Study on the main effects of the COVID-19 pandemic on the EU fishing and aquaculture sectors

EASME/EMFF/2018/011 Lot 1

Specific Contract No.4

and

EASME/EMFF/2018/011 Lot 2

Specific Contract No.5

Final Report

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European Climate, Infrastructure and Environment Executive Agency

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LIST OF ABBREVIATIONS

Term	Description
AER	Annual Economic Report on the EU Fishing Fleet
AIS	Automatic Identification System
CPC	Cooperating Contracting Party
DCF	EU Data Collection Framework
DWF	Distant Water Fleet
EASME	Executive Agency for Small and Medium-sized Enterprises
EMFF	European Maritime and Fisheries Fund
EMFAF	European Maritime, Fisheries and Aquaculture Fund
EU	European Union
FAO	Food and Agricultural Organisation of the United Nations
FTE	Full-Time Equivalent (employment)
GFCM	General Fisheries Commission for the Mediterranean
HORECA	Hotels, Restaurants and Catering market sector
ICCAT	International Commission for the Conservation of Atlantic Tuna
ICES	International Council for the Exploration of the Sea
IUU	Illegal, Unreported and Unregulated Fishing
LSF	Large Scale Fishing Fleet
MS	EU Member States
OECD	Organisation for Economic Co-operation and Development
SSF/SSCF	Small Scale (Coastal) Fishing Fleet
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
US	United States of America
VMS	Vessel Monitoring System

EXECUTIVE SUMMARY (ENGLISH)

The COVID-19 pandemic and the measures taken to confine its spread have impacted fisheries and aquaculture production systems across the European Union (EU). This report covers the time period from March to September 2020 for all 27 EU Member States (MS). It offers: a summary of the available information on the effects of the pandemic; a limited quantification of the extent of these effects; an indication of how long they may last and what mitigation measures governments have implemented in order to contain the short, medium and long term negative economic effects on fishers and fish farmers. Knowledge gaps are identified in a further chapter.

The COVID-19 pandemic has had mostly negative effects on fisheries and aquaculture segments throughout the EU, but there have been some positive effects, too. On one hand, the closure of fresh fish markets as consequence of the closure of the HORECA (Hotels, Restaurants and Catering) sector has had a negative impact on demersal fisheries and some aquaculture production systems. On the other hand, there was an increase in demand for canned and frozen fish, which was also accompanied by lower fuel costs. This meant that large, pelagic fisheries were only negatively affected in terms of travel restrictions. In the following overview we summarize the main information and conclusions from the report.

Identifications of main effects:
For fisheries, MS reported changes in fishing activities as vessels were forced to stay in port (demand for certain species decreased substantially), to change procedures on board to follow the COVID-19 restrictions and to alter control routines, since inspectors and observers were unable to board the vessels. Partners and sub-contractors reported losses, especially in demersal fresh fish fisheries as fresh fish sales decreased as HORECA services were mostly closed. For some time, exports outside the EU were also restricted and demand decreased in some EU countries.

In the aquaculture sector, farms also had problems with the decreased demand, which led to them being forced to keep fish longer in the facilities. Consequently, hatcheries and nurseries had problems with selling juvenile fish for the next stage of the production cycle. Farmers reported that the reduced tourism led to low sales over summer 2020, and that in summer 2021, more fish will be available in certain markets. Some MS reported that direct sales of some species increased in 2020, but fewer fish may be available in 2021.

Quantified effects:
For some MS, quantifiable effects could be identified. For roundfish and flatfish species, demand and fishing effort decreased and for some species, a 50-60% reduction in the volume and value of landings was reported in logbook data. Prices dropped in many countries. For example, in Finland, the fish price index dropped from 129.09 in January to 109.4 in October. This negatively affected some fleet segments.

For the aquaculture sector, less quantifiable information was available. As of drafting this report, there is no official data available. Sales for certain species decreased; carp by 50% in Denmark, exports of seabass and seabream by 50% in Cyprus. However, an increase was reported for some species (e.g. 10-20% increase in trout sales in Denmark).

Analysis of impacts and consequences:
At the moment of the drafting of the report (at the end of 2020), it was not possible to predict how long the effects of the COVID-19 measures will last. Many countries were still in a second lockdown. In the spring of 2020, nearly every country issued mitigation measures to cover some of the losses resulting from the first lockdown. These will most likely be extended into the second wave of the pandemic. Fisheries segments dependent on the HORECA sector, such as the small-scale fisheries, were not resilient to the pandemic. However, fishers have been searching for new ways to sell fish (e.g. through more direct sales using of online platforms). The fishing sector has claimed, however, that many companies may still go bankrupt. Companies in both the fishing and aquaculture sectors have argued that support funds, especially those not specific to the respective sectors, are occasionally difficult to access. They have noted that the process is very bureaucratic. For fisheries funds, fishers have argued that there is sometimes an uneven playing field between the MS in terms of the levels of support available. This may lead to long-term competitiveness issues, as companies that receive higher support funding will be in a better economic position after the crisis.

Mitigation measures:
Nearly all MS have reported implementing mitigation measures to support fishing and aquaculture companies during the pandemic. Not all MS have used EMFF funds for these payments and partners and sub-contracts have reported that only support from regional or national governmental budgets were provided. It is, however, important to distinguish between specific support for the fishing and aquaculture sectors and general funding for all sectors. In many cases, specific funding is supplied by EMFF funding, and there is additionally access to general COVID-19 relief funds (e.g. support for employees). A number of fishers and farmers demanded the inclusion of an emergency fund for the new funding scheme in the EU: the EMFAF.

Knowledge gaps:
At the stage of drafting, the report could only summarise the information available for the period March to September 2020. There was, however, no information yet on the impacts on fish stocks, the financial position of companies or effects of the mitigation measures. For a deeper analysis of the impacts, like possible effects of mitigation measures, a dedicated data collection effort will be necessary in 2021. This will allow the gathering of qualitative and quantitative information. By applying bio-economic models, together with the stock assessment data from ICES and GFCM, predictions for fisheries can be made about the mid- to long-term financial impacts on fishing companies. For aquaculture, a data collection exercise has also been necessary because less economic data is available. Economic data is mandatory only for marine aquaculture under the DCF, although some MS also collect data from freshwater aquaculture. This data is necessary for making predictions on developments in the sector.

Examples of fisheries and aquaculture production systems:
For some issues, the report summarises information on examples of fisheries and aquaculture production systems. These examples cover: the low resilience of the shrimp fishery in the North Sea; the effects on species in the North Sea flatfish fisheries, the change in market conditions for seabass/seabream and the change in observer programmes for the tuna fisheries in the Mediterranean.

Market development:
For most of the pelagic fleet segments, after a short disruption of the export routes, everything appears to have returned to normal. Problems were reported with crew changes and the increased requirements on board regarding social distancing etc. Comparatively, there were lower fuel costs due to lower oil prices, which were beneficial for vessels in many MS. For many demersal segments, including the flatfish fishing fleet in the North Sea, the situation has been more problematic because fresh fish markets have been closed or demand decreased.

Resilience:
Shrimp fisheries in the North Sea are a good example of low resilience to a shock, like the pandemic, as fishers have faced lower demand due to restrictions of shrimp peeling capacity in Morocco. Especially for small-scale fisheries it was reported that fishers had to stay in port, lost income and prices dropped. It was also reported that there was a necessity to diversify the markets in order to not be dependent on a single market segment, especially for the small-scale segment.

Export restrictions:
For some species, like seabass and seabream, reduced demand was reported (e.g. in Italy and Spain). This led to a decrease in sales up to 50% in Greece. The industry has also reported a stagnation in prices which may last well into the future.

It is unclear what will happen when the pandemic is over. It is hoped that some of the mitigation measures, like alternative sourcing (e.g. buying fish from local/regional suppliers), using new marketing channels (e.g. online platforms) and the development of new products, will lead to more resilience in the sectors. The fishers and farmers also requested that some kind of emergency mechanism is put in place in the new funding scheme (EMFAF) to be able to react quickly to a shock, like the pandemic. For fisheries, further analysis on greater flexibility of distribution of fishing opportunities may also make it easier for companies to react to market disruptions.

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RÉSUMÉ EXÉCUTIF (FRANÇAIS)

La pandémie causée par la COVID-19 et les mesures prises pour limiter la diffusion du virus ont un impact sur les productions halieutiques et aquacoles au sein de l'union Européenne. Ce rapport couvre la période allant de mars à septembre 2020 pour les 27 EU état-membres. Il présente une synthèse de l ; information disponible sur les impacts de la pandémie, il quantifie ces impacts, donne une indication de leur possible durée, et répertorie les mesures d'atténuation mises en place par les gouvernements pour limiter les effets économiques négatifs à court, moyen et long terme sur les pécheurs et les aquaculteurs. Les lacunes de connaissance sont identifiées dans un chapitre spécifique.

La pandémie causée par la COVID-19 a des effets graves, principalement négatifs, mais aussi dans certains cas positifs, sur les pêches et l'aquaculture au sein de l'union Européenne. D'une part, la baisse du marché du poisson frais liée à la fermeture du secteur de l'hôtellerie-restauration a eu un impact négatif sur les pêcheries démersales, et certaines productions aquacoles. D'autre part, l'augmentation de la demande pour le poisson en conserve et congelé, conjointement à un prix du gasoil bas, explique que le seul impact négatif sur les pêcheries de grand pélagiques soit lié uniquement aux restrictions sur les voyages. Les principales informations et conclusions de ce rapport sont résumées:

Identification des principaux effets
Pour le secteur de la pêche, les états membres de l'EU ont rapporté des changements dans l'activité de pêche liés au fait que les navires sont restes au port (il y a eu une forte baisse de la demande pour certaines espèces). Les états ont dû changer les procédures à bord afin de se conformer aux mesures pour lutter contre la COVID-19, et les pratiques de contrôle ont dû être modifiées (impossibilité d'embarquer pour les inspecteurs et les observateurs). Les partenaires et sous-traitants du projet ont rapporté des pertes, particulièrement concernant le poisson frais issu des pêcheries démersales, dues à la baisse des ventes de poisson frais (fermeture du secteur de la restauration) et au fait que les exportations en dehors de l'union européenne ont été limitées durant une période et que la demande de certain pays hors union européenne a baissé.

La baisse de la demande a également posé problème aux fermes aquacoles, qui ont du maintenir en élevage du poisson commercialisable. Les écloseries et les nourriceries ont, par voie de conséquence, eu des difficultés à vendre leur juvéniles de poisson pour le cycle de production suivant. Les exploitants déclarent également que la baisse de l'activité touristique a conduit à des ventes faibles durant l'été et qu'ils s'attendent à ce qu'il y ait un excès de poisson sur certains marchés pour l'été 2021. Pour certains états membres, les ventes directes de certaines espèces on augmente en 2020 et il pourrait y avoir moins de poisson disponible en 2021.

Quantification des effets
Pour certains états membres, les effets quantifiables ont été identifiés. Pour les poissons ronds et les poissons plats, la demande et l'effort de pêche ont diminué, et pour certaines espèces, une baisse de 50-60% des débarquements (en volume et en valeur) a été constatée à partir des données des journaux de pêche. Les prix ont chuté dans de nombreux pays (par exemple en Finlande, l'indice du prix du poisson a chuté de 129.09 en janvier a 109.4 en octobre), ce qui a affecté défavorablement une partie des flottilles.

Peu d'information quantitative était disponible pour le secteur de l'aquaculture. Au moment de la rédaction de ce rapport, aucun donnée officielle n'était encore disponible. Les ventes ont diminué pour certaines espèces dont la carpe (-50% au Danemark), les exportations de bar et daurade (-50% pour Chypre), alors qu'une augmentation a été constatée pour d'autres espèces (augmentation de 10-20% des ventes de truite au Danemark).

