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# **Science, Technology, and Society Initiative to Minimize Unwanted Catches in European Fisheries**

**WP1. Ecological, socioeconomic and technical  
characteristics of discarding fisheries.**

**Deliverable 1.5 Interviews with end users**

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# Interviews with end users

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## 1. Summary

An interview process with industry (individual fishers' interviews) to understand the behavioural and procedural reasons for discarding was carried out. This study was initiated by designing a long and very complete questionnaire (74 questions in 10 pages). The English questionnaire was translated into the different local languages in the case studies (Spanish, Portuguese, Italian and Greek) and passed to individual fishers in face-to-face interviews. An indicative minimum of 10 complete interviews per case study was recommended. Before starting the interview, the fisherman signed an authorization for the use of the collected information for scientific purposes, following the Data Protection Regulation 95/46/ EC; Regulation (EC) No 1882/2003. Typically, the interviews lasted between 1-1.5 hours and were carried out in the harbour offices, in the fishers' domiciles or onboard. The results of this study produced 173 valid interviews, corresponding to the same number of fishing units. The data was entered in electronic format and analyzed. The electronic database is internally available to the Consortium to provide estimates of certain parameters needed in WP2 and WP3, and background information for WP4. The analysis helped define the perception of the fishing industry in relation to the "discards problem", and their attitude towards the current legal framework was recorded as well. In the context of the project deliverables, especially in WP4, these views will be communicated to the policy makers and control authorities in order to revise and improve fisheries governance. The analysis shows that fishers are sceptical on the likelihood that the Landings Obligation (Art. 15, EU Reg. 1380/2013) will have a positive impact on European fisheries and are concerned about the increased costs to their commercial activity that can be anticipated by the implementation of the Landings Obligation. The results of the questionnaires helped also identify options for utilization of unwanted catches brought to land and realize the lack of appropriate infrastructure on land to handle this fraction of the catches. Data on the technical equipment of the vessels provided information on the handling and storage capabilities of current fleets, which at present seem not to be able to store and handle large amount of unwanted catches, especially the fleets performing long fishing trips (e.g. Portuguese and Sicilian trawlers) or with high amount of catch (purse seiners).

## 2. Introduction

Individual interviews with fishers were carried out in south European case studies participating in the MINOUW project to describe fishing socio-economic behaviour in relation to discarding practices and to understand the behavioural and procedural reasons for discarding.

A questionnaire, specifically designed for face-to-face interviews, was prepared in English and translated into local languages (see Appendix 1).

The interview contained 74 questions. The questions were structured in the following blocks:

- Identifier (name of person, fishing vessel, harbour, age, etc.): Q1-10
- Vessel characteristics (LOA, tonnage, power, etc.): Q11-20
- Main fishing gear: 1) characteristics Q21-25; 2) economic data: Q26-31
- For each main fishing gear, description of métiers and their target species: Q32
- For each métier, space-time characteristics; duration and quantity of unwanted catches (UWC): Q33-42
- Fate of Catch: commercial target, commercial bycatch, discarded: Q43
- Fishers Perceptions:
  - Effect of UWC on the activity: Q44-Q49
  - Knowledge of the Landings Obligation: Q50-54
  - Effect of the Landings Obligation (LO): Q55-58
  - Incentives for compliance: Q59-66
  - Fate of UWC brought to land: Q67-74

The first two blocks (Q1 to Q20) gathered personal data and technical data from the vessels to cross-check this information with independent databases (e.g. European Fleet Register; local vessel lists) and assess the reliability of the answers provided.

The interview process aimed at a minimum of 10 valid interviews per case study (see table 1.5.1). Individual fishers were selected in the case study harbours from fishers previously acquainted with the researchers, from a basis of long-time collaboration with research projects, to ensure the interest in the interview and the veracity of the responses. The fishers accepting to participate in the questionnaire were handed a form describing the purposes of the study and the commitment of the MINOUW project to ensure confidentiality of the data (Appendix 2; fishers signed the authorization for the use of the collected information for scientific purposes, following the Data Protection Regulation 95/46/ EC; Regulation (EC) No 1882/2003). The interviews (field work) were carried out between September 2015 and March 2016.

Table 1.5.1. Case studies where the fishers interview process took place.

CS	Fleet <sup>1</sup>	Country	Total fleet (vessels)	Number of valid interviews
CS1.2 Algarve trawl fishery	Bottom trawl (OTB)	Portugal (PT)	46	8
CS1.4 Catalonia trawl fishery	Bottom trawl (OTB)	Spain (ES)	256	14

<sup>1</sup> Fleets are referred to by their main fishing gear, following their designation in the Data Collection Framework (DCF), Level 4

CS1.5 Bottom trawl crustacean fisheries in Sicily	Bottom trawl (OTB)	Italy (IT)	100	10
CS1.6/1.8 Ligurian and North Tyrrhenian trawl fishery	Bottom trawl (OTB)	Italy (IT)	330	19
CS1.7 Aegean sea bottom trawl fishery	Bottom trawl (OTB)	Greece (GR)	250	33
CS2.2 Algarve purse seine	Purse seine (PS)	Portugal (PT)	46	13
CS2.x Catalonia purse seine (additional) <sup>2</sup>	Purse seine (PS)	Spain (ES)	86	6
CS2.3 North Aegean purse seine	Purse seine (PS)	Greece (GR)	18	12
CS3.1.1 Algarve small scale fishing gear (trammel net)	Trammel nets (GTR)	Portugal (PT)	697	11
CS3.1.2 Algarve small scale fishing gear (bivalve dredge)	Dredges (DRB)	Portugal (PT)	53 Portuguese trawlers + 25 Spanish trawlers under bilateral agreement	10
CS3.2 Mallorca set nets	trammel nets (GTR)	Spain (ES)	260	10
CS3.4 Catalonia small	trammel nets (GTR)	Spain (ES)	422	18

<sup>2</sup> Taking advantage of the interest of local purse seine fishers in the MINOUW project, a new case study was added in Catalonia.

scale fisheries				
CS3.5 Ligurian and North Tyrrhenian trammel net	trammel nets (GTR)	Spain (ES)	839	9
<b>Total valid interviews</b>				173

The total number of valid interviews obtained was 173. The number of interviews, arranged by case study and fishing gear, are shown in table 1.5.2.

Table 1.5.2. Types of fishing gear investigated in the different countries.

country	DRB	GTR	OTB	PS	total
GR			33	12	45
IT		9	29		38
PT	10	11	8	13	42
ES		28	14	6	48
Total	10	48	84	31	173

Table 1.5.3. Summary characteristics of the fisheries investigated (see Deliverable D1.1 for a complete description) in relation to the problem of unwanted catches

CS	Fleet country	Main target species	Unwanted catches problem
CS1.2 Algarve trawl fishery	OTB / PT	deepwater rose shrimp: <i>Parapenaeus</i> ; <i>Nephrops</i> ;  other important species: blue and red shrimp ( <i>Aristeus</i> ), scarlet shrimp ( <i>Aristaeopsis</i> ) and giant red shrimp ( <i>Aristaeomorpha</i> )	low value finfish, some are regulated species (e.g. blue whiting, horse mackerel); undersize hake, <i>Parapenaeus</i> or <i>Nephrops</i>
CS1.4 Catalonia trawl fishery	OTB / ES	mixed bottom trawl fishery targeting finfish (hake, red mullet, cephalopods) and crustaceans ( <i>Nephrops</i> ;	low value finfish, some are regulated species (e.g. blue whiting, horse mackerel); undersize

		red shrimps)	hake or Nephrops
CS1.5 Bottom trawl crustacean fisheries in Sicily	OTB / IT	deepwater crustaceans: Parapenaeus; Nephrops; red shrimps	low value finfish, some are regulated species (e.g. blue whiting, horse mackerel, Sparidae); undersize hake, Parapenaeus or Nephrops
CS1.6/1.8 Ligurian and North Tyrrhenian trawl fishery	OTB / IT	mixed bottom trawl fishery targeting finfish (hake, red mullet, cephalopods) and crustaceans (Nephrops; red shrimps)	low value finfish, some are regulated species (e.g. blue whiting, horse mackerel); undersize hake, Nephrops or red mullet
CS1.7 Aegean sea bottom trawl fishery	OTB / GR	mixed bottom trawl fishery targeting finfish (hake, red mullet, cephalopods) and crustaceans (Nephrops; Parapenaeus; Penaeus kerathurus)	undersize specimens of some regulated species of fishes (sardine, horse mackerel, hake, red mullet) and crabs
CS2.2 Algarve purse seine	PS / PT	sardine, horse mackerel, anchovy, Atlantic chub mackerel	undersize specimens of regulated species (incl. the target species)
CS2.x Catalonia purse seine (additional)	PS / ES	sardine, anchovy	undersize specimens of regulated species (incl. the target species); unwanted catches of horse mackerels, mackerels
CS2.3 North Aegean purse seine	PS / GR	sardine, anchovy	low value round sardinella; unwanted catches of the target species are practically nil due to the highly

			selective fishing procedures
CS3.1.1 Algarve small scale fishing gear (trammel net)	GTR / PT	different metiers varying seasonally: cuttlefish; seabass; Sparidae, soles, monkfish	regulated species such as chub mackerel or sardine
CS3.1.2 Algarve small scale fishing gear (bivalve dredge)	DRB / PT	clams ( <i>Spisula solida</i> , <i>Donax trunculus</i> , <i>Chamelea gallina</i> ) and the razor clam <i>Ensis siliqua</i>	undersize specimens of target species
CS3.2 Mallorca set nets	GTR / ES	different metiers varying seasonally: cuttlefish; striped red mullet and spiny lobster	specimens in poor condition; among them regulated species such as hake, striped red mullet or mackerel
CS3.4 Catalonia small scale fisheries	GTR / ES	different metiers varying seasonally: cuttlefish; <i>Penaeus kerathurus</i> , striped red mullet	specimens in poor condition or undersize; among them regulated species such as certain Sparidae, red mullet or hose mackerel
CS3.5 Ligurian and North Tyrrhenian trammel net	GTR / ES	different metiers varying seasonally: cuttlefish; <i>Penaeus kerathurus</i> , striped red mullet	specimens in poor condition or undersize; among them regulated species such as certain Sparidae, red mullet or hose mackerel

### 3. Results

#### 3.1. Technical characteristics of the fleet and discarding volumes

The following table summarize the average technical characteristics of the fleets in the case study fisheries, according to the interviews.

Table 1.5.4. Technical characteristics of the vessels (I)

fleet <sup>3</sup>	CS <sup>4</sup>	country	average LOA	Average engine power (kW)	Average capital € (estimated sale value / vessel)
DRB	CS3.1.2	Pt	7.85	75.00	62,222
GTR	CS3.1.1	Pt	6.71	71.10	18,818
	CS3.2	Sp	8.56	66.50	59,300
	CS3.4	Sp	8.65	49.42	64,316
	CS3.5	It	9.52	77.56	101,444
OTB	CS1.2	Pt	23.25	569.00	790,625
	CS1.4	Sp	19.14	234.00	490,714
	CS1.5	It	29.16	509.53	788,889
	CS1.6	It	19.29	192.10	354,615
	CS1.7	Gr	26.53	382.81	550,000
PS	CS2.2	Pt	17.68	271.54	321,154
	CS2.3	Gr	22.03	333.17	512,500
	CS2.x	Sp	19.63	251.67	616,667

Case studies of small scales fisheries (CS 3.1 to CS3.5) are carried out by small vessels in vessel length class VL0612 generally. Their engine power is smaller than 100 kW and their sale value (as estimator of capital) is around 60,000 €; except the bivalve dredgers in Portugal with sale value lower than 20,000 €. Bottom trawlers (CS1.2 to CS1.7) and purse seiners (CS2.2 to CS2.3) range from 18 to 30 m length (VL1824 and VL2440), with the largest vessels in the long distance fleet of Sicily (CS1.5). Engine power and vessel capital correlate well, as expected, with length overall (LOA).

The following table summarizes the working surface, storing capabilities and cold/freezing capacity of each fleet. These are key parameters of relevance to the problem of storing unwanted catches covered by the landings obligation while being transported to land.

Table 1.5.5. Technical characteristics of the vessels (II, hold capacity and refrigeration / freezing facilities)

fleet	CS	Cou ntry	Deck working surface (m <sup>2</sup> )	Hold dry Store (m <sup>3</sup> )	Hold cold Store (m <sup>3</sup> )	Percentage of vessels with ice machine	Average freezing volume (m <sup>3</sup> )
DRB	CS3.1.2	Pt	10.25	1.11	2.89	0%	0.00

<sup>3</sup> Acronyms are shown in Appendix 3

<sup>4</sup> case study codes as in Table 1.5.1

<b>GTR</b>	<b>CS3.1.1</b>	Pt	6.83	- <sup>5</sup>	0.00	0%	0.00
	<b>CS3.2</b>	Sp	16.90	0.00	-	0%	0.00
	<b>CS3.4</b>	Sp	8.16	3.29	0.41	0%	0.00
	<b>CS3.5</b>	It	4.28	0.00	1.58	11%	0.00
<b>OTB</b>	<b>CS1.2</b>	Pt	50.63	20.00	66.88	75%	12.38
	<b>CS1.4</b>	Sp	25.07	5.86	6.09	0%	0.00
	<b>CS1.5</b>	It	25.33	123.75	31.25	100%	30.38
	<b>CS1.6</b>	It	11.08	0.00	18.66	42%	0.00
	<b>CS1.7</b>	Gr	75.25	-	23.54	58%	-
<b>PS</b>	<b>CS2.2</b>	Pt	58.85	43.00	9008.46	0%	0.00
	<b>CS2.3</b>	Gr	40.08	27.40	25.64	25%	0.00
	<b>CS2.x</b>	Sp	26.50	16.00	3.17	33%	1.17

As can be expected, the trawl and purse seiner fleets have larger surfaces of deck working space because the vessels are larger in these fleets. Dry stores are small or nil in small scale vessels (CS3.1.1 to CS3.5) or in trawl vessels carrying short fishing trips (i.e. one to few days in CS1.4 and CS1.6). Likewise, cold store, ice machines or freezing stores are small or absent in the same fleets. Long distance trawlers (such as CS1.5 or CS1.2), which carry out long trips and have high volumes of catch have correspondingly large stores and have the means of refrigerating or freezing the catch. Purse seiners do not tend to have freezing capacity because their product (small pelagics) is destined to fresh markets, but in Greece and Portugal they possess cold stores, particularly large in the latter.

