STUDY ON ARTICLE 17
OF THE COMMON FISHERIES POLICY

METHODOLOGICAL CONSIDERATIONS OF AN ALLOCATION OF FISHING QUOTAS BASED ON SOCIAL AND ENVIRONMENTAL CRITERIA.

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Study on Article 17 of the common fisheries policy.
Methodological considerations of an allocation of fishing quotas based on social and environmental criteria.

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FOREWORD

In the European Parliament, where I am elected since 2019, I am fighting for more sustainable and fairer fisheries, for a fisheries system that respects the ecosystems and fish stocks on which it depends, but also for fisheries policies that treat every fisherman or fisherwoman with dignity.

At the end of each year, the fisheries ministers of each EU Member State meet to set the TACs (total allowable catches), often called quotas, which define how much of each fish species will be caught during the year. These quotas are then distributed among the Member States. But few people are interested in the rest of the process. How are the fishing quotas distributed among the different fishers and producer organisations? The Member States have a free hand in deciding this allocation. Only an article in the basic regulation of the Common Fisheries Policy obliges them, in theory, to use objective and transparent criteria, including economic, social and environmental criteria. In reality, many states are opaque and very few use social or environmental criteria. Little or nothing is done to encourage fishers who implement more environmentally friendly practices. Industrial fishing manages to take advantage from this system, at the expense of small-scale fishers who provide a living for coastal areas.

In order to prepare a parliamentary report on the subject, I asked VertigoLab to imagine how social and environmental criteria could be put in place and to calculate what effect this could have on the economy or employment.

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SUMMARY OF THE STUDY

The European Union's common fisheries policy primarily aims to ensure the sustainability of fisheries and to guarantee stable income and jobs for fishers. This mission is reflected in particular in the management of the impact of fisheries on fish stocks through the establishment of total allowable catches (TAC) that determine the number of landings that can be made in a year. These TACs are then allocated among member countries, then within these countries among producers according to their past fishing activities. This current allocation of quotas does not allow fishing opportunities to be guided towards practices with a lower environmental impact.

In order to reduce the impact of fisheries on biodiversity, it seems crucial to guide fishing opportunities towards lower-impact fisheries. In order to inform policymakers, the socioeconomic impact of incorporating environmental and social criteria in the allocation of quotas needs to be assessed.

This study offers a methodological consideration of the allocation of fishing quotas according to social and environmental criteria, the latter of which are based on the analysis of the relevance of these fishing quota reallocation criteria, their scoring, the establishment of application scenarios and the assessment of the socioeconomic impacts.

The reallocation of quotas in favour of environmental and social criteria also appears to positively impact GDP and employment. Indeed, this kind of reallocation would affect the entire value chain and the use of the ImpacTer model would allow changes in sectors beyond the fishing sector to be anticipated.

In the two reallocation scenarios described, an increase in direct socioeconomic impacts and European fishing figures in terms of production, employment and value added can be expected at the same time as positive environmental and social impacts. Scenario 1, which proposes reallocating 10% of active gear volumes to passive gears while remaining in the same length category, proves more appealing in terms of its impacts on production and the indirect impacts on employment and value added. In fact, the direct and total impacts on production are almost 8 and 11% higher, respectively, compared to the baseline scenario. The total impacts on value added are greater than 8.3%, and total impacts on employment are 15.8% higher than in the baseline scenario. Scenario 2, allowing 10% of vessel volumes to be reallocated to the lower size class and for the same gear category, is more advantageous because of its direct impacts on employment and value added. In fact, the direct impacts on employment rise by 8.1%, and the direct impacts on value added are 20.2% higher than in the baseline scenario. Lastly, during this study various issues were identified that would benefit from more in-depth consideration (for example, the availability of data to inform durability criteria, criteria selection and the geographical scope of the analysis).

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1. CONTEXT AND OBJECTIVES

The European Union's common fisheries policy (CFP) primarily aims to ensure the sustainability of fisheries and to guarantee stable income and jobs for fishers. This mission is reflected in particular in the management of the impact of fisheries on fish stocks through the establishment of Total Allowable Catches (TAC) that determine the volumes of fish that can be caught in a year. These TACs are then allocated among member countries, then within these countries among producers according to their past fishing activities. The latter are established according to the average catch for each producer during the reference years of 2001, 2002 and 2003.

The current allocation of fishing quotas [1] by the member states does not allow fishing opportunities to be guided towards practices with a lower environmental impact and/or a positive effect on the social aspects (e.g. the creation of local jobs or the reduction of risks aboard fishing vessels). With regard to the environment, a report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [2] (IPBES) from 2019 gives fishing as the most important factor in the loss of biodiversity and the degradation of marine ecosystems. It is then a question of examining the reallocation of quotas, which would depend on the fulfilment of the environmental and social objectives. In order to inform political decisions, it is necessary to assess the socioeconomic impact of incorporating these criteria.

Such consideration falls within the framework of Article 17 of the CFP of (EU) Regulation 1380/2013 that covers 'Criteria for the allocation of fishing opportunities by member states' and states that 'when allocating the fishing opportunities available to them, as referred to in Article 16, Member States shall use transparent and objective criteria including those of an environmental, social and economic nature'.

In order to guide the allocation of quotas towards one fleet or another, it is necessary to establish a set of criteria to be taken into account and to assess these criteria for different types of fishing. A number of studies seek to score fleets or gears based on their impacts or to identify relevant criteria to be incorporated in this scoring process (e.g. Dewals and Gascuel, 2020; William and Carpenter, 2015 [3]). This involves providing elements substantiating the allocation of fishing resources to fleets with the aim of focussing on socioeconomic benefits in the territories and minimising the impacts on the environment.

This theoretical study performed at the European level aims to provide methodological elements capable of informing consideration of the incorporation of environmental and social

1 The member countries decide how the quotas are subdivided and then allocated within their fishing fleet, including any method or criterion used for the allocation. According to the study by Carpenter, G. & Williams, C. from The News Economics Foundation (2021), only 12 out of 22 countries use one or more of the environmental criteria in their allocation, while the past activity criterion remains the most used.

2 the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), Global assessment report on biodiversity and ecosystem services, 2019.

3 Williams, C. & Carpenter, G., NEF working paper, European Seabass in the UK: A test case for implementing Article 17 of the reformed CFP, 2015.

criteria in the allocation of quotas. To do this, a macroeconomic analysis was performed on the basis of theoretical reallocation scenarios in order to identify trends. The technical feasibility of the scenarios was not taken into account. We seek, first of all, to choose a set of easily measurable and relevant criteria that can provide guidance on the impacts of the different types of fishing. Secondly, the criteria were assessed for the different categories of fleet in order to guide the theoretical exercise of reallocating the quotas. Finally, the direct, indirect and induced socioeconomic impacts of each category were calculated according to a baseline (STECF data, 2019) and two European Union-level reallocation scenarios. In the final section, we analyse a practical case, that of tuna in France caught in the Mediterranean.

II. SELECTION OF ENVIRONMENTAL AND SOCIAL SUSTAINABILITY CRITERIA FOR EUROPEAN FISHERIES.

In order to inform policy guidelines, we propose defining a set of sustainability criteria characterising European fisheries that can guide the allocation of fishing quotas. These criteria must account for the environmental and social challenges and they must be measurable using currently available data. They will be determined based on a literature review and discussions with a number of European experts (see the list in Annex 1).

To select the criteria, we will ask the following questions:

- Can this criterion provide guidance on the environmental or social impact of the fishing activity?
- Is this impact considered a priority for the fishing sector?
- Is this criterion already measured for different types of fishing and are data sources to characterise it currently available?
- For criteria that are not currently measured for all fisheries, would it be feasible to expand their assessment?
- Do the criterion assessment method and the associated results have consensus support among the scientific and socio-occupational communities?
- Is this criterion sufficiently representative of fishing practices at the European level?
- Does this criterion allow all fishing practices to be characterised at the European level?
- To which stocks and types of gear is this criterion relevant or not relevant?

1.INITIAL LIST OF CRITERIA

In order to determine the sustainability of a fishing fleet, three dimensions need to be taken into account: environmental sustainability, economic sustainability and social sustainability. In this study, environmental and social sustainability are considered as input data, while economic sustainability is calculated in parts III and IV.

We propose drawing on the works of Dewals and Gascuel (2020) [4], who present a consideration of the criteria to be used to determine the sustainability of fishing fleets in France.

4 Dewals, J-F, & Gascuel D., Dimensions, criteria and indicators of sustainability of French fisheries, Pre-study – progress report, Publications of the Fisheries Centre of AGROCAMPUS OUEST, 2020, p. 59.

Table 1: Dimensions and criteria of environmental and social sustainability of French fisheries from the works of Dewals and Gascuel (2020)

Dimensions		Criteria
Environmental	Management of the exploited resource	Scientific coverage State of the exploited stocks Exploitation pattern Dependence on species impacted by climate change
	Impact on habitats	Fishing in sensitive habitats Impact on the seafloor
	Impact on biomasses and biodiversity	Unwanted catches Catches of sensitive species Ecosystem health
	Environmental footprint	Carbon footprint Pollution footprint Macro-waste Lifecycle of the means of production
Social	Employment	Job creation Compensation Social justice in employment Labour law and social rights On-board safety
	Link to the territory	Economic contribution Contribution to local jobs Social and cultural contribution Territoriality of capital holders
	Attractiveness of the sector	Working conditions Image of fishing
	Quality of the decision-making processes	Diversity of actors involved Transparency Science-based
	Regulations	Surveillance and monitoring Conflict management

2. CATEGORISATION OF FISHING GEARS

In order to carry out this exercise, it is necessary to rely on a categorisation of fishing gears. Given the number of these in community waters, the practices have been split into six categories based on fishing gear size and type criteria (passive, active).

This categorisation is based on the typology used in the Data Collection Framework of the Scientific, Technical and Economic Committee for Fisheries (STECF). The fleet segments are defined as groups of vessels of the same size class (Length Overall Measurement - LOA) and with a prevailing metier during the year according to European legislation [5].

There are six length classes: 0-< 10 m, 10-< 12 m, 12-< 18 m, 18-< 24 m, 24-< 40 m and 40 m or larger, which were brought together into three classes of 0-<12 m, 12-<24 m and larger than 24 m.

The gear types are then categorised into two families:

- Passive gears do not move; it is the movement of the fish that causes them to get caught, like a trap. In this category are pots, the different types of longlines, and angling and net fishing.
- Active gears are moved along the seafloor or through the water to catch the animals sought. In this category are dredges, the different types of trawls and seines.

Type of gear	**STECF acronym**	**Vessel's main metier**
Passive	DFN	Drift nets
	HOK	Hooks
	FPO	Pot vessel
	PG	Various passive gears
	PGO	Various passive gears
	PGP	Various passive gears only
	PMP	Various active and passive gears
Active	MGO	Various active gears other than beam trawls, bottom trawls and pelagic trawls and seines.
	MGP	Various active gears only
	DRB	Dredgers
	DTS	Trawls/demersal seiners
	PS	Demersal seiners
	TBB	Beam trawlers
	TM	Pelagic trawls

5 See Appendix III of 2010/93/: Commission Decision of 18 December 2009 adopting a multiannual Community programme for the collection, management and use of data in the fisheries sector for the period 2011–2013 (notified under document C(2009) 10121) and Annex, Chapter I of Commission Implementing Decision (EU) 2016/1251 of 12 July 2016 adopting a multiannual Union programme for the collection, management and use of data in the fisheries and aquaculture sectors for the period 2017–2019 (notified under document C(2016) 4329).

The classification is also in line with the definitions commonly used at the European level. Thus, the category of small-scale coastal fisheries includes vessels of less than 12 m using passive fishing gears[6].

Type of gear/size	0-<12 metres	12-<24 metres	> 24 metres
Passive	*Category 1*: D < 12	*Category 3*: D 12–24	*Category 5*: D > 24
Active	*Category 2*: T < 12	*Category 4*: T 12–24	*Category 6*: T > 24

Note: The proposed categorisation does not allow differences that may exist between gears within these categories to be taken into account. For example, within categories 2,4 and 6, taking into account whether the gear is pelagic or demersal would allow the impacts to be defined in more detail, in particular the impacts on the seafloor. Therefore, it is necessary to perform a more detailed analysis in order to identify these impacts in the operational application of our methodology.

3. ANALYSIS OF THE SOCIAL AND ENVIRONMENTAL CRITERIA

The table below presents an analysis of the different criteria used in our quota reallocation approach. To this end, various aspects are discussed:

- **The priority** of the criterion with regard to the impacts of fishing on the environment. Fishing practices create pressures of different intensities, and ecosystems or species do not have the same level of sensitivity to different pressures. Thus, it is a question of prioritising criteria that can provide information on the impacts recognised as being the most significant for the environment.
- **The relevance of reallocating quotas among fishing gears to improve the sustainability criterion.** Some criteria are not discriminatory for different fishing gears. For example, the dependence on species impacted by climate change may be the same for passive and active gears of less than 12 metres fishing the same species.
- **The availability of data**. For some criteria, data are only available in case studies (e.g. for a gear in a specific geographic area). For our analysis, criteria that can be completed for all categories have been favoured.

Analysis of the environmental criteria.

There are various types of environmental criteria, such as criteria directly related to the exploited species (e.g. link to climate change, trophic level), criteria related to fishing effort (e.g. management of the resource, scientific coverage, exploitation pattern) and criteria related to the mode of exploitation in terms of fishing gears (e.g. the impact of the gears on habitats, equipment used). It is then a question of seeing which sustainability criteria can be leveraged to reduce the impact of fishing on the environment.

6 COM(2018) 390 final, 2018/0210 (COD), Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the European Maritime and Fisheries Fund and repealing Regulation (EU) No. 508/2014 of the European Parliament and the Council.

	Environmental criteria: 1) Management of the exploited resource					
Criterion	**Sustainability criterion**	**Description**	**Priority in relation to the impacts of fishing on the environment**	**Relevance of the reallocation of quota among fishing gears to improve the sustainability criterion.**	**Management tools complementary to quotas and management scale**	**Evaluation method (quantitative or qualitative) and data used**
Scientific coverage	The exploited stock is subject to good-quality scientific assessment.	Quality of the ICES assessment of the stock exploitation level.	**High** In 2018, out of the 397 fish stocks exploited by EU fleets, 168 were scientifically monitored ([7]).	**Low** In the case of management using quotas, the scientific assessment of the ICES is the same for all fleets exploiting the species being assessed.		**Criterion not used for the study**
State of the harvested stocks	The exploited stock is in good condition.	Assessment of the condition of the stock (e.g., good, over-harvested)	**High** In 2018, roughly 37% of known European fish stocks were sustainability exploited ([8]).	**Low** In the case of management using quotas, the level of exploitation is the same for all fleets exploiting the stock.		For the purposes of the study, the stock is considered exploited at the maximum sustainable yield (MSY). **Criterion not used for the study.**

7 https://www.stats-et-peche.fr/ Nevertheless, the information report submitted by the European Affairs Committee on sustainable fishing for the European Union notes that "the concern that TACs are still not sufficiently in line with scientific recommendations is regularly raised. For the fisheries of the North East Atlantic, for example, 32% of TAC proposed by the European Commission in November 2018 exceed scientific recommendations. Finally, 41% of TAC adopted by the Council in 2018 exceeded scientific recommendations'. https://www.assemblee-nationale.fr/dyn/15/rapports/due/l15b2175_rapport-information#

8 Scientific, Technical and Economic Committee for Fisheries (STECF), Monitoring the performance of the Common Fisheries Policy (STECF-Adhoc-19-01).

Exploitation pattern	The exploitation pattern (mesh size and/or minimum size) of the fishery limits its impact on the exploited stocks.	This criterion makes it possible to assess whether the fleet maintains low mortality in the first age classes. It can be measured using the following indicators: 1) Size indicator, 2) Mortality indicator, 3) Impact on the stock.	**High** The improvement of the exploitation pattern tends to bring the exploitation of the stock closer to the objective of the MSY (reduced fishing mortality). [9]	**Low** This criterion does not depend on the fishing categories as defined in the study, nor on a specific metier (although some metiers have greater selectivity). The regulation of minimum catch sizes applies to all metiers.	This criterion could be used at a local scale for quota management. A quota bonus could be allocated to vessels improving this criterion (e.g., working to increase mesh net size).	To date there are no data distinguishing the types of metier in relation to this criterion. There is a working group within the STECF to assess fleets based on the stock exploitation pattern. **Criterion not used for the study.**
Dependence on species impacted by climate change	The species is impacted by climate change.	The stock is identified as impacted by climate change.	**Weak** Climate change has an impact on the general distribution of species. Climate change may lead to a local reduction or increase in fishing opportunities [10].	**Low** As this criterion is species-specific, it does not distinguish between fishing metiers.		**Criterion not used for the study.**

9 IFREMER, https://wwz.ifremer.fr/peche/Archives/Precisions-sur-les-diagnostics
10 Cheung, W. W., Lam, V. W., Sarmiento, J. L., Kearney, K., Watson, R. E. G., Zeller, D., & Pauly, D., Large-scale redistribution of maximum fisheries catch potential in the global ocean under climate change, Global Change Biology, 16(1), 2021, pp. 24–35.

	Environmental criteria: 2) Impact on habitats *These criteria only relate to gears operating on the seafloor, or active gears.*					
Criterion	**Sustainability criterion**	**Description**	**Priority in relation to the impacts of fishing on the environment**	**Relevance of the reallocation of quota among fishing gears to improve the sustainability criterion**	**Management tools complementary to quotas and management scale**	**Evaluation method (quantitative or qualitative) and data used**
Impact on the seafloor	Minimising the impact on the seafloor	This criterion takes into account three impact sizes: - The footprint of each gear used (surface affected by the gear per fishing hour), - The degree of penetration of the gear, - The ecosystems' recovery time	**High**	**High** Management using quotas allows the minimisation of impacts on the seafloor to be taken into account. This criterion is in fact discriminating because it attributes an impact only to active gears (excluding demersal trawls).		Available studies on the assessment of the impacts of active gears on habitats [11]. **Criterion used for the study with a qualitative assessment.**

11 STECF - Scientific, Technical and Economic Committee for Fisheries, Criteria and indicators to incorporate sustainability aspects for seafood products in the marketing standards under the Common Market Organisation (STECF-20-05), *Potential impact on* the seafloor of detailed gears, 2020, p.44

Fishing in sensitive habitats	Fishing minimises its activity in areas containing sensitive habitats.	This criterion allows the part of the fishing area that does not contain sensitive habitats to be assessed.	**High**	**Moderate** This criterion is in fact discriminating for active gears, but the criterion also depends on fishing areas.	European-level quota management is not the right tool to work on minimising this impact. This criterion depends on local management using planning tools (e.g. Marine Protected Areas). This criterion could be used on a local scale for quota management. A quota bonus could be allocated to vessels that minimise their impact on sensitive habitats.	Studies currently exist locally to characterise fishing areas and assess the cumulative impacts on habitats. However, numerous fishing areas are not well known (VMS [12] are not required for vessels smaller than 12 m). **Criterion not used for the study.**

12 A Vessel Monitoring System (VMS) is a satellite monitoring system for fishing vessels that provides data on the position, route and speed of vessels to the authorities at regular intervals. These have been mandatory for professional fishing vessels larger than 12 m under the flag of the European Union since 1 January 2012.

Impact on biomass and biodiversity	Unwanted catches (not the correct size or exceeding the quota)	Proportion of unwanted catches and discards in the fleet's total catches.	**High**	**High** Criterion partially dependent on fishing techniques. On average, passive gears are less selective than active gears, but there is a certain degree of heterogeneity within the categories (e.g., bottom and pelagic trawls)		Lack of monitoring of unwanted catches. Estimation per species, with the possibility of orders of magnitude per gear (difference between active and passive). Project Horizon2020 DiscardLess [13] **Criterion used for the study with a qualitative assessment.**
	Catches of sensitive species	Minimising the impacts on the species (International Union for the Conservation of Nature (IUCN) red list, species subject to conservation measures, species of fishing interest or zero quota species, Annex 1 of CFP Technical Regulation, Barcelona Convention).	**High** Major issue of marine biodiversity conservation and regulatory obligation (CFP, MSFD [14], Habitats Directive [15]).	**Moderate** The impact depends on the gear and the target species. A distinction can be made between passive gears (impacts on megafauna) and active gears (impacts on protected fish species).	Other management tools can be effective at reducing this impact (e.g. planning, technical measures such as scaring methods, net sizes).	There are existing data on the signalling of these catches (obligation), but a study is necessary to assess the homogeneity within a pseudo fleet (gear-species-area). See ICES, 2020 [16]. **Criterion not used for the study.**

13 Project Discardless http://www.discardless.eu/
14 MSFD: Marine Strategy Framework Directive
15 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
16 ICES, Working Group on Bycatch of Protected Species (WGBYC), ICES Scientific Reports, 2:81, 2020, pp. 216, http://doi.org/10.17895/ices.pub.7471

	Environmental criteria: 3) Environmental footprint of the activity					
Criterion	**Sustainability criterion**	**Description**	**Priority in relation to the impacts of fishing on the environment**	**Relevance of the reallocation of quota among fishing gears to improve the sustainability criterion**	**Management tools complementary to quotas and management scale**	**Evaluation method (quantitative or qualitative) and data used**
Carbon footprint (fuel consumption) [17]	The fleet has a minimal carbon footprint	This criterion allows an estimation to be made of the CO_2 emitted per tonne of landed volume. Fuel consumption expressed as litres per landed tonne allows an estimation to be made.	**High** The greenhouse gas emissions linked to fishing practices are high. With a consumption of 40 billion litres in 2011, the fishing sector generated a total of 179 million equivalent tonnes of CO_2 (4% of global food production) [18]. Favouring types of fishing that reduce their CO_2 emissions helps provide low-carbon food.	**High** Discriminating for the different types of active gears. This indicator is calculated at the vessel level (landed product). This criterion makes it possible to differentiate between fishing practices, in particular between passive and active gears. Consumption differences are also expected between inshore and offshore vessels, however, the differences are likely to diminish in relation to the volumes fished. This is therefore an indicator that allows the impact of the types of fishing on climate change to be assessed.		Official declarative figures for energy consumption (in litres) in the STECF data. Easily measurable criterion with reliable data. **Criterion used for the study with a quantitative assessment.**
Pollution footprint	The fleet has a weak footprint (excluding CO_2) on the environment	This criterion allows for an estimation of the pollution (excluding greenhouse gases) emitted per tonne of fish caught. This provides information on the impacts on water acidification, eutrophication, and human and aquatic toxicity, etc.	**Weak** This criterion is not a priority for the fishing sector (relatively low impacts compared to other impacts generated by fishing, and compared to other sectors).	**High** Reallocating quotas, taking into account efforts to minimise pollution, is relevant for reaching environmental goals. This criterion does not allow for the differentiation of fishing types and categories as defined in the study. Indeed, pollution is more related to the materials used than to fishing practices.		Data allowing this sub-criterion to be studied are not available for all categories studied. This is a current topic of research, particularly in relation to life cycle analyses (LCA) of fish products. **Criterion not used for the study.**
Macro-waste	The fleet produces a minimum quantity of macro-waste during its fishing activity.	This criterion provides an estimate of the waste produced per tonne of product landed.	**Moderate** Reducing macro-waste from fishing would reduce the impacts of fishing on biodiversity (e.g. ghost nets). Most of this pressure comes from land via rivers or coastal discharges.	**Low** This criterion makes it possible to differentiate between types of fishing based on their plastic use. In our study, however, the categories are too aggregated to distinguish a trend within a category.	At a local level and in relation to local fishery management bodies, certain quota bonuses could be allocated for vessels using fishing gears made of biodegradable material or taking part in waste monitoring or collection projects.	There are some local and one-off assessments [19]. **Criterion not used for the study.**

17 This criterion only accounts for carbon from fuel consumption and not carbon sequestered in the sediment that may be released during bottom trawling into the water column and subsequently into the atmosphere (see Sala, E., Mayorga, J., Bradley, D., Cabral, R. B., Atwood, T. B., Auber, A., ... & Lubchenco, J., Protecting the global ocean for biodiversity, food and climate, Nature, 592(7854), 2021, pp. 397–402.).

18 Parker, R. W., Blanchard, J. L., Gardner, C., Green, B. S., Hartmann, K., Tyedmers, P. H., & Watson, R. A., Fuel use and greenhouse gas emissions of world fisheries, Nature Climate Change, 8(4), 2018, pp. 333–337.

19 STECF–Scientific, Technical and Economic Committee for Fisheries, *Criteria and indicators to incorporate sustainability aspects for seafood products in the marketing standards under the Common Market Organisation* (STECF-20-05), 2020, p. 47 and Report by France AgriMer, *Reduction of the environmental impact of plastics used in the fishing and aquaculture sector*, 2020, p. 126

Lifecycle of the means of production	The fleet's means of production (vessel hull, nets) are mostly biodegradable or recyclable.	This criterion allows an estimate to be made of the pollution linked to the materials and means of production.	No data currently available **Criterion not used for the study.**
Moderate			
High It could be interesting, at the local level, to allocate quota bonuses to vessels using biodegradable materials or involved in an approach to minimise pollution linked to production tools. This criterion does not depend on the fishing categories as defined in the study, nor on a specific metier. In addition, the regulations apply equally to all gears. It then depends on the choices made at the vessel level.			

The main limitation of using many environmental criteria is the accessibility of data for different types of gear, species and habitats. Thus, at the European level, the level used for the current study, aggregated data can be used. However, they will not be representative of all fishing behaviour. At the level of local characterisation of the fleets, studies carried out locally could then complete these general data.

Thus, for environmental criteria, only the assessment of energy efficiency can be based on robust quantitative data. A qualitative estimate based on a literature review can be made to propose an assessment of the impact of unwanted catches and the impact on the seafloor.

Analysis of social criteria

This is a question of seeing which exploitation system maximises benefits to society.

	Social criteria: **1) Employment**		
Criterion	**Sustainability criterion**	**Description**	**Evaluation method (quantitative or qualitative) and data used**
Job creation	The fleet creates direction employment	Direct employment created on the territory per tonne of landed fish	STECF data **Criterion used for the study.**
Compensation	The average salary within the fleet is high	Comparison to the average salary received by fleets	STECF data **Criterion not used for the study because of significant heterogeneity within the categories defined.**
Social justice in employment	The fleet allows for diversity in employment	Fairness of pay Gender equity Intergenerational equity	Point data **Criterion not used for the study.**
Labour law and social rights	The fleet respects labour law and provides social security	Rate of violation of labour law Rate of social security coverage via an additional mutual fund	Point data **Criterion not used for the study.**
On-board safety	The number of maritime accidents is low		Point data **Criterion not used for the study.**
	Social criteria: **2) Link to the territory**		
Criterion	**Sustainability criterion**	**Description**	**Evaluation method (quantitative or qualitative) and data used**
Economic contribution	The fleet lands significant quantities of product on the territory, which contributes to its economic vitality.	Value of landings in the territory	Analysis of STECF data with the ImpacTer model **Criterion not used for the study as input data as the criterion was used as output data.**

Contribution to local jobs	The fleet employs a large number of '**locals'.**	Wage bill remaining on the territory	Point data **Criterion not used for the study.**
Social and cultural contribution	The fleet carries out its activity in a territory where fishing creates a **tourist attraction**	The number of people visiting a fishing museum on the territory or a fishing-related cultural event.	Point data **Criterion not used for the study.**
Territoriality of capital holders	The capital owners of the fleet are people close to the territory.	Parts of the capital held at the local, national or European level	Point data **Criterion not used for the study.**
	Social criteria: **3) Attractiveness of the sector**		
Criterion	**Sustainability criterion**	**Description**	**Evaluation method (quantitative or qualitative) and data used**
Working conditions	The **work rate** appears moderate		Point data **Criterion not used for the study.**
Image of fishing	**The image of the fleet** is not an obstacle to recruiting young people.		Point data **Criterion not used for the study.**

The criteria used for the exercise are:

Dimension	**Criteria**
Environmental	Carbon footprint (fuel consumption), unwanted catches, impact on the seafloor
Social	Job creation

III. ASSESSMENT OF THE ENVIRONMENTAL AND SOCIAL CRITERIA FOR FISHERIES IN EUROPE

The assessment of the criteria used for all fishing categories defined in this study (Section I.1) is presented below quantitively based on data from the STECF database (if these data exist) or qualitatively based on the review of the literature and information collected from the aforementioned European experts.

In this study, we make the following assumptions:

- The exploited stocks are subject to good-quality scientific assessment.
- The stocks are all subject to quotas
- The quotas defined allow for good management of stock exploitation (at the MSY).

As the analysis was performed at the European level and aggregated, the scores produced can only provide trend elements. Any assessment performed on a smaller scale (taking into account the gear, the species and the fishing area) would need to use more specific data allowing more specific results to be obtained.

The scoring scale is presented below.

Environmental criteria	Social criteria
Very weak	**Very strong**
Weak	**Strong**
Weak - Moderate	**Strong - Moderate**
Moderate	**Moderate**
Moderate - Strong	**Moderate - Weak**
Strong	**Weak**
Very strong	**Very weak**

This scoring scale is used for all criteria assessed quantitatively or qualitatively. The study seeks to compare the fishing categories to each other and no threshold value is proposed. The aim is to minimise the environmental impacts of fishing and maximise its social impacts.

1. SCORING OF CRITERIA

Unwanted catches

Unwanted catches: This criterion is a major challenge in fishery management, and despite the lack of precise data, different assessments allow this criterion to be qualitatively characterised. We therefore decided to use the data from the study by Roda et al. (2019) [20] on discards to perform a qualitative assessment. The data used present the rates of unwanted catches, specifically the volume of unwanted catches for the landed volume. An extract of this data is presented in Annex 2.

Unwanted catches	**0-<12 metres**	**12-<24 metres**	**> 24 metres**
Passive	*Very weak*	*Weak*	*Weak*
Active	*Moderate*	*Strong*	*Strong*

A distinction can be made between gears; passive gears have a relatively weak impact compared to active gears. The size is another element that allows a distinction to be made between the categories with a lower rate of unwanted catches for the categories of less than 12 metres [21].

Impact on the seafloor

Impact on the seafloor: This criterion is a major challenge for fishery management. Various studies have been performed that characterise its impacts. Several elements need to be taken into account, such as the type of target species (demersal, pelagic), the type of substrate and the type of gear. We opted to use the study carried out by the STECF (2020) [22] that characterises these impacts based on the gear and the species and substrate. An extract of this study is presented in Annex 3.

Impact on the seafloor	**0-<12 metres**	**12-<24 metres**	**> 24 metres**
Passive	*Weak*	*Weak*	*Weak*
Active	*Moderate - Weak*	*Strong*	*Strong*

The impacts are relatively strong for active gears. However, for active gears not touching the seafloor, such as pelagic trawls, the impact is weak.

20 Roda, M. A. P., Gilman, E., Huntington, T., Kennelly, S. J., Suuronen, P., Chaloupka, M., & Medley, P. A., A third assessment of global marine fisheries discards. Food and Agriculture Organization of the United Nations, 2019, (see pp. 41 and 42)

21 The categories of our study aggregate a large number of gears, so a certain degree of heterogeneity may exist within the same category.

22 STECF–Scientific, Technical and Economic Committee for Fisheries, Criteria and indicators to incorporate sustainability aspects for seafood products in the marketing standards under the Common Market Organisation (STECF-20-05), 2020, (see p. 44)

Carbon footprint (fuel consumption)

The carbon footprint related to fuel consumption: The STECF database [23] allows this indicator to be precisely and quantitatively completed for each type of gear. The average fuel consumption for the landed volume is calculated for each category.

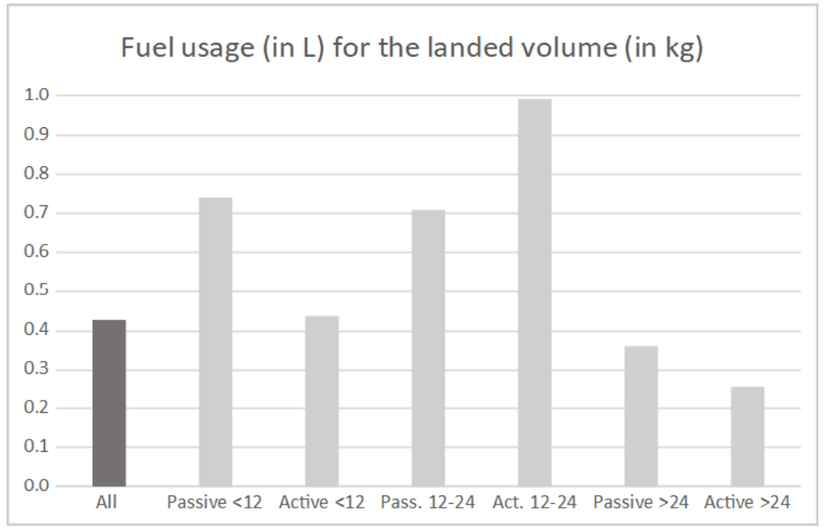


Figure 1: Fuel consumption for the landed volume (in L/kg)

Table 2: Fuel consumption (in L) by EU vessels per landed volume (in kg), based on STECF data (2018)

	All categories	Passive <12	Active <12	Passive 12–24	Active 12–24	Passive >24	Active >24
Fuel consumption (in L) per landed volume (in kg)	0.427	0.739	0.437	0.708	0.991	0.359	0.255

Based on STECF data, on average per 1 kg of landed fish, a vessel uses 0.43 L of fuel. The vessels using the most fuel per kg of landed fish are those 12–24 metres in size, using active gears. Vessels with passive gears less than 24 metres in size use the same amount of fuel per kg of landed fish, roughly 0.72 L/kg. Active gears' high usage is explained by the fuel needed to drag the nets along the seafloor. An economy of scale can be observed for vessels less than 24 metres in size; the volumes landed by these vessels are particularly high.

Thus, we can give them the following qualitative scores.

Fuel consumption	**0-<12 metres**	**12-<24 metres**	**> 24 metres**
Passive	*Strong*	*Strong*	*Weak - Moderate*
Active	*Moderate*	*Very strong*	*Weak*

23 Table 2018-07_STECF 18-07–EU Fleet Economic and Transversal data accessible on the STECF site: https://stecf.jrc.ec.europa.eu/reports(see bibliography for exact link).

Direct jobs and figures

The assessment of this criterion is performed qualitatively based on employment data from the STECF [24] and the use of the ImpacTer model presented in the following section.

Two employment indicators are used:

- The first corresponds to **direct FTE jobs** created by the fishing activity (fishers, skippers and sailors)
- The second corresponds to **direct and induced FTE jobs** generated by fishing [25].

Table 3: Number of direct, indirect and induced jobs linked to fishing in Europe according to the 6 categories (in FTE)

	FTE jobs			FTE jobs/Landed volume (kt)		
	Direct effects	**Indirect + induced effects**	**Total impacts**	**Direct effects**	**Indirect + induced effects**	**Total impacts**
All categories	107,135	60,663	167,798	23.9	13.5	37.4
Passive <12	42,734	8,408	51,141	161.0	31.7	192.6
Active <12	4,362	1,669	6,031	37.9	14.5	52.5
Passive 12–24	9,228	3,445	12,673	74.3	27.7	102.1
Active 12–24	23,767	14,257	38,025	25.6	15.3	40.9
Passive >24	6,350	5,360	11,709	64.4	54.4	118,8
Active >24	20,693	27,525	48,219	7.0	9.3	16.4

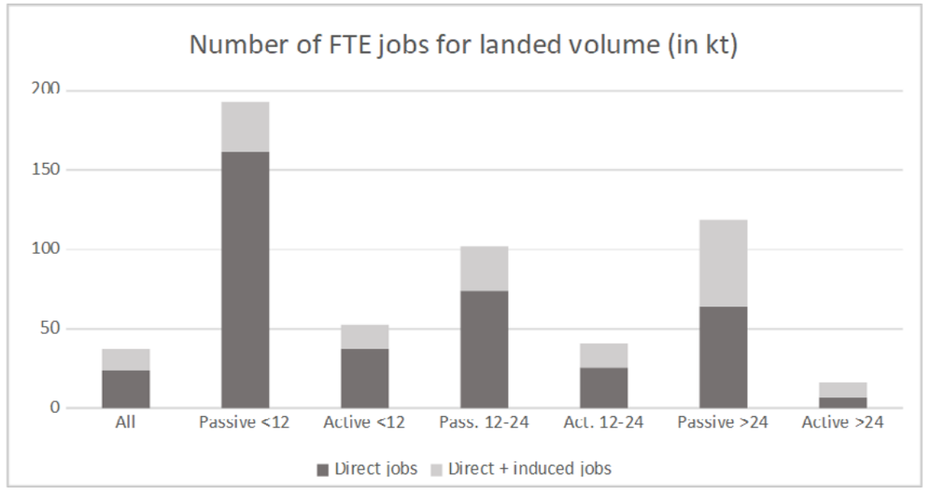


Figure 2: Graphical representation of direct, indirect and induced jobs related to fishing in Europe according to the 6 categories (in FTE)

24 Table 2018-07_STECF 18-07–EU Fleet Economic and Transversal data accessible on the STECF site: https://stecf.jrc.ec.europa.eu/reports (see bibliography for exact link)

25 The indirect jobs are those of the suppliers of fishing enterprises. Induced jobs are those generated by the daily consumption by the employees of fishing enterprises and their suppliers.

Total jobs	**0-<12 metres**	**12-<24 metres**	**> 24 metres**
Passive	*Very strong*	*Strong*	*Strong*
Active	*Moderate*	*Moderate*	*Weak*

2. SUMMARY OF CRITERIA ASSESSMENT

Impacts	Passive < 12	Passive 12–24	Passive > 24	Active < 12	Active 12–24	Active > 24
Unwanted catches	*Very weak*	*Weak*	*Weak*	*Moderate*	*Strong*	*Strong*
Impact on the seafloor	*Weak*	*Weak*	*Weak*	*Moderate-Strong*	*Strong*	*Strong*
Fuel consumption for the landed volumes	*Strong*	*Strong*	*Weak - Moderate*	*Moderate*	*Very strong*	*Weak*
Total jobs for the landed volumes	*Very strong*	*Strong*	*Strong*	*Moderate*	*Moderate*	*Weak*

IV. CALCULATION OF SOCIOECONOMIC CRITERIA FOR THE BASELINE

1. DESCRIPTION OF SOCIOECONOMIC INDICATORS CALCULATED

The ImpacTer model for the calculation of socioeconomic effects

The methodology we propose here aims to quantify the **socioeconomic effects** (in terms of production, value added and number of jobs) of fisheries on the European economy, through the **knock-on effect** that this sector generates on the other sectors of the European economy.

The socioeconomic impacts are assessed using three socioeconomic indicators:

- **Production**: this corresponds to the monetary value of the goods and services sold by a business or establishment. It is calculated based on the turnover, corrected for stock variations.
- **Value added**: this corresponds to the economic wealth created by a business or establishment. It is equal to the difference between production and intermediate consumption (i.e. purchases of non-durable goods and services destroyed or transformed during the production process: raw materials, energy products, provision of services, etc.). The value added contributes to the creation of the total French economic wealth calculated based on Gross Domestic Product (GDP).
- **The number of jobs**: this corresponds to the number of full-time equivalent (FTE) jobs (salaried and self-employed) that are supported by the production activity of an enterprise or an establishment.

Presentation of the ImpacTer model

The socioeconomic impacts are assessed using the ImpacTer model developed by Vertigo Lab. This model is used to calculate the socioeconomic impacts of an activity or spending on goods and services in a given territory. ImpacTer is based on an economic model known as the **'input-output model'**. This model was developed by Wassily Leontief, who won the Nobel Prize in Economic Sciences in 1973. This model is **robust and recognised in academic circles**. It is currently widely used in **socioeconomic impact studies**. The input-output model is based on **input-output tables** that are published annually by the statistical institutes (INSEE and EUROSTAT). These tables record, in a coherent accounting framework, trade flows of goods and services between different activities within a territory, as well as data on the production process of these activities.

The impacts of fishing on the European economy are assessed according to three impact levels (Figure 3):

- **Direct impact**: this corresponds to the production amounts, the value added and the number of fishing jobs.
- **Indirect impact**: this corresponds to the production amounts, the value added and the number of fishing jobs in supplier sectors in the upstream section of the fishing value chain. This includes direct suppliers, but also suppliers of suppliers, etc.
- **Induced impact**: this corresponds to the production amounts, the value added and the number of jobs in the sectors of activity (excluding the blue economy) that benefit from consumption by the employees who work in the fishing value chain, i.e. the employees of European fishing activity, as well as the employees of suppliers.

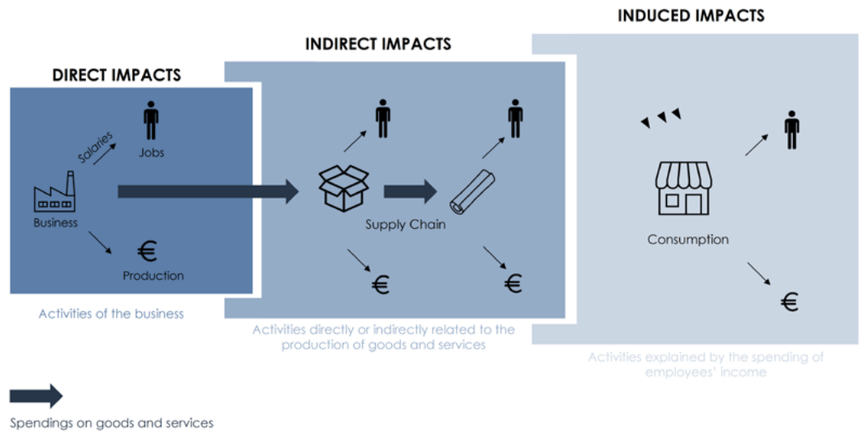


Figure 3: Chart presenting the 3 impact levels assessed (direct, indirect and induced)

The impacts of fishing in the 23 coastal countries of the European Union [26] on all 28 EU member countries [27] are calculated in the study.

2. THE SOCIOECONOMIC IMPORTANCE OF FISHING IN EUROPE

In 2018 [28], EU fishing generated €8.1 billion of production and €4.49 billion of value added. It supported a total of 107,135 FTE jobs (Table 4). Thus, the direct impacts of European fishing contribute 0.028% of Europe's GDP.

26 The 23 coastal countries of the EU are: Germany, Belgium, Bulgaria, Cyprus, Croatia, Denmark, Spain, Estonia, Finland, France, Greece, Ireland, Italy, Latvia, Lithuania, Malta, The Netherlands, Poland, Portugal, Romania, Slovenia, Sweden and the United Kingdom. The UK is included as data used is from before the UK withdrawal from the EU.

27 The EU countries are the 23 above as well as: Austria, Hungary, Luxembourg, Czechia and Slovakia.

28 The reference year used is 2018 for all EU countries except for Ireland and Bulgaria in 2017 and Slovenia in 2016.

Table 4: Direct impacts of EU fishing activities (source: Authors)

EU Fisheries		
Production (in billion €))	Value added (in billion €)	Jobs (in FTE)
8.138	4.512	107,135

The category of vessels of more than 24 metres in size using active gears has the highest production and value added in the EU, followed by the category of vessels of 12–24 metres in size using active gears, then that of vessels less than 12 metres in size using passive gears (Table 5).

Table 5: Socioeconomic importance of different fishing categories in the territory of the EU (source: Authors)

Categories	Production (billion €)	GVA (billion €)	Jobs (FTE)	Landings (kt)	Vessels (number)
All categories	8.138	4.512	107,135	4,481	71,699
P < 12	1.259	0.830	42,734	265	52,974
A < 12	0.272	0.167	4,362	115	4,492
P 12–24	0.447	0.261	9,228	124	2,704
A 12–24	2.038	1.118	23,767	930	9,299
P > 24	0.486	0.212	6,350	99	255
A > 24	3.635	1.923	20,693	2,948	1,976

Figure 4 illustrates the direct contribution of the 6 EU fishing categories. Thus, fishing vessels of less than 12 metres make up 80% of vessels and contribute 43% of jobs and 9% of landed volumes.

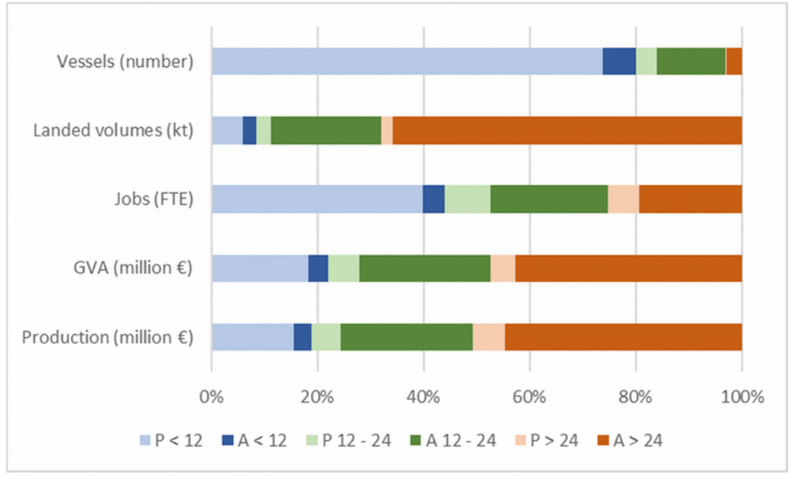


Figure 4: Direct impacts of different categories of EU fishing (source: Authors)

3. SOCIOECONOMIC EFFECTS OF FISHING IN EUROPE

Indirect and induced impacts

European fishing has impacts on the whole EU economy both through purchases from suppliers located in the territory (indirect impacts), and through consumption by workers throughout the value chain (induced impacts).

Fishing generates, within other sectors of activity in the EU (indirect and induced impacts) production of €9.7 billion, an added value of €4.2 million and supports 60,663 FTE jobs in other sectors of the European economy. **Fishing contributes (direct, indirect and induced impacts) €17.8 billion of production and €8.7 billion of value added (~0.05% of EU GDP) to the EU economy and supports 167,798 FTE jobs**.

Table 6: Summary of the socioeconomic impacts of EU fishing (source: Authors, based on results from the ImpacTer model)

		EU fisheries		
		Production (in billion €)	**Value added (in billion €)**	**Employment (in FTE)**
Baseline	Direct impacts	8.138	4.512	107,135
	Indirect and induced impacts	9.656	4.217	60,663
	Total impacts	17.794	8.729	167,798
	Multipliers	2.19	1.07	20.7

Key: On average, €1 million of production in European fisheries contributes in total (direct, indirect and induced impacts) to the European economy with €2.19 million of production, €1.07 million of value added and supports 20.7 FTE jobs.

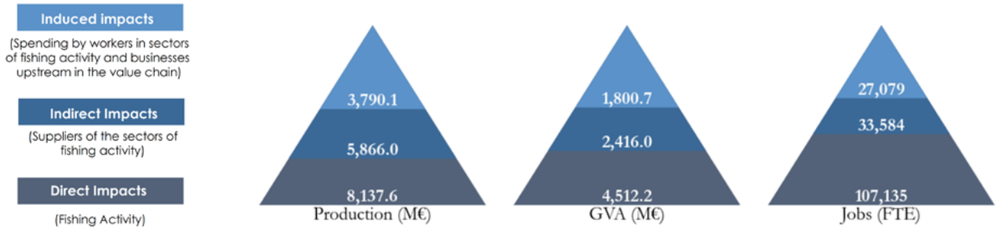


Figure 5: The socioeconomic effects of EU fisheries (source: Authors, based on results from the multiregional ImpacTer model)

Key Figure 5 (above): Fishing activities support 107,135 FTE jobs for €8.138 billion of production and €4.512 billion of value added. Purchases by fishing businesses from their suppliers located in Europe generate 33,584 FTE jobs for €5.866 billion of production and €2.416 billion of value added. Finally, consumption by employees working in fishing businesses or in the supply chain generates 27,079 jobs for €3.79 billion of production and €1.801 billion of value added.

Table 7 details the socioeconomic impacts of the 6 categories of EU fisheries defined in the study.

Table 7: Socioeconomic impacts of the different EU fishing categories (source: Authors, based on results from the multiregional ImpacTer model)

		EU fisheries		
		Direct impacts	Indirect and induced impacts	Total impacts
All categories	Production (in billion €)	8.138	9.656	17.794
	Value added (in billion €)	4.512	4.217	8.729
	Jobs (in FTE)	107,135	60,663	167,798
Passive < 12	Production (in billion €)	1.259	1.179	2.437
	Value added (in billion €)	0.830	0.523	1.345
	Jobs (in FTE)	42,734	8,408	51,141
Active < 12	Production (in billion €)	0.272	0.290	0.562
	Value added (in billion €)	0.167	0.128	0.294
	Jobs (in FTE)	4,362	1,669	6,031
Passive 12–24	Production (in billion €)	0.447	0.517	0.964
	Value added (in billion €)	0.261	0.231	0.492
	Jobs (in FTE)	9,228	3,445	12,673
Active 12–24	Production (in billion €)	2.038	2.391	4.430
	Value added (in billion €)	1.118	1.025	2.143
	Jobs (in FTE)	23,767	14,257	38,025
Passive > 24	Production (in billion €)	0.486	0.792	1.279
	Value added (in billion €)	0.212	0.353	0.565
	Jobs (in FTE)	6,350	5,360	11,709
Active > 24	Production (in billion €)	3.635	4.486	8.122
	Value added (in billion €)	1.924	1.957	3.881
	Jobs (in FTE)	20,693	27,525	48,219

Passive gears contribute more significantly to employment and value added than active gears. However, among passive gears, those smaller than 12 metres contribute significantly more jobs than the 12–24 or greater than 24-metre categories. Passive gears greater than 24 metres contribute very significantly to value added. Among active gears, those smaller than 12 metres contribute the most to employment and value added. Active gears greater than 24 metres contribute very little to employment.

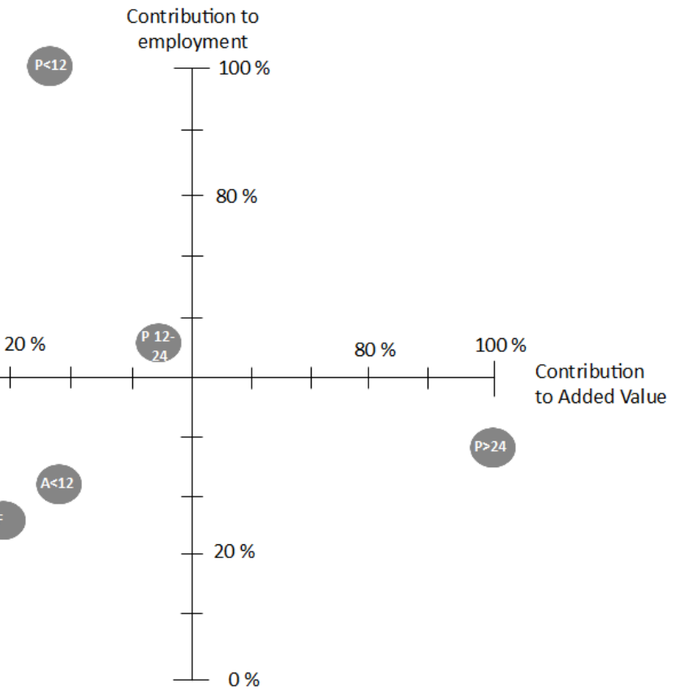
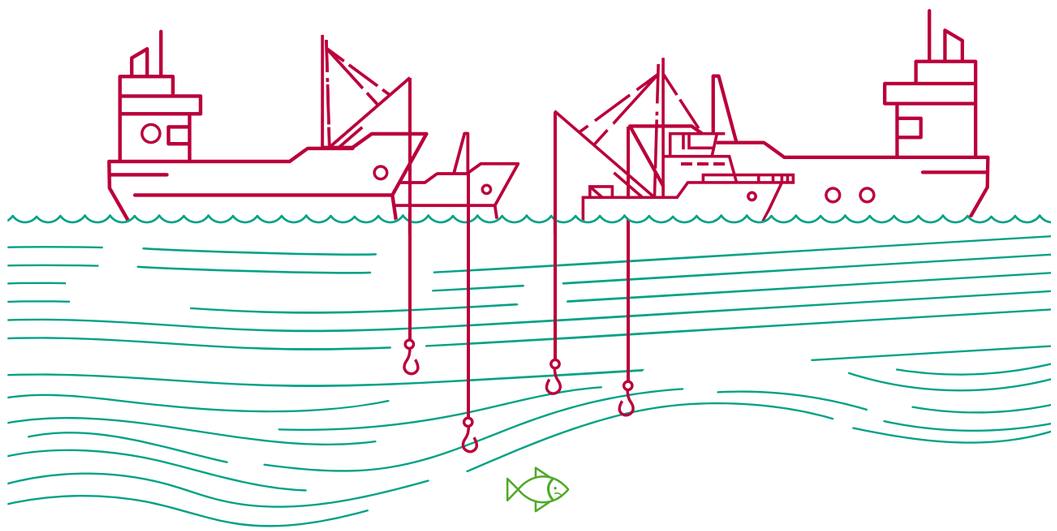


Figure 6: Fishing categories according to their contribution to value added and fishing employment in Europe (F: all categories together) (source: Authors, based on results from the ImpacTer model)

Key Figure 6 (below): Each multiplier for the fishing categories in this study is compared to the multipliers of value added and employment of the 6 categories plus the category 'all

categories of European fishing'. The figure shows the percentile scale, which ranks the 7 multipliers from the lowest multiplier at the 0 percentile to the highest at the 100th percentile. For example, the multiplier of the 12–24 metre passive gears category (corresponding to the 55th percentile of employment) shows that this category is in the top 45% of categories with the highest contribution to employment, while its value-added multiplier (corresponding to the 45th percentile) shows that this sector is in the 55% of categories with the highest contribution to employment.



V. CALCULATION OF SOCIOECONOMIC INDICATORS FOR THE REALLOCATION SCENARIOS

1. CURRENT QUOTA ALLOCATION AND REALLOCATION SCENARIOS

In this study, we make the following assumptions:

- All species are subject to quotas.
- Quotas do not change within a country.
- In the absence of data on quotas by gear category at the level of the different European countries, we use the landed volumes as a 'proxy' by assuming that quota volumes are equivalent to landed volumes.
- The structure of intermediate consumption does not change within each category between the baseline and the scenarios. Indeed, in reality, economies of scale could arise in the case of an increase in quotas within a single category.
- There is no sector creation. In the event that a country does not have a category that should be reallocated, no reallocation will be made within that country. However, in order to ensure a fixed percentage reallocation across Europe, volumes that could not be reallocated within a country were distributed to the other countries with the reallocation categories in proportion to the weight in the category. Thus, the multipliers do not change at the country level, but change at the European level, since the reallocation of quotas is not homothetic between countries. Thus, the weighting of the categories changes. For example, if the scenario reallocates some volumes to passive gears, it will only do so in countries that have these categories and therefore potentially change the weighting.

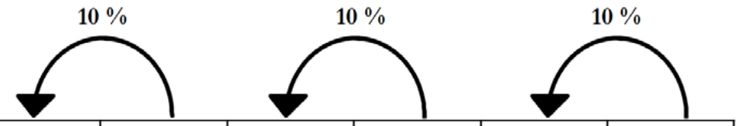
As mentioned in this introduction, this theoretical study aims to provide methodological information. Thus, the technical feasibility of these reallocations was not taken into account. Furthermore, the potential rebound effects of such a reallocation were not examined.

Current allocation of landed volumes (2018 data)

Categories	All categories	P < 12	A < 12	P 12–24	A 12–24	P > 24	A > 24
Landed volumes (in kt)	4,480	265	115	124	930	99	2,948
Share of fishing (in volume)	100%	5.9%	2.6%	2.8%	20.8%	2.2%	65.8%

Scenario 1

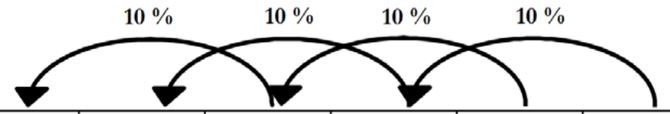
According to the assessment of the criteria, one scenario to reduce the environmental impacts and increase the social impacts of fishing would be to shift some of the production from active gears to passive gears. Thus, for the first quota reallocation scenario, we propose reallocating 10% () of active gear volumes to passive gears while remaining in the same length category.



Categories	Toutes catégories	Passive < 12	Active < 12	Passive 12 - 24	Active 12 - 24	Passive > 24	Active > 24
Scenario 1	Identical	+ 10% Active < 12	- 10 %	+ 10% Act. 12-24	- 10 %	+ 10% Active > 24	- 10 %
Landed volumes (in kt)	4 480	277	103	217	836	393	2 653
Share of fishing (in volume)	100 %	6,2 %	2,3 %	4,8 %	18,7 %	8,8 %	59,2 %

Scenario 2

According to the assessment of the criteria, one scenario to reduce the environmental impacts and increase the social impacts of fishing would be to shift some of the production from larger vessels to smaller vessels. Thus, for the first quota reallocation scenario, we propose reallocating 10% of volumes of vessels to the smaller size class for the same gear category.



Categories	Toutes catégories	Passive < 12	Active < 12	Passive 12 - 24	Active 12 - 24	Passive > 24	Active > 24
Scenario 2	Identical	+ 10% Pass 12-24	+ 10% Act. 12-24	- 10% **&** +10% Pass > 24	- 10% **&** +10% Act > 24	- 10 %	- 10 %
Landed volumes (in kt)	4 480	278	208	122	1 131	88,7	2 653
Share of fishing (in volume)	100 %	6,2 %	4,6 %	2,7 %	25,3 %	2,0 %	59,2 %

2. ECONOMIC ASSESSMENT OF THE TWO FISHING QUOTA REALLOCATION SCENARIOS

In the two scenarios, an increase in the direct and total impacts of European fishing in terms of production, employment and value added can be seen (Table 8, Figure 6 and Figure 7). In terms of production, scenario 1 is more beneficial. Regarding value added, scenario 2 is more beneficial in terms of its direct impacts, while scenario 1 is more beneficial when the total impacts are considered. With regard to employment, scenario 2 is more beneficial for direct jobs, while scenario 1 creates a greater increase in total jobs.

Scenario 1 is more beneficial in terms of its impacts on production and indirect impacts on employment and value added. Scenario 2 is more beneficial in terms of its direct impacts on employment and value added.

Table 8: Summary of the socioeconomic impacts of the baseline and reallocation scenarios of EU fishing (source: Authors, based on results from the ImpacTer model)

		EU fisheries		
		Production (in billion €)	Value added (in billion €)	Employment (in FTE)
Baseline	Direct impacts	8.138	4.512	107,135
	Indirect and induced impacts	9.656	4.217	60,663
	Total impacts	17.793	8.729	167,798
	Multipliers	2.19	1.07	20.7
Scenario 1	Direct impacts	8.781 (+ 7.9%)	4.632 (+ 2.7%)	124,915 (+ 16.6%)
	Total impacts	19.75 (+ 11.0%)	9.453 (+ 8.3%)	194,288 (+ 15.8%)
Scenario 2	Direct impacts	8.613 (+ 5.9%)	4.875 (+ 8.1%)	128,786 (+ 20.2%)
	Total impacts	18.49 (+ 3.9%)	9.197 (+ 5.4%)	190,777 (+ 13.7%)

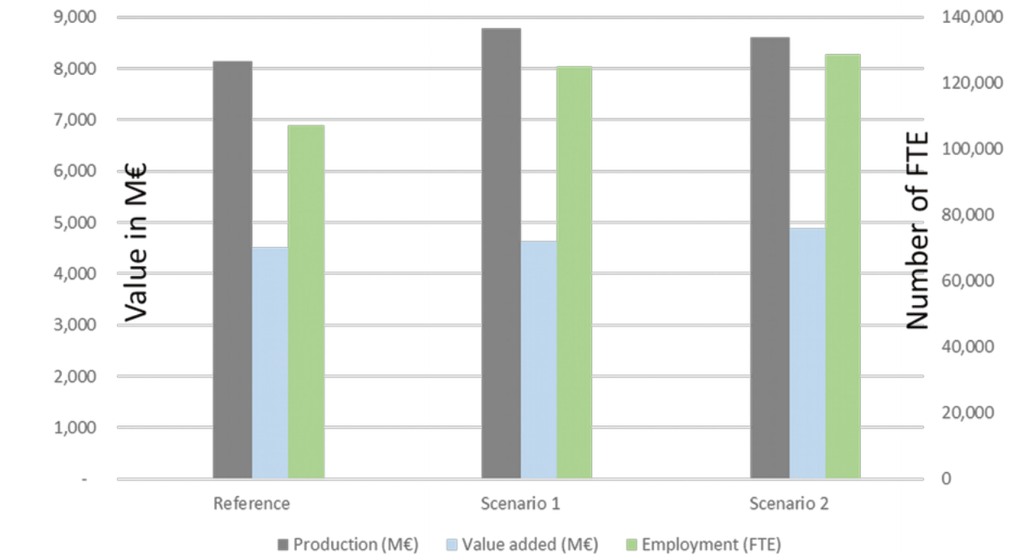


Figure 7: Direct impacts of different reallocation scenarios (production and value added: left axis and employment: right axis) (source: Authors, based on results from the ImpacTer model)

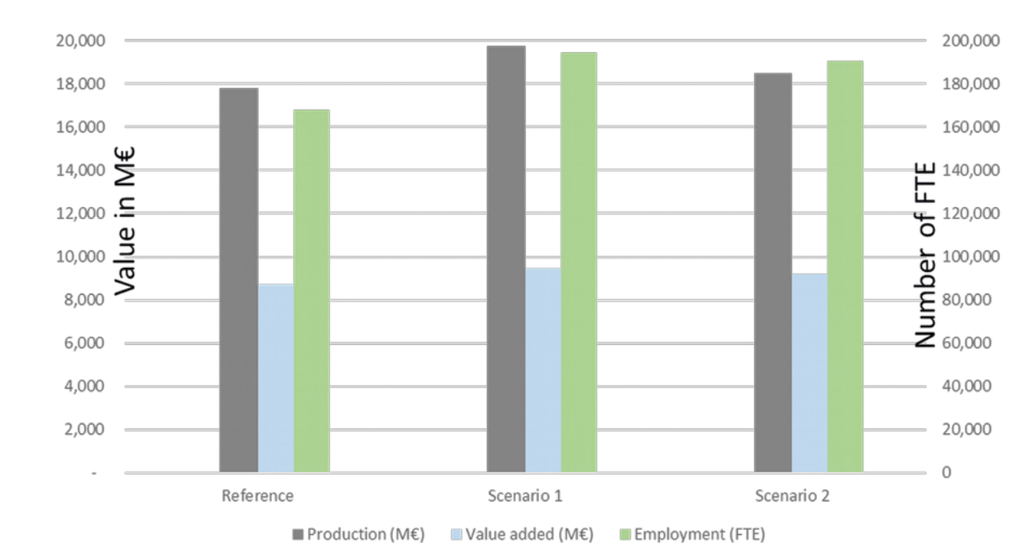


Figure 8: Total impacts of different reallocation scenarios (production and value added: left axis and employment: right axis) (source: Authors, based on results from the ImpacTer model)

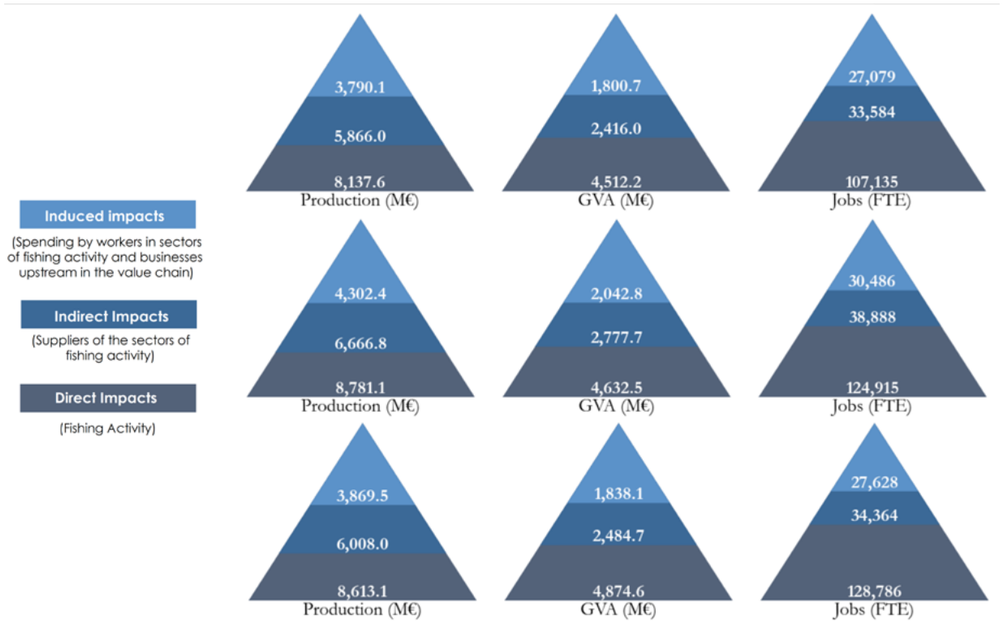


Figure 9: Summary of socioeconomic impacts of fishing in Europe according to the baseline (top), scenario 1 (middle) and scenario 2 (bottom) (source: Authors, based on results from the ImpacTer model)

Key (baseline above): Fishing activities support 107,135 FTE jobs for €8.138 billion of production and €4.512 billion of value added. Purchases by fishing enterprises from their suppliers located in Europe generate 33,584 FTE jobs for €5.866 billion of production and €2.416 billion of value added. Finally, consumption by employees working in fishing businesses or in the supply chain generates 27,079 FTE jobs for €3.79 billion of production and €1.801 billion of value added.

VI. EXAMPLE OF THE METHODOLOGY APPLIED TO A STOCK

In order to illustrate the methodological approach previously described, we analysed the socioeconomic effects of French tuna fishing (all species [29]) in the Mediterranean based on the baseline and a hypothetical quota reallocation scenario.

1. THE SOCIOECONOMIC EFFECTS OF FRENCH TUNA FISHING IN THE MEDITERRANEAN

In 2018, French tuna fishing in the Mediterranean generated €60.9 million of production and €56.1 million of value added. It supported a total of 362 FTE jobs.

Table 9: Direct impacts of French tuna fishing activity in the Mediterranean (source: Authors)

Tuna fishing by France in the Mediterranean		
Production (in million €)	Value added (in million €)	Employment (in FTE)
60.9	56.1	362

The category of vessels greater than 24 metres using active gears makes up 85% of production and value added of French tuna fishing in the Mediterranean. The second category is made up of passive gears smaller than 12 metres and makes up 12% of production and value added. Passive gears between 12 and 24 metres make up 2% of production and value added (Table 10).

29 In the Mediterranean, only bluefin tuna is subject to quotas, and this makes up the majority of tuna caught by France.

Table 10: Details of the direct impacts of the different categories of French tuna fishing in the Mediterranean

Categories	Production (million €)	GVA (million €)	Jobs (FTE)	Landings (kt)	Vessels (number)
All categories	60.9	56.1	362	4.3	1,222
P < 12	7.8	6.8	69	0.3	1,113
A < 12	0.18	0.17	0.1	0.1	28
P 12–24	1.6	1.4	7	0.06	18
A 12–24	0.045	0.042	0.03	0.04	39
A > 24	51.5	47.8	286	3.9	24

French tuna fishing in the Mediterranean has impacts on the entire French economy, both through purchases from suppliers located on the territory (indirect impacts), and through the workers' consumption throughout the value chain (induced impacts).

French tuna fishing in the Mediterranean generates, within other sectors of activity in France and the EU (indirect and induced impacts), the production of €16.5 million, an added value of €7.4 million and supports 83 FTE jobs in other sectors of the European economy. French tuna fishing in the Mediterranean therefore contributes (direct, indirect and induced impacts) to the EU and French economy in the form of €77.4 million of production and €63.5 million of value added and supports 445 FTE jobs (Table 11).

Table 11: Summary of the socioeconomic impacts of French tuna fishing in the Mediterranean (source: Authors, based on results from the ImpacTer model)

		EU fisheries		
		Production (in million €)	**Value added (in million €)**	**Employment (in FTE)**
Baseline	Direct impacts	60.9	56.1	362
	Indirect and induced impacts	16.5	7.4	83
	Total impacts	77.4	63.5	445
	Multipliers	1.27	1.04	7.31

Key: On average, €1 million of production in European fisheries contributes in total (direct, indirect and induced impacts) to the European economy with €1.27 million of production, €1.04 million of value added and supports 7.31 FTE jobs.

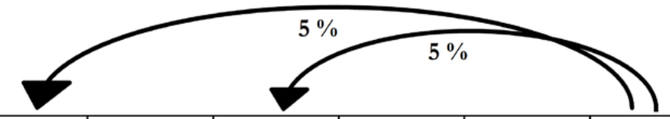
2. CURRENT QUOTA ALLOCATION AND REALLOCATION SCENARIO

Current allocation of landed volumes in France and the Mediterranean (2018 data)

Categories	All categories	P < 12	A < 12	P 12–24	A 12–24	P > 24	A > 24
Landed volumes (in kt)	4,312	259	0.594	122	0.386	0	3,929
Share of fishing (by volume)	100%	6%	0%	3%	0%	0%	91%

Scenario

According to the assessment of the criteria, one scenario to reduce the environmental impacts and increase the social impacts of fishing would be to shift some of the production from active gears to passive gears and part of the large vessels to smaller vessels. Thus, for the first quota reallocation scenario, we propose reallocating 5% of volumes of active gears larger than 24 metres to passive gears 12–24 metres in size and 5% to passive gears smaller than 12 metres. This would constitute an increase in the quota of 261% for passive gears 12–24 m in size and an increase of 176% for passive gears smaller than 12 metres.



Categories	Toutes catégories	Passive < 12	Active < 12	Passive 12 - 24	Active 12 - 24	Passive > 24	Active > 24
Scenario 1	Identical	+ 5% Active > 24	Identical	+ 5% Active > 24	Identical	Identical	- 10 %
Landed volumes (in kt)	4 312	455	0,594	318	0,386	0	3 536
Share of fishing (in volume)	100%	11%	0%	7%	0%	0%	82%

3. ECONOMIC ASSESSMENT OF THE FISHING QUOTA REALLOCATION SCENARIO

The reallocation scenario increases the direct and total impacts in terms of production, value added and employment. In fact, with this scenario, the direct impacts increase by 5.5%, the impacts on value added by 4.7% and the impacts on employment by 9.5% (Table 12).

Table 12: Summary of the socioeconomic impacts of the baseline and reallocation scenarios of French tuna fishing in the Mediterranean (source: Authors, based on results from the ImpacTer model)

		Tuna fishing by France in the Mediterranean		
		Production (in million €)	**Value added (in million €)**	**Employment (in FTE)**
Baseline	Direct impacts	60.9	56.1	362
	Indirect and induced impacts	16.5	7.4	83
	Total impacts	77.4	63.5	445
	Multipliers	1.27	1.04	7.31
Scenario	Direct impacts	64.3 *(+ 5.5%)*	58.8 *(+ 4.7%)*	396 *(+ 9.5%)*
	Total impacts	79.7 *(+ 7.4%)*	67.1 *(+ 5.8%)*	492 *(+ 10.5%)*

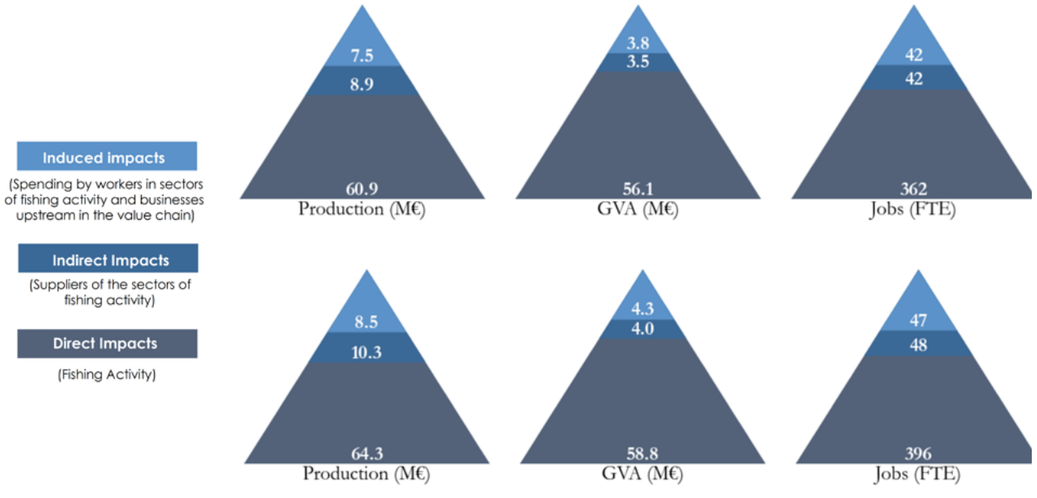


Figure 10: Summary of socioeconomic impacts of French tuna fishing in the Mediterranean according to the baseline (top) and the reallocation scenario (bottom) (source: Authors, based on results from the ImpacTer model)

Key (baseline above): French tuna fishing activities in the Mediterranean support 362 FTE jobs for €60.2 million of production and €56.1 million of value added. Purchases of fishing enterprises from their suppliers located in Europe generate 42 FTE jobs for €8.9 million of production and €3.5 million of value added. Finally, consumption by employees working in fishing enterprises or in the supply chain generates 42 FTE jobs for €7.5 million of production and €3.8 million of value added.

VII. CONCLUSIONS AND RECOMMENDATIONS

This study sheds light on the opportunities offered by Article 17 of the CFP. Despite the different significant assumptions made in this European-level exercise, it is possible to assess the socio-economic consequences of different quota reallocation scenarios. The reallocation of quotas in favour of environmental and social criteria also appears to positively impact GDP and employment. Indeed, this kind of reallocation would affect the entire value chain and the use of the ImpacTer model would allow changes in sectors beyond the fishing sector to be anticipated. Finally, a number of questions that would benefit from deeper consideration were identified during this study.

The question of data to inform sustainability criteria

There are currently myriad environmental and social criteria characterising the sustainability of fisheries and they enjoy consensus support among scientists. However, only some of them can be reliably completed. In this analysis, few of the criteria considered as priorities with regard to the impact of fisheries on the environment have also been the subject of scientific or reporting system studies at the European level. Thus, the lack of data appears to be a major issue, since this limits the characterisation of the criteria identified as priorities. Consideration could be given to allocating a percentage of quotas to vessels monitoring a specific criterion (e.g. accidental catches).

The question of criteria selection

During this exercise, the choice of criteria was based on currently available scientific data. However, according to some interviewees, they should be defined not only on the basis of scientific expertise, but also in consultation with civil society. This point highlights the potential trade-offs that may be necessary if the reallocation scenarios differ according to the criteria chosen (e.g. lowering the carbon footprint does not go hand in hand with lowering unwanted catches).

This report does not deal with the operational implementation of the reallocation. However, in-depth studies should examine this subject, in particular in relation to fleets' capacity to adapt.

The question of taking into account indirect and induced impacts

The use of the ImpacTer model has permitted not only the assessment of the direct socioeconomic impacts of fisheries, but also the indirect and induced impacts. The assessment of the latter two demonstrates the knock-on effects of the fishing sector on other sectors of the European economy and consequently its interdependence with these other sectors. The reallocation of quotas would affect the entire value chain and the use of this kind of model would allow changes in sectors beyond the fishing sector to be predicted.

The question of the geographical scope of the analysis

The use of the multiregional ImpacTer model provides a global picture of the effects of quota reallocation. Indeed, this model evaluates the socio-economic impacts of the fishing activity in the territory of the Member State, but also in the whole European territory. It thus demonstrates the interdependence between the different European countries in terms of fishing activity.

The question of the link to the territory is crucial in the calculation of the socioeconomic impacts of fisheries. Although the analysis was performed for all Member States, it is vital to perform additional analyses with a smaller scope (e.g. coastal regions) in order to better take into account the impact of the reallocations in territories that depend heavily on the fishing economy.

The question of approaches to quota reallocation

In the present study, a static approach was used, i.e. the proposed reallocations focused on low impact gears. Nevertheless, incentive and evolving approaches can also be promoted (e.g. encouraging high-impact gears to reduce their pressures, the approach used by the Marine Stewardship Council [30]). With a view to long-term management, consideration could be given to making it possible for fishery management plans to allocate, at the level of each fishery, a percentage of quotas according to compliance with certain environmental criteria and to negotiate the remaining quotas for the incorporation of other criteria in the long term (see the toothfish management plan in the French Southern and Antarctic Lands [31]). Consideration at the fishery level would provide additional elements in terms of management.

30 Each principle of the Fisheries Standard is made up of 28 indicators. If a certified fishery receives a score lower than 80/100 for an indicator, a 'certification condition' will be imposed on it by the independent assessor. The fishery must then implement an action plan to make improvements that will bring it into line with world best practices. If the conditions are not met during the certification period (generally five years), the fishery is suspended from the MSC programme.

31 https://taaf.fr/content/uploads/2019/10/Plan-de-gestion.pdf

ANNEXES

ANNEX 1: LIST OF EXPERTS INTERVIEWED

- Didier Gascuel: Lecturer and researcher in Ecology and Health of Fishery Ecosystems, STECF member (France)
- Daniel Stepputis: Researcher in fishery management and alternative management approaches, ICES member (Germany)
- Lisa Borges: Researcher in biological and ecological sustainability of fisheries and aquaculture, with two areas of expertise: incidental catches and discards (Portugal)
- Leire Ibaibarriaga: Researcher in sustainable fishery management, stock assessment and management, in particular for small pelagic fish (Spain)

ANNEX 2: DOCUMENTS USED FOR SCORING THE IMPACT ON UNWANTED CATCHES

Roda, M. A. P., Gilman, E., Huntington, T., Kennelly, S. J., Suuronen, P., Chaloupka, M., & Medley, P. A. (2019). *A third assessment of global marine fisheries discards*. Food and Agriculture Organization of the United Nations.

TABLE B.1.
Posterior mean discard rates, 95% credible intervals and sample sizes (N, number of compiled discard rate records per gear type[3]), for 25 gear categories

		Discard Rate			
Gear Category	Gear Code	Mean	Lower 95% CI	Upper 95% CI	N
Barrier, fence, trap, etc.	FWR	0.039	0.002	0.568	2
Purse seine	PS	0.047	0.039	0.056	60
Longline, pelagic	LLP	0.074	0.058	0.094	42
Pole-and-line	PL	0.094	0.064	0.144	5
Handline	HL	0.095	0.019	0.442	2
Lift net, boat-operated	LNB	0.100	0.012	0.619	1
Gillnet, pelagic (driftnet)	GNP	0.117	0.074	0.190	13
Otter trawl, midwater	OTM	0.121	0.082	0.182	26
Longline, bottom and pelagic	LL_	0.134	0.110	0.164	66
Boat dredge	DRB	0.138	0.110	0.173	15
Seine, beach	SB	0.148	0.057	0.344	6
Pots	FPO	0.166	0.121	0.222	30
Stow net	FSN	0.172	0.080	0.361	2
Gillnet, surface and bottom	GNS	0.174	0.088	0.329	4
Trammel net	GTR	0.182	0.132	0.251	21
Trawl, pair, midwater	PTM	0.192	0.033	0.735	1
Trolling lines	LTL	0.199	0.068	0.498	5
Longline, bottom	LLB	0.239	0.180	0.311	24
Gillnet, bottom	GNB	0.261	0.198	0.338	28
Otter trawl, bottom	OTB	0.309	0.275	0.346	118
Trawl, otter twin	OTT	0.435	0.285	0.600	9
Trawl, beam	TBB	0.457	0.377	0.538	22
Trawl, pair, bottom	PTB	0.482	0.141	0.878	1
Seine, boat	SV	0.506	0.358	0.657	9
Trawl, shrimp	OTS	0.549	0.500	0.596	68

TABLE B.2.
Estimates of mean discards levels (t) and 95% credible intervals by gear type. N=number of fishery records[4]

		Annual discard level (t)			
Gear type	**Gear Code**	**Mean**	**Lower 95% CI**	**Upper 95% CI**	**N**
Stow net	FSN	149	0	308	2
Longline, bottom and pelagic	LL_	6 530	5 312	7 747	6
Trammel net	GTR	10 565	9 052	12 077	30
Barrier, fence, trap, etc.	FWR	13 393	0	50 218	22
Lift net, boat-operated	LNB	27 836	8 470	47 202	8
Pole-and-line	PL_	33 487	30 052	36 923	44
Trolling lines	LTL	39 872	0	87 853	36
Seine, beach	SB_	40 754	21 592	59 917	27
Trawl, pair, midwater	PTM	58 791	0	188 622	14
Longline, pelagic	LLP	97 761	93 264	102 257	233
Gillnet, surface and bottom	GNS	100 152	83 307	116 997	28
Pots	FPO	177 720	169 280	186 161	141
Boat dredge	DRB	198 365	170 441	226 289	38
Trawl, pair, bottom	PTB	225 981	0	900 841	11
Longline, bottom	LLB	252 082	227 015	277 149	111
Trawl, otter twin	OTT	291 505	200 827	382 184	11
Gillnet, pelagic	GNP	299 451	278 840	320 062	132
Handline	HL_	323 116	90 692	555 539	124
Gillnet, bottom	GNB	393 499	369 233	417 764	78
Trawl, beam	TBB	423 905	356 222	491 588	16
Seine, boat	SV_	478 112	398 800	557 423	50
Miscellaneous	MIS	526 292	485 699	566 885	61
shrimp trawl	OTS	836 397	787 175	885 619	90
Otter trawl, midwater	OTM	881 240	770 777	991 703	102
Purse seine	PS_	1 019 002	916 306	1 121 699	203
Otter trawl, bottom	OTB	2 383 849	1 994 561	2 773 138	236

ANNEX 3: DOCUMENTS USED FOR SCORING THE IMPACT ON UNWANTED CATCHES

STECF (2020). Scientific, Technical and Economic Committee for Fisheries – Criteria and indicators to incorporate sustainability aspects for seafood products in the marketing standards under the Common Market Organisation (STECF-20-05), Gascuel, D. and Druon, J. editor(s), EUR 28359 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-36158-9 (online), doi:10.2760/211065 (online), JRC124927.

Table 3.3 – Potential impact on the seafloor of detailed gears (as defined in Annex 3 of the CMO regulation)

Gear type	Detailed gear	Gear code	Potential Impact on the seafloor
Seines	Beach seine	SB	Medium
	Danish seine	SDN	Medium
	Scottish seine	SSC	Medium
	Pair seine	SPR	Medium
Trawls	Beam trawl	TBB	High
	Bottom otter trawl	OTB	High
	Bottom pair trawl	PTB	High
	Midwater pair trawl	OTM	Medium
	Pelagic pair trawl	PTM	Low
	Otter twin trawl	OTT	High
Gillnet and similar nets	Set (anchored) gillnets	GNS	Medium
	Driftnet	GND	Low
	Encircling gillnets	GNC	Low
	Trammel nets	GTR	Low
	Combined trammel and gillnets	GTN	Low
Surrounding nets and lift nets	Purse seine	PS	Medium
	Lampara nets	LA	Medium
	Boat operated lift nets	LNB	Medium
	Shore-opened stationary lift nets	LNS	Medium
Hooks and lines	Handlines and pole lines (hand operated)	LHP	Low
	Handlines and pole lines (mechanised)	LHM	Low
	Set longlines	LLS	Low
	Longlines (drifting)	LLD	Low
	Troll lines	LTL	Low
Dredges	Boat dredges	DRB	High
	Hand dredges used on board a vessel	DRH	High
	Mechanised dredges including suction dredges	HDM	High
Pots and traps	Pots (traps)	FPO	Low

ANNEX 4: SOCIOECONOMIC IMPACTS OF FISHERIES BY COUNTRY ON THE EU

Belgium		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	22,35	87,55	218,38	2,49	42,40	90,30	1,03	222,69	713,44	8,15
Passive 12-24	0,45	1,78	5,00	2,81	0,65	1,90	1,07	7,37	20,55	11,58
Active 12-24	2,97	11,89	28,47	2,39	6,18	12,30	1,03	37,43	100,32	8,44
Active >24	18,92	73,88	184,92	2,50	35,58	76,09	1,03	177,89	592,58	8,02

Bulgaria		PRODUCTION (MILLION €)			**GVA (MILLION €)**			**JOBS (FTE)**		
	Volumes (kt)	**Direct impacts**	**Total impacts**	**Multiplier effects**	**Direct impacts**	**Total impacts**	**Multiplier effects**	**Direct impacts**	**Total impacts**	**Multiplier effects**
Total	8,51	8,87	15,77	1,78	6,78	9,59	1,08	715,90	845,46	95,35
Passive <12	2,85	4,93	7,42	1,50	4,19	5,22	1,06	490,21	537,96	109,17
Passive 12-24	1,43	1,15	2,30	1,99	0,80	1,26	1,09	77,36	98,29	85,25
Active <12	0,07	0,06	0,16	2,93	0,02	0,07	1,20	12,06	14,09	254,25
Active 12-24	1,79	1,35	3,04	2,25	0,84	1,52	1,12	82,42	113,70	84,16
Active >24	2,36	1,38	2,86	2,07	0,93	1,53	1,11	53,85	81,42	58,99

Cyprus		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	**Multiplier effects**	**Direct impacts**	**Total impacts**	**Multiplier effects**	**Direct impacts**	**Total impacts**	**Multiplier effects**
Total	1,47	6,59	22,09	3,35	2,66	9,07	1,38	748,00	905,39	137,44
Passive <12	0,51	3,43	10,09	2,94	1,74	4,46	1,30	559,00	625,76	182,20
Passive 12-24	0,74	2,05	6,58	3,21	0,91	2,81	1,37	148,00	194,63	95,08
Active >24	0,22	1,11	5,41	4,90	0,01	1,80	1,63	41,00	85,00	76,84

Germany		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	258,37	172,01	331,23	1,93	102,72	174,00	1,01	1 194,81	2 269,04	13,19
Passive <12	5,67	7,17	20,15	2,81	1,37	7,36	1,03	551,69	644,23	89,88
Passive 12-24	0,32	1,06	1,22	1,16	0,98	1,06	1,00	6,23	7,41	7,00
Passive >24	0,84	3,30	13,84	4,19	-1,38	3,45	1,04	66,49	140,62	42,56
Active <12	0,70	1,36	3,08	2,26	0,60	1,39	1,02	13,51	25,69	18,85
Active 12-24	24,16	72,43	130,28	1,80	47,30	73,04	1,01	343,90	730,63	10,09
Active >24	226,68	86,68	162,65	1,88	53,84	87,70	1,01	212,99	720,45	8,31

Denmark		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	787,83	470,39	767,79	1,63	310,39	435,94	0,93	1 775,09	3 099,15	6,59
Passive <12	8,46	24,52	45,06	1,84	12,38	21,38	0,87	217,46	318,80	13,00
Passive 12-24	11,90	34,42	58,61	1,70	21,04	31,54	0,92	223,28	336,91	9,79
Active <12	3,31	4,00	8,49	2,12	1,39	3,35	0,84	24,80	46,64	11,66
Active 12-24	137,23	115,58	200,15	1,73	69,23	105,59	0,91	646,07	1 036,40	8,97
Active >24	626,93	291,88	455,48	1,56	206,35	274,08	0,94	663,48	1 360,41	4,66

Estonia		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	66,94	15,86	31,60	1,99	10,22	16,74	1,06	266,00	393,24	24,79
Passive <12	10,44	5,93	14,66	2,47	2,75	6,37	1,07	173,00	245,96	41,44
Active >24	43,18	9,93	16,93	1,71	7,47	10,38	1,05	93,00	147,28	14,84

Greece		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	68,25	449,13	922,63	2,05	282,12	503,70	1,12	18 342,41	23 856,35	53,12
Passive <12	23,46	212,65	440,39	2,07	131,71	235,68	1,11	14 834,37	17 408,64	81,86
Passive 12-24	2,50	24,97	63,90	2,56	11,40	30,19	1,21	892,41	1 362,91	54,59
Active <12	0,74	3,54	8,89	2,51	1,70	4,26	1,20	326,82	390,58	110,44
Active 12-24	20,80	98,95	201,06	2,03	63,77	113,75	1,15	1 113,45	2 367,55	23,93
Active >24	20,76	109,03	208,40	1,91	73,54	119,83	1,10	1 175,36	2 326,67	21,34

Spain		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	431,37	1 886,14	4 556,96	2,42	973,09	2 160,78	1,15	27 060,56	45 467,23	24,11
Passive <12	26,66	158,80	297,55	1,87	112,33	174,35	1,10	5 105,23	6 063,53	38,18
Passive 12-24	28,39	97,16	218,56	2,25	56,84	111,31	1,15	2 537,65	3 380,73	34,80
Passive >24	46,70	320,09	854,43	2,67	136,74	376,74	1,18	4 306,97	8 051,73	25,15
Active <12	7,89	39,26	61,57	1,57	31,94	41,63	1,06	1 303,31	1 448,88	36,90
Active 12-24	147,63	284,48	626,27	2,20	168,86	317,58	1,12	5 543,23	7 807,67	27,45
Active >24	174,10	986,34	2 498,57	2,53	466,37	1 139,16	1,15	8 264,17	18 714,68	18,97

Finland		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	147,64	37,56	71,30	1,90	22,55	38,20	1,02	242,11	332,89	8,86
Passive <12	9,54	8,64	15,96	1,85	5,34	8,86	1,02	132,63	152,64	17,66
Active 12-24	28,90	8,16	13,15	1,61	5,98	8,31	1,02	45,26	58,66	7,19
Active >24	109,21	20,76	42,19	2,03	11,23	21,03	1,01	64,21	121,59	5,86

France		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	423,55	1 356,44	3 166,90	2,33	732,73	1 492,76	1,10	8 934,02	18 134,10	13,37
Passive <12	53,45	289,20	576,17	1,99	193,02	316,36	1,09	3 081,46	4 564,29	15,78
Passive 12-24	18,25	85,78	194,06	2,26	48,97	95,31	1,11	658,17	1 219,20	14,21
Passive >24	25,21	83,78	209,76	2,50	40,41	94,03	1,12	671,23	1 323,84	15,80
Active <12	63,76	112,95	242,82	2,15	68,71	123,89	1,10	699,48	1 366,15	12,10
Active 12-24	129,06	348,16	853,94	2,45	172,85	383,11	1,10	2 032,11	4 576,81	13,15
Active >24	133,82	436,56	1 090,16	2,50	208,78	480,06	1,10	1 791,57	5 083,82	11,65

Croatia		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	69,40	88,60	228,67	2,58	52,56	113,82	1,28	3 121,68	4 967,11	56,06
Passive <12	1,42	23,02	51,48	2,24	15,71	28,18	1,22	1 384,45	1 762,10	76,56
Passive 12-24	0,06	0,61	1,47	2,40	0,40	0,77	1,26	12,57	23,99	39,08
Active <12	1,83	12,63	28,59	2,26	8,50	15,48	1,23	394,18	605,08	47,91
Active 12-24	27,21	28,42	84,73	2,98	13,86	38,44	1,35	824,79	1 563,47	55,00
Active >24	38,88	23,91	62,39	2,61	14,11	30,94	1,29	505,69	1 012,46	42,34

Ireland		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	252,71	310,55	594,42	1,91	163,45	302,04	0,97	2 608,29	3 633,01	11,70
Passive <12	11,89	40,09	70,87	1,77	24,08	38,99	0,97	844,10	962,54	24,01
Passive 12-24	4,08	13,26	20,41	1,54	9,59	13,07	0,99	149,28	175,89	13,27
Active <12	4,97	27,29	48,92	1,79	16,10	26,62	0,98	361,30	442,98	16,24
Active 12-24	29,88	69,00	135,20	1,96	34,71	67,25	0,97	546,49	771,57	11,18
Active >24	199,79	160,92	319,02	1,98	78,96	156,11	0,97	707,12	1 280,03	7,95

Italy		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	**Total impacts**	**Multiplier effects**	**Direct impacts**	**Total impacts**	**Multiplier effects**	**Direct impacts**	**Total impacts**	**Multiplier effects**
Total	191,71	973,58	1 902,73	1,95	583,47	958,18	0,98	19 841,30	25 246,47	25,93
Passive <12	24,55	184,75	294,27	1,59	137,13	182,63	0,99	8 610,14	9 275,68	50,21
Passive 12-24	6,31	42,41	80,69	1,90	25,97	42,09	0,99	1 425,86	1 660,72	39,16
Active <12	2,16	9,75	17,82	1,83	6,27	9,55	0,98	285,11	332,83	34,14
Active 12-24	115,81	549,21	1 136,31	2,07	304,66	539,44	0,98	7 625,85	11 001,37	20,03
Active >24	42,87	187,47	373,64	1,99	109,44	184,48	0,98	1 894,34	2 975,87	15,87

Littuani		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	**Direct impacts**	**Total impacts**	**Multiplier effects**
Total	24,75	65,59	186,83	2,85	8,20	67,89	1,04	365,15	2 000,83	30,51
Passive <12	0,63	0,79	1,44	1,83	0,49	0,81	1,03	46,23	55,16	70,07
Active >24	20,84	64,80	185,39	2,86	7,71	67,08	1,04	318,92	1 945,67	30,03

Latvia		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	70,36	23,09	56,70	2,46	11,58	26,65	1,15	288,00	795,95	34,47
Passive <12	4,18	2,65	5,58	2,10	1,66	2,97	1,12	118,00	161,97	61,05
Passive 12-24	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Active 12-24	8,76	3,00	8,44	2,81	1,15	3,58	1,19	44,00	125,42	41,81
Active >24	57,42	17,44	42,68	2,45	8,77	20,10	1,15	126,00	508,56	29,17

Malta		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	2,73	15,05	38,78	2,58	8,77	17,71	1,18	594,00	773,60	51,41
Passive <12	0,81	5,38	15,19	2,82	2,69	6,36	1,18	364,00	436,90	81,24
Passive 12-24	0,40	3,13	9,03	2,89	1,53	3,78	1,21	87,00	132,32	42,32
Active <12	0,14	0,79	2,04	2,60	0,46	0,94	1,19	37,00	46,62	59,32
Active 12-24	1,25	3,78	6,55	1,73	3,15	4,22	1,12	64,00	86,10	22,78
Active >24	0,13	1,98	5,96	3,01	0,94	2,42	1,23	42,00	71,65	36,23

Netherlands		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	403,29	448,25	905,52	2,02	224,96	405,90	0,91	1 686,42	3 883,81	8,66
Passive <12	0,37	5,60	8,52	1,52	4,19	5,35	0,95	81,50	95,56	17,05
Passive 12-24	0,25	1,75	2,94	1,68	1,17	1,65	0,95	11,17	17,14	9,82
Active <12	0,05	0,16	0,38	2,44	0,04	0,14	0,87	3,11	4,30	27,56
Active 12-24	36,89	107,61	201,95	1,88	61,17	99,21	0,92	505,97	969,77	9,01
Active >24	365,73	333,14	691,73	2,08	158,38	299,54	0,90	1 084,67	2 797,03	8,40

Poland		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	178,72	48,76	107,01	2,19	26,40	49,92	1,02	2 355,00	3 130,08	64,19
Passive <12	11,20	10,91	22,03	2,02	6,62	11,25	1,03	1 504,00	1 662,12	152,28
Passive 12-24	0,37	0,60	1,53	2,54	0,24	0,63	1,04	42,00	55,23	91,35
Active 12-24	47,23	16,08	36,80	2,29	8,10	16,46	1,02	451,00	726,47	45,18
Active >24	119,71	21,16	46,65	2,20	11,44	21,58	1,02	358,00	686,26	32,43

Portugal		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	153,46	394,99	813,56	2,06	253,46	436,65	1,11	7 913,00	11 495,74	29,10
Passive <12	19,89	94,70	163,89	1,73	71,59	102,36	1,08	2 578,00	3 184,11	33,62
Passive 12-24	17,10	69,95	134,99	1,93	48,45	77,53	1,11	2 042,00	2 616,17	37,40
Passive >24	11,67	49,65	128,18	2,58	22,57	57,03	1,15	877,00	1 557,91	31,38
Active <12	12,00	15,38	28,82	1,87	10,94	16,82	1,09	361,00	474,96	30,88
Active 12-24	39,85	46,35	88,91	1,92	32,46	51,16	1,10	1 033,00	1 395,49	30,10
Active >24	52,95	118,96	268,77	2,26	67,45	131,75	1,11	1 022,00	2 267,10	19,06

Romania		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	7,74	4,16	8,31	2,00	2,82	4,62	1,11	59,75	170,87	41,06
Passive <12	2,78	1,84	3,82	2,08	1,20	2,07	1,12	27,72	80,90	43,91
Passive 12-24	3,85	1,82	3,33	1,82	1,34	1,99	1,09	24,18	64,24	35,20
Passive >24	1,12	0,49	1,16	2,35	0,28	0,57	1,15	7,85	25,72	52,06

Sweden		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	214,68	119,15	274,67	2,31	56,32	119,93	1,01	746,91	1 350,15	11,33
Passive <12	3,57	14,29	31,36	2,19	7,20	14,37	1,01	274,57	344,10	24,08
Passive 12-24	0,13	0,26	0,66	2,52	0,10	0,26	1,00	5,91	7,46	28,56
Active <12	2,86	6,77	14,60	2,16	3,57	6,81	1,01	44,92	75,99	11,23
Active 12-24	19,97	35,88	77,10	2,15	19,17	36,22	1,01	223,07	385,62	10,75
Active >24	188,15	61,95	150,95	2,44	26,28	62,27	1,01	198,44	536,98	8,67

Slovenia		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	0,15	2,21	2,87	1,30	1,83	2,15	0,97	69,65	74,93	33,91
Passive <12	0,06	1,48	1,85	1,24	1,28	1,45	0,98	56,60	59,50	40,12
Active 12-24	0,09	0,73	1,02	1,41	0,56	0,70	0,96	13,05	15,43	21,23

United Kingdom		PRODUCTION (MILLION €)			GVA (MILLION €)			JOBS (FTE)		
	Volumes (kt)	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects	Direct impacts	Total impacts	Multiplier effects
Total	694,85	1 153,08	2 568,90	2,23	632,74	1 292,32	1,12	7 983,80	14 347,16	12,44
Passive <12	43,09	158,14	340,09	2,15	91,60	176,84	1,12	1 699,28	2 518,55	15,93
Passive 12-24	27,62	65,03	158,64	2,44	30,74	74,61	1,15	877,40	1 299,03	19,98
Passive >24	10,60	29,07	71,24	2,45	13,53	33,21	1,14	420,27	609,53	20,97
Active <12	14,49	37,82	95,68	2,53	16,42	43,37	1,15	495,77	756,13	20,00
Active 12-24	93,62	237,13	596,20	2,51	104,27	271,20	1,14	2 592,33	4 205,00	17,73
Active >24	505,43	625,89	1 307,06	2,09	376,19	693,09	1,11	1 898,75	4 958,92	7,92

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