Analyse de impacts et des conséquences

A l'heure de la rédaction du rapport (fin 2020), il n'est pas possible de prédire sur quelle durée les impacts de la COVID-19 se feront sentir, puisque de nombreux pays sont toujours en confinement en cette fin de 2020. Au printemps 2020, pratiquement tous les pays ont déployés des mesures d'atténuation pour couvrir une partie des pertes engendrées par la première période de confinement. Ces mesures seront très probablement reconduites pour cette seconde phase de la pandémie. Il a été montré que les pêcheries dépendant fortement du secteur de la restauration, comme c'est le cas pour la petite pêche, ne sont pas résilientes face à la pandémie. Cependant, les pêcheurs ont également cherché d'autres débouchés pour leur poisson (par exemple plus de vente en direct et utilisation de plateformes de vente en ligne). Le secteur de la pêche déclare, cependant, que de nombreuses compagnies sont menacées de faillite. Des entreprises du secteur de la pêche et de l'aquaculture se plaignent du fait qu'il est parfois difficile d'avoir accès aux aides financières, en particulier celles qui ne sont pas destinées spécifiquement à ces secteurs. Elles notent également un processus jugé souvent très bureaucratique. Les pêcheurs regrettent aussi les disparités entre états membres concernant le montant des aides au secteur de la pêche. Ceci pourrait à long terme donner lieu à des problèmes de compétitivité car les compagnies ayant reçu des aides plus élevées pourraient avoir un avantage économique lors de la sortie de crise.

Mesures d'atténuation

Pratiquement tous les états membres ont mis en place des mesures visant à atténuer les effets de la pandémie sur le secteur de la pêche et de l'aquaculture. Les états n'ont pas tous eu recours aux fonds FEAMP pour financer ces mesures, et les partenaires et sous-traitants du projet rapportent que pour certains états seuls des fonds provenant des budgets de gouvernements régionaux ou nationaux ont été mobilisés. Une distinction doit cependant être faite entre des aides spécifiques au secteur de la pêche et de l'aquaculture (dans de nombreux cas bases sur les fond FEAMP), et des fonds de soutiens plus généraux pour la crise du COVID-19 (p. ex. aides aux employés). De nombreux pêcheurs et aquaculteurs ont demandé à ce qu'un fond d'urgence soit intégré au nouveau mécanisme d'aides européennes, les Fonds européen pour les affaires maritimes et la pêche et l'aquaculture (EMFAF).

Lacunes de connaissance

Seules les informations disponibles pour la période allant de mars a septembre 2020 ont pu être prises en compte dans cette synthèse. Aucune information n'est encore disponible sur les impacts sur les stocks de poisson, sur la position financière des entreprises ou sur les effets des mesures d'atténuation. Afin de pouvoir mener une analyse plus en profondeur des impacts (par exemple les effets possibles des mesures d'atténuation) il serait nécessaire de procéder à une collecte de données focalisée sur ce sujet en 2021, qui permettrait de rassembler à la fois des informations qualitatives et quantitatives. Ces informations, combinées aux données d'évaluation des stocks du CIEM et de la GFCM, permettront de faire des prédictions à moyen et long terme des impacts financiers sur les entreprises de pêche à l'aide de modèles bioéconomiques. De même, une collecte de

données pour le secteur de l'aquaculture est nécessaire puisque les données économiques actuellement disponibles sont peu nombreuses, car l'obligation de délivrer de telles données ne s'applique que pour l'aquaculture en milieu marin, même si certains états membres collectent également des données pour l'aquaculture en eau douce.

Exemples pour certains systèmes de production halieutiques et aquacoles
Le rapport résume l'information disponible sur certains points pour quelques exemples de systèmes de production halieutiques et aquacoles. Les exemples pris se rapportent à la faible résilience des pêcheries crevettières de mer du nord, aux différents types d'impacts concernant les espèces exploitées par les pêcheries de poissons plats de mer du nord, les changements survenus sur le marché du bar et de la daurade ou les changements intervenus dans les programmes d'observation à la mer pour les pêcheries de thon en Méditerranée.

Développement du marcher
Après des perturbations ponctuelles des voies d'exportation pour La plupart des flottilles ciblant les poissons pélagiques, la situation est retournée à la normale. Les partenaires et sous-traitants du projet, ont cependant rapporté des problèmes pour la rotation des équipages et la mise en place des mesures de distanciation sociale à bord des navires. En compaison, les couts liés au carburant ont diminués du fait de la baisse du prix du baril de pétrole, ce qui a bénéficié aux navires de nombreux états membres. La situation est plus problématique pour les pêcheries démersales, notamment la pêcherie de poissons plats en mer du nord, puisqu'il n'y a plus de marcher pour le poisson frais, ou tout du moins une moins forte demande.

Résilience
Les pêcheries crevettières de mer du nord constituent un bon exemple de pêcherie faiblement résiliente à un choc tel que celui engendré par la pandémie, puisqu'elle doit faire face aux baisses ce capacité de décorticage des crevettes au Maroc qui limite les déboucher pour ses captures. Concernant la petite pêche, il a été rapporté que les pêcheurs ont dû rester au port, que leurs revenus ont baissé, et les prix ont chuté. Il a également été rapporté qu'il y avait une nécessité de diversifier les marchés afin de ne pas dépendre d'un seul segment de marché, en particulier dans le cas de la petite pêche.

Restrictions sur les exportations
Pour certaines espèces telles que le bar ou la daurade, une baisse de la demande a été constatée (par exemple en Italie et Espagne), ce qui a conduit à une baisse des ventes de 50% pour la Grèce. Le secteur constate également une stagnation des prix qui pourrait se poursuivre dans le futur.

Il est difficile de prévoir ce qui se passera à la fin de la pandémie. Il est a espérer que certaines des mesures d'atténuation – tels que des voies d'approvisionnement alternatives (par exemple l'achat auprès de vendeurs locaux ou régionaux), l'utilisation de nouveaux moyens de marketing (par exemple des plateformes en ligne) ou le développement de nouveaux produits - permettront d'améliorer la résilience des secteurs de la pèche et de l'aquaculture. Les pécheurs et les exploitants aquacoles font également la demande qu'une sorte de mécanisme d'urgence soit inclus dans le nouveau schéma de financement (EMFAF) de façon à pouvoir être plus réactif en cas de choc tel que la pandémie. La poursuite des analyses sur une flexibilité accrue dans l'allocation des quotas permettrait également aux entreprises de pêche de pouvoir réagir en cas de perturbation des marches.

***

1 INTRODUCTION[1]

When governments in the European Union decided to implement strict measures to contain the spread of COVID-19, it was anticipated that this would have effects on the fisheries and aquaculture sectors. The EU fishing and aquaculture sectors are diverse in structure and economic performance. Small-scale fisheries (SSF) segments are often characterised as being in a weak economic position, while large-scale fisheries (LSF) are often characterised as being in a rather strong one (STECF 2020: 43). Small farms dominate the aquaculture sector. There is a huge range in the economic performance between fleet segments, MS and the fisheries and aquaculture sectors (see for trout STECF 2019: 99). Therefore, it is expected that the effects of the COVID-19 pandemic and the related measures will affect fisheries and aquaculture differently.

This project was conducted from 1st September 2020 until 31st January 2021. The report summarises information for the time period from March to September 2020, provided by partners and sub-contractors within the EASME/2018/011 framework contracts (Lot 1 No.4 and Lot 2 No. 5) for all 27 EU Member States (MS). It covers the effects of the pandemic, quantifies the effects (to a limited extent), gives an indication of how long the effects may last and what mitigation measures governments have implemented to contain the short, medium and long-term negative economic effects on fishers and fish farmers. There may be positive ecological benefits to stocks and habitats in the long-term, because of the reduction in fishing in 2020, but until the stock assessments are updated by ICES or other RFMOs, using data from 2020 and later years, this cannot be confirmed.

In the report, we describe the scope of the study and the methods used (see Section 2). This study is short-term, requested from EASME and DG Mare. Substantial data collection exercises were not requested so only a short literature review was conducted (see Section 0). As this is a scoping study, information was collected from existing reports and papers on the effects of COVID-19, with additional anecdotal and public information collected from commercial sources.

We describe the requests made for information in Tasks 1–5 to provide all available information from each MS. Task 1 lists the main effects of COVID-19 on fisheries and aquaculture production reported for MS. Quantifiable information regarding the number of these effects is then summarised in Task 2. For Task 3, information was collected on the possible duration of effects, followed by the mitigation measures implemented in each respective MS in Task 4. As there was only limited information available at this point, we give an overview on knowledge gaps, focusing especially on the availability of biological and economic data in Task 5.

The results are presented for some areas and specific fisheries in certain areas where it has been possible to combine information from several MS (e.g. Lot 1: North and Baltic Sea/Lot 2: Mediterranean bluefin tuna). In Section 5, an initial comparison of the mitigation measures in different MS is provided; where they exist, the differences of the

[1] This report has been produced as a joint report by Lot 1 and Lot 2 to ensure full coverage of all 27 MS. Data collection was coordinated through Partners and Subcontractors across the two lots in each MS, with Lot 1 covering the northern MS from the Baltic to Belgium, Lot 2 covering Ireland, the Mediterranean and Black Sea MS, including France and Spain.

effects are also identified. Two fisheries and two aquaculture production systems were selected to describe specific issues for these example situations in more detail.

An assessment of the risks to MS is described in Section 7. This provides an indication of how risks were assessed regarding certain fisheries and aquaculture production systems. Finally, Section 8 draws some conclusions from the collected information. These conclusions should be read with caution as they are not supported by a comprehensive data collection, interviews or focus groups. It is recommended that these are conducted in follow-up work.

2 SCOPE AND METHODS

The intention of this study was to summarise information received from across the EU on the effects of the COVID-19 pandemic, review the effects and trends (offering quantification as far as possible) and inform readers about the mitigation measures MS have put in place to address the effects of the pandemic. The projects, under both Lot 1 and Lot 2, were requested to deliver information that has already been collected or would be easily retrievable from public sources. The project scope defined a short (5-month), desk-based research study to collect the available information (including anecdotal) on COVID-19's impact on fisheries and aquaculture. It will also highlight requirements for future, wider assessments, in terms of the biological (e.g. effects on stocks), social (e.g. effects on fishing communities) and economic (e.g. effects on fleet performance) effects and the required methods for the collection of primary data, such as applying social science methods with interviews or focus groups with the sector. The project addresses the knowledge gaps identified during this study in Task 5 and this provides guidance for future detailed impact assessment studies.

The information collected was limited to a specific period from March 2020, when effects of the COVID-19 pandemic started to affect the fisheries and aquaculture sectors, to September 2020 when its effects were documented and mitigation measures put in place.

The project covers information from all MS about COVID-19's impacts on the fisheries and aquaculture sectors. The report does not address direct effects on other parts of the supply chain, such as fish processing and markets, but does account for the effects on parts of the value chain (e.g. fish processing and the closing of restaurants) on both the fisheries and aquaculture sectors.

The available information varies greatly between MS. It was decided to collect the information on a relatively broad fleet segment level: at small scale fisheries, large scale fisheries and distant water fisheries. This enabled comparisons between fleets that have similar characteristics, the harvests of similar species (from the perspective of markets) and the performances of MS that depend on the same value chain.

For the aquaculture sector, information was collected at production system level for the main species cultivated in each of the MS. This highlights one of the main differences for fisheries and aquaculture data collection requirements under the EU's Data Collection Framework (DCF). For fisheries, the collection of biological and economic data is mandatory (to feed into ICES for e.g. stock assessments and the STECF for the Annual Economic Report on fishing fleets). As a result, there is a more regular exchange of data within the fisheries sector than within the aquaculture sector. In the case of aquaculture, data collection for freshwater aquaculture is not mandatory, and partners and sub-contractors had less publicly available information, so the study relied on national and commercial reporting.