The following table provides an estimate, according to the fishers interviews, of the volume of catches, discards and production of target species.

Table 1.5.6. Estimation of fishing effort, volume of catches and percentage of discards

fleet	CS	country	Fishing hours/day	Daily catch volume (kg)	Percentage UWC discarded	Percentage target discarded
<b>DRB</b>	<b>CS3.1.2</b>	Pt	6	308	5%	1%
<b>GTR</b>	<b>CS3.1.1</b>	Pt	21	61	27%	-
	<b>CS3.2</b>	Sp	31	27	7%	4%
	<b>CS3.4</b>	Sp	7	32	5%	2%
	<b>CS3.5</b>	It	9	47	31%	26%
<b>OTB</b>	<b>CS1.2</b>	Pt	15	673	21%	23%
	<b>CS1.4</b>	Sp	8	180	28%	4%
	<b>CS1.5</b>	It	17	251	10%	9%

<sup>5</sup> dash (-) shows that the responses did not allow to calculate a figure, while 0 means that the responses indicated 0 as value.

	<b>CS1.6</b>	It	12	259	38%	24%
	<b>CS1.7</b>	Gr	14	386	6%	4%
<b>PS</b>	<b>CS2.2</b>	Pt	3	9875	6%	1%
	<b>CS2.3</b>	Gr	2	2229	0%	0%
	<b>CS2.x</b>	Sp	2	1308	5%	7%

The results show that the small scale fisheries investigated here are heterogeneous in terms of fishing effort (or activity), volume of catches and production of discards. The bivalve dredgers of Portugal (CS3.1.1) produce a large amount of catches of target species, with very low unwanted catches (5%) and almost no discard of target species (1%, discarded usually because of non-marketable quality). The trammel netters in CS3.1.2 and CS3.2 have long soaking times (1 day or 1.5 days), while the trammel netters in CS3.4 and CS3.5 have shorter soaking times, probably because the target species are very different among the case studies. However, the amount of discards from unwanted catches is high (>25%) in CS3.1.2 and CS3.5 and low in CS3.2 and CS3.4 (<10%). In CS3.5 the discards of target species is also high, probably due to low value or damaged specimens.

Regarding the activity of bottom trawlers, in most case studies fishing trips are carried for several days (except in CS1.4<sup>6</sup>) and fishing operations (trawl hauls) last for 12 h or more (again, with the exception of CS1.4). The volume of catches is highest in the Atlantic case study (CS1.2) and also in the Aegean Sea (CS1.7), with the lowest volume of catches in CS1.4. The fraction of unwanted catches is 10% or higher in all cases, except in the Northern Aegean (CS1.7). The discards of target species are lower than 10% in most cases, with the exception of CS1.2 and CS1.6.

Purse seiners carry out very short tows (usually 1 h, with a total of 2-3 tows per fishing trip) and produce very high volume of catches. Because this fleet targets a low number of small pelagics in large quantities, the discards of unwanted catch as well as of target species are low. Note that the Kavala purse seine fishery is extremely selective with practically no discards, due to its traditional model of operation (see Deliverable D1.1 for details).

### 3.2. Economic structure

The following table provides some economic estimates, derived from the interviews for the case study fisheries:

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<sup>6</sup> In Mediterranean Spain, where CS1.4 takes place, trawling is allowed for a maximum 12 h daily with obligatory return to port everyday, resulting in 8 h / day approximately of effective fishing time.

Table 1.5.7. Economic parameters of the fleets.

CS	Fleet	country	Fisher's age	Starting year in activity	Fuel consumption (l/week)	Landings (kg/week)	landings per fuel (kg/l)	cost structure - % common costs	cost structure - % share owner	cost structure - % share crew	Annual fixed costs (€)
CS 3.1.2	DRB	Pt	49	1997	411	735	1.76	35%	40%	23%	2575
CS 3.1.1	GTR	Pt	52	1978	98	89	1.27	33%	43%	22%	7623
CS 3.2	GTR	Sp	44	1992	229	84	1.49	40%	53%	8%	10830
CS 3.4	GTR	Sp	47	1986	156	157	1.35	39%	34%	27%	15067
CS 3.5	GTR	It	55	1986	-	148	-	-	-	-	-
CS 1.2	OTB	Pt	47	1987	10228	967	0.11	25%	50%	29%	96000
CS 1.4	OTB	Sp	44	1987	2121	1021	0.46	41%	26%	33%	56111
CS 1.5	OTB	It	56	1983	6867	2156	0.33	37%	35%	30%	107778
CS 1.6	OTB	It	52	1981	3208	835	0.28	-	-	-	-
CS 1.7	OTB	Gr	44	1991	5536	2169	0.51	-	-	-	77494
CS 2.2	OTB	Pt	49	1983	1312	28542	22.61	32%	32%	34%	23231
CS 2.3	PS	Gr	51	1989	2146	7713	3.819	-	-	-	537067
CS 2.x	PS	Sp	48	1986	1767	5125	3.06	43%	20%	38%	78000

### 3.3. Assessing fishers' perceptions

The following tables provide a summary analysis of the perceptions of fishers related to discarding practices and the impact of the landings obligation on the fisheries

studied. The values reported are the % of agreement (“yes”) with the question. The tables have been color-coded to facilitate comparison, with greener hues denoting agreement and redder hues disagreement.

### 3.3.1. Perceived problem of unwanted catches

Table 1.5.8. Unwanted catches at present

gear	CS	co un try	44'] Do you take steps to avoid UWC	45'] Hauling UWC on board cause problems with sorting?	46'] Hauling UWC on board cause increased fishing costs?	47'] Potentially commercial UWC are discarded because of low price?	48'] Potentially commercial UWC are discarded because of quota or minimum size limits?	49'] Potentially commercial UWC are discarded because of lack of storage capacity?
DRB	CS3.1.2	Pt	90%	30%	40%	100%	50%	0%
GTR	CS3.1.1	Pt	64%	27%	0%	82%	9%	9%
	CS3.2	Sp	90%	40%	30%	70%	70%	0%
	CS3.4	Sp	44%	22%	6%	94%	39%	0%
	CS3.5	It	78%	33%	22%	56%	22%	22%
OTB	CS1.2	Pt	100%	88%	88%	100%	100%	38%
	CS1.4	Sp	43%	21%	14%	86%	57%	14%
	CS1.6	It	26%	47%	47%	95%	95%	16%
	CS1.5	It	100%	100%	90%	100%	86%	75%
	CS1.7	Gr	97%	27%	15%	12%	88%	9%
PS	CS2.2	Pt	100%	62%	31%	100%	92%	62%
	CS2.x	Sp	100%	50%	17%	100%	67%	17%
	CS2.3	Gr	75%	0%	0%	8%	17%	0%

The majority of fishers in most case studies claim to be taking already steps to avoid unwanted catches (question nº 44), regardless of the landings obligation, except in CS3.4, CS1.4 and CS1.6. In particular, in the more productive fisheries such as CS1.2, CS1.5, CS2.2 and CS2.x the agreement is 100%. Only in 2 case studies a majority of fishers interviewed declared that unwanted catches are a significant problem when sorting (question nº 45), again related to the more productive fisheries (CS1.2, CS1.5 and partly CS2.2 and CS2.x). However only in CS1.2 and CS1.5 fishers complained about increased costs when fishing operations produced large amounts of unwanted catches (question nº 46). The majority of fishers in most case studies declared that potentially commercial by-catch was discarded because of low price (question nº 47), with the significant exception of the two case studies in Greece (CS1.7 and CS2.3). To the question of discarding due to quota caps (Portugal only) or minimum conservation reference size, the responses in agreement in the majority of bottom trawl and purse seine case studies (with the exception of CS2.3). Among the small scale fisheries, the bivalve dredgers in Portugal (CS3.1.1) and trammel netters in Spain (CS3.2, Balearic islands) also tended to agree with this question. The problem of storage capacity

(question 49) did not seem to be of paramount importance in the majority of cases, with only 2 case studies showing high levels of agreement (CS1.5 and CS2.2, corresponding to highly productive fisheries).

### 3.3.2. Knowledge of the Landings Obligation

Table 1.5.9. Knowledge of the Landings Obligation

gear	CS	country	50] Are you aware that discarding of UWC will be banned in European waters progressively in the period 2015 – 2019?	51] Do you know if your fishing activity will be affected by the landings obligation?	52] Do you think that the landings obligation will be positive for local fisheries?	53] Do you think that the landings obligation will be generally accepted by all fishers?	54] Do you believe that the exemptions covered in the Regulation are sufficient / adequate (i.e. survival, unbearable costs and “de minimis”)
DRB	CS3.1.2	Pt	10%	50%	0%	0%	13%
GTR	CS3.1.1	Pt	9%	11%	0%	11%	9%
	CS3.2	Sp	40%	60%	11%	0%	70%
	CS3.4	Sp	28%	11%	28%	17%	17%
	CS3.5	It	14%	22%	22%	11%	33%
OTB	CS1.2	Pt	88%	75%	0%	0%	25%
	CS1.4	Sp	79%	79%	0%	7%	7%
	CS1.6	It	13%	47%	6%	21%	13%
	CS1.5	It	90%	90%	0%	0%	0%
	CS1.7	Gr	48%	91%	0%	0%	42%
PS	CS2.2	Pt	31%	100%	15%	8%	31%
	CS2.x	Sp	83%	83%	17%	17%	0%
	CS2.3	Gr	100%	0%	0%	17%	36%

Awareness of the Landings Obligation was surprisingly low in many case studies (question nº 50). Only 3 bottom trawl case studies and 2 purse seine case studies showed a majority of fishers aware of the landings obligation. After being informed of the contents of Art. 15 of the Common Fisheries Policy detailing the landings obligation, only a majority of bottom trawl fishers and purse seiners agreed that their fishery could be impacted by this regulation (question 51). Purse seiners of Kavala (CS2.3) felt the landings obligation was inconsequential in their fishery because they produce practically nil unwanted catches. The responses to question nº 52 showed that fishers are very sceptical on the potential benefits of the landings obligation to their fisheries, and likewise, they are sceptical on the general acceptance of the regulation by fishers (question nº 53). The majority of fisheries believed that the exemptions in Art. 15 are insufficient (question nº 54) with the exception of trammel netters in CS3.2 (Spain, Balearic islands) who showed a relatively high agreement.

### 3.3.3. Short term impacts of the landings obligation

Table 1.5.10. Short term impacts of the landings obligation

gear	CS	country	55] Will sorting time or needs of personnel increase?	56] Will your activity incur extra costs to comply with the landings obligation	57] Will your fishing vessel require technical / structural modifications to adapt to the landings obligation?	58] Can you think of a strategy to bring to land former discards
DRB	CS3.1.2	Pt	56%	30%	10%	0%
GTR	CS3.1.1	Pt	27%	36%	10%	20%
	CS3.2	Sp	30%	50%	0%	100%
	CS3.4	Sp	39%	28%	0%	0%
	CS3.5	It	67%	78%	0%	0%
OTB	CS1.2	Pt	100%	88%	57%	25%
	CS1.4	Sp	79%	64%	21%	0%
	CS1.6	It	84%	95%	37%	16%
	CS1.5	It	100%	100%	100%	100%
	CS1.7	Gr	15%	97%	12%	33%
PS	CS2.2	Pt	75%	67%	31%	10%
	CS2.x	Sp	50%	83%	33%	0%
	CS2.3	Gr	0%	0%	0%	0%

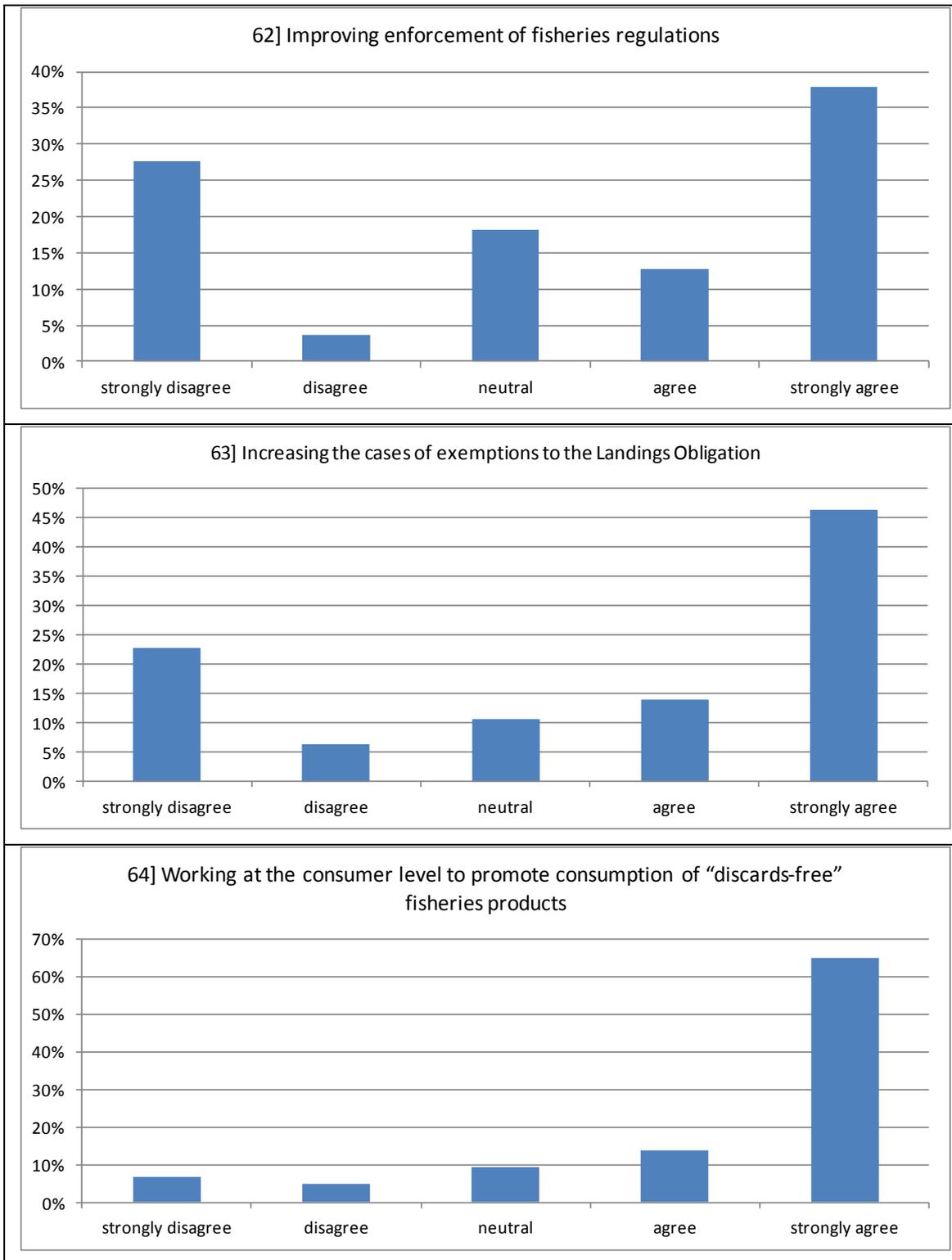
(note that CS2.3 is not discussed in the following text because the unwanted catches produced by this fishery are practically nil and the fishers do not feel concerned by the issue of the discards ban)

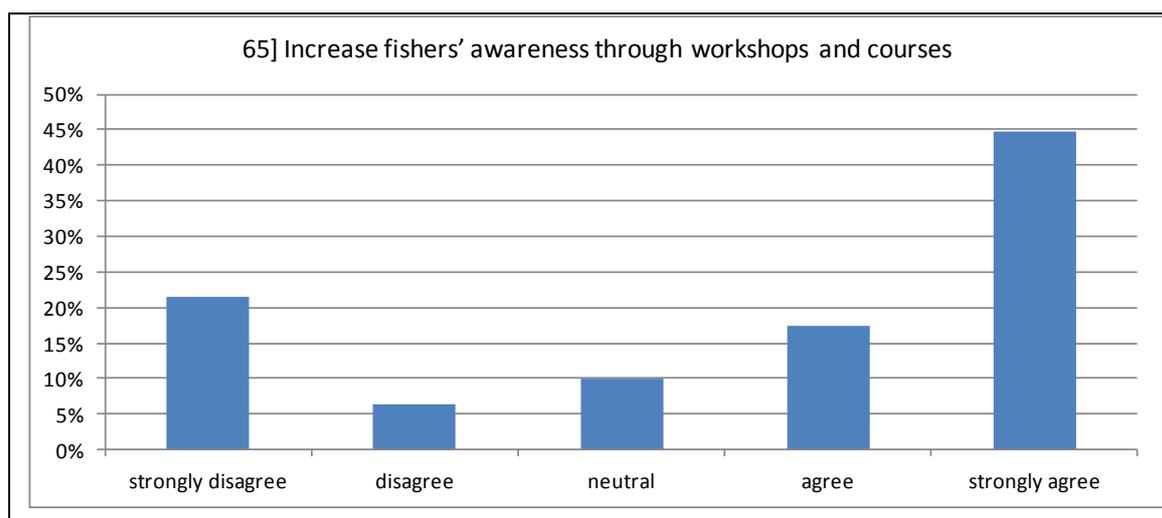
Fishers agreed that sorting times (question n° 55) will increase in the more productive fisheries, such as the bottom trawl fisheries studied (except CS1.7), the purse seiners in Portugal (CS2.2), bivalve dredgers in Portugal (CS3.1.2) and trammel netters in Italy (CS3.5). The compliance with the landings obligation was felt to imply extra costs in terms of fish handling or storage (for instance, purchasing extra boxes) in a majority of fisheries (question n° 56): bottom trawlers, purse seiners, but also some trammel netters (CS3.2 and CS3.5). However only a majority of fishers in 2 case studies (CS1.2 and CS1.5) felt that the landings obligation would, additionally, require structural modifications to the fishing vessels (question n° 57). The question of devising a practical strategy to bring former discards to land (question n° 58) was answered by a majority of fishers in only 2 case study fisheries (CS3.2 and CS1.5).

### 3.3.4. Incentives for compliance

Questions 59 to 66 proposed a scale of 5 levels from total disagreement to total agreement on seven possible mechanisms to incentivise compliance with the landings obligation. The questions are summarized in the charts below:





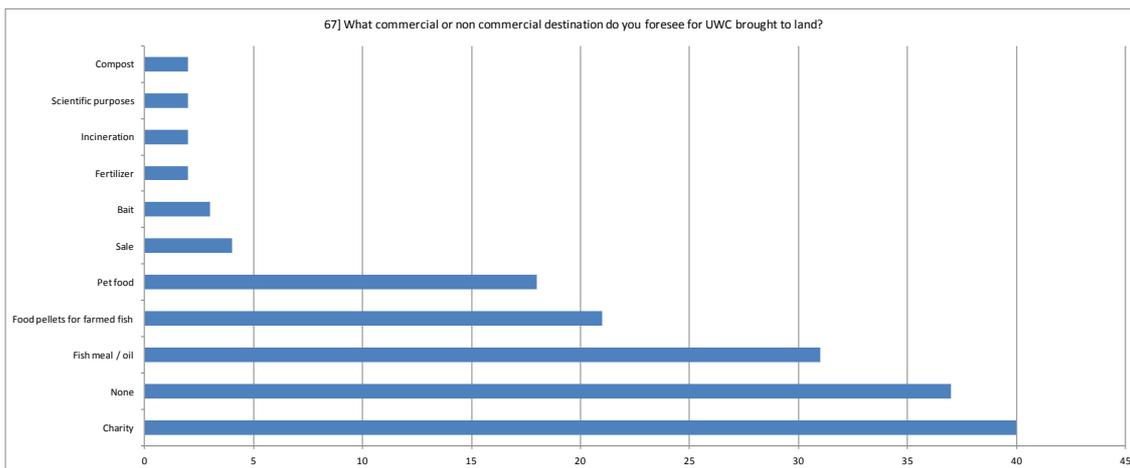


Regarding question n° 59 the responses were inconclusive because the proportion of fishers agreeing and disagreeing that changing the current fisheries management system would help comply with landings obligation was similar (ca. 40% each). Instead, reducing taxes to fishers (question n° 60) was perceived by a majority of fishers (76% strongly agreed) as a good way to incentivise compliance. A majority of fishers (71% agreed or strongly agreed) that improving the sale system of landings (question n° 61) would help incentivise compliance, because fishers believe that the present system disadvantages the producer. Only 51% agreed or strongly agreed with the proposition that enforcement of fisheries regulations should be improved (question n° 62). Increasing the cases of exemptions to the landings obligation also received a high share of support (60% agree or strongly agree to question n° 63). Working at market level, by correctly labelling the product of 'discards-free fisheries' or otherwise certifying the product (question n° 64), would help comply with the regulation according to a majority of fishers (79% agree or strongly agree). Capacitation or other formative actions were also considered to be important in terms of complying with the landings obligation (question n° 65) by a majority of fishers (62% agree or strongly agree). A majority of fishers (73% agree or strongly agree) also supported the proposition that working at the level of giving a prize to fishers complying with the landings regulation (question n° 66) would be a good incentive.

It should be noted that the option most frequently chosen for questions 60 to 66 was "strongly agree".

### 3.3.5. Utilization of unwanted catches brought to land

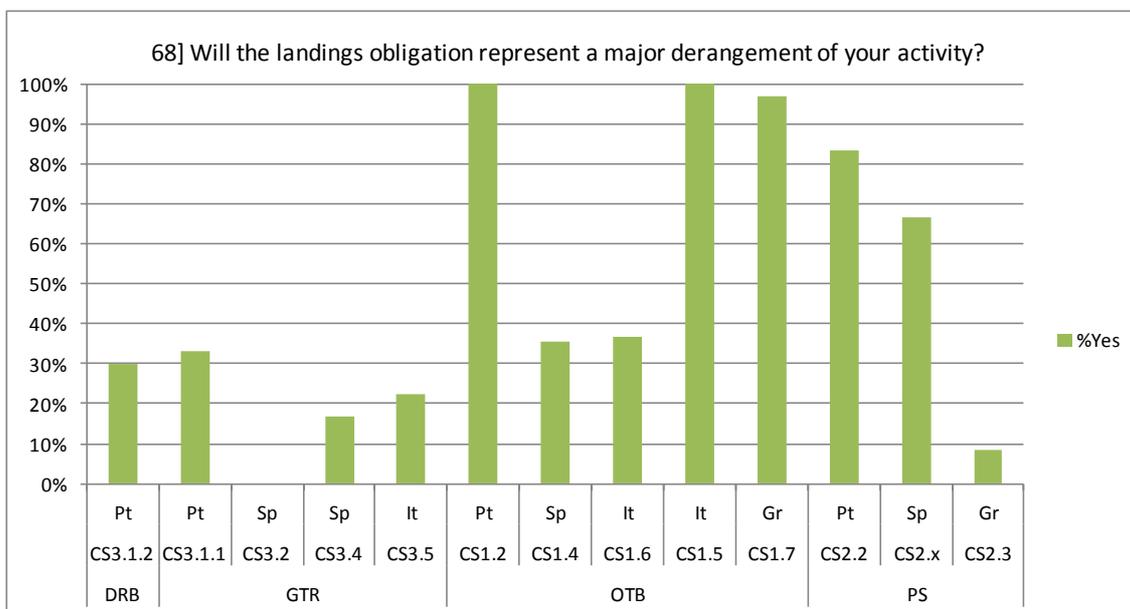
In question 67 fishers were asked about possible types of utilization of former discards, focusing on mass markets. The question was open and several answers were possible. The most often cited type of utilization was "Charity" (i.e. destined for human consumption without creating a commercial outlet to the producer). However, note that the second most often cited utilization was "None": i.e. many fishers are sceptical or ignorant of the possible utilization of discards for alternative uses. The classical utilization types, such as "fish meal / oil", "pellets for farmed fish" or "pet food" were also often cited.



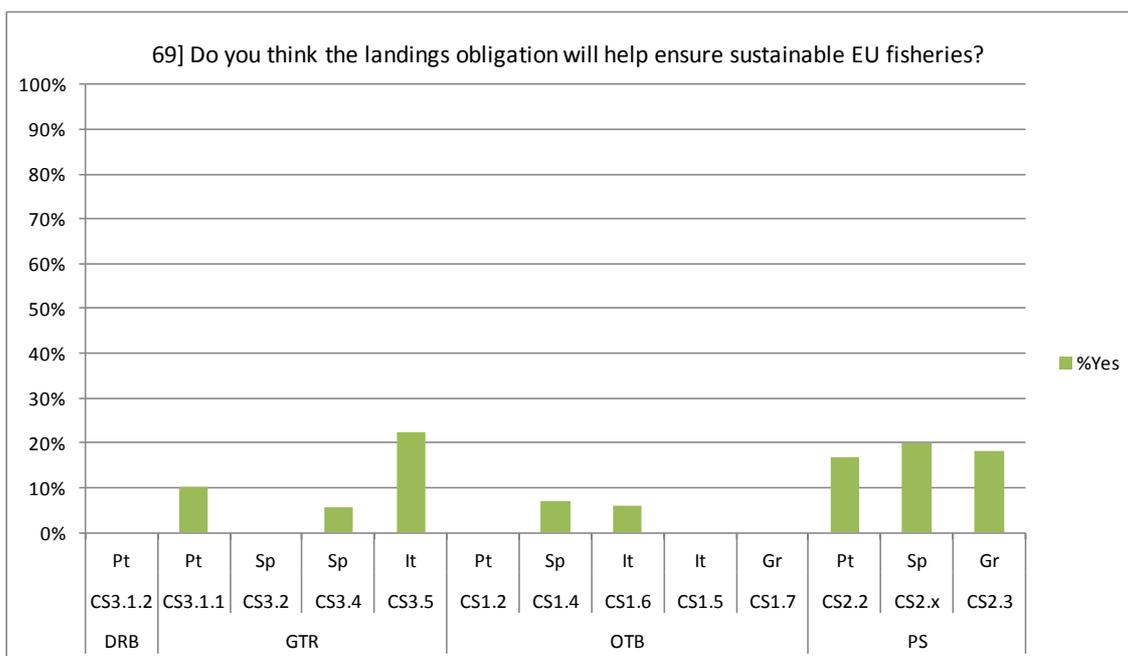
Responses to questions 70 to 74 will not be discussed further because the responses were not satisfactory. Most fishers did not know whether their existed infrastructure at the local, regional or national level to handle former discards, and there were contradictions within some case studies, with fishers in the same harbour giving opposite responses to the same question.

### 3.3.6. Impacts of the landings obligation for European fisheries

A majority of fishers in the more productive fisheries (i.e. bottom trawl fisheries CS1.2, CS1.5 and CS1.7; purse seiners in CS2.1 and 2.x) are of the opinion that the landings obligation will represent a major derangement in bottom trawl and purse seine fisheries (question n° 68).



The benefit of the landings obligation of the goal of sustainable fisheries was not appreciated and the majority of fishers in all case studies disagreed with the landings obligation as a mechanism to ensure future sustainable fisheries in Europe.



#### 4. Discussion and Conclusions

The size of the fleets examined in the case studies varied importantly in terms of length overall, engine power and capital. Fleets in small scale fisheries (bivalve dredgers and trammel netters) comprise small vessels in length class VL0612, with typically small deck working surface and low capacity of storing unwanted catches. However, the amount of unwanted catches of regulated species produced by these fleets is low (excepting the trammel net fishery in CS3.5).

The bottom trawl fleets examined fell in two types: the Sicilian trawlers, conducting long trips, the Portuguese, Spanish, Italian and Greek coastal trawlers, conducting short fish trips of a few days at most. The average size, engine power and capital are slightly larger in the first group, but trawlers generally fall in the VL1824 and VL2440 classes. However, the main difference lies in the availability of larger deck working surfaces, and of dry, cold and freezing stores in the first group. The amount of unwanted catches reported in the interviews is higher than 10% only in CS1.2 and CS1.6, suggesting that these fleets may have problems of storing and transporting unwanted catches to land.

The purse seine fleets investigated were of similar technical characteristics (VL1824) and because the target species are mainly consumed fresh, generally do not have freezing capacity. The Portuguese purse seiners have very large hold cold stores because the volume caught is much larger than the Mediterranean purse seiners. The volume of unwanted catches is generally low, due to the very selective nature of these fisheries and the use of “early slipping” techniques, with the highest volumes of discards among the Spanish purse seiners (CS2.x, 7%).

The economic structure of the fisheries also varied substantially among the case studies. Weekly landings are relatively low in trammel netters, typically below 200

kg/week. In bivalve dredgers the weekly volume of landings is high, comparable to bottom trawlers. The landings of the latter vary around 1 to 2 tons per week. The volume of landings of purse seiners is an order of magnitude higher, with 5 to 30 t/week. Interestingly, the relative production per litre of fuel of each type of fishing gear is fairly constant: small scale fisheries produce 1-2 kg/l, trawl fisheries 0.1 - 0.5 kg/l and purse seiners 3 - 20 kg/l. Regarding the cost structure, in the case studies that produced relevant data between 25 and 40% of the income was destined to meet common costs (particularly, fuel expenses). The share reserved for the owner varied between 20 and 53%, while the share for the crew was typically around 30% (note that in trammel net fisheries, many vessels are owner operated and have very small crews of 1 to 2 persons, including the owner, i.e. no extra deckhand). No clear pattern was evident by country or type of fishing gear. Annual costs (including engine maintenance or repair, fishing license and depreciation of capital were relatively low in small scale fisheries (2 to 20 000 euro/year) and in the range of 50 to 100 000 euro/year in bottom trawlers and purse seiners.

The analysis of the questions of fishers perceptions showed that fishers do not perceive discarding or the production of unwanted catches as a major problem in their activity (as opposed to, for instance, dwindling productivity of fish stocks, high fuel prices or low prices fetched at first sale). Additionally, it must be mentioned that prior to the reformed Common Fisheries Policy, the keeping on board and landing undersize or over-quota specimens was forbidden, and discarding was the only option. In spite of the Landing Obligation, a majority of fishers in many case studies already take steps to avoid unwanted catches, such as choosing certain fishing grounds at certain times of the year, mainly to reduce sorting time. Increased sorting time due to unwanted catches is already a problem in the more productive fleets (such as Portuguese and Sicilian bottom trawlers; Portuguese purse seiners) and is recognized as major hurdle to the implementation of the Landings Obligation. Fishers in these same fleets feared limited hold capacity in their vessels to comply with the Landings Obligation. Knowledge on the existence of the Landings Obligation varied among fleet segments as well, with less than half of small scale fishers being aware of its existence or its impact on their activity. Most fishers in all fleets studies were sceptical about the benefits to local fisheries of the Landings Obligation and about its general acceptance. Most fishers agreed that only incentives of economic nature would help convince a majority of fishers with complying with the Landings Obligation: reduction of taxes, improving the system of selling fisheries products or promoting “discards-free” products. Additional income would help offset the extra costs incurred by complying with the Landings Obligation. Improving enforcement of fisheries regulations or improving awareness of fishers through formative actions were also valued as positive towards compliance albeit with lower support. The Landings Obligation is perceived as a major derangement to fishing by the more productive bottom trawl fleets (Portuguese and Sicilian, but also Greek) and by purse seiners in Portugal and Spain. In general, the majority of respondents in all case studies were sceptical about the benefits of the Landings Obligation to European fisheries.

In addition to the problems of handling, storing and landing unwanted catches, fishers do not see in general sufficiently attractive utilization options for this product. The classical utilization options (charity, fishmeal, fish oil or pet food) were mentioned

often, but “no option for utilization” ranked second in the responses obtained. In addition to the perception of absence of markets for unwanted catches, the majority of fishers declared that no processing plants are available near the landings sites.

## Appendix 1 – Interview forms

(English version; interview forms were translated to local languages)

### MINOUW (EU H2020 RIA project 634495)



#### Interview on UnWanted Catches (UWC) *questions refer to the fishers perception in last 10-20 years*

1] Interview #		
2] Date:	3] Location:	
4] Interviewer(s):		
5] Recorded on tape:	<input type="checkbox"/> YES	<input type="checkbox"/> NO
6] File code:		
7] Name/forename interviewed	<i>optional</i>	
8] Age		
9] Start of professional career (year)		
10] Port of activity in last 10-20 years, or last port of activity		

<b>THE FISHING VESSEL</b>			
11] Name of vessel			
12] Length (m)		13] GRT or GT	
14] HP or kW		15] Estimated sale value (€)	
16] Available working surface in boat deck (m <sup>2</sup> )		17] Dry storage capacity (m <sup>2</sup> or m <sup>3</sup> )	
18] Cold store (m <sup>2</sup> or m <sup>3</sup> )		19] Cold store for freezing (m <sup>2</sup> or m <sup>3</sup> )	
18.1] Ice machine (yes or not)			
20] Fishing gears used		Main Gear	
		Other gear1	
		Other gear2	
		Other gear3	

<b>MAIN GEAR</b>	
21] Type (local name)	
22] Length and width of the net (number of meshes)	
23] Vertical opening (m) or vertical hanging (m)	
24] Mesh size (cod-end in case of trawl. Other –specify- in other fishing gear) (mm)	
25] Net material / cod-end or	

other					
26] Weekly fuel consumption (liters):		27] kg/week commercialized			
28] % common costs (“boat share”)		29] % share to owner		30] % share to crew	
31] Annual fixed costs (€) (engine repair, nets mending, painting, license, radio, social security, etc.)					
32] Target species (local name or common name) <i>Each metier<sup>7</sup> may have one or more target species, which not necessarily will be the most abundant in the catch</i>	metier 1)				
	metier 2)				
	metier 3)				
	metier 4)				

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<sup>7</sup> or fishing strategy. Interviewer should have knowledge on the metiers practiced locally and agree with the interviewee on the concept and characteristic species to make sure we are talking about the same thing.

<b>METIER OR FISHING STRATEGY</b>				
	metier or fishing strategy 1)	metier or fishing strategy 2)	metier or fishing strategy 3)	metier or fishing strategy 4)
33] Main fishing grounds (location and depth range)				
34] Types of bottoms exploited: Sand, mud, hard bottoms, <i>Posidonia</i> meadows etc				
35] Main fishing season (months)				
36] Duration of typical fishing trips (days)				
37] Number of hauls / day				
38] duration haul (hours)				
39] estimate the total volume of a typical haul (kg), including UWC				
40] Amount of UWC (% of total catch) <i>mark the corresponding value</i>	<input type="radio"/> 0 – 10% <input type="radio"/> 10 – 25% <input type="radio"/> 25 – 50% <input type="radio"/> 50 – 75% <input type="radio"/> 75 – 100%	<input type="radio"/> 0 – 10% <input type="radio"/> 10 – 25% <input type="radio"/> 25 – 50% <input type="radio"/> 50 – 75% <input type="radio"/> 75 – 100%	<input type="radio"/> 0 – 10% <input type="radio"/> 10 – 25% <input type="radio"/> 25 – 50% <input type="radio"/> 50 – 75% <input type="radio"/> 75 – 100%	<input type="radio"/> 0 – 10% <input type="radio"/> 10 – 25% <input type="radio"/> 25 – 50% <input type="radio"/> 50 – 75% <input type="radio"/> 75 – 100%
41] Periods of maximum presence of UWC (months)				
42] Name a few / the most important species in the UWC fraction				



<b>EFFECTS OF UWC ON YOUR ACTIVITY</b>				
	metier or fishing strategy 1)	metier or fishing strategy 2)	metier or fishing strategy 3)	metier or fishing strategy 4)
44] Do you take steps to avoid UWC (e.g. gear modification; avoidance of certain areas or times of day, etc.)				
45] Hauling UWC on board cause problems with sorting? (increased sorting time, manpower)				
46] Hauling UWC on board cause increased fishing costs?				
47] Potentially commercial UWC are discarded because of low price?				
48] Potentially commercial UWC are discarded because of quota or minimum size limits?				
49] Potentially commercial UWC are discarded because of lack of storage capacity?				

<b>THE LANDINGS OBLIGATION OR DISCARDS BAN</b>				
50] Are you aware that discarding of UWC will be banned in European waters progressively in the period 2015 – 2019?	yes/no	(explain)		
51] Do you know if your fishing activity will be affected by the landings obligation?	yes/no	(explain)		
52] Do you think that the landings obligation will be positive for local fisheries?	yes/no	(explain)		
53] Do you think that the landings obligation will be generally accepted by all fishers?	yes/no	(explain)		
54] Do you believe that the exemptions covered in the Regulation are sufficient / adequate (i.e. survival, unbearable costs and “de minimis”)	yes/no	(explain)		
<i>under the landings obligation:</i>	metier or fishing strategy 1)	metier or fishing strategy 2)	metier or fishing strategy 3)	metier or fishing strategy 4)
55] Will sorting time or needs of personnel increase?				
56] Will your activity incur extra costs to comply with the landings obligation (in terms of ice, costs for storage on board and on land, transport...)				
57] Will your fishing vessel require technical / structural modifications to adapt to the landings obligation?				
58] Can you think of a strategy to bring to land former discards				

<b>UNDER THE LANDINGS OBLIGATION:</b>					
Which incentives are needed to ensure compliance choose from 1 to 5, with 5 more important and 1 less important					
59] Changing the current fisheries management system	1	2	3	4	5
60] Reducing taxes to fishers	1	2	3	4	5
61] Improving the system of selling fisheries products	1	2	3	4	5
62] Improving enforcement of fisheries regulations	1	2	3	4	5
63] Increasing the cases of exemptions to the Landings Obligation	1	2	3	4	5
64] Working at the consumer level to promote consumption of "discards-free" fisheries products	1	2	3	4	5
65] Increase fishers' awareness through workshops and courses	1	2	3	4	5
66] Working on new control and monitoring techniques that give a premium to compliant fishers	1	2	3	4	5

<b>FATE OF UWC BROUGHT TO LAND</b>				
	metier or fishing strategy 1)	metier or fishing strategy 2)	metier or fishing strategy 3)	metier or fishing strategy 4)
67] What commercial or non commercial destination do you foresee for UWC brought to land?				
68] Will the landings obligation represent a major derangement of your activity?				
69] Do you think the landings obligation will help ensure sustainable EU fisheries? <sup>8</sup>				

<b>INFRASTRUCTURE AT THE LANDING SITES</b>	
70] Is there in the landing site any infrastructure (e.g. managed by the Municipalities or by the fishermen Association) devoted to storage of fish	
71] Do the national law on waste requires that the discarded catches to be considered as special waste? If so, would you summarize below the main regulations to be applied (reference)? (*)	
72] Is there any infrastructure for storage, processing and freezing the landed unwanted fishery catches nearby? (yes or not)	
73] Is in your country or region any structure (processing plant) producing pet food or fish meal (yes/no) (*)	
74] If so, how far in Km from the landing port? (*)	

(\*) Central Agency and/or Local Authorities feedback can be requested.

<sup>8</sup> for EU fisheries in general; the question on the previous page referred to local fisheries

## Appendix 2 – Authorization

fishers who agreed to be interviewed were requested to sign the following document (translated into local languages) to grant the project MINOUW the right to use the data collected during the interview.

### MINOUW (EU H2020 RIA project 634495)



#### DISCLAIMER

Authorization for the exploitation of data collated during personal interviews in the course of the MINOUW project exclusively for scientific purposes and at an aggregated level, ensuring the anonymity of the respondent.

The undersigned:

Mr. \_\_\_\_\_ / \_\_\_\_\_ Ms.

with identity document number \_\_\_\_\_

Understanding that:

- He/she has been interviewed for scientific purposes only,
- He/she may appear in audio / video recordings related to the interview process,
- All information will be exploited at the aggregate level, without reference to personal data,
- The MINOUW Consortium and any persons acting on its behalf will follow European and national codes of privacy and best practices (Data Protection Directive 95/46/ EC; Regulation (EC) No 1882/2003),

Authorizes to:

- The MINOUW Research and Innovation Action the use of data resulting from the interview process in any support (paper or digital) for the purpose of scientific dissemination of the project research.

Signed at \_\_\_\_\_, on \_\_\_\_\_

Signature \_\_\_\_\_

## Appendix 3 – Acronyms used

CS	Case study
DRB	Dredge
GTR	Trammel and Gillnets
LO	Landings Obligation
LOA	Length Overall (m)
OTB	Otter Bottom Trawl
PS	Purse Seine
VL	Vessel Length

## The MINOUW Consortium



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