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Strengthening regional cooperation in the area of fisheries data collection – Socio-economic data collection for fisheries, aquaculture and the processing industry at EU level

D 0.3 Final Technical Report

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Partners involved:

NISEA, SEAFISH, COISPA, WR, BIM, LUKE, EV-ILVO, UCPH

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Executive Summary

The final report of the SECFISH project provides an overview of the achievements/results in the project between August 2018 and the End of the project (May 15th 2019) and problems encountered during that period. In general, the project partners finalized the Deliverables on time. The deliverables will be available on the DCF website.

The project was organised in 7 thematic Work packages (WP) and one WP for project management. The thematic WP were in line with the objectives for socio-economic data collection outlined in the call text. The consortium consisted of institutes with a long-lasting experience in economic data collection and research activities regarding application of the DCF data for end-user needs in the advisory process. The main achievements, described in the respective chapters of the final report on the WP, of the project were:

WP 1 (Summary of what has been achieved in 2016-2017): The institutes which were partner in the project participated regularly in PGECON work and provided an overview on what has been achieved in e.g. PGECON 2016-17. (further details as well in Annex on Deliverable 1.1)

WP 2 (Harmonization of methodologies for sampling design and estimation methods for fleet and aquaculture economic data collection): The consortium addressed the methodologies for sampling designs and estimation methods by providing a handbook including the relevant information. (Handbook in Annex on Deliverable 2.1)

WP 3 (Development and implementation of common methodologies to disaggregate economic variables by activity and area): The disaggregation of economic variables is one of the main problems when analysing economic effects of management decisions. The consortium developed a methodology (R-code) for a standardised routine to disaggregate the economic data. (more details in Annex on Deliverables 3.1 and 3.2)

WP 4 (Methodologies for estimation of intangible assets in EU fisheries): In more and more countries tradable fishing rights are introduced. It is, therefore, important to estimate the intangible assets like fishing rights in EU fisheries. This was addressed in this WP. (Annexes on Deliverable 4.1 and 4.2)

WP 5 (Origin and sources of raw material in the EU seafood processing industry): The STECF has repeatedly argued that without information on the origin of raw material it is impossible to draw a link between the processing sector and the fishing fleets. The participants in this WP elaborated on the possibilities to collect data on raw material in the fish processing industry. (Annex on Deliverable 5.1)

WP 6 (Social indicators): As it is important to improve the collection on social variables (e.g. included in the new DCF), WP 6 addressed such possibilities for improvement and came up with a list of suggestions (Annex on Deliverable 6.1).

WP 7 (Recreational fisheries): Under this WP the consortium elaborated on the possibilities for the economic data collection on recreational fisheries. The main reason is that there are some regions where recreational fisheries are very important for the regional economy. (Annex on Deliverable 7.1)

WP 8 was focused on the overall coordination of the project. The project coordinator has organized for WP 8 several Web-Meetings e.g. in December 2018 and a physical meeting in the Hague in March 2019. He presented an overview on the SECFISH project and coordinated the presentation of the project participants at the PGECON meeting of May 2019. Project partners have presented the planned activities already at the PGECON meeting in May 2018 and have presented results at e.g. the EAFE conference in Santiago di Compostela in April 2014.

1. Background and project objectives

This project was funded under the call for proposals MARE 2016/22: *Strengthening regional cooperation in the area of fisheries data collection* and addressed the term of reference regarding social and economic data collection issues. As stated in its proposal, the project specifically contributes to the overall and specific objectives of the call for proposals:

- Improve completeness and reliability of the social and economic data collection.
- Improve the availability of data to scientists to provide advice to end-users.
- Address aspects raised by the Scientific, Technical and Economic Committee for Fisheries (STECF) and other relevant scientific committees to improve the social and economic data collection (e.g. data on raw material for the processing industry to be able to form a link to the sustainable exploitation of fish stocks in the regional seas).
- Improve the regional coordination between MS of different regions regarding sampling design and end-user needs.
- With new approaches to the disaggregation of data, contribute to the definition of different fleet segments.
- Address coordination of methodologies for socio-economic data collection going beyond the coordination through PGECON.

The consortium covered the main sea basins of the European Union (Baltic Sea, North Sea, Western Waters, Celtic Sea and Mediterranean Sea) and a wide variety of fleet segments, aquaculture production systems and sectors of the fish processing industry.

The project was organised in 7 Work Packages (WP) which were in line with the objectives for socio-economic data collection outlined in the call text:

WP 1: Summary of what has been achieved in the socio-economic data collections in 2016-2017.

WP 2: Harmonization of methodologies for sampling design and estimation methods for fleet and aquaculture economic data collection (Handbook).

WP 3: Development and implementation of common methodologies to disaggregate economic variables by activity and area.

WP 4: Methodologies for estimation of intangible assets in EU fisheries.

WP 5: Origin and sources of raw material in the EU seafood processing industry.

WP 6: Social indicators

WP 7: Recreational fisheries

The project coordinator has organized since the delivery of the interim report for WP 8 – overall coordination of the project – a Web-Meeting in December 2018 and a physical meeting in The Hague in March 2019. He presented an overview on the SECFISH project and coordinated the presentation of the project participants at the PGECON meeting.

The project ended on May 14th 2019. This final report includes a description of the WP with objectives and achieved results. In addition, a description of encountered difficulties is added in chapter 3.

All project deliverables have been sent together with this report to the European Commission and are available as embedded documents in the Annexes.

The report has a number of Annexes, listed below and which can be found as embedded files on page 45 of this report:

1. Annex on Deliverable 1.1 ‘Report on the main outputs of PGECON and its working groups and on suggestions for possible improvements in the future coordination activities’
2. Annex on Deliverable 2.1 ‘Handbook on sampling design and estimation methods for economic data collection in fisheries statistics’
3. Annex on Deliverable 3.1 ‘Determination of cost structures (e.g. metièr), identification of correlations’
4. Annex on Deliverable 3.2 ‘Guidelines for disaggregating economic data at the same resolution of transversal data and validation tool’
5. Annex on Deliverable 4.1 ‘Methodologies for estimation of intangible assets in EU fisheries’
6. Annex on Deliverable 4.2 ‘Guidelines for the valuation of fishing rights’
7. Annex on Deliverable 5.1 ‘[Feasibility study on the collecting of raw material data from the EU fish processing industry](#)’
8. Annex on Deliverable 6.1 ‘Availability and methodology of social data’
9. Annex on Deliverable 7.1 ‘Report on the main outputs of WGRFS and on suggestions for a quality assurance framework including data formats for the use in RDBs, socioeconomic data collection requirements and future coordination activities’

2. Work programme, implementation and achieved results

2.1 WP 1: Summary of what has been achieved in 2016-2017

WP1 Coordinator: Evelina Sabatella (NISEA)

Partners involved: NISEA, ILVO, BIM, THÜNEN.

Objectives

The EU Data Collection Framework (DCF) – (EU Regulation 2017/1004) is the official framework of the European Union dedicated to the collection, management and use of data in the fisheries sector. It intends to improve the amount and quality of data available to scientists and European institutions, enabling these and end-users to enhance their evaluation for policy and research purposes.

One of the basic principles of the new DCF adopted in 2017 is that Union legislation should no longer determine the details of methodologies to be applied in collecting data. Provisions on particular methods of data collection should therefore be replaced by the description of the process by which they will be determined. That process should essentially include cooperation between Member States and data users in regional coordination groups or pan-European groups.

PGECON was established by the 2011 Liaison Meeting to improve European coordination on methodological and coordination issues related to the economic modules of the DCF at European level (fleet economic data, aquaculture, processing sector). Taking into consideration that coordination is one of the most important aspects of the DCF, and due to the fact that some issues of the functioning and achievements of PGECON are yet unclear, the objectives of the WP1 of the project SECFISH were:

- 1) to review what has been already achieved in the framework of pan-regional cooperation - checking what has been discussed, highlighted and initiated –
- 2) to undertake an open consultation to obtain views, determine the degree of consensus on possible future developing of coordination in the collection of social and economic data, on the implementation of common methodologies, as well as the development of ad-hoc working groups, and note any outstanding areas of disagreement that need to be addressed.

Work done/results achieved

The review phase highlighted that data collection and coverage of economic data for the fleet, aquaculture and processing sectors have improved in the last ten years and several

methodological targets have been achieved by Member States (MS). This improvement has been driven by different workshops and meetings organized under the umbrella of the DCF (like the PGECON, planning group on economic issues) and the STECF (like the former SGECA, sub group on economic advice). Since its establishment, 7 PGECON meetings have taken place and 11 different working groups were suggested by PGECON and organized from 2012 to 2018. These fora helped MS in the definition of datasets, development of harmonized methods/techniques and scientific protocol. The methodological development and the definition of best practices increased the accuracy and reliability of the socio-economic data currently available. The revision also pointed out some weakness in the whole system, in particular several issues that were opened but never finalized and some useful tools that unfortunately are not publicly available. The reasons for these weaknesses are strictly related to the status and governance of PGECON. A serious reflection on these issues started only in 2016 during the 5th PGECON plenary meeting when, for the first time, there was an awareness of the role of PGECON and a desire to be more incisive in terms of recommendations and provision of guidelines.

The consultation process used a questionnaire that was prepared and distributed to National Correspondents, PGECON participants and researchers involved in the economic data collection under DCF. The questionnaire was aimed at acquiring inputs relevant to analyse the impacts on the data collections at MS and EU levels of PGECON activities and to give advice on future status of PGECON. To this end, the questionnaire included specific questions on the respondent profile, the role of PGECON, the status and governance of PGECON and practical points regarding attendance to PGECON meeting.

PGECON was highlighted by almost 85% of the respondents as being a valuable community for DCF experts to share their experience, best practice and knowledge. The questionnaires highlighted areas where PGECON was determined not to be fully aware of data requirements (see table 3 of D1.1, page 24). Most respondents (40%) felt that PGECON does not have the right competence to discuss environmental data for the aquaculture sector and that it should be tasked by a separate group, even if there is no expert group so far where this issue seems to fit in or people participating in those meetings feel qualified to address it.

The consultation revealed where PGECON might need more training/expertise for each data category (see table 4 of the Annex on Deliverable 1.1, page 28, which is available as embedded file at the end of this report, page 50) and suggestions for improvements to the headings data quality, data coverage and data calls/data dissemination (see table 7 of the Annex on

Deliverable 1.1, page 33). An interesting output of the questionnaire is related to the use of PGECON recommendations in drafting Work Plans and implementing economic surveys, with an overall positive response with an average of 81%. A specific question asked if respondents agree that PGECON should change its status into a pan-European Regional coordination group. This question was introduced after the presentation of the questionnaire to the 2018 PGECON meeting. Overall, 52% (7% partly, 26% mostly, 19% totally), agreed that PGECON should become an RCG, 41% took a neutral position and 7% disagreed. The analysis also contains a summary of the statements with justifications given to the choice (see table 8 of the Annex on Deliverable 1.1, page 38).

On the basis of the review phase and of the consultation phase, a SWOT analysis has been elaborated to give an overview of the constraints (weaknesses, and the threats) and advantages (strengths and opportunities) of the pan-regional cooperation activities in the framework of the current DCF system. The results are reported in the following table.

Table 1: SWOT on Pan-regional cooperation activities in the framework of the current DCF

| SWOT Analysis | |
|---|---|
| Strengths | Weaknesses |
| <p>Increased co-operation at European level</p> <p>Comparability, among MS, of collected data</p> <p>Highly dedicated, educated and experienced group, welcoming to new members</p> <p>Sharing experiences, providing advice, sharing case studies and new methodologies/approaches in data collection.</p> <p>Dedicated time and place for dealing with problematic areas in socio-economic data collection</p> <p>Common definitions, understanding of different contexts of data collection, creation of EU-wide methods and analyses</p> <p>Providing definitions of social data collection and analyses</p> <p>Instrument to find a common approach between MS for the data collection</p> <p>Opportunity to discuss common problems and find a solution</p> <p>Forum for the provision of methodological guidance</p> <p>Exchange of best practices and methodological improvements</p> | <p>Poor participation by main end users and feedback on data used for assessment/management</p> <p>Unclear feedback by end users identifying problems in data transmission</p> <p>Lack of common web interface workspace to improve cooperation</p> <p>Weak intersessional communication during the year</p> <p>Lack of a common template for WG and PGECON reports</p> <p>Recommendations and best practices difficult to be extracted from reports</p> <p>Different methodologies driven by MS specificities</p> <p>Basic regulations and EUMAP sometimes not clear or complete</p> <p>Lack of formalised routines and guidelines for evaluation/comparison of quality</p> <p>Data quality assessment not performed</p> <p>Too much focus on fleet; need to increase the discussion on aquaculture and processing</p> <p>Lack of expertise in some topics (statistics and social information)</p> |
| Opportunities | Threats |

| | |
|---|--|
| <p>Strengthening of the pan-regional cooperation with the possibilities to establish a more appropriate and adequate sampling approach</p> <p>Improvement the knowledge of statistical tools, quality validation methods, preparation of questionnaires</p> <p>Integration of scientific knowledge on fisheries and fleets</p> <p>Comparison of data and assumptions</p> <p>Improvement in the dissemination/exchange of data and results</p> <p>Definition of simply/clear quality indicators in collaboration with main end-users</p> <p>Harmonising data formats and the scheduling of data calls</p> <p>Possibility to work and to cooperate closely with the end-users (e.g. GFCM, STECF) and to clearly meet and identify their needs in determining data to be covered by DCF</p> <p>Consultation with end users to ensure that the definition of variables and the aggregation levels are in line with end users' needs</p> <p>Development and maintenance of quality assurance framework</p> | <p>Complexity of the entire mechanism and inter links with other DCF bodies/entities</p> <p>Establishment and maintenance of agreements/recommendations</p> <p>Difficulties (i.e. human and financial resources) for some MS to collect all the requested information</p> <p>Increasing of data requests which could imply additional human and financial resources</p> <p>Change of the status from expert group to RCG</p> |
|---|--|

Conclusions

To summarize, some good examples of pan-regional coordination already exist (e.g. SIM - Subgroup of DCF/PGECON on statistical issues and methodologies - works on definitions and methodologies, guidelines on data quality), but still there is room for improvement. The future challenges are focused on ensuring data quality and improving data availability as well as end-user-oriented collection.

Areas on which there is still need to improve coordination, collaboration and standardization are: data quality, role of end users (role and data needs), data dissemination, standardization of methodologies. For some of these topics, as demonstrated by the SWOT analysis, despite some measures have been already undertaken, several gaps exist.

Possible improvements in this field could be achieved as follows: a) through the development of common web interface workspace to improve cooperation and intersessional work, allowing the dissemination of statistical tools, questionnaires used for the collection of economic and social data, etc; b) Specific training sessions that could be organized by PGECON to share methods/tools that require very specific knowledge, such as statistical programming; c) The dissemination of the handbook implemented in WP2 that could increase the efficiency in data collection

2.2 WP 2: Harmonization of methodologies for sampling design and estimation methods for fleet and aquaculture economic data collection

Coordinator: Jarno Virtanen (LUKE)

Partners involved: LUKE, NISEA.

Objective

WP 2 aimed at harmonizing the methodologies of sampling design and estimation methods by providing a practical manual, based on the general theory of probability sampling.

Work done/results achieved

WP 2 produced the Handbook on sampling design and estimation methods for economic data collection in fisheries statistics (Annex on Deliverable 2.1, which can be found as embedded file on page 45 of this report). The handbook provides the general theory of probability survey sampling. It aims at harmonizing the methodologies of sampling design and estimation methods by providing a practical manual based on the general theory of probability sampling. The manual explains the general principles of probability sampling and of essential requirements for a good quality survey plan and covers the basic sampling techniques.

The description of each design is accompanied by the explanation of appropriate methods of estimation as well as of the uncertainty assessment leading to a well-based coefficient of variation.

Detailed descriptions of the methods and explanation of the associated formulae in terms of concrete numbers are complemented by worked-out examples using simplified simulated data. The data of these examples and the computer code – both in SAS and in R – for implementing the estimations are included as a part of the manual. In addition, the theory is demonstrated by describing the applied methods and results of the operational data collection of Italy and Finland.

Conclusions and recommendations

PGECON 2019 concluded in recommendation 1.2 on follow up of WP 2:

It was agreed that each MS should try to follow the suggested procedure. MS experience with the handbook can be presented at PGECON 2020. A Quality Assurance Framework (QAF) subgroup workshop should take place to define the process of quality assessment and assurance and revise the guidelines of the methodological report (with reference to the Handbook). On this basis, PGECON could provide recommendations and guidelines to the EWG on the

evaluation of annual reports for data collection on how to improve quality evaluation of DCF data and to complement the currently existing quality evaluation procedures.

2.3 WP 3: Development and implementation of common methodologies to disaggregate economic variables by activity and area

Coordinator: Ralf Döring (THÜNEN)

Partners involved: BIM, COISPA, ILVO, LUKE, NISEA, SEAFISH, THÜNEN, WER.

Objectives

The main aim of the developed methodology was to synchronize the two different sources (biological and economic) of data collection. One of the implications of this process would be the enhancing of the standardisation of bio-economic models.

Specifically, the objectives of WP2 were:

- ✓ to analyse comprehensive individual vessel data sets of different types of fisheries from different MSs;
- ✓ to develop **common and shared guidelines** and **tools** for disaggregating economic data at the same resolution of transversal data;
- ✓ to provide a **validation tool** to allow the MSs to evaluate the quality of the disaggregated economic data.

Work done/results achieved (Deliverable 3.1)

The outcome of the R-tool developed within WP3 is described extensively in the Annex on the Deliverable 3.1, available on page 45 of this report, through two case studies: Italy and Germany. These case studies are conducted using datasets from two project participants: NISEA and Thünen. Three other applications of the tool were carried out on Belgian, Dutch and Finnish individual vessel datasets made available by LUKE, WUR and ILVO. Preliminary results are presented in Annex II of the Annexes of Deliverable 3.1.

The analysis under this WP is divided into three steps: 1) an exploratory analysis on data structure, potential outliers and linear regressions; 2) an application of a GLM (Generalised Linear Model) to use effort and capacity data in combination with métier information to model labour costs, other variable costs, repair and maintenance costs and fuel costs/fuel consumption; 3) a third step where a disaggregation tool is applied using the results derived from the GLM.

In the Italian and German case studies, correlations between the cost/consumption variables and their explanatory variables were investigated. Overall, the highest correlation was found for labour costs, which can be explained by the revenues (as expected, considering the share method used in both countries). Fuel consumption and fuel cost could be explained through

effort and engine parameters (kW and days-at-sea), but this applied mainly to segments using towed gear. The correlations found (value of R-square) were in general <1 for labour costs. The lowest correlations were found for repair and maintenance costs when explained by kW and days-at-sea or hours at sea: this is in line with previous observations and with the fact that these expenses are not explained by the métier actually performed but by the vessel unit. Other variable costs showed mediocre correlations with kW X days-at-sea and hours at sea.

For the German case, the analysis of the influence of the métier on the cost structure was found to be insignificant for all segments except for one. This is mainly due to the fact that the segments analysed are ruled by one métier while others play an insignificant role. This was also true for the Belgian and Finnish case studies. Accordingly, the GLM produced the same results as the linear regression. Only for the small-scale segment (PG0010) of German fleet a significant influence of the métier on the cost could be observed. Within the German case study this segment was the most diverse one with respect to métiers. However, the data were quite scattered and it has to be borne in mind that the German data sets were not corrected for outliers, which appears to have had a major influence on the results.

In the Italian case study, the métier served as explanatory variable in several cases, as shown by both the simple correlation analysis and the generalized one (GLM). However, in some cases the correlation was often not as high as expected, even when differences were significant. The output of the GLM carried on the Italian case study showed that for some costs and for some segments the additive factors were more significant than the multiplicative factors and that in almost all cases the métier is significant. For this reason, the additive model (mod1) and the multiplicative (mod2) have been chosen alternatively, according to the specific case (type of cost/fleet segment).

In the project, the disaggregation exercise was only run for the Italian case where the GLM indicated more than one segment with a significant métier influence. The consistency check on the Italian case showed, in a first step, a high discrepancy between the results by métier from modelling, given the assumptions taken and the official data by segments. This issue has been further addressed, highlighting that the estimation of the same relationships on the hours at sea instead of the days at sea per KW improved considerably both the reliability of the linear models and the disaggregation results. For this reason, the R tool was made in a second step more flexible, allowing to estimate the relationships using alternatively the two options.

For all the case studies it was considered that the métier was not necessarily an effective parameter to separate or group vessel activities for all the type of variable costs. For example,

for Italian case study, the energy costs resulted significantly dependent on the métier for all the fleet segments (except for HOK1218), while it was not the case for the maintenance and other variable costs. The results of the German case study underlined that, for several fleet segments, regional aspects could play a role as well, suggesting, in these specific cases, the use of a combination of métier and fishing zone. This exploration can be made with the current version of the tool developed in WP3, and which is available at <https://github.com/Isabella84/SECFISH>.

Task 3.2 of this WP was aimed at developing a methodology and a tool to be used for:

- Deriving relationships between variable costs and transversal variables on individual vessel data by means of simple linear regressions and Generalized Linear Models (GLM), to test the significance of the métier on the costs structure (phase 1);
- Disaggregating variable costs time series from fleet segment level to métier level and developing a validation tool of the disaggregated costs (phase 2).

Phase 1 required individual vessel data to derive the relationships, while in phase 2 only the official time series of costs (by fleet segment) and transversal variables (by fleet segment and métier) as well as the coefficients of the relationships were needed, as estimated in phase 1. Thus, this second phase does not use the individual vessel data but this simulation could be carried out by any end-user, given that all the input of phase 2 are made available in the Annex on Deliverable 3.2, which can be consulted as embedded file on page 45 of this report.

The defined methodology was, then, implemented in 6 scripts in R language in order to deliver an open and flexible tool working on .csv files in a common format.

The developed scripts are:

1. EA.r (exploratory analysis): this code fits simple linear regression by fleet segment and by fleet segment-métier to highlight possible differences in the corresponding slopes;
2. GLM (generalized linear modelling): this script allows to test the significance of the métier on the cost structure and to determine the models that will be used in the disaggregation phase;
3. Detecting outliers: this code allows to detect possible outliers highlighted in the GLM results;
4. Disaggregation of the costs: this code disaggregates the variable costs from the fleet segment level to métier level;
5. Consistency check (validation tool);
6. Constrained regression: this code is used to perform a constrained multiple regression.

The data format and the methodologies used during the last two workshops on allocation of Economic Data at disaggregated level as related to the DCF (Malta in 2012 and Hamburg in 2011) were used as starting point for WP3 analysis. In WP3, the analyses performed during the abovementioned workshops were deeply generalized, using GLMs instead of the only simple linear regressions, including the métier as explanatory variable.

In Deliverable 3.1 of WP 3 the input needed to run the developed codes is described in detail for both phase 1 and phase 2. The 6 scripts are described in specific sections (in the excel file below), providing all the instructions to carry out the analyses and interpret the results. In particular, each section describes the following steps:

- how to technically run the code in R;
- how to define the needed settings;
- output produced and how to interpret the results.

Several applications of RTools-SECFISH package are reported in the Annex on Deliverable 3.1, available as embedded file on page 45 of this report. The 6 developed scripts are attached to the Annex on Deliverable 3.2, available as embedded file on the same page 45 of this report, with a sample dataset and an Excel file containing the format of all the input.



Templates-RTools
SECFISH_2019.xlsx

Conclusions and recommendations

Deliverable 3.1

The analysis carried out on the Italian and German case studies and the preliminary results obtained for the Belgian, Finnish and Dutch fleets allowed to derive some conclusions on the estimation of relationships between variable costs and effort, as well as on the disaggregation exercise, reported point by point below:

- *Size (and coherence) of the dataset:* the dataset should be large enough to allow the analysis and the data contained in the dataset should be representative enough of official data, meaning that the distribution of effort by métier in the vessel data chosen for testing the approach should be checked against official data of effort by métier. This indeed impacts the disaggregation phase, using official data. Furthermore, transversal data should be available at the same level of fishing operations in the individual vessel dataset (for example the hours at sea time series should be by fleet segment and métier

and not only by métier) to avoid losing important effects of the métiers practiced in other fleet segments. For example, this was the case of Italian case study, for which the effort time series of hours at sea (at fleet segment and métier level) was used for the disaggregation of the costs.

- *Specificity of some fleet segments:* according to the obtained results, for some fleet segments, the relation between some variable costs e.g. maintenance costs and effort is not significant. The reasons could vary and some hypotheses were made in the text. Maybe a deeper analysis at lower geographical scale could be beneficial to highlight specificities of the same métier applied in different areas, that could differently impact the variable costs. Moreover, some variable costs could be more importantly affected by the effort than others, as it was the case of the fuel costs respect to the maintenance costs, being the latter in-between variable and fixed costs.
- *Fleet segments with high variability:* the case studies here reported are related to fleet segments with high variability (Italian case study) and small variability (German case study) in terms of métier applied. The results showed that the developed methodology and R-tool allow to disaggregate the variable costs as accurately as the individual vessel data replicate the variability among the métier within the fleet segment under investigation. The more the individual vessel data is in line with the official time series of transversal variables and variable costs, the more the disaggregation of the variables costs is accurate.
- *Need of specific analysis for each fleet segment:* following what said above, the exercise would need a specific analysis for each fleet segment, taking into account the specific features of each national fleet segments and the related mix of métiers. This is better clarified in the Annex on Deliverable 3.2, aimed to show the utility of the user-friendly tool developed within SECFISH for disaggregating AER data.
- *Potential modification to the disaggregation approach applied to the case studies:* the differences between costs by fleet segment and costs disaggregated by métier could be due to different reasons. One possibility to reduce these discrepancies is to carry-out the analysis increasing the threshold of representativeness (for example 80-90%).
- *Potential different approach:* a potential different approach could be explored in the future based on a multiple regression analysis on the original dataset, taking into account for each observation all the different métiers used in the fishing operation and not only the prevalent one.

- *Disaggregation by characteristics other than métier*: the métier is basically an indicator of gear, mesh size and a rather general description of the target assemblage. There are examples for which within the same fleet segment the same métier is derived for fisheries which are different in cost structure, namely for high seas and coastal fisheries. The same can apply also within the coastal fishery, though not as evident. Anyway, the input files feeding the developed R tool, include a wide set of information for each observation (characteristics of the vessel, fishing zone, etc.). Considering the flexibility in the definition of the métier (as a generic string, concatenating all the relevant information that are expected to impact on the costs structure) also characteristics other than métier can be taken into account in the analysis.
- *Aggregation of métiers*: the métier can be rather detailed, thus distinguishing for instance between adjacent mesh size ranges which are not likely to have any impact on cost structures. As a consequence, the number of observations within the métier can be rather low, which lowers the effectiveness of the modelling approach. In these cases, a meaningful grouping of métiers should improve the outcome of the analysis. This approach should be followed in a consistent manner using expert knowledge. As described above, through defining the field métier in the input files, aggregating the métier with different mesh size, this issue can be easily overcome.
- *Non-significant métiers*: if differences at a métier level turn out to be insignificant, then the assumption that there is no difference in cost structure can be made. If the correlation between the cost variable and the explanatory transversal variable is “satisfactory”, then this explanatory variable alone can be used for disaggregation and no further component is necessary.
- *Pooling individual vessel data of different years*: has the advantage of increasing sample size. However, this could cause a hierarchical structure in the data, implying that the observations are not entirely independent. To account for this dependency structure, it may be advisable to include a random effect to account for a “vessel effect” as well as a random effect, or a time series model (e.g. AR1) for a “year effect”.
- *Other distributions for the GLM*: could be explored in the future for positive continuous response variable (e.g. a Gamma distribution with a logarithmic link function) in order to relax assumptions of normality in the residuals.

Deliverable 3.2

The outcome of the SECFISH WP3, as reported in this Deliverable, was aimed at supporting the suitable quantification of these correlations through an R tool. The R tool is a standard tool that can be used by MS both for deriving the relevant relationships on individual vessel data and for disaggregating the variable costs official time series by métier.

Moreover, any end-user using the scripts of phase 2 (disaggregation of the costs and consistency check) with the coefficients of the relevant relationships, can disaggregate the time series and carry out the relevant consistency checks.

The flexibility of the R tool and the detailed description of the functionalities implemented make this tool easy to be modified and enhanced in the future for further uses or also to be adapted to new data formats.

During the 2019PGECON meeting, a training session was dedicated to the application of the SECFISH R tool during which it was applied on different other case studies. This work contributed to several recommendations:

- The SECFISH R-tool was demonstrated to be a valid tool for the purposes of WP 3;
- Further explorations and application of the tool to passive gears would allow to identify areas of improvements and eventually of generalization of the tool;
- The development of an R library, published on R Cran, implementing the consolidated methodology could make this tool more easily available and applicable;
- The organization of training workshops could help the MS in familiarizing themselves with the developed R-tool;

The disaggregation/validation tools facilitate the detection of weaknesses in the sampling designs. Indeed, the presence of discrepancies between data by fleet segment and by métier can be a signal of inadequate distribution of the sampled vessels in the fleet population strata.

2.4 WP 4: Methodologies for estimation of intangible assets in EU fisheries

Coordinator: Hans van Oostenbrugge (WER)

Partners involved: BIM, ILVO, NISEA, SEAFISH, WER.

Objectives

This report includes the activities carried out and the results of analyses on the valuation of the intangible assets for the fisheries carried out under WP 4. This WP aimed to:

- Provide an overview of fishing rights and of the available fishing rights data in all EU MS;
- Define a methodology to estimate the value of different types of rights (license, quota, transferable and non-transferable, etc) and specify the input as required for the estimation;
- Define a methodology to separate the intangible part of capital (quota, license, etc) from the overall capital value when this value is not directly observable;
- Investigate factors determining changes in values of intangible assets;
- Provide guidelines for the estimation of the value of fishing rights applicable under all circumstances observed in EU MS.

Work done/results achieved

Deliverable 4.1

In order to reach all of the objectives stated above the following activities (steps) were carried out:

Step 1: EU wide inventory of types of rights, data availability and methods used for valuation

In order to obtain a full overview of the types of rights used and data availability, both a desk study on the topic of fishing rights was carried out both on scientific literature and national programs and annual reports (e.g. Annual Economic Report on the EU Fishing Fleet, National Plans). It was found however that there is very little information on the valuation of fishing rights methods available in either fisheries literature or the existing information from the MS.

In addition, a questionnaire was sent out to all MS and was filled in by seventeen EU MS. The questionnaire results provided information on the type of rights used, the valuation methods available and the information available for valuation. This information (results desk study and

questionnaires) was turned into an EU-wide overview on the systems of fishing rights, data availability and methods used and a complete list of types of situations (combinations of fishing rights and available data) which are described in the resulting guidelines (available in Annex under Deliverable 4.1 which has been uploaded as embedded file on page 45 of this report).

The results of the survey showed the wide variety of fishing rights used in the EU and the lack of methodologies to evaluate the value of these rights. When the rights are tradeable, market prices represent the main reference for their measurement in monetary terms. However, the survey showed that the degree of tradability of fishing rights as well as the information available for their evaluation differ greatly among EU fisheries management systems. In most EU MS, market prices of fishing rights are not collected and available. In some EU MS, there is an official market, administered by the Government for many types of fishing rights. In other, EU MS there is only an unofficial market for fishing rights. Nevertheless, in both cases where markets for fishing rights exist (unofficial and official market) most EU MS suggested the fishing charge or the counter value paid by fishers for obtaining permits as reference value for valuating licenses or quotas. Administrative fees are usually based on the normal value of catches of the preceding year or on the market price by species derived from the sales notes. Various MS have their own system for the estimation of the value of fishing licenses, using for instance the net present value of the fisheries or information from the fishing industry. In order to harmonize methodologies between MS it would be preferable that the information on the valuation methods applied in the MS is available in the methodological report.

In cases where fisheries are mainly managed by a license system, there is little information available for the valuation of fishing rights. The questionnaire answers suggest that expected profits (and revenue) deriving from holding a license are an important factor affecting the value. In EU MS where licenses cannot be transferred separately from the vessel, it has been observed that for certain types of vessels (e.g. very old fishing boats) the value of the license has a very high influence on the sale price of the vessel.

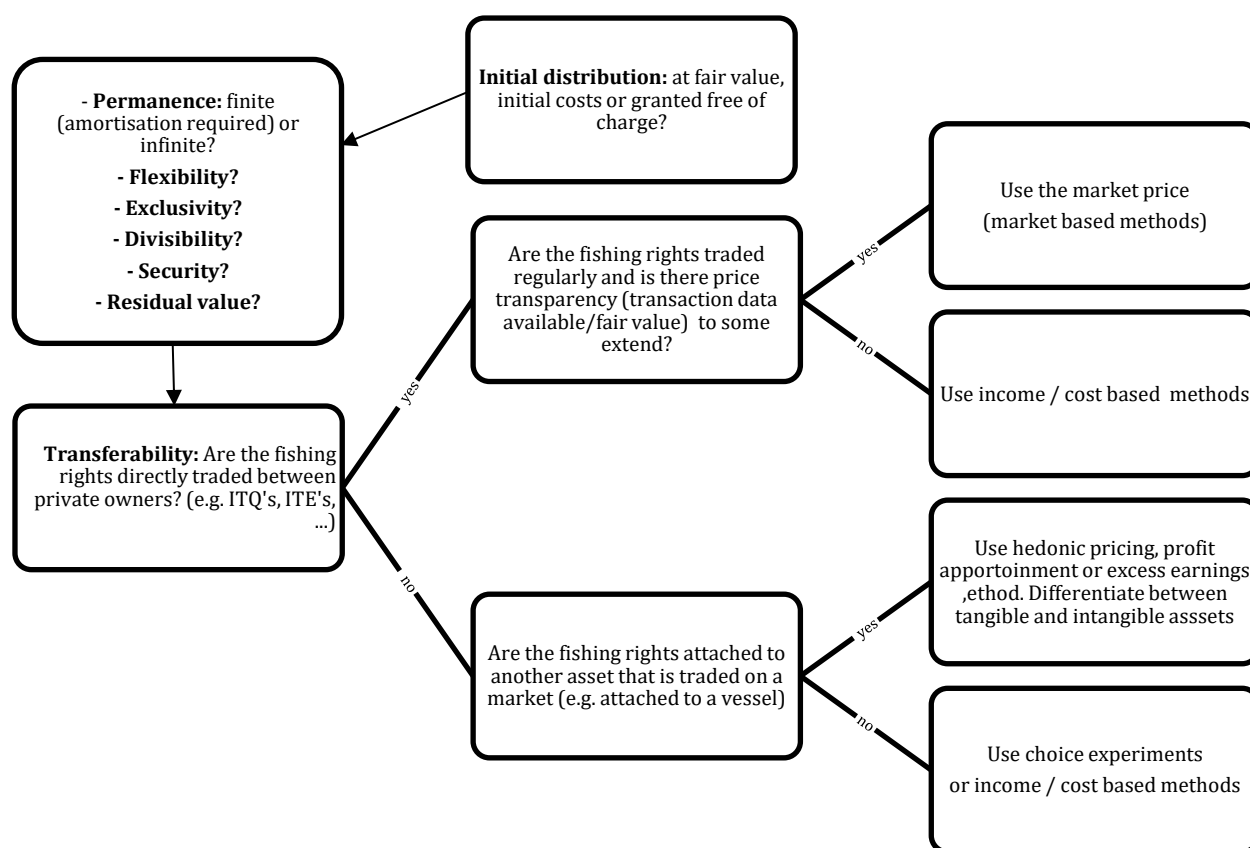
Step 2 Development of theoretical valuation models of fishing rights

Based on a literature review on the valuation of fishing rights and valuation method of intangible assets in general, a theoretical framework was developed to value the fishing rights. After a general introduction on fishing rights and a description of fishing rights in the context of intangible assets, the review summarizes the available methods for valuation of these rights (available in the chapter 3 of Deliverable 4.1, see p. 45). It encompasses both methodological standards developed by official authorities such as the International Valuation Standards and

information on valuation of fishing rights and production rights in other sectors depending from natural resources (e.g. agriculture). For each of the methods information is provided on their assumptions, pros and cons in the applications to fishing rights and data needs. Special attention has been given to distinguishing between the value of intangible assets (e.g. licenses) and the value of tangible assets (e.g., vessels).

In combination with the assessment of the type of rights in use, the overview of valuation methods resulted in a preliminary decision tree to choose the valuation method better suited to each type of fishing right (see figure below). For each of the specified valuation method, the method was explained and the advantages and disadvantages of application of the method to the case of fishing rights were listed.

Decision tree for selecting the appropriate valuation method given the fishing rights regime



This overview resulted in three preferred valuation methods for the valuation of fishing rights:

- Market based pricing: in case market information is available and a market for rights exists;

- Discounted cash flow method: in case fishing rights are transferable, but no market prices are available;
- Hedonic pricing method: in case fishing rights are attached to the physical asset (vessel).

Step 3: Analysis of factors determining the value of intangibles

The techniques used for the valuation of intangibles should preferably take into account the factors that influence their market value. Therefore, an analysis of the effects of external factors on the value of fishing rights was carried out. Because of the limited amount of cases with sufficient data available, only the Dutch fisheries were analyzed. The analysis included detailed accounts information available from almost 6000 quota transactions from the period 2003-2017. In a regression analysis, the effects of a wide variety of both economic factors, catch rates and the availability of fishing rights were tested. As there was too little information available from selling transactions, leasing transactions were used for the analysis. The analysis showed that higher availability of quota had a negative effect on the price of the quota and also higher fuel prices lowered the prices of quota for most species. In contrast, fish market prices had a positive effect on quota lease prices for the main species plaice and sole. Many other initial external factors could not be included in the model because of high collinearity or did not have significant effects. However, the explanatory power of these factors is low. This was also caused by the fact that small-scale dynamics data (effort, landings and CPUE) were only available on an aggregated level (monthly, for the whole fleet).

This analysis shows that the price setting mechanism for Individual Transferable Quotas (ITQ) in a multi-species fishery is a complex process in which macro-economic factors, such as the availability of quota and the costs of fishing, play a dominant role. However, micro-economic factors such as the relationship between the leasing and letting enterprise and the timing of the transaction during the year might be of high importance. The current study could not analyze these factors in detail, as the individual data on the fisheries (catch and effort) could not be linked to the enterprises that had made the transactions. However, this study provides a good starting point for such in-depth analyses, but more detailed data needs to be made available to study this process in detail.

In general, the study shows that a large number of independent factors could potentially influence the price of ITQ's. This causes significant limitations on the possibilities to analyze this market. As shown by the analysis, the collinearity in the independent factors is the reason why not all explanatory factors can be taken into account in the statistical model, thus reducing the capacity of this model to explain the complete process of price setting. Moreover, the

analysis shows that the number of observations (transactions) needed to carry out a proper statistical analysis may very well exceed the number of transactions that are available in the market. As a result, it will be hard to study pricing of ITQ's, especially in case of ITQ-sales, which do not occur as often as the ITQ-leases in this fishery. Pricing of ITQ's will therefore in many cases be more based on expert judgement and gut feeling than based on hard science.

Step 4: Application of valuation techniques to case studies

Five case studies were selected in which the various valuation methods were applied (BE, IRL, IT, NL, UK). These cases covered various types of fishing rights (e.g., ITQs in multi species fisheries, ITQs in single species fisheries and fishing licenses) and levels of information availability. The case studies included both market-based pricing and indirect pricing based on the Discounted Cash Flow method and resulted in a comparison of values from various methods. Because of lack of data, the application of the hedonic pricing methods could not be tested. Sensitivity analysis was carried out in one case study (UK) to assess the effects of these assumptions on the outcomes. The application of the case studies showed that the Discounted Cash Flow method can be used to value fishing rights that are not attached to a vessel. The case studies also show, however, that the main factors determining the value of the fishing rights are largely dependent on the chosen discount rate and amortization rate. The UK case shows a sensitivity analysis of the values of fishing rights. The case studies from Italy and The Netherlands show that the market price from the ITQ resemble different perceptions of the ITQ durability. In the Dutch case, the values of discounted cash flow method with finite durations (15 years) seemed to be more in line with market based values, whereas in the Italian case, a duration of 3 years seemed more consistent with the duration of the investments and with the duration of the fishing right. These results show the dilemma between a case specific application of the valuation methods, which resemble the estimated values of the fishing rights in the field, or a hypothetical valuation of the fishing rights based on harmonization of basic assumptions (discount rate and amortization period) among different European fisheries, in order to obtain consistent and comparable estimates.

Step 5: Integration of results into the final guidelines and conclusion

In the last step, the lessons learned were incorporated in the guidelines and these were finalised and presented to PGECON during the 2019 meeting. The guidelines can be found in the Annex on Deliverable 4.1 of this study – “Report on the valuation of intangible assets of fishing fleets in the EU”, available as embedded file on page 45 of this report.

Work done/results achieved

Deliverable 4.2

Based on the theoretical framework and the identification of fishing rights in the EU, draft guidelines for the valuation of fishing rights were developed. The draft guidelines were tested through case studies and following this process, results from the case studies were used in the preparation of the final guidelines. The draft guidelines were also presented at PGECON in May 2019.

Conclusions and recommendations

Based on the discussion during PGECON, the project had provided a good starting point for the valuation of fishing rights, but the guidelines should not be seen as the final version that can be applied without further elaborations. These elaborations should focus on: further methodological development of the discounted cash flow method; (1) further elaboration on the methods to assess the fishing rights that may not be traded separately; (2) and the data needs to implement the methods mentioned under 1 and 2 (3).

As discussed above the application of the preferred method of valuation of the fishing rights (the discounted cash flow method) is based on firm assumptions on the lifetime of the fishing rights and the amortization costs and these two aspects may vary between fisheries and fishing rights and may also vary in time, depending on the management regime. Therefore, more guidance is needed for the MS in order to come to a comparative system in which the various aspects of the fishing rights can be assessed and evaluated in a comprehensive and comparable manner, leading to values of fishing rights that are comparable as well.

The methods to value the fishing rights attached to the vessel need to be further developed, in order to be generally applicable. The case studies have shown that the data needed for a hedonic price analysis (purchase prices of vessels) are not easily accessible, as they are not collected by default through the EU-MAP for data collection. Moreover, it is not clear whether the number of observations will be high enough to carry out a statistical analysis, in case data is available. In many cases, the amount of combinations of various licences (GTs, KWs, sea-days) is large and the number vessel transactions per year is limited, restricting the statistical power of any analysis of the value of the fishing rights. An alternative could be to base the value of the fishing rights on the perception/knowledge of the fishing entrepreneurs. However, to be able to provide guidance to MS on this issue, more work needs to be done.

In order to bring the valuation of the fishing rights further it is recommended that PGECON takes-up further testing and refinement of the guidelines in a specific workshop. The workshop should to focus on three topics:

- Further elaboration and testing of the discounted cash flow method and process to evaluate the aspects of the fishing rights and the translation of these aspects into the parameters of the valuation. This will result in additional guidelines on the application of this method.
- Elaboration of the methodological aspect of the application of hedonic pricing in case fishing rights are attached to the vessel, including methodology to assess the feasibility of hedonic pricing based on the size of the fishery (and the number of vessel transactions) and the complexity of the (combination of) licenses. This will also need to include recommendations for additional data collection in case the value of fishing rights cannot be obtained from the data currently collected.

The results of Deliverable 4.2 are available in the Annex on Deliverable 4.2, which can be consulted on page 45 of this report, as embedded file.

2.5 WP 5: Origin and sources of raw material in the EU seafood processing industry

Coordinator: Rasmus Nielsen (IFRO)

Partners involved: BIM, IFRO, LUKE, THÜNEN.

Objective

The aim of this WP was to evaluate the possibilities and constraints of a regular collection of data on raw material entering the EU fish processing industry (European NACE Code 10.20).

The analysis examined the feasibility of collecting data on raw material input entering the fish processing industry by species, product form and origin including production method defined as fisheries or aquaculture. Finally, benefits and costs of establishing such a data collection on a regular basis, not necessarily on an annual, were estimated.

Work done/results achieved

The WP 5 report describes the five steps planned and carried out according to the project description (see Annex on Deliverable 5.1, which can be consulted as embedded file on page 45 of this report).

The WP had five steps:

1: Evaluation of the Finnish data collection and development of a common methodology

The starting point for the Finnish data collection was the statistical Combined Nomenclature and the Commodity Number classification codes. The Combined Nomenclature is a tool for classifying goods, used in the EU intra- and extra-trade statistics. The Commodity Number code, an 8-digit level code, enables identification of most species and product forms of raw material entering the fish processing industry. This also provides the possibility to compare prices by species and product forms of raw material between EU countries.

However, due to the limited amount of species entering the processing industry in Finland the methodology used in the Finnish data collection questionnaire was based on a main species and main product approach. Nevertheless, the data could be organized in such a way that corresponds to the Combined Nomenclature, which allowed for a comparison of product and price between EU countries, but at a slightly more aggregated level than using the Commodity Number classification code at an 8-digit level.

To be able to compare data between all EU MS, future data collection needed to be built on a common platform that was available in all countries. At the same time, the information included information on species and product form of the raw material entering the processing industry.

Thus, the common methodology chosen for the questionnaire developed within this project was the Combined Nomenclature using the Commodity Number classification code at an 8-digit level.

Using the Combined Nomenclature and the Commodity Number classification code at an 8-digit level satisfied the data needs requested in this project. However, the main species and main product form approach in line with the Finnish data collection example could be used as an alternative.

2: Examination of existing data sources

Existing data sources in Denmark and Germany were examined with the aim of identifying the volume of fish and fish products going into the processing industry. The description of the Finnish data sources has been included under step 1, because Finland already has a data collection on raw material. An overview of the existing data sources in Denmark and Germany are presented in the Annex on Deliverable 5.1.

From the existing data sources, it was not possible to determine the amount of raw material entering the fish processing industry. However, it was possible to establish a supply balance and apparent consumption in each case study MS ((catches for food-use + aquaculture + imports) – exports = apparent consumption), even if import and export statistics and calculation of whole live fish can be very challenging and the difficulties in avoiding double counting. Furthermore, the domestic trade flows of fish are very hard to follow since many fish products are traded without or with limited amount of processing both through traders but also internally between processors. Existing data sources on the product produced within the processing industry allowed some kind of estimate on species going into the industry, but without the knowledge of the product form entering the industry it is very difficult to estimate the volume of raw material used. Furthermore, from these data it was not possible to determine the origin of the raw material, the product form and prices of the raw material entering the industry. Thus, without more exact knowledge (data) the questions on the production environment, origin, product form and price cannot be answered from the existing data sources.

3. Development of a preliminary survey questionnaire

A preliminary questionnaire was developed and was presented at the 2018 PGECON meeting, with the overall conclusion was that the questionnaire can be used by all MS. The questionnaire was then presented to representatives from the industry and they were asked if it was possible for them to collect and deliver data in this format using the Commodity Number classification

code at an 8-digit level. The industry agreed that data could be delivered in this format and that data were available.

4. Qualitative interviews

The questionnaire was tested through qualitative interview with the fish processing industry, industry organizations and data collection experts in the following countries Belgium, Denmark, Finland, Germany, Netherlands, Ireland, Italy and UK. Furthermore, data collection experts commended on the feasibility of collecting raw material data using the questionnaire in the following countries Bulgaria, France, Greece, Hungary, Latvia, Lithuania, Poland, Slovenia and Spain. These interviews provided insights on whether it was feasible for the industry to deliver the raw material data on the described 8-digit Commodity Number code or if an alternative to this approach seemed more feasible for the industry.

The interviews revealed that the industry has all the information that was requested within this project on volume and value of species, production environment, origin and product form of the raw material purchased. However, the industry expressed great reservation in participating in such a data collection. The main issue for the industry was that it would be costly for them to organise and deliver data in a way that could be easily assessable and comparable between EU MS, such as the described 8-digit Commodity Number code. Enterprises often have many transactions which are not always stored electronically (sometimes only on paper) or in a way that could easily be harmonized with the 8-digit Commodity Number code. Furthermore, the enterprises perceived the price information as confidential in many cases. Thus, from an industry perspective, such a data collection would only induce extra costs without having any benefit for the industry.

A way forward, that would reduce the workload for the industry, could be a harmonisation of the data that should be provided according to the Control Regulation (traceability legislation) and the data that should be collection on raw materials for the processing industry. Under the new Control Regulation data should be stored electronically by the industry and delivered on request. The data stored in the EU data centre for the Control Regulation could then also be used for the purpose of a future data collection on raw material, which will limit the response burden for the industry delivering these data.

From the interviews and experts involved in testing the questionnaire, it was recommended that the questionnaire could be further developed in such a way that a drop-down panel using “species name” would become the main entrance point instead of the Commodity Number

codes (which were not always known by the industry in detail). However, this technical development was not possible under this project.

5. Estimation of costs of a regular data collection

The cost estimation of a regular data collection on raw material was based on the collected estimates from experts working with collection of economic data for the fish processing industry. For MS for which it was not possible to get this information, an estimate was provided based on other MS with a similar size industry using the same data collection methods. These estimates must be considered with caution, as the actual cost will become clear only if an actual data collection is set in motion and will depend on industry size, comparability within segments of the industry, industries willingness to participate, etc.

The total cost of an annual data collection was estimated to be €1 million. The cost covers the collection of the raw material data from the industry using the developed interview questionnaire. This also includes cost of the administrative personnel and cost related to collecting and managing the data from the industry, such as, estimating sample size, visiting/interviewing/contacting the enterprises and storage of the data. The costs do not cover cost born by the industry related to gathering and providing the data to the administrative data collectors. One reason for this relative reasonable annual cost may be due to the fact that EU MS already collect economic data from the fish processing industry and that an additional collection of raw material data therefor seems to be reasonable cost effective.

Conclusions

The feasibility study shows that the data requested within this study are available at the enterprise level and that it is possible to gather the data at a CN 8-digit level (or species and product level), which makes it comparable at a species and product level within the EU. The estimated annual cost of a data collection (€1 million at EU level) also seems reasonable from a data collection perspective. On the other hand, the industry seems very reluctant to deliver the data, because it is an extra workload for them and therefore costly. Therefore, it might be challenging to collect and receive representative data. A way forward could be a coordination between the Control Regulation related to traceability of fish and a data collection of raw material. This could minimize the cost for the industry and at the same time provide the needed data for both regulatory and data collection purposes. Furthermore, under the existing data collection an investigation on industry specialisation into species and product form could be conducted by the STECF Expert Working Group for the processing industry.

2.6 WP 6: Social indicators

Coordinator: Arina Motova (SEAFISH)

Partners involved: BIM, ILVO, NISEA, SEAFISH, THÜNEN.

Objectives

The work under this WP needed to provide, based on the work completed during the PGECON WS on social variables on 15-16 May 2017 in Vilnius, methodological support to MS developing their own surveys on social data collection, with further elaboration on other sources of social data available as well as on the feasibility of linking other data sources to fisheries.

Work done/results achieved

WP 6 produced a report on the availability of socioeconomic data and a methodology for socioeconomic data collection for EU fisheries, aquaculture and the fisheries processing industry (results can be consulted in the Annex on Deliverable 6.1, which can be consulted as embedded file on page 45 of this report).

The work focused on social data—end users, possible applications for the data, and linking societal indicators with fisheries—in the EU and EU Multi-annual plan for data collection (EU-MAP). The research also included investigating relevant international data sources (e.g. EUROSTAT, OECD, FAO) to identify available data and useful variables with the end-goal of evaluating the feasibility of extracting data already available from these international data sources. For the best use of data and variables, as found with all types of data, including social, the ultimate needs and requirements of end users need to be understood, as this impacts what data should be collected and how they should be collected. Data collection is time consuming and costly - both economically-speaking and in “good will”- as respondents are inundated with ever-increasing requests for information and data. Setting up industry, fleet, port, and/or regional profiles using social and other indicators and data is one means to the end of providing needed data in an efficient way.

One of the main uses of the current EU-MAP-derived data is for evaluating impacts of regulatory changes on fisheries, aquaculture and processing industries (e.g. multi-annual management plans). The current list of EU-MAP indicators (gender, employment by age, employment by nationality, employment by employment status and employment by education level) covers the main demographic and socioeconomic characteristics of employees that can potentially contribute to the impact assessment analysis of, for example, some EMFF measures

and seafood industries issues, e.g. aging employees and support for young fishermen, gender equality in the sector, etc.

Nevertheless, for social data end users and possible applications of the data, an analysis of the EU-MAP variables and end users needs shows that the current list of social indicators in the EU-MAP is providing only a small portion of the social information that might be needed for end users to get a full social profile of fisheries, fish processing and aquaculture industries or to provide further scientific analysis, e.g. vulnerability of coastal fishing communities. For specific questions, other social indicators, covering e.g. cultural, behavioral or well-being aspects, may be needed. For a better understanding of social characteristics of the sector, regional and case study approaches with a wider list of variables could be used. The analysis under this WP included an investigation of MS data collection systems and found a variety of approaches taken by MSs to collect social data, beyond the requirements of the EU-MAP.

Additionally, for the future EU-MAP and data needs, it might be useful to consider keeping results of social surveys (as defined in EU-MAP) at a MS regional level and stratifying the population in order to assess rather regional differences than fully follow the DCF segmentation based e.g. on fishing technique, or species produced in aquaculture sector. The possibility to collect and store the data at a regional level (e.g. fisheries dependent regions, FLAG areas, NUTS) could in the future add to the analysis of EMFF regional dimensions and contribute to development of measures by Fisheries Local Action Groups (FLAG).

Despite limitations in number and type of EU-MAP social variables, their inclusion is a great step forward in understanding some of the social aspects of fisheries, aquaculture and fish processing sectors and can be of great use (e.g., for EMFF employee analyses).

A great deal of work has also been undertaken at the international level on social data collection. It is recommended that international guidelines and experiences are used for analysing the sector and creating definitions for the EU-MAP variables. PGECON reports (2017 and 2018) provided a broad direction that should be followed, while still allowing that at the MS level the approaches differ, to reflect data availability in each individual country. Work examples conducted at MS level are presented in this Annex on Deliverable 6.1. The analysis of other data sources, e.g. EU census, showed that despite the availability of a number of socio-demographic indicators and the data collected during those exercises, there is no link to the fishing sector, aquaculture or fish processing sector available in publicly-accessible data sets.

As fisheries management has evolved over time, the understanding of which scientific disciplines and data are essential to fulfil requirements and needs has also evolved and there

has been an increase in the importance of social science. The importance of social aspects and demand for more social analyses is also growing at the international level. In 2018, ICES established a separate working group on social research; at the EU level, in 2019 STECF held an Expert Working Group on social data in the EU fisheries sector. There will be more requests coming from the end users in the future. This report provides an initial investigation into the availability of socioeconomic data and a methodology for socioeconomic data collection for EU fisheries, aquaculture and the fisheries processing industry, with the goal of providing some guidance in meeting the social science data needs of the EU.

Conclusions

The main objective of the call for tender under social indicators WP was to contribute to development of definitions and social indicators of the EU-MAP, therefore the work under WP6 was focused on the list of EU-MAP social indicators and the development of their definitions. The analysis of each indicator defined in the EU-MAP showed that each of them could contribute to the assessment of the Common Fisheries Policy and of EMFF measures (see the Annex on Deliverable 6.1 attached to this report) and therefore their data collection should be continued. However, a wider analysis of social data needs was out of the scope of this project and the wider list of social indicators, e.g. cultural, wellbeing, etc. The analysis of the policy objectives also did not give an indication of more data needs, as there are no clear social objectives in the current Common Fisheries Policy, beyond those related to communities. The project highlighted the importance of this objective, by recommending the increase in data resolution to territorial, rather than fleet specific.

The list of social indicators needed would always depend on issues to be analysed and policy objectives therefore the project also recommends the continuation of the case studies approach, which could form a basis for the future development of social analysis through other research projects.

2.7 WP 7: Recreational fisheries

Coordinator: Harry V. Strehlow (THÜNEN)

Partners involved: AZTI, Cefas, WUR, ILVO, DTU Aqua, IRIBM, SLU.

Objectives

WP 7 aimed to strengthen regional coordination in marine recreational fisheries (MRF) data collection, including biological and socioeconomic data, in line with the momentum towards a regional approach in fisheries management introduced by the Common Fishery Policy (CFP, EU 2013). The first objective was to list the issues addressed by Working Group on recreational fisheries Surveys in ICES (WGRFS) and collate the improvements to marine recreational fisheries data collection and in particular to establishing a quality assurance framework. The aim of WP7 was to set up a framework to look at the quality of national survey schemes and document bias in data collection and estimates that satisfies the ICES quality assurance framework and requirements of the EU DCF and provides an assessment of quality for end-users of the data.

This WP also identifies the metadata formats required to capture and integrate recreational fisheries data into the existing Regional DataBase (RDB) and finally into the new Regional Database and Estimation System (RDBES).

Work done/results achieved

Deliverable 7.1 includes a summary of the main outputs of WGRFS on suggestions for a quality assurance framework including data formats for the use in RDBs, socioeconomic data collection requirements and future coordination activities.

During the project implementation contact was established with two other European projects (fishPi² and STREAM) also part of the same grant call for proposals and which were working on marine recreational fisheries data collection in different EU regions . It was formally approved that the three projects - SECFISH, fishPi² and STREAM - would work on a common document which collated the available information developed from the three projects to make it a reference document for potential end users (i.e. RCGs, European Commission, etc.). This will be sent to the European Commission and serves to support future definition or legal requirements to collect recreational fisheries data as part of the EU-MAP.

Quality assurance framework

To ensure quality assurance of recreational catch estimates from national surveys and document bias in data collection that satisfies ICES and EU-MAP requirements, WGRFS has developed a quality assurance toolkit (QAT) for evaluation. During SECFISH, the QAT was evaluated and several improvements were made. The work will be continued intersessional within a subgroup and with input from SECFISH. The current status of the QAT is presented in the Annex on Deliverable 7.1 available as embedded file on page 50 of this report).

MRF data in assessments

Regular integration of marine recreational fisheries (MRF) data in assessments is currently lacking due to challenges in assessing data and lack of a formalized procedure. At present, MRF data is used in few analytical stock assessments (e.g. sea bass, Western Baltic cod, Baltic salmon) but is generally not accounted for on a regular basis. However, a routine collection of MRF data would not only make this process more transparent but would enable consecutive improvement of data quality. In order to improve this process a flow chart was developed to guide the decision-making process (ICES WGRFS 2019).

RDB data formats

It is currently very difficult for end users to access MRF data. At present MRF catch data are stored by the individual MS and the most accurate collated annual data is available in the annexes of the WGRFS reports. A recommendation (by this project together with the FishPi2 project and members of WGRFS) is to collate all available MRF data in a consistent way to maximize the utility and uptake of MRF data by end users. The development of the RDBES by ICES provides an opportunity to make MRF data available, increase documentation of data, make raising more transparent and facilitate fisheries management advice. A proposal was made providing a summary of the data fields needed to be included in the RDBES. During sub-meetings between members of this project, the FishPi2 project and the ICES-WGRFS group it became apparent that the commercial and recreational survey data is quite different and therefore a separate MRF database is required. The reason for that is (i) the lack of any census data on catch and effort, and (ii) the large variety of sampling designs (including on-site and off-site methods) and raising procedures, provoked by varied nature of the recreational fishery and culture differences in responses.

Socioeconomic data requirements

The European Parliament has recognized the size and value of the MRF sector and supports its development. Therefore, data on the economic value and social benefits of MRF is required. Currently the DCF includes requirements to collect employment and other economic data only for the commercial catch, processing sector and the aquaculture industry. Studies have shown that recreational fisheries have high economic value. According to Hyder et al. (2017) the economic impact of European recreational fisheries is approximately 10.5 billion EUR and supports around 100,000 FTE.

The commercial fishery is a resource extraction, processing and retailing industry that produces food products. Output can be measured in tonnes (or euros) and consumption is made by the society in general. The recreational fishery is a form of outdoor recreation which is dependent on a natural resource (fish). Output is measured in fishing trips or days, while consumption is made by anglers themselves. The economic value of the angling experience is affected by fish availability and several non-fish related factors such as angler satisfaction.

Different analysis can be done to consider economics within the MRF sector. Availability of socioeconomic data in the diverse MS is heterogeneous. There are few data collection programmes devoted exclusively to MRF. Only a few of them include socioeconomic data as part of the program. Different initiatives are led in MS to collect socioeconomic data of recreational activities at national and regional level. It is notable that these do not correspond to regular national data collection programs and have been in most case collected together with data on fishing effort and catches. Socio-economic data mostly include estimations of the total value of the fishery in question, expenditure and employment both direct, indirect and induced. Since in many cases both marine and freshwater recreational fisheries are addressed together it is hard to separate the economic effects of MRF.

Evaluation of small-scale commercial and recreational fisheries

Marine recreational fisheries often operate similar to small-scale inshore fisheries (SSF) which involve very large numbers of commercial fishing vessels under 10m fishing full or part time. In many areas such as the Mediterranean, these commercial SSF vessels are diffusely distributed and poorly monitored. Recreational boat fisheries may operate in similar ways to SSF, fishing in similar areas and targeting similar species assemblages, often using similar fishing methods such as rod-and-line, handlines, longlines, nets, pots, spearfishing and hand-picking using SCUBA. This can lead to conflicts between sectors that are difficult to resolve without information on fishing activities and catches.

Incorporating the human dimension

Management of fisheries is often thought to be more about managing people than fish. However, responses to fishing regulations vary across angler populations, i.e. the average angler does not exist. For example, angler behaviour can affect harvest rates through the consumption orientation of the angler. Moreover, understanding how anglers are affected by different regulations is crucial to sustain the recreational fisheries sector and ensure economic benefit to coastal regions. One predominant factor in the human dimension research is angler heterogeneity. Angler heterogeneity does not only impact management (responses to fishing regulations) but has implications for data collection and assessment introducing bias.

Conclusions

In order to ensure the regular integration of MRF data in assessments, SECFISH recommends to include MRF data routinely into data calls so that assessment WGs can decide to either use the data in the analytical assessment or explain why the data was not used. This way it would be made explicit that MRF impacts were considered in the assessment process. To ensure quality assurance of recreational catch estimates from national surveys and document bias the available quality assurance toolkit (QAT) developed by WGRFS was evaluated as still fit for purpose. Once MRF data is collected it should be collated in a consistent way to maximize the utility and uptake of MRF data by end users. The RDBES provides for such means. At this stage, the preferred solution is a database to store raised tonnages and numbers of fish caught and released by area and year, alongside length–frequency distributions. The recommendation made by fishPi²/SECFISH is the creation of two new tables (see Annex specifically designed to host MRF data (Scenario A). The alternative solution (fitting MRF in existing tables) have also been considered and it is presented as Scenario B.

Future management considerations rely on the evaluation of the quality of the fishing activity or on competition between the commercial and the recreational sector by, for example, comparing recreational and commercial fisheries' economic impact. SECFISH recommends in a first step to focus on the collection of trip expenditure data to describe the economic contributions to coastal communities from expenditures by recreational anglers. This information is relatively easy to collect alongside existing MRF surveys. To collect this type of information, different survey methods can be used such as angler intercept surveys, mail surveys, telephone surveys, or a combination of these. It may be possible to collect expenditure from anglers alongside existing surveys done annually, but then carry out a more detailed survey every 5 years to assess marginal values and impacts of changes in fish stocks.

Information on social/societal benefits of recreational fishing can also be gathered through existing or specific surveys at intervals of several years. In some areas, MRF catches may be comparable to SSF catches for many inshore species (e.g. charter and private boats) and the issues around estimating effort and catches is similar in both fisheries. Both types of fishery require sampling schemes if exhaustive logbook coverage is not possible. Where appropriate, regional data collection approaches from inshore fisheries should cover both the MRF and SSF sector using similar types of surveys. SECFISH recommends to incorporate a special section of SSF in the new EU-MAP after 2020. In the case where complete or almost complete lists of vessels are available the same data collection methods may apply. During SECFISH, an ICES workshop on Integrating human dimensions into the management of marine recreational fisheries (WKHDR) was proposed, with the aim to develop approaches for integrating angler heterogeneity into the assessment and management of marine recreational fisheries. SECFISH recommends to integrate the key attributes identified by ICES WKHDR in future EU data collection regulations to advise on management implications.

2.8 WP 8: Project management and dissemination

Coordinator: Ralf Döring (THÜNEN)

Partners involved: All

WP 8 includes the actions for the coordination of the project and dissemination of the project activities.

The Kick-off meeting of the project was held in Brussels on January 12th 2018. The coordinator and the WP leader of WP 5 participated in that meeting.

The official project start was December 15th 2017, but activities did not begin immediately after that due to the Christmas break. The activities started after the Kick-off meeting in the middle of January.

The Consortium met in Hamburg on February 12-13 to discuss the work plan and to plan the further activities in the project. Due to this delayed start of the project, the coordinator discussed during the consortium meeting in February about a possible contract extension. The partners proposed a slightly modified work plan (Milestones and Deliverables) adjusted to the foreseen contract extension. The coordinator requested a two-month extension that was accepted and an amendment signed by the coordinator and the European Commission (took effect 30.01.19).

The project partner realised at the consortium meeting that the distribution of the Person / months workload was not totally correct in the grant agreement and asked for the final numbers to be included in contract amendment. The amended table was included as annex in the project extension document.

The coordinator presented a short summary of the project at the PGECON meeting of May 16th 2018, but due to the bad quality of the Skype connection the question and answer part of the meeting was cancelled. During the PGECON meeting 2018 several WP were presented to make the PGECON participants aware of the activities and to clarify which input is expected from them. The consortium had also a web-meeting during that meeting.

The interim report was delivered in time to the EC in July 2018 and discussed during a meeting in Brussels September 27th. The project partners addressed the comments by the European Commission and delivered the final version in November 2018.

On December 3rd the project partners held a web-meeting to discuss the progress of the project.

On March 6-8 2019 the project partners met in the Hague for a second consortium meeting and discussed the upcoming deliverables and the presentations at the PGECON meeting. During

the following PGECON meeting of May 2019 the consortium presented the results of the project and issued training sessions for the application of new methodologies for e.g. disaggregation of data.

As the participants at the PGECON meeting are seen as the main recipients of the results of the project, the consortium considered the meeting of 2019 as the main dissemination event. Project results were also presented at the EAFE conference 2019 from April 1st to 5th in Spain. The following presentation included results from SECFISH:

- Jörg Berkenhagen: An alternative, fisheries-based approach for the segmentation of the fishing fleet.
- Arina Motova: Social data collection in the EUMAP: first steps towards EU fisheries social profiles?
- Jarno Virtanen: Handbook on sampling design and estimation methods for economic data collection. Poster presentation.

The Handbook developed in WP 2 was also distributed to the other projects under the MARE/2016/22 call as the methods are generally applicable for the DCF data collection.

WP 6 had been presented to PGECON on the 17th of May 2018 during its meeting in Ghent. The WP 6 coordinator presented the WP6 outline, the achievements of 2017 PGECON workshop on social variables and organised one day discussion session with EU MS on pilot studies results and MS plans for 2018 data collection. The results of discussions with overview of MS work plans for 2018 were added to PGECON report and used to inform final deliverable of the WP6.

The project was also represented at the DCF/PGECON Workshop on social variables and ensuring the smooth transition between data collection regulations (DCF to EU-MAP) where main researcher presented WP outputs and encouraged discussions between MS.

The newly established ICES WG on social indicators first time met in Copenhagen on 25-29 of July in Copenhagen. The SECFISH WP6 was represented during this meeting through Video Conference. The coordinator of WP6 followed discussions of ICES WGSOCIAL during that week and presented social indicators of the EU-MAP to the members of the ICES WG referenced above on 25 of July. The second meeting of WGSOCIAL was held in Rome between 11th and 15th of March 2019, WP6 coordinator also attended the meeting on 13-15th of March and contributed to the discussions.

3. Difficulties encountered during the project

WP 1: Summary of what has been achieved in 2016-2017

The work in the WP has been accomplished according to the project proposal and was not affected by particular problems in its implementation.

The only critical issue was a delay in the preparation of D.1.1 that has been shifted of by one month compared to the initial proposal because of the delay in the definition of the questionnaire.

The project team prepared the web questionnaire and presented it during the PGECON meeting (14-18 May 2018). The questionnaires were sent to the DG MARE project focal point to receive comments and final validation. The last comments by DG MARE were received in the second week of June. Therefore, the link to the web questionnaire was sent by the project coordinator to a wide range of participants in the DCF including national correspondents and PGECON members on 19 June asking a reply by July 20, 2018.

WP 2: Harmonization of methodologies for sampling design and estimation methods for fleet and aquaculture economic data collection

No difficulties encountered.

WP 3: Development and implementation of common methodologies to disaggregate economic variables by activity and area

One of the difficulties encountered in the work carried out within WP3 was related to the putting the individual vessel data in the required formats defined during the last 2 PGECON Workshops on cost disaggregation. This was due to the need that every expert in charge for a case study to define a procedure to extract the individual vessel data from his/her database in the correct format. This was addressed including a specific, very detailed section on the input data preparation in Deliverable 3.2.

Moreover, the experts not very familiar with R found several difficulties in running the developed codes, especially at the beginning of the timeframe related to WP3. This was mainly due to the fact that the codes were in the beta version and that a comprehensive documentation was not available at that time. These difficulties were firstly overcome organizing an ad hoc meeting among the experts of COISPA, Thünen and NISEA institutes in Bari (Italy) in January 2019. During this meeting, the code was run for Italian and German case studies and the main results, presented in the first version of the Deliverable 3.1, were obtained. In order to address the difficulties of experts not familiar with R, a training session on the R Tools-SECFISH

developed in WP3 was planned during the next PGECON that was held in Ljubljana in May 2019.

After the comments of the Commission, the experts refined the analyses, focusing on Italian case study, where several inconsistencies on disaggregated costs were encountered. The experts took also advantage of the final meeting held in the Hague in March to discuss about how to improve the obtained results. The subsequent investigation led to a generalization of the method and a new more consolidated version of the R tool that allows to derive the relevant relationships using 2 different options to represent the fishing activity. Moreover, the preliminary results of two additional case studies were also included in the last version of deliverable 3.1, thanks to the contribution of the experts from Luke and ILVO institutes.

WP 4: Methodologies for estimation of intangible assets in EU fisheries

Within the EU there is a large variation of fishing rights, used in various combinations and in combination with different fisheries. As such valuating these rights is a complex issue that is not solved easily.

The inventory of fishing rights tried to capture the complexity in fishing rights, but from the responses of many MS it became apparent that this complexity was simply too large to capture in all its details. Therefore the overview of the fishing rights does cover the main types of fishing rights and management schemes in the MS, but do not cover all specific details for all fisheries.

The analysis of the external factors suffered from a lack of data. Despite the fact that data of quota sales were available for approximately 40% of the active vessels for the period 2001-2016, the number of data points (about 200 transactions) proved to be too few (to carry out a proper regression analysis). Therefore, the analysis was carried out on the quota leases. Even though the analysis is not indicative of the factors determining the value of fishing rights on the long term, this analysis shows the complexity of the price setting mechanisms.

The application of the guidelines has been a very good exercise but also showed that the issue of valuating the fishing rights is not solved by providing guidelines. It came out that the application of the Discounted Cash Flow method to estimate the value of fishing rights that can be transferred is possible for all cases. The outcomes show however that the application of the method is very sensitive to the assumptions for the calculation of the net present value. More information and discussion about the choice of these parameters is needed to come to a consistent approach. Implementing the hedonic regression to estimate the value of the fishing rights in case they are attached to the vessel turned out to be impossible for the partners because the available data on transactions of vessels were not sufficient to carry out decent analyses.

Therefor additional analyses in other case studies should be carried out in order to elaborate this part of the guidelines.

In conclusion, the project provided a good starting point for the valuation of fishing rights, but the guidelines should not be seen as the final version that can be applied without further work to the data collection of all member states. It is recommended that PGECON takes up further testing of the guidelines in a wider context in a specific workshop and the refinements of the guidelines. This will also need to include recommendations for additional data collection in case the value of fishing rights cannot be obtained from the data currently collected (as might be needed for the Hedonic pricing). Also a link with future value of fisheries and management options (bio-economic modelling).

WP 5: Origin and sources of raw material in the EU seafood processing industry

The WP has accomplished its deliveries according to the project proposal and has not been affected by particular problems in its implementation. However, minor issues have been experienced during the project period.

Industry participation

A good relationship has been established between the partners of this WP and the industry organisations. However, the individual processing enterprises were more reluctant to participate in interviews regarding the possibility of collecting raw material data. The main issues have been that data collection is time consuming, price data are considered confidential and that participation within this project might instigate a future regular data collection. Thus, the interviews are based on showing the Excel questionnaire to the industry and discussing the feasibility of collecting and providing the data. Furthermore, most of the interviewed persons/enterprises express great reservation regarding the usefulness of such data collection.

Action: Clear communication of the benefit for the industry of collecting raw material data

Country participation

The country reports for MS without a partner in the project has been done on a voluntary basis it has not been possible to get a country report or a full country report from all EU Member States. The reason is that it has not been possible to get in contact with the person/persons that would be most suited for answering the questions or that this/these person/persons has/have not responded to our inquiry.

Cost related to sample size

For countries not providing a cost for a future data collection on raw material, the estimation of cost is based on the total number of enterprises in each country and the data collection method

used (questionnaire or Statistical Office). For countries with large industries extrapolation to the full population may be used, which may result in too high estimates for countries where the industry is homogenous and too low estimates where the industry is more heterogeneous. All in all, the estimates should be used with caution.

Action: An in-depth analysis of industry structure based on species and products should be conducted before an actual data collection is initiated within EU Member States where extrapolation of data are an issue.

Classification of fish species and products under NACE, DCF and EUMOFA

The commodity groups (CG) of EUMOFA do not coincide with the target assemblages under the DCF, and therefore the allocation of landings to CG needs to be done at a species level. The structure of the tables describing national availability of raw materials needs to be made ad hoc each year, as the NACE codes, though in a small fraction, are updated yearly. Failing to do so may leave out important species (e.g. some tuna products in 2014) or lead to inconsistencies (e.g. some products may change their main species/ commodity grouping).

Action: An alignment of the CG's and DCF should be discussed.

WP 6: Social indicators

No difficulties encountered.

WP 7: Recreational fisheries

One of the difficulties encountered in the work carried out within WP7 was related to the specification of economic data requirements in MRF surveys as this needs to be defined by end user needs. It is not clear who shall collect end user responses and the European Commission was asked to clarify that. Following those clarification and possible responses by end users the data requirements will be refined.

WP 8: Project management

As the project kick-off meeting was organised at the beginning of January 2018, the consortium was not able to organise a parallel first consortium meeting as planned in the grant agreement. This first meeting was held in Hamburg February 12-13. During that meeting it was also discussed to have a second consortium meeting not before December 2018 as it was early enough for discussion on the final products and to plan the final stages of the activities. At the end the Consortium had a web-meeting on December 3rd 2018 and a physical meeting in The Hague March 6th-8th.

4. Annexes

1. Annex on Deliverable 1.1 ‘Report on the main outputs of PGECON and its working groups and on suggestions for possible improvements in the future coordination activities’



Deliverable 1.1
SECFISH.docx

2. Annex on Deliverable 2.1 ‘Handbook on sampling design and estimation methods for economic data collection in fisheries statistics’



Deliverable 2.1
Handbook

3. Annex on Deliverable 3.1 ‘Determination of cost structures (e.g. métier), identification of correlations’ and 3.2 ‘Guidelines for disaggregating economic data at the same resolution of transversal data and validation tool’



Deliverable 3.1-
SECFISH_May2019.



Deliverable 3.2-
SECFISH_May2019.

4. Annex on Deliverable 4.1 ‘Methodologies for estimation of intangible assets in EU fisheries’ and 4.2 ‘Guidelines for the valuation of fishing rights’



Deliverable 4.2
secfish final.docx



Deliverable 4.1 -
SECFISH final

5. Annex on Deliverable 5.1 ‘Feasibility study on the collecting of raw material data from the EU fish processing industry’



Deliverable 5.1 Raw
material fish

6. Annex on Deliverable 6.1 ‘Availability and methodology of social data’



Deliverable
6.1SECFISH

7. Annex on Deliverable 7.1 ‘Report on the main outputs of WGRFS and on suggestions for a quality assurance framework including data formats for the use in RDBs, socioeconomic data collection requirements and future coordination activities’



Deliverable 7.1
recreational