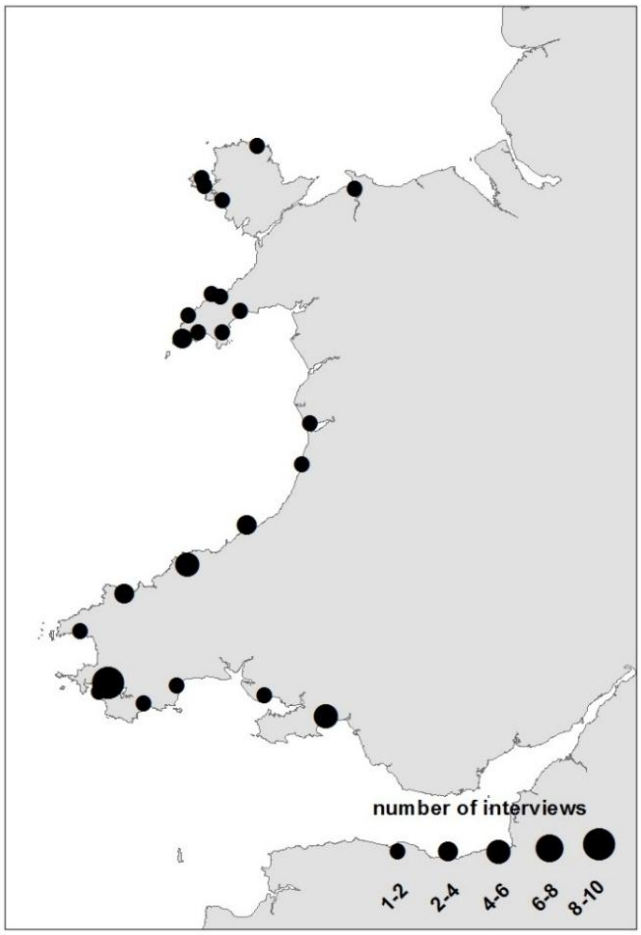

Figure 1. Locations of the fishers interviewed by base port.

The fleet was divided into six main segments according to the fleet segmentation protocol adopted by Seafish. The description of these segments (according to the data collection framework (DCF) of the European Commission) referred to all gears used by the vessels and not only to the main one.
Six fleet segments were identified through the interviews:

1. PMP ≥ 10 m = Vessels ≥ 10 m length combining mobile (scallop dredge) and passive gears (pots)
2. PGO ≥ 10 m = Vessels ≥ 10 m length using passive gears (pots and nets)
3. PGO < 10 m = Vessels < 10 m length using passive gears (pots and nets)
4. PMP < 10 m = Vessels < 10 m length combining mobile (scallop dredge) and passive gears (pots and nets)
5. DTS < 10 m = Vessels < 10 m length using demersal trawl
6. Low activity < 10 m = Vessels < 10 m length fishing part-time with passive gears (pots and nets)

Out of the six segments identified, the first three were the most representative (highest number of boats out of fishers interviewed). These were PMP ≥ 10 m (we refer to this segment as "scallop dredge medium scale (MS)"), PGO ≥ 10 m ("pots and nets medium scale (MS)") and PGO < 10 m ("pots and nets small scale (SS)").

Economic analysis

During the interviews we collected information about the crew (number of fishers and how the income shares were divided among the crew and the boat owner) and fishing effort (total number of fishing days by gear and month). The cost data included the variable costs (fuel, lubricating oil, bait, ice), fixed costs (including dockage, insurance, maintenance costs, annual bank fees in the case of a loan) and investments (type, cost and lifetime of investments made in 2012). The production data included the total monthly catch and monthly catch by species (in kg) and the average landing price by species and month (£/kg). Finally, participants were asked to estimate the current value of their vessel and its equipment, if they were to sell or purchase it in the same condition. This information was essential for estimating the value of the total invested capital (TC).

Table 1. Economic indicators selected for assessing the performance of the Welsh fleet in 2012 and the algorithms used for quantifying them.

	Type	Description	Algorithm
Costs Indicators	Fixed Costs (FC)	Administrative costs (AC), maintenance costs (MC), depreciation (D)	AC+MC+D
	Variable Costs (VC)	Annual cost of fuel (CF), lubricating oil (LO), bait (BC), ice (I) and crates (C)	CF+LO+BC+I+C
	Opportunity Cost (OP)	Benefits that the owner could have obtained by investing their capital (TC) in an alternative risk-free investment (national debt). It is calculated by multiplying the total capital (TC) by the average real interest rate (R)	TC · R

	Average Wage (AW)	Average salary obtained by each employee, calculated by dividing the salary cost (SC) by the number of crew (N)	SC/N
Profit Indicators	Vessel Physical Productivity (VPP)	Average production of each vessel in terms of weight of landings	
	Capacity Physical Productivity (CPP)	Average production in terms of weight of landings for each capacity unit (GT) of the vessel.	
	Vessel productivity (VP)	Average production in terms of market value at first sale for each vessel. It is calculated by multiplying the VPP by the landing prices (LP)	VPP · LP
Profitability Indicators	Total capital (TC)	Current price assigned to the vessel and the vessel's equipment	
	Net Profit (NP)	Difference between VP and all costs (VC, fixed costs (FC), OP and SC)	VP-VC-FC-OP-SC
	Rate of Return on Investment (ROI)	Percent ratio of yearly net profits plus the opportunity cost in relation to the investment.	OP+NP/TC

The economic indicators for the three fleet segments most representative of the studied fleet are presented in Table 2.

Cost, profit and profitability indicators were thus assessed for the three main segments previously identified (see Table 1 for more details).

Table 2. Indicators of costs, profit and profitability per vessel for the three main segments of the Welsh fleet in 2012.

		Scallop dredge MS	Pots and nets MS	Pots and nets SS
Costs Indicators	Variable costs (VC) (£)	64 520	132 334	16 028
	Maintenance Cost (MC) (£)	32 463	6 750	518
	Opportunity Cost (OP) (£)	1 183	402	202
	Average Wage (AW) (£)	36 318	35 304	17 062
Profit Indicators	Vessel Physical Productivity (VPP) (t)	308.5	307.2	28.1
	Capacity Physical Productivity (CPP) (t)	6.3	10.4	7.6
	Vessel Productivity (VP) (£)	299 094	319 681	61 584
Profitability Indicators	Total Capital (TC) (£)	372 500	126 560	63 552
	Net Profit (NP) (£)	54 906	25 473	7 535
	Rate of Return on Investment (ROI) (%)	6.8	21.6	6.5

All the fleet segments identified had a good economic performance for the fishing activity during 2012.

The total capture and the total income of an average vessel per fleet segment were also estimated with reference to the main target species. Some interesting patterns were found in the timings of the main species caught by scallop dredge MS (Figure 2) and pots and nets SS (Figure 3 and Figure 4).

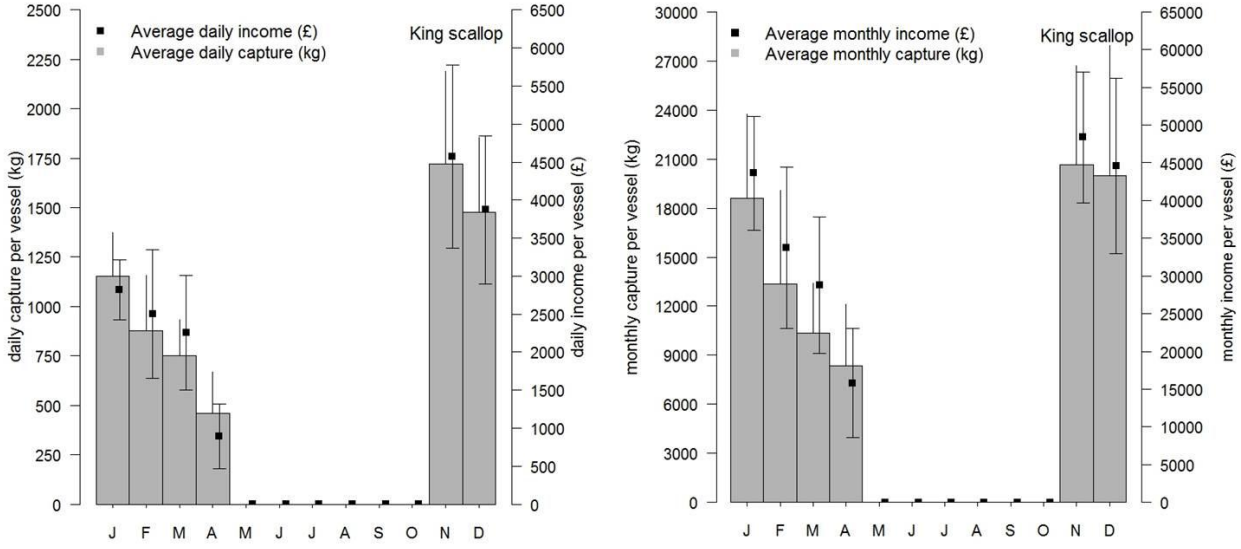

Figure 2. Daily (left graph) and monthly (right graph) capture and income from king scallops for an average vessel from the segment "scallop dredge MS".

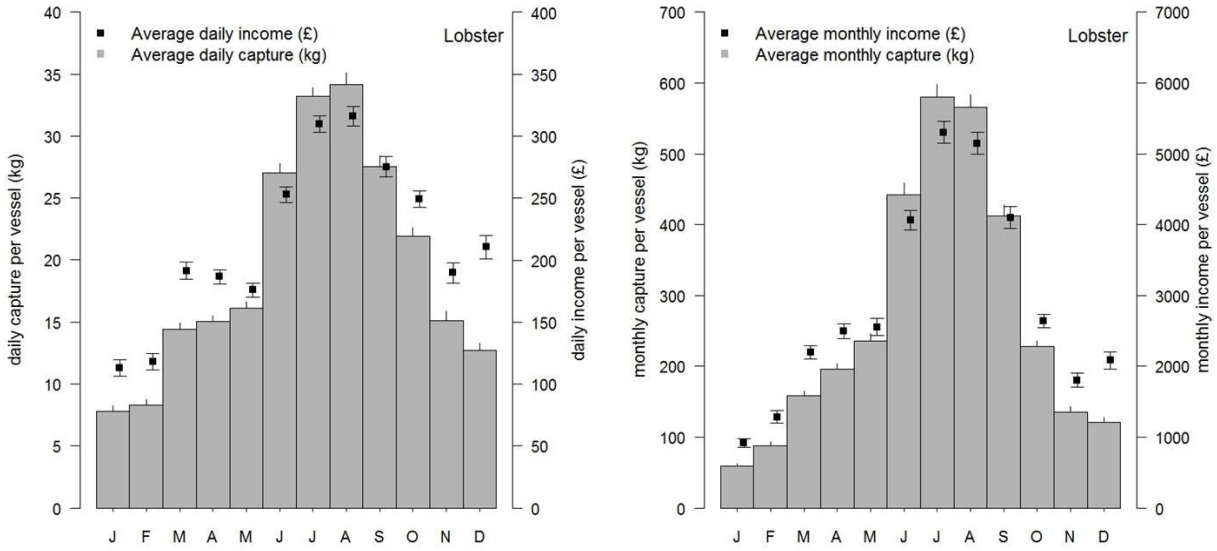

Figure 3. Daily (left graph) and monthly (right graph) capture and income from lobster for an average vessel from the segment "Pots and nets SS".

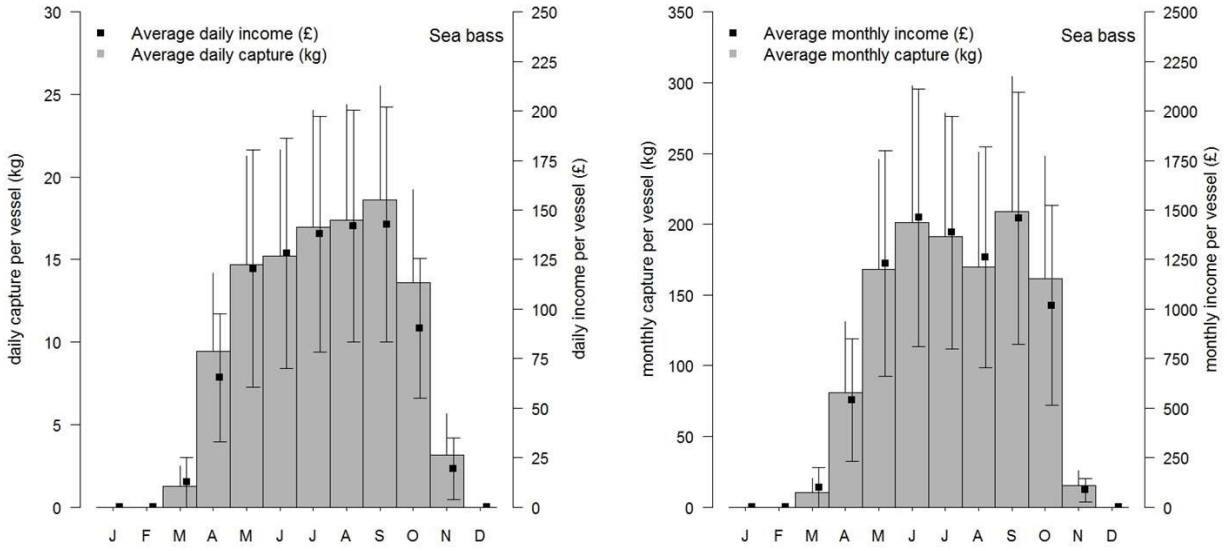

Figure 4. Daily (left graph) and monthly (right graph) capture and income of bass for an average vessel of the segment "Pots and nets SS".

Within the studied fleet a total of 19 different fishing tactics have been identified. Each fishing tactic is characterized by a different catch profile and a different temporal (time period) use.

The fishing tactics employed by the Welsh fleet are related not only with season and target species but also with the general fishing locations.

Conclusions

- The studied fleet, in particular "scallop dredge medium scale", "pots and nets medium scale" and "pots and nets small scale", had good economic performance in 2012. The knowledge of this economic structure is essential for management and the economic indicators can be used to simulate the financial consequences of a range of proposed management options.
- Several fishing tactics exist for each gear and vessel type.
- Accounting for these fishing tactics is essential for improving the assessment of the impact of a fishery.
- Accounting for fishing tactics can reduce conflicts when applying management options.