The COVID-19 containment measures, and the lock-down in most countries beginning in March in particular, changed the conditions for fishing and aquaculture companies in a single moment. The closures had immediate effect. The effects on some market segments lasted for some time, while the effect on others was shorter, and a kind of 'normal' value chain started to function again, before long. It was obvious that nearly no quantitative information about the effects at a commercial level would be available in 2020. In particular, economic data on fishing fleets and aquaculture farms would be inaccessible

since it only becomes available after a time lag of at least 1.5 to 2 years. The reason for this is that the data is mostly obtained from companies' tax statements, which are only available 1 to 2 years after the end of the relevant fiscal year. Therefore, in addition to the limited early qualitative and quantitative information (e.g. from landings declarations or direct information from fish-farmers), the project provides some publicly available 'anecdotal' information, collected press releases and information from sectoral publications. This also includes information retrieved from regular meetings with the sectors. We have treated conclusions based on information from a limited number of MS and anecdotal information with caution.

The spreadsheets with more detailed information from the MS provided an opportunity to compare some of the results for specific fleet segments. For example, we were able to gain more detailed information on shrimp beam trawlers in the North Sea, flatfish fisheries in the North Sea, as well as aquaculture production systems, like bluefin tuna and seabass / seabream aquaculture in the Mediterranean Sea. This allowed us to draw, where possible, conclusions on how countries may have reacted similarly or differently to the pandemic. Large differences between MS could, for example, be associated with long-term competitiveness between the fishing fleets and farms of the MS.

A basic assessment of the level of risk to MS has been developed using information collected by the study to determine the likelihood and severity of the effects. This has been accomplished in order to estimate a level of inherent risk of COVID-19's effects on both the fisheries and aquaculture sectors (see Section 0). This is not a detailed risk assessment, but a simple estimation of the level of risk across an entire sector for each MS, the likelihood of effects extending for a significant period and the level and mitigating results of measures employed by each of the MS. Task 1 provides the data for the overall level of the effect's severity. We were able to produce a qualitative assessment of risk using the Task 2 responses. The likelihood of effects is estimated based on their (i) reversibility and (ii) duration, as collected in Task 3. When combined, these two factors provide a qualitative assessment of the inherent level of risk. The effects of any mitigation measures (Task 4) can then be estimated to reduce the level of inherent risk (see Figure 1).

A single assessment of the risks for each sector and the MS was estimated where appropriate. In line with standard risk assessment methods, where no information was available, the risk was be considered at the highest level. It should be noted that the level of risk does not in any way represent the size or the regional, social or economic importance of any particular sector, and only refers to the risks related to the sector.

By way of example, where quantified effects are between 0% and 20% (either as landings or value) these would be considered low, between 20% and 40% medium, and over 40%, high.

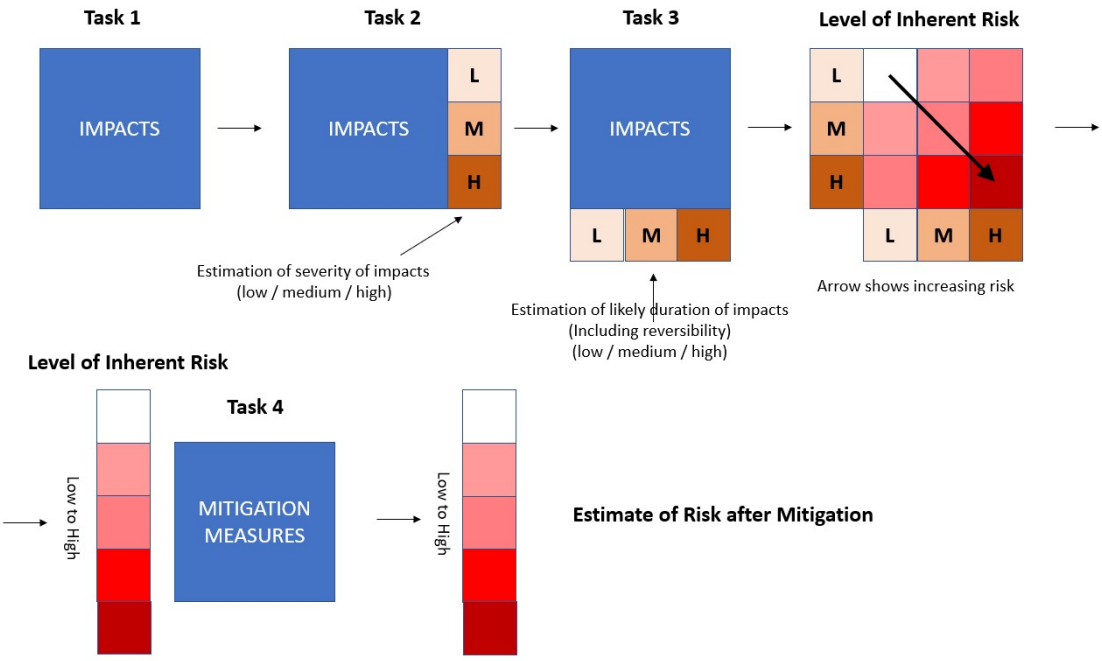

Figure 1 Graphical description of risk-based assessment approach.

3 EXTERNAL LITERATURE REVIEW

In addition to the collection of information, the project participants also collected scientific and grey literature on the economic and social effects of COVID-19 on fisheries and aquaculture, with an emphasis on sources from outside the EU. Up until the finalisation of the report (in mid-December 2020), there was still little information in the literature about the effects of this crisis.

The Annual Economic Report 2020 (AER 2020) of the STECF provides a nowcast about the economic situation of the fishery sector in the EU in 2020, based on the results of 2018 and 2019. It calculates a 17% decrease in landings values, of 18% per FTE and a 16% reduction of revenues (accompanied by lower fuel and labour costs). However, but it indicates that all national fleets generated gross profits in 2020. In some MS, there may even be an increase in fishing activity for a few segments, so COVID-19 will have no significant effect on those regions or that segment. The current economic impact on fisheries is heterogeneous even within MS, and COVID-19 is only one of several drivers of the situation, e.g. the impacts of Brexit. For more precise conclusions, additional data needs to be made available (AER 2020).

Giannakis *et al*. made an input-output-analysis as well as conducting interviews with Cypriot fishermen and representatives from fishermen's organisations. They found out that, during the lockdown, fishermen's gross margins were four times lower compared to the winter period, or 2.5 times lower than the same month in 2019. The interviewed fishermen related that the financial aid from the government and the EU was insufficient to compensate for the effects of COVID-19 and there was a need for long-term economic restoration programs and additional measures (Giannakis, E. *et al.* 2020).

In the early phase of the pandemic in April 2020, the Food and Agriculture Organization of the United Nation (FAO) issued general statements about the economic and social effects of COVID-19 on the fisheries and aquaculture sector. They noticed a reduction in fishing activity and even the cessation of operations of some fisheries. In the aquaculture sector, they reported that farmers could not sell their fish, so the fish had to stay in the ponds and farmers had to feed them for longer periods. The FAO gave recommendations on how the effects should be mitigated, such as grants to cover losses, transparent quota systems, minimum floor prices, credits and the exploration of new markets (FAO 2020a).

In June 2020, the FAO produced another publication: a worldwide overview of the effects of the pandemic on fisheries and aquaculture. They found, that COVID-19 had caused disruptions in all segments of all supply chains. Fishing activities had decreased for several reasons, such as closed markets, closed HORECA sectors and difficulties in working activities caused by increased sanitary measures like social distancing. At the end of April, the worldwide commercial fishing activity had been reduced by about 6.5% of what it had been. Aquaculture companies could not sell their fish. Fish remained in production facilities, which increased running costs, because the fish needed food and support. Processors, traders and the food service sector at large had to find new supply chains, such as delivery services and direct sales. Workers throughout the supply chain lost their jobs; there were a high number of migrant workers who could not cross the borders, had to face high sanitary conditions and a higher risk of infection. There was no conclusion in this paper, except for the FAO's intention to support and strengthen the sector (FAO 2020b).

A report from the OECD from June 2020, confirmed the FAO's observations on the fisheries and aquaculture sector. They added that the market price of fish had been reduced or become more volatile and that the pre- and post-production handling, like port operations or inspections, had become more difficult. Moreover, they speculated about the chances for success of the new distribution models. They also speculated on the effects of the crisis on natural resources and the effects on food security, however, the main effects of the pandemic are still unknown were still unknown in June 2020. They suggested that in future, the policies should support sustainable fishing and give direct and indirect financial support to the fisheries (OECD 2020).[2]

Another FAO-Report from May 2020 reported on questionnaires directed at fisheries management organisations and fisheries advisory bodies. The questionnaires concerned the impact of employers in fisheries and aquaculture, the effects on monitoring activities, planned mitigation measures and the demand or price of fisheries products. They found that most organisations assumed that COVID-19 would have negative effects on fishery management and on monitoring, control and surveillance (MCS). The parties surveyed assumed that employers in fisheries would be most affected, but employment in aquaculture would be less affected because there was still a need of care to the fish stocks (FAO 2020c).

Bennet *et al.* (2020) also wrote about the effects on supply chains and the fish processing industry, the situation of employees along the supply chain and the effects on (especially Asian and African) small scale fisheries. They confirmed the FAO's observations on the economic effects due the market disruption and the increasing health risks along the supply chain. Moreover, they reported positive initiatives, like food sharing systems in several Pacific Islands and many parts of the industry looking for new distribution models. Bennet *et al.* drew the conclusion that the positive outcomes were succeeded by the negative effects on the small-scale fisheries and that the short-term consequences probably would be followed by a long-term crisis related to economic challenges. (Bennett, J. *et al* 2020).

Love *et al*. (2020) commented on the disruption of the supply chain. They noted that demand, distribution, labour and production and the reactions of system actors and institutions world-wide had been affected. They pointed out that many countries are dependent on imports. They highlighted lessons learned from the pandemic, outlined a possible future after the COVID-19 pandemic passes, how to strengthen the sector or use the effects of the crisis to transform the food system to more green and resilient sourcing. It was a description of the situation in May and gave the outlook that there was still much to learn as the pandemic continues to spread (Love *et al.* 2020).

White *et al*. (2020) researched the early effects of COVID-19 on American fisheries and seafood consumption. They found that landings of US fisheries, in the first month of 2020, had decreased by about 40%, exports by 43% and imports by 37% compared to 2019. The demand from restaurants had dropped by 70% during the lockdown. In the US, similar to MS, alternative seafood distribution and direct sales had ensured the sector's resilience during the pandemic. The study showed widespread and heterogenous effects on the sector, which were related to the special sub-sector and the state. Some segments

[2] http://www.oecd.org/coronavirus/policy-responses/fisheries-aquaculture-and-covid-19-issues-and-policy-responses-a2aa15de/

recovered faster than others. This required administration interventions to focus on different priorities (White, E. *et al*. 2020).

4 TASKS

The study was structured under 5 Tasks, covering both fisheries, aquaculture and a section with general questions for respondents to provide information on a few, basic effects in a quantitative way.

4.1 Illustrated information on basic effects

4.1.1 Fisheries

For fisheries, information on change in control activities, application of law and analyses for the effects is provided.

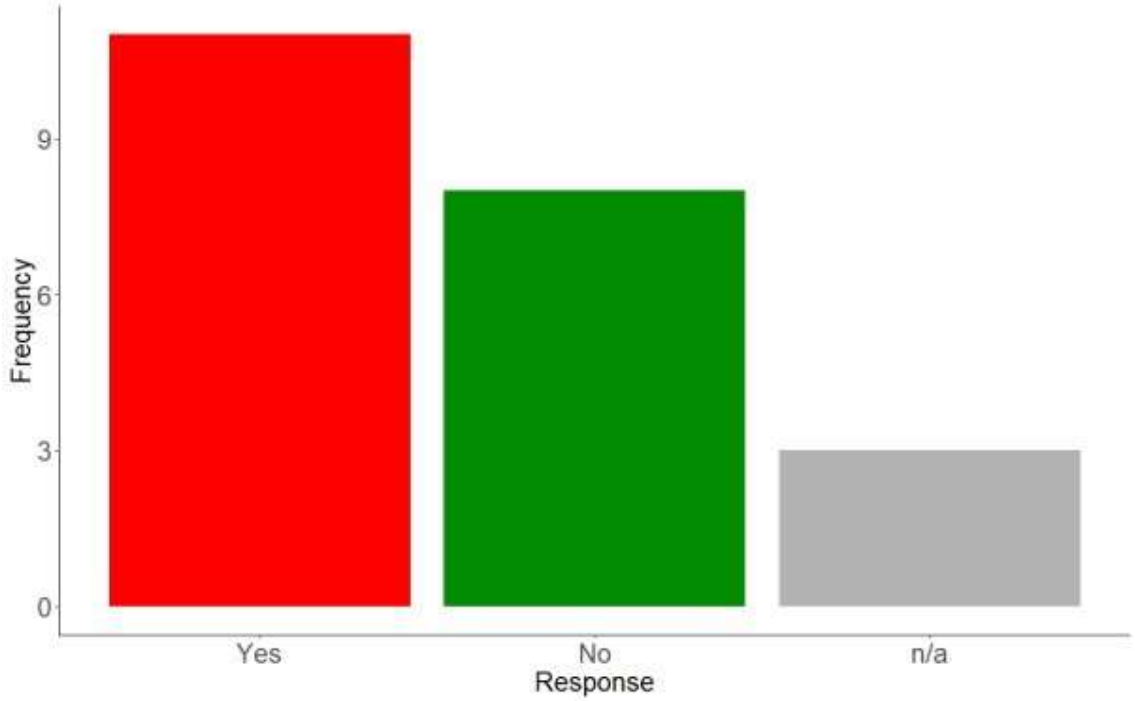

Figure 2 Have there been changes in the monitoring and control of fishing activities?

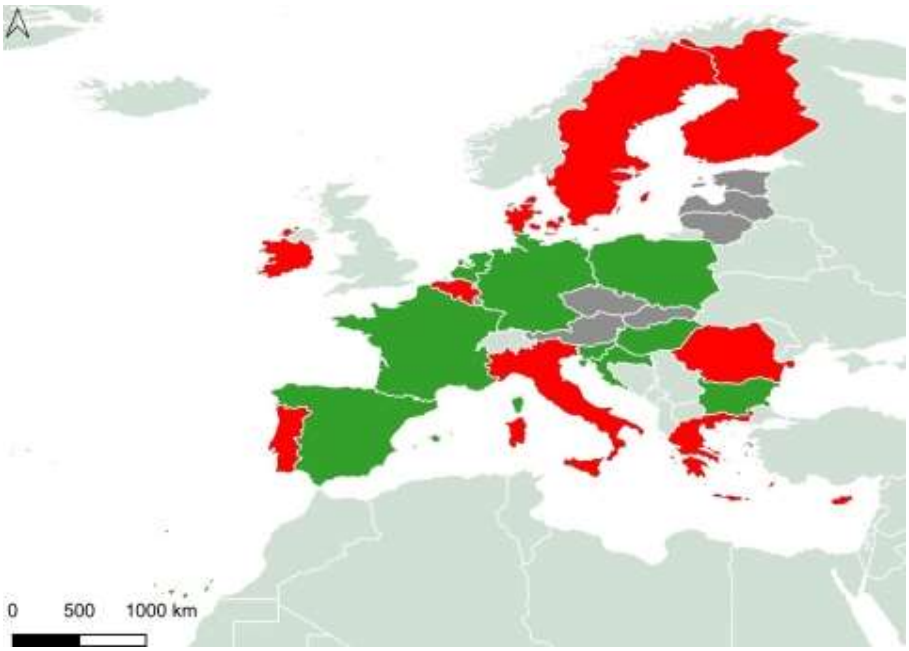

Figure 3 Map showing MS that have reported changes in the monitoring and control of fishing activities in response to COVID-19.

NB: Red (changes reported), green (no changes reported), grey (no data available).

From the 22 maritime MS, 11 reported that there were effects on control activities. Eight reported no effects and three were not able to respond (see Figure 2 for a simple chart and Figure 3 for map that shows responses geographically). For 11 MS, it was noted that inspectors were not able to conduct their normal physical inspections on board of fishing vessels. Inspectors implemented controls through logbook verification onshore. Restricted inspections at ports and fish auctions were noted for a while, although some MS noted changes in the locations of inspections from on-board and in markets to outside, in fresh air on the quayside.

All of these restrictions were implemented to avoid close contact and the potential spread of COVID-19. Observer programmes were impacted, but notably, the ICCAT BFT programme was able to continue across MS with added safety precautions and periods of self-isolation. MS also suspended other activities, including issuing fishing licences and scientific sampling during the lockdown period. One of the MS also reported that inspectors were assigned to COVID-19 related efforts outside of the fishing sector, which reduced the ability for controls on recreational fishing vessels.

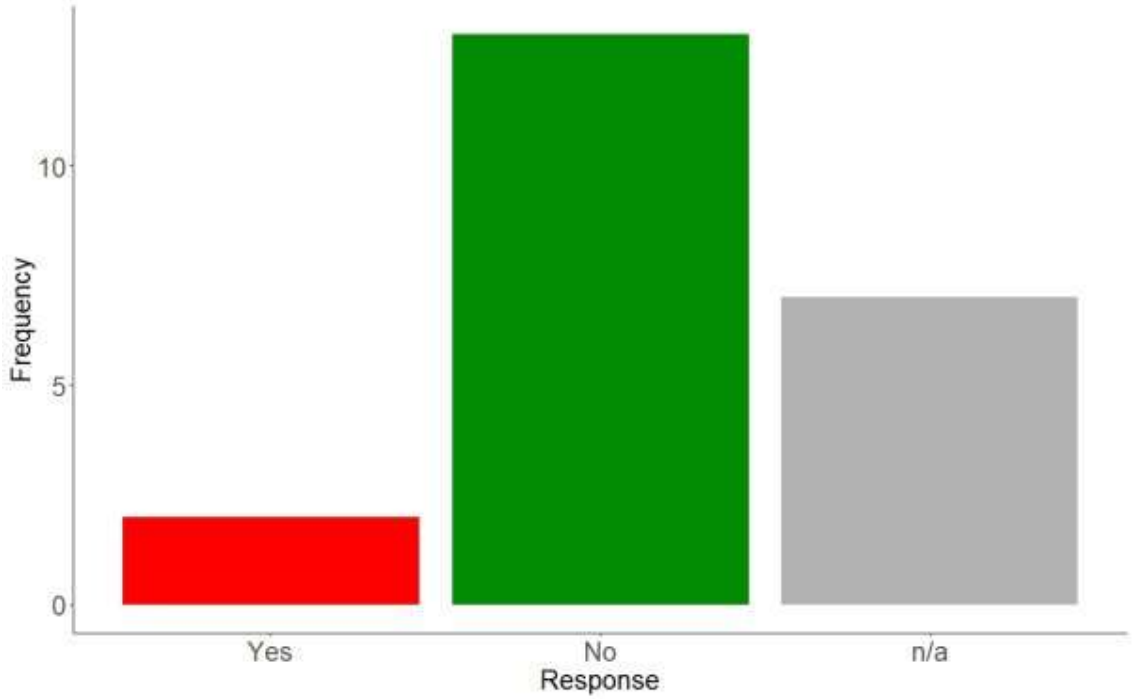

Figure 4 Have changes and obstacles to the correct application of EU fisheries law been reported?

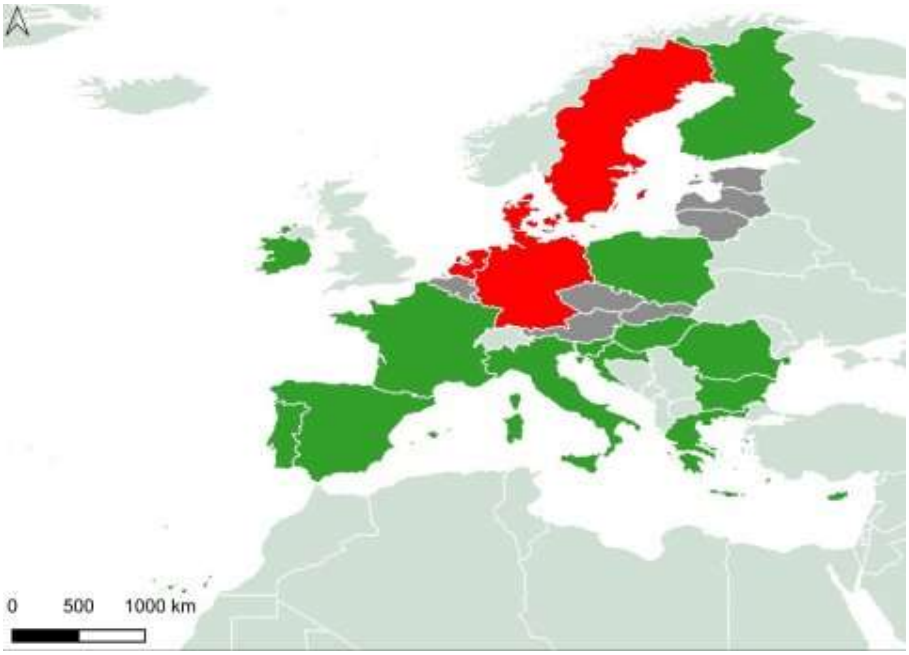

Figure 5 Map showing MS that have reported changes and obstacles for the correct application of EU fisheries law during the response to COVID-19.

NB: Red (changes reported), green (no changes reported), grey (no data available).

Only two countries reported changes in the application of EU law (see Figure 4 and Figure 5). Some countries implemented simpler traceability rules for supply chains during the lockdown period.

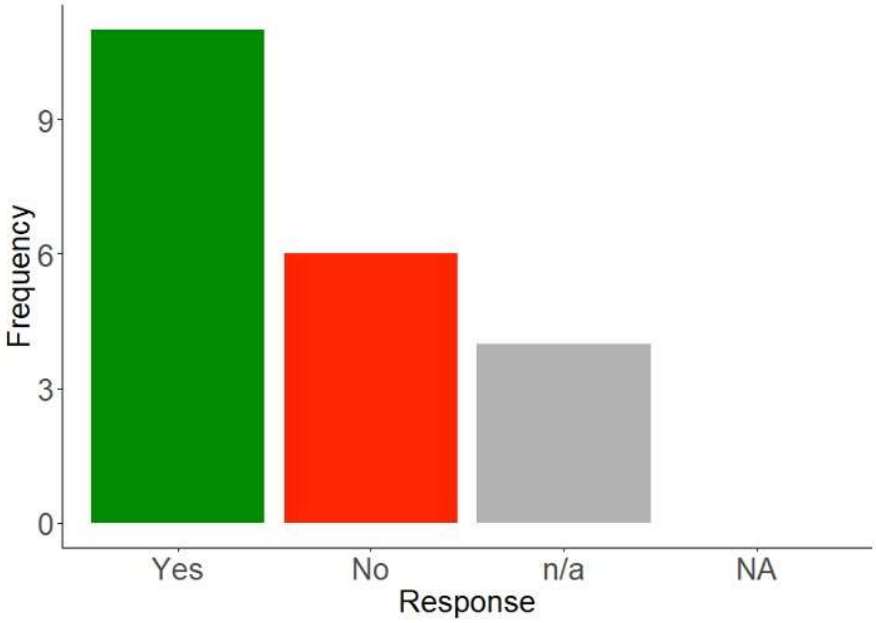

Figure 6 Have MS reported mitigation measures for fisheries supported by/under EMFF, EU Regulations and state aid amendments?

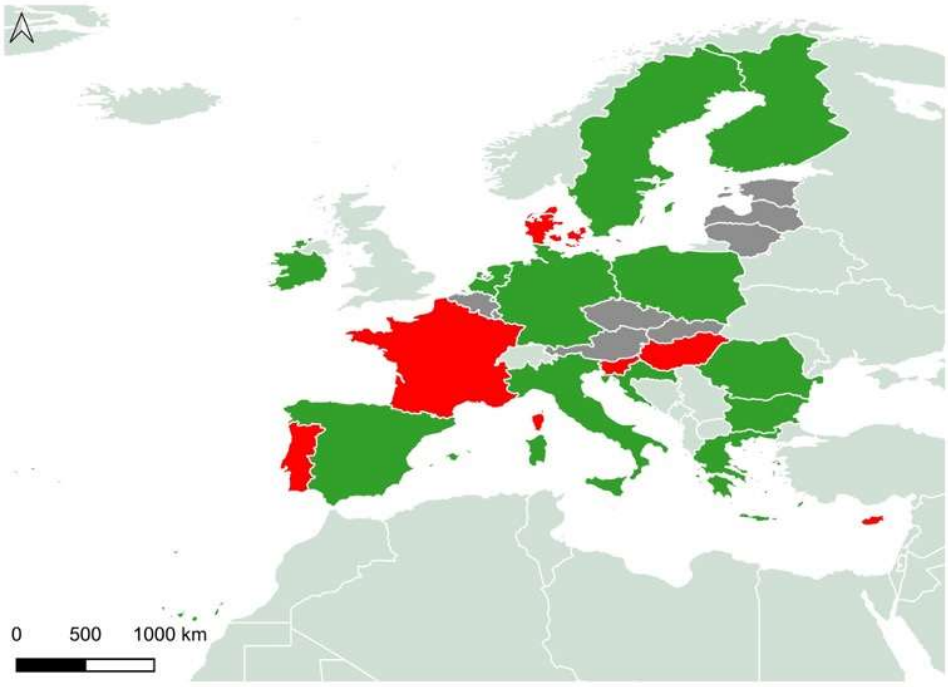

Figure 7 Map showing MS that have reported mitigation measures in the fisheries sector supported by EMFF, EU regulations and state aid amendments in response to COVID-19.

NB: Red (changes reported), green (no changes reported), grey (no data available).

For 11 countries, mitigation measures were reported for the fisheries sector (see Figure 6 and 7). Not all countries, however, reported that they used the EMFF funding (eight MS specifically named the EMFF) scheme for those mitigation measures. Temporary cessations of fishing were the main instruments in several countries. For nine MS, it was reported that fishers were also eligible for general COVID-19 relief packages, such as wage subsidies for employees (reported by Ireland, Italy and Portugal). Some countries also issued grants, advance payments and credits as part of relief packages of up to €120,000.

4.1.2 Aquaculture

The following information was provided for the aquaculture sector.

Regarding changes of laws or problems in the application of laws, little information was available and only one MS reported changes (see Figure 8 and Figure 9). The little information that was available revealed simpler traceability rules and changes in monitoring activities (e.g. the systematic monitoring of water quality at aquaculture sites in some countries).

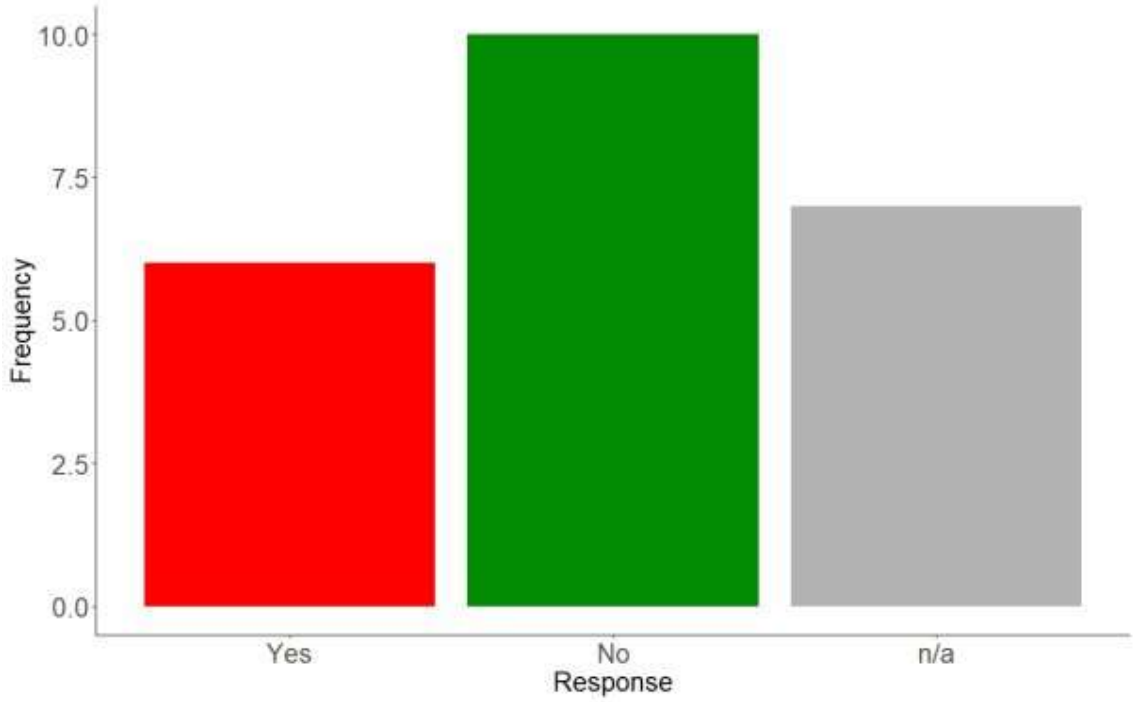

Figure 8 Have changes been reported in the monitoring and control of aquaculture activities?

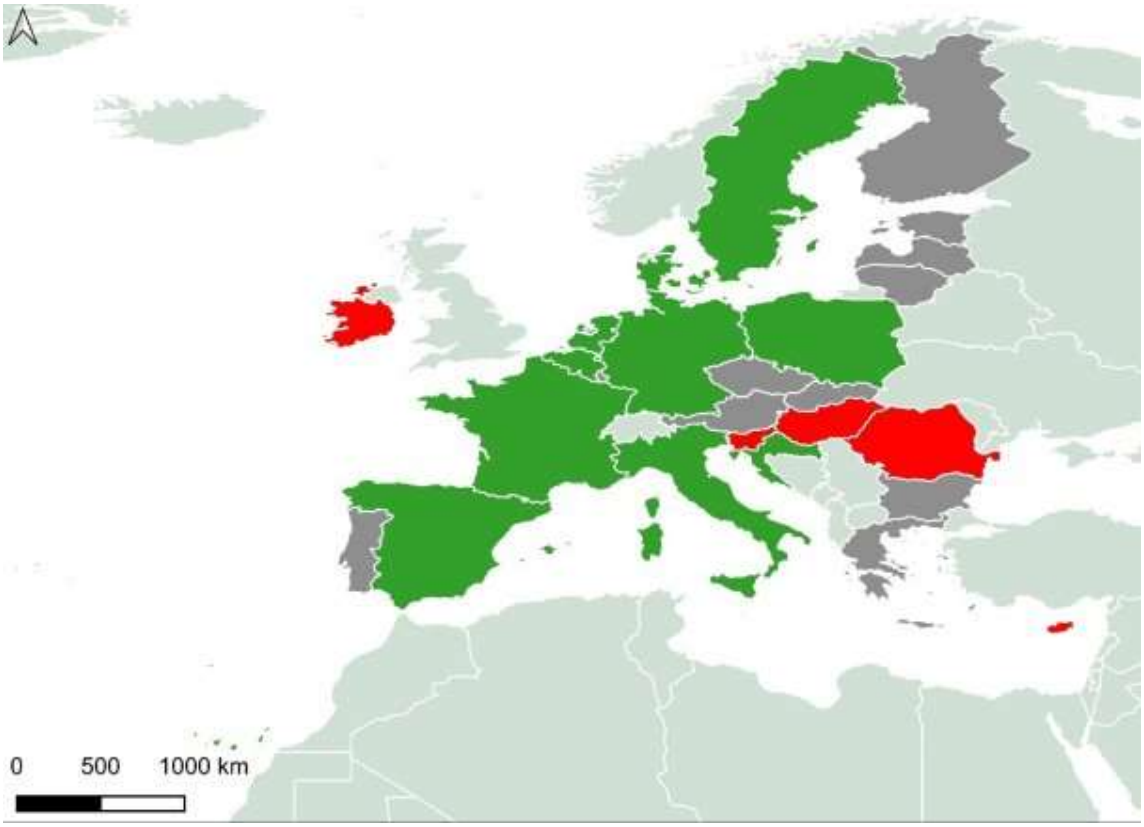

Figure 9 Map showing MS for which changes are reported in the monitoring and control of aquaculture activities in response to COVID-19.

NB: Red (changes reported), green (no changes reported), grey (no data available).

For aquaculture, only six MS reported changes in control activities, for example, changes to control activities on-board vessels capturing fish for ranching (e.g. bluefin tuna) or on vessels used to support offshore aquaculture (see Figure 8 and Figure 9). For freshwater aquaculture, no information was available on changes in control activities. Authorities have, however, allowed exemptions for production sites to store more fish.

Regarding changes of laws or problems in the application of laws, little information is available and only one MS reported changes (see Figure 10 and Figure 11). The little information that was available revealed simpler traceability rules and changes in monitoring activities e.g. water quality in some MS.

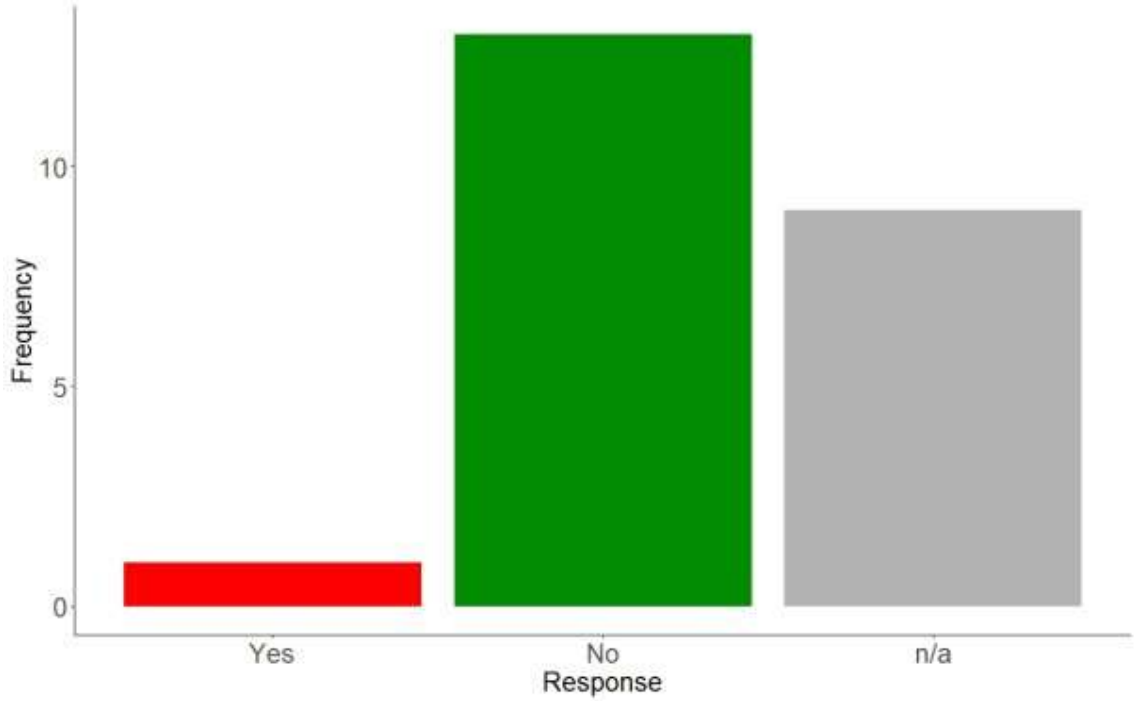

Figure 10 Have there been changes and obstacles to the correct application of EU aquaculture law?

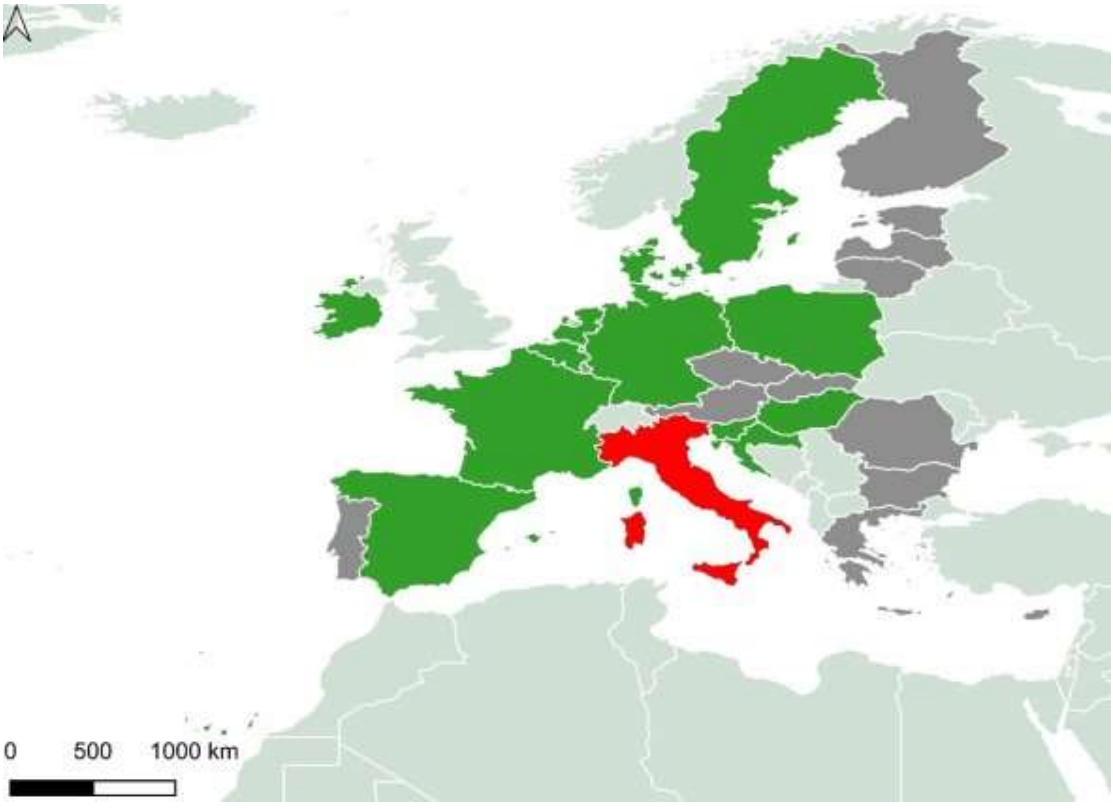

Figure 11 Map showing MS that have observed changes and obstacles for the correct application of EU fisheries law during the response to COVID-19.

NB: Red (changes reported), green (no changes reported), grey (no data available).

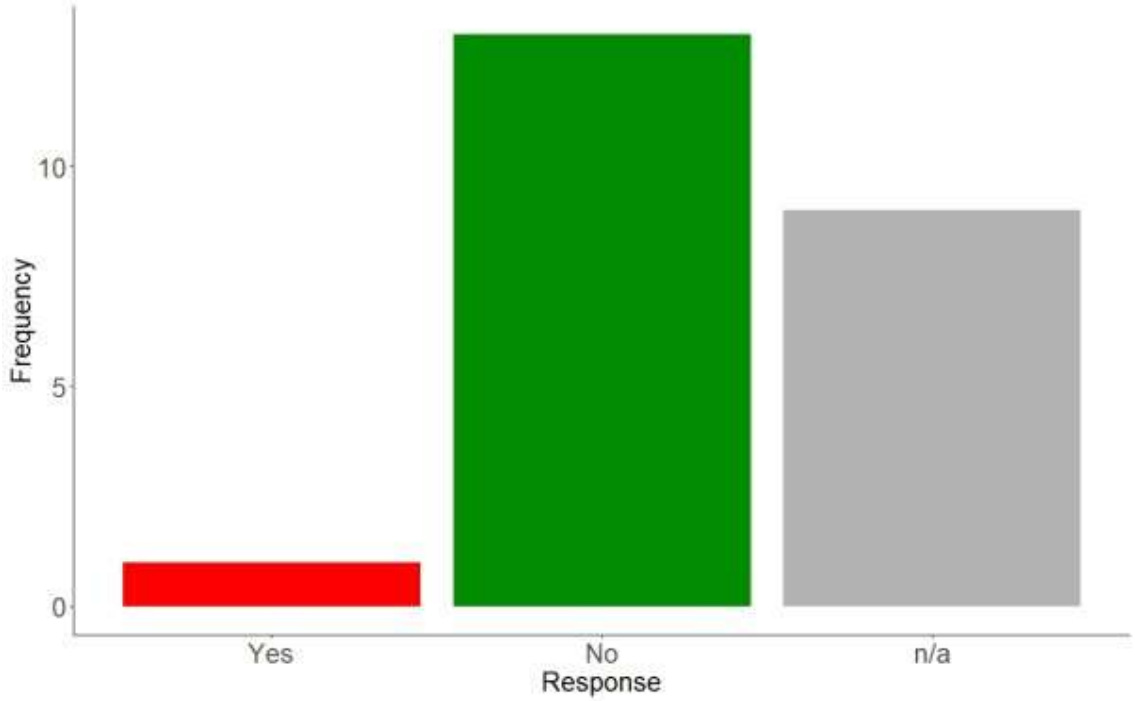

Figure 12 Have MS implemented mitigation measures for aquaculture supported by/under EMFF, EU Regulations and state aid amendments?

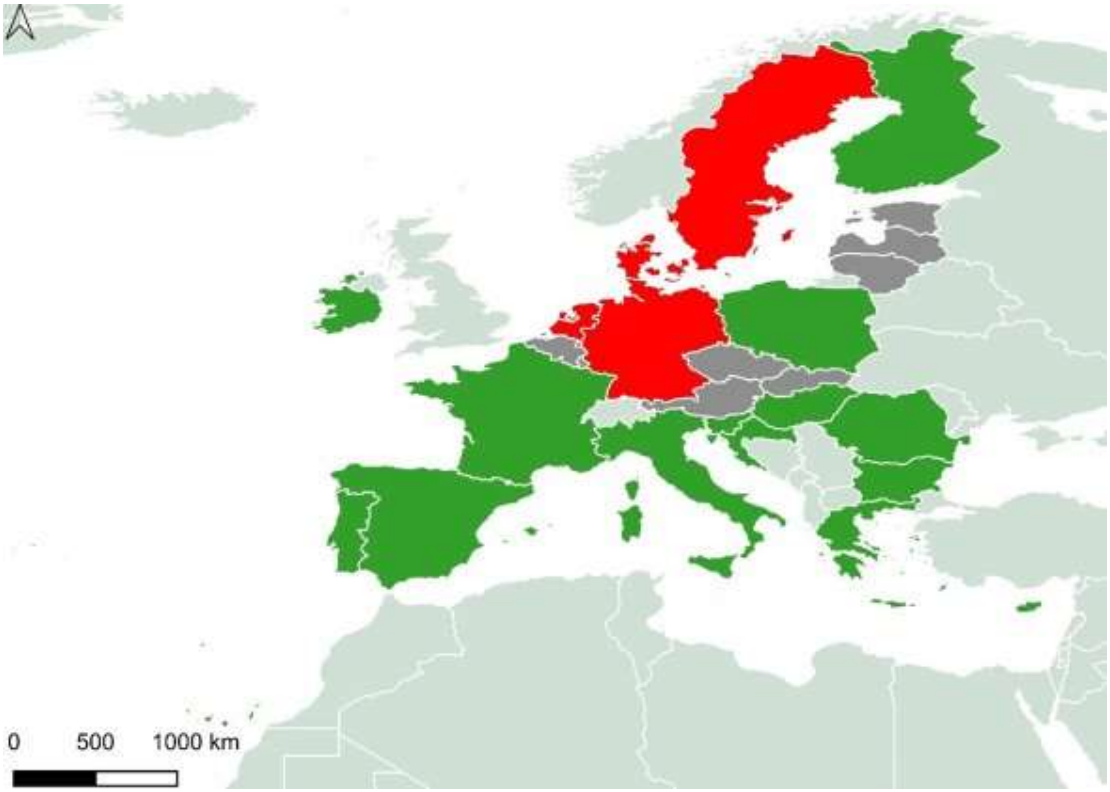

Figure 13 Map showing MS that have reported mitigation measures in the aquaculture sector supported by EMFF, EU regulations and state aid amendments in response to COVID-19.

NB: Red (changes reported), green (no changes reported), grey (no data available).

As for fisheries, around half all MS (15 of 27) issued mitigation measures, either by using EMFF funding (e.g. for losses due to restrictions) or fish farmers were eligible to participate in general COVID-19 relief funds (e.g. wage subsidies). However, the data shows that fewer MS appear to have applied for the EMFF funding for the aquaculture sector compared to fisheries (3 compared to 8) (See Figure 12 and Figure 13).

4.2 Task 1 Identification of the main effects of COVID-19 in the EU fisheries and aquaculture sectors

For the first task, we summarised the information provided for the main effects of COVID-19.

4.2.1 Fisheries

The COVID-19 pandemic resulted in a wide variety of effects on the fishing sector.

4.2.1.1 Large Scale Fisheries

Changes in activity: Low prices and low levels of sales at auctions were observed in at least seven MS, including Belgium, Ireland, the Netherlands and Sweden. This led to fishing vessels staying in port or self-imposing a maximum hour at sea to reduce catches. This was common for vessels catching demersal fresh fish compared to relatively few effects on frozen fish segments. Strict lockdown measures also reduced fishing activities. For example, fishers were not allowed to go on board fishing vessels as this would have violated social distancing rules, such as was reported in Romania. In countries that issued temporary cessation relief funds, fishers stayed in port because this was a requirement for receiving payment. Ports also issued new landing routines that limited activity.

However, there were reports from some countries, mainly among for pelagic fishing fleets, including those fishing for reduction (e.g. Denmark, Sweden), that the crises had a relatively limited impact (e.g. Germany, the Netherlands). In 2020, oil prices decreased as demand for fuel dropped, which led to lower fuel costs for the fishing sector, which might have been beneficial.

Changes in controls: Some MS reported changes to their control routines to minimise interactions with fishers (e.g. Belgium). Often, no physical controls were made and there were only electronic checks to minimise the time on board. There is a concern that limited inspections on board may have led to misreporting in logbooks. Anecdotally, many observer programmes appear were stopped, however, other sources confirm that some critical programmes, such as the ICCAT bluefin tuna observer programme in the Mediterranean Sea, continued according to plan.

Changes on board: Many MS (16) reported changes in fleet activity for their fleet segments, but there was only very limited change in reporting. For some LSF segments, conditions on board of vessels changed due to requirements for social distancing, protective measures on board (e.g. alcohol and gloves, reported from France, Italy and Portugal) and compulsory testing for fishers. In several cases, crews also remained longer on board (changing the crew was problematic, e.g. reported in Sweden) and the producer associations issued information material for fishers to reduce the likelihood of transmission. Some MS also required regular weekly cleaning on board fishing vessels.

Changes in market access: For many fleet segments, it was impossible to sell fresh fish while auctions were closed and international markets were not available, as exports were physically impossible (observed in Belgium, Finland and Portugal among others). This led to some MS having a larger proportion of their catches transported to fishmeal plants (reported in Finland and Sweden, for example). The closure of the HORECA segment led to a substantial reduction in fresh fish sales and/or a drop in prices (e.g. plaice in the North Sea impacting the flatfish fishers in Belgium, Germany and the Netherlands). In addition, the high price segments, like the gourmet canning industry, saw a drop in sales of up to 100% due to the closure of stores aimed at tourists.

For a limited amount of time, exports were impossible. This led to loss of income for fishers. For some market segments, however, the demand increased, as was the case for (among others) pre-cooked frozen products and frozen fish, as people increased their cooking at home.

4.2.1.2 Small scale fisheries

Changes in catches: Overall, there was a decrease in the fishing effort. Many small-scale fishing fleets had to stay in port during the lockdown in spring, as they were unable to sell their fish. This led to a substantial decrease in income. In addition, as auctions were closed or lowered their activities, where fishing was possible, the prices dropped significantly for the limited amount of fish that was still transported to the auctions.

Changes in reporting: The rules on inspection were changed in some MS and allowed only transactions, requests and certifications to be received electronically (e.g. Cyprus). Inspections of SSF on vessels were also minimised.

Changes on board: On vessels of SSF, crews stayed on board longer than usual before protective measures were available, in order to not to risk infection on land.

Changes in access to markets: SSF faced the same restrictions with fresh fish sales as larger vessels. In some countries, fishers tried different ways to sell their fish by finding new sales channels. In some cases, this led to increased direct sales to consumers (e.g. in Poland, online sales were reported). These different pathways were alternatives to supplying fish to the HORECA sector or exporting it, which was impossible in some cases, due to the restrictions.

4.2.1.3 Distant water fishery

Only a limited number of MS have distant water fisheries, and information on these fleet segments was harder to obtain than for domestic fleets.

Changes in catches: Some of DWF activity continued unaffected with some extra restrictions being placed on vessels operating in the Indian and Atlantic oceans. Activity here was impacted by vessels identified with COVID-19 positive crew on-board needing to remain in port until given medical clearance (e.g. Spanish vessels in Seychelles[3]). Crew rotation was impacted, with longer rotations and clearance needed with self-isolation in port before joining the vessels. This impacted vessels' time at sea. However, it may not

[3] http://www.seychellesnewsagency.com/articles/13107/+crew+members+of+Spanish+fleet+in+Seychelles%27+waters+test+positive+for+COVID-

have impacted the annual overall catch, as crews were still able to fish throughout their fishing opportunities (e.g. purse seiners in the Indian Ocean) during the reminder of the year when normally they would have been required to stop fishing, having reached their agreed limits. A reduction in fishing effort in the Azores was noted due to the decrease in the price of fish sold at auction. In some places, however, it was noted that the fishing effort was increased. For example, on the island of São Miguel, more fish were caught during the summer than before the pandemic.

Changes in reporting: No major changes to reporting have occurred. Fleets all reported by electronic means, as usual, and were tracked via VMS and AIS.

Changes on board: Large DWF vessels experienced problems with changing crews and crews travelling home from the place of the exchange was difficult. Other changes were similar to LSF. Portugal reported changes with the implementation of protective measures, such as keeping distance, use of alcohol gel disinfectant and gloves (when possible), and tested the fishers for COVID-19. To ensure the safety of the crew, cleaning teams were hired to disinfect fishing vessels weekly. Measures were developed for long-distance fishing (longline and trawl), which include testing fishers, disinfecting vessels, measuring crew temperature daily and having a quarantine room onboard. An awareness campaign was started by one fishing association, to inform members about the measures necessary to reduce the possibility of contagion, both within families and the workplace. Canning and freezing companies already used personal protective equipment: they added to this with the use of masks and social distancing. Spacing between shifts was implemented in these factories. Several representatives of organisations pointed out the difficulty in accessing personal protective equipment (PPE) (gloves, masks and hand sanitiser) at the beginning of the pandemic.

Changes in access to markets: The major tuna DWFs reported no major issues and carried on through their normal supply chains. Other fisheries noted decreases in prices, similar to those observed by domestic fisheries in the range of 25–70%, and some were unable to sell their catch. The change in the frozen fish value chain was rather short and it is reported that the demand for frozen fish products particularly increased.

In the Netherlands, the demersal fisheries organisation produced a video on the effects of the COVID pandemic.[4]

4.2.2 Aquaculture

Freshwater aquaculture: Farming activities did not change much, but due to the reduced sales of certain species (e.g. trout and carp), fish had to be kept longer in the farms (as observed in Denmark, France, Poland and Sweden). This meant that hatcheries and nurseries needed to look for alternative markets abroad. It was reported by Swedish correspondents that sales of Norwegian salmon increased substantially in many countries, which led to lower prices for other salmonid species, like trout. Many MS also observed a fall in prices for juvenile stock. Juvenile fish could not be sold to farms for onward growing, as the farms were at maximum capacity owing to the larger fish not leaving the facilities. Companies reacted by looking to export the juveniles to countries outside of the EU (e.g.

[4] https://www.youtube.com/watch?v=oVKP59dSkTI&feature=youtu.be

Spain). Farms with their main customers and supply chains delivering their products to the tourism sector saw a large drop in demand. The search for alternative markets led to a pressure on the prices (e.g. in Cyprus). For some MS, it was reported that small companies in particular had liquidity problems (e.g. Croatia). There is a concern that, when markets open again, fish may have to be sold quickly to enable farms to readjust to their annual cycle as quickly as possible. This may lead to fish being offloaded into the market in high amounts, resulting in subsequent low prices. This may increase imports in the mid-term and harm national production.

For some countries, an increase in direct sales was reported (e.g. Germany), even of younger fish, which reduces the possible production for 2021. However, some countries reported concerns that lower demand in some segments will lead to increased supply in 2021, with a drop in prices and more competition in national production.

Marine aquaculture: Many companies were encouraged to decrease the presence of their staff (less rotation), but it is unclear how this was implemented. The application of additional health and safety regulations meant that work could not be carried out as normal, although staff were still needed to take care of the fish (e.g. reported by Croatia). Mussels were left in the water longer and the harvesting of certain species was postponed. Due to the closure of the HORECA sector, the access to markets also changed, as it did for fisheries. This was especially problematic for small companies, which sell high-priced species like trout.

It was reported that the activities for shellfish did not change much in spring, as the main annual harvests take place in the summer (during the tourist season) or in the autumn. Information on summer activities was not available at the time of reporting, so effects cannot be reported.

Concern were raised about countries outside the EU subsidising their industries at higher rates than the MS. This would allow those countries to sell fish to the European market with lower prices; one example is Turkey, where high subsidies have led to low priced fish being sold in Spain. Another concern is that other countries (both MS and non-EU countries) will have to sell higher amounts of fish within a shorter period of time, once the restrictions are lifted.

4.3 Task 2 Quantification/Estimation of the main effects

4.3.1 Fisheries

Fishers are required to provide information on catches/landings in near real time and this information is gathered by national authorities. Changes in the volume (t) and value (€) of landings, where quantifiable estimates of landings or value of catches could be observed and assessed from Logbook data, are provided in Table 1. These estimates cover the first five to nine months of the COVID-19 restrictions, unless stated otherwise.

The impact is almost exclusively negative for landings, and all prices are down compared to the same period in 2019. Effects range mainly from 15% to 75%, with values being slightly more negatively impacted than volume, showing losses to fishers for most species, in both the basic volume landed and the price per tonne.

Some fleet segments, such as the DWFs of France and Spain, appear to have suffered few or no negative effects. They have continued to fish as usual and although some canneries they utilise have been temporarily affected (e.g. Mauritius), landings were always possible in alternate locations. This led to COVID-19 having a low impact for this sector.

Finland reported a reduction of sales of 39% in fresh Baltic herring and sprat, while exports of frozen herring and sprat increased by 16% (comparing January and August 2019). Other export markets (e.g. France to Spain and Italy, Ireland to France) have reported reductions in the landing values listed above. Sweden noted that border trade with Norway was hit hard when the borders between the two countries were closed.

Table 1 Impact of COVID-19 on fisheries landing volumes and values from logbook data.

Location	Species	Impact (Volume)	Impact (Value)
Finland	Overall[5]	n/a	-16%
France	Whelk	-45%	-51%
France (Bretagne)	Overall	-46%	-51%
France (Hauts de France and Normandie)	Overall	-43%	-48%
France (LSF)	Pelagics	<5% change	<5% change
France (Mediterranean LSF) (est. weeks 12-29 of 2020)	Overall	-35%	-38%
France (Pays de la Loire and Nouvelle Aquitaine)	Overall	-37%	-43%
Germany	Pikeperch	-63%	-71%
Germany	Shrimp	-31%	-53%
Ireland	Herring/Sprat	Fresh -39% Frozen +16%	n/a
Ireland	Overall	n/a	-25 to -70%
Ireland	Scallops	n/a	-22%
Malta	Lobster	n/a	-50 to -70%
Malta	Seabream	n/a	-40%
Netherlands	Lobster	n/a	-55%
Netherlands	Sole	-40 to -45%	n/a
North Sea (Denmark, Netherlands, Germany)	Plaice	-61%	-60%
North Sea (Denmark, Netherlands, Germany)	Sole	-15%	-6%

[5] Consumer Price Index for Fish

Location	Species	Impact (Volume)	Impact (Value)
Poland	Overall	-15%	-26%
Spain (Basque region)	Anchovies	n/a	-19%
Spain (est. March-April)	Shellfish (goose barnacle)	n/a	-75%
Sweden	Nephrops		-12%
	Prawns		-6%
Sweden	Pikeperch	-50%	-60%
	Pike	n/a	-30%
	Perch	n/a	-40%
Sweden (auction markets – March/April)	All	-80%	n/a

4.3.2 Aquaculture

Throughout Europe, a wide variety of changes in fish sales were reported (see Table 2). As farmers do not have to report sales (neither do fisheries landings), the information collected by partners and sub-contractors relies on the knowledge of national experts (e.g. Poland) or from contracts with the sector. For seabass and seabream, for example, exports decreased by 50% of the expected number,[6] while in Denmark and Poland trout sales increased by 10–20%, depending on the region. In Sweden, trout sales in March decreased by 75% compared to 2019. In Denmark, carp sales decreased by 10–50% depending on the region, but carp is often a seasonal dish with most sales in late autumn. In Poland, 80% of the carp production is traditionally in October/November, in preparation for the Christmas meal. Lower sales to tourists were reported in the summer (expert opinion). In Hungary, there is an estimated decrease of 60% in sales across all aquaculture segments.

The information reported by MS show an increase in sales in supermarkets (with pressure on prices) for some fish species, while sales of high-valued fresh product exports have fallen (e.g. exports from Greece to France by 15% and to Italy by 25%). It was noted that sales of larger fish that are usually delivered to catering services (to be portioned, rather than for domestic sales) dropped significantly.

Ireland reported a decline in sales from small- and medium-sized enterprises (SMEs) of 60%. Others reported a loss of 40–60% of turnover in the first five months of the year.

[6] EUMOFA information for Cyprus.

Table 2 Impact of COVID-19 on aquaculture landings volumes and values.

Location	Species	Impact (Volume)	Impact (Value)
Croatia	Seabass/Seabream		
Cyprus	Seabass/Seabream	-50%	n/a
Denmark	Carp	-10 to -50%	n/a
Denmark	Trout	+10 to +20%	n/a
Finland	Salmon		
Finland	Trout		
Greece	Overall	-15%	-10%
Hungary	Overall	n/a	-60%
Ireland	Overall	n/a	-40 to 60%
Poland	Trout	+10 to +20%	n/a
Spain	Overall	n/a	-55%
Sweden	Rainbow trout	-75%	n/a

4.4 Task 3 Analysis of the identified effects and consequences

For this task, we distinguish between:

- the duration of effect,
- the resilience of the sector to the pandemic's impact and
- any highlighted opportunities and threats to the sector.

4.4.1 Duration of effects

There was no information on the predicted duration of mid- or long-term effects. The responses only addressed short-term effects, which would be for the six months covered by this report (March to September 2020). At the time this report was produced, some MS had already started a second phase of lockdowns, but this is not addressed here.

The main uncertainty identified was how long it would take to go back to something like 'normal'. The study had to take into account not only COVID-19, but other developments, like Brexit, and the subsequent disruptions to supply chains that this may cause. Many fishers' representatives fear that prices will stay low for some time, as it is not clear when, for example, the supply chains can operate at full capacity again. The loss of revenue affects not only the vessel owner and the crew members, but also other secondary sectors, like fish processors and marketers, which were not assessed by this study. The

sector was, therefore, to a certain extent, dependent on public funding to cover at least part of the costs of supporting the fisheries and aquaculture sectors during the pandemic. In Germany, for example, the government issued two 30-day periods for temporary cessations. Land-based activities also received payments from general COVID-19 relief funds. In the Netherlands, fishers could apply for a payment for a five-week temporary cessation. Nearly all MS around the Mediterranean Sea offered fishers support for temporary cessation (e.g. Cyprus, France, Italy or Spain). It was expected that this would lead to a reduction in bankruptcies.

A number of problems ceased after a short period of time as market chains got back to more or less 'normal' operation (e.g. export routes of frozen fish segments resumed). It is expected that the fresh fish market segments will also be able to get back to normal in a relatively short time period when all activities are allowed again. In a few MS, the industry has already reported processes that reverted back to normal in September. However, it should be noted that this was before many MS reintroduced more restrictive COVID-19 measures again.

There is the positive expectation that certain new initiatives, like increasing the direct sales to consumers in harbours and selling via the internet with direct delivery, will continue after the pandemic is over.

4.4.2 Resilience

Resilience levels are difficult to extrapolate from the available information. It is difficult to distinguish between the fleet segments and aquaculture production systems where the markets were impacted, even though some have gone back to normal relatively quickly. This has been observed for some pelagic fleets, large vessels landing frozen fish and DWF vessels. For other segments, where the main marketing channels were basically closed (e.g. fresh fish markets and North Sea shrimp fishing), the fishers depended on governmental support. This is likely to increase the resilience of the fishers to the pandemic. It should be noted that small-scale fishers particularly argued that their level of financial resilience was low.

Some limited initiatives have increased resilience through diversification, for example starting a fresh fish vending machine and directing sales from coast to city. Fishers, particularly through associations, have tried to decrease their dependency on established value chains.

4.4.3 Opportunities

Many fishers' associations have used the time of low productivity and fishing activity to undertake other activities. These include:

- training teaching workers new knowledge to help them more recover from the pandemic more easily (e.g. Cyprus and Portugal);
- issuing programmes to reduce dependency on imported fish by sourcing from local/regional markets (e.g. Romania and Finland);
- starting new marketing channels and improving direct sales or using of online platforms (e.g. France and Poland);
- starting pre-purchase mechanisms with supermarkets (e.g. France); and
- starting development of new products from fish that are usually exported (e.g. reported new products being produced from large monkfish in France).

There is an expectation that the lower levels of fishing activities in 2020 will be positive for fish stocks. The lowered activities should allow a break in fishing pressures and a rebuilding of stocks, although it may be two years before these effects are confirmed through the relevant stock assessments.

4.4.4 Threats

The following threats were reported:

- Unemployment among crews may lead to crew members searching for new jobs (e.g. reported in Belgium).
- In areas dependant on tourists, fishers are highly dependent on being able to sell fresh fish directly to consumers or to the HORECA sector (e.g. Greece).
- The COVID-19 measures were enacted very quickly, with the industry allowed no time to adjust and the capacity of the companies to adapt is limited (e.g. reported for Italy).
- It is important to introduce flexible instruments to react to 'emergencies' in new funding schemes (e.g. reported for Italy).
- In many cases, financial support was provided very late, so timely payment is critical.
- Dependency on the foreign peeling capacity has been proven very problematic and an increase in mechanical peeling has been discussed (e.g. for Netherlands and Germany. Germany reported that an initiative for building a prototype mechanical peeler has not received funding so far).
- Fishers reported that there were regulatory barriers in digitalising direct sales, developing of shorter value chains and covering increasing demand for local products. Therefore, a change in regulations is necessary for improving the possibilities for direct sales.

4.5 Task 4 Mitigation measures

A variety of mitigation measures were reported throughout the EU, although information was not available for all MS and there is an expectation that general national governmental mitigation measures (in the form of short-term wage compensations) will also be granted for the fisheries and aquaculture sectors. We list the information on the measures that have been reported below. MS that received information from partners and sub-contractors on this specific measure are listed. However, in the majority of cases it is not known what the exact amount of financial aid was.

4.5.1 Fisheries

Short-term instruments

- Temporary cessation to cover losses in revenues was implemented by at least nine countries,[7] with exemptions in some countries for large vessels (e.g. in Sweden pelagic vessels above 24 m were ineligible). These payments, in nearly all MS, depended on the vessel size, the segment or what landing facilities were used.
- Regional funds provided for vessels that could not prove a drop in turnover, i.e. new vessels and companies without full taxation histories or accounts (e.g. France, regional funds in Portugal, Spain).
- Funds to cover losses (e.g. Cyprus).
- Aid to buy protective equipment (e.g. Portugal).
- Access to credit lines (e.g. Italy, Portugal).
- Wage subsidy schemes (e.g. Ireland, Italy, Portugal).
- Exemptions from certain fees at ports and auctions (e.g. Portugal, the Azores and Madeira regions).
- *De minimis* measures with direct payments to a company (e.g. Slovenia).

Mid-term instruments

- MS issued programmes for longer-term relief to guarantee company liquidity (e.g. Bulgaria).
- Within the proposed long-term EU budget (new EMFAF), an emergency recovery instrument that helps to ease immediate economic and social damage may be expected (e.g. Ireland) and could be implemented.
- Some of the instruments implemented to cover short-term losses will be prolonged to cover longer-term financial effects (e.g. Italy).

4.5.2 Aquaculture

For freshwater and marine aquaculture, less information was available on the nature of mitigation measures. However, the following were present.

- Access to general COVID-19 relief funds, like wage substitution (e.g. Germany, Finland, Ireland, Slovenia and Sweden).
- Specific funds under the EMFF to cover losses or providing grants (e.g. Cyprus, Italy, Poland or Romania).
- Providing credit lines (e.g. Portugal, Italy).
- Change of provisions on how much fish could be kept in a production site (e.g. Sweden).
- Provide funding to finance purchase of protective equipment (e.g. Portugal).

[7] In the Netherlands the budget for direct payments for fishing activity cessation for a maximum period reached almost the maximum budget. At the moment, during the second COVID-19 lockdown, the sector asked for a new cessation regulation.

4.5.3 Long-term expectations for fisheries and aquaculture

For several MS, it was reported that there was the expectation that after the end of the COVID-19 restrictions, the sectors would return to normal operation (e.g. Denmark, Germany).

Most of the mitigation measures were implemented quickly. In many MS, governments also adjusted the support for fishers to mitigate for their losses as additional information for spring and summer on the spread and effects of the pandemic became more well-known. For example, payments for temporary cessations were introduced after more information was available in Cyprus and in Germany, where a second 30-day temporary cessation period was introduced.

The sectors' main complaints regarding the general governmental mitigation measures were that there was often a long administrative procedure before receiving support or aid from their governments. Similarly, overall, fishing and aquaculture companies are limited in the extent to which they can react on such an economic shock. Fishers, in particular, are inflexible in what they can catch and land because they have limited fishing opportunities throughout the year, related to annual quotas for certain stocks.

4.6 Task 5 Knowledge gaps

At this stage of the pandemic and ten months after the first lockdowns, it is obvious that there are many gaps in our knowledge about the impact of COVID-19 on the fisheries and aquaculture sector. In this chapter, we:

- identify the need for further analysis,
- discuss measures to mitigate the impact, and
- identify what longer-term approaches would help with supporting recovery from the pandemic.

4.6.1 Identification of needs for further analysis

It was reported that for many MS, there was no data available to identify and quantify effects. Additionally, the mid- to long term approaches in 2021 were reported to need some kind of scenario analysis/forecast to predict developments in fisheries and aquaculture.

The following main factors have been identified for further analysis:

1) **Impact of changes in fishing activities (e.g. effort and catches) on fish stocks:** For an analysis of the impact of the pandemic on fish stocks, the 2021 stock assessments by ICES (Baltic Sea in May, North East Atlantic in July) and GFCM (autumn 2021) will be necessary. Together with the data on fishing effort (Fisheries Dependent Information (FDI) of STECF), this will give the basis for an analysis of the changes in stocks, fishing activities, effects of changes in gears used, as well as an indication of potentially increased illegal activity.

2) **Impact on crew mobility:** It is not clear yet to what extent crew mobility was impacted by the pandemic, although a few examples have been identified. Partners and subcontractors reported that crews were required to stay on board

for longer and problems with foreign crew members traveling home. However, it was not clear for how long and to what extent crew mobility was impacted.

3) **Mid- to long-term economic impact on fisheries and aquaculture:** Nearly all MS have reported that they implemented mitigation measures to avoid short-term harmful economic effects on fisheries and aquaculture. It is, however, necessary to analyse the mid- to long-term effects on fishing fleets to react to possible negative economic effects in 2021 and 2022. As economic data for 2020 is not available before 2022, this will be only possible by issuing a substantial data collection effort for qualitative and quantitative data in 2021. This data could be applied in bio-economic models along with the information on changes in stocks and fishing activities. This would enable predictions of fleet reactions. Part of this data collection would be information on price developments.

4) **Aquaculture impact assessment:** For aquaculture, in order to make predictions of the developments in 2021, economic data from 2019 has to be included in models and then assessed. From this, we can extrapolate how changes in 2021 will financially impact aquaculture farms. This has to be accompanied by a substantial data collection exercise for qualitative and, were possible, quantitative data for 2020 in 2021.

4.6.2 Recommendation/discussion of measures to mitigate impact

The following specific recommendations have already been made in this study:

1) At the moment, there is very limited or no available data for the change in marketing activities, especially of the SSF. This is due to the fact that the HORECA sector is the main customer and its facilities were closed in spring and closed again in many countries in autumn and winter 2020/2021. Fishers and farmers have reacted to this and searched for alternative markets, but it is unclear how successful they have been. MS need to decide what mid- to long-term measures are necessary to support these companies and how to improve the industry's resilience to future shocks like this pandemic, especially for the SSF segments. For example, the industry would benefit from more direct sales to consumers, supporting the use of online platforms and supporting investments in diversification in general.

2) With the new EMFAF, a new funding scheme has been planned for 2021. Fishers state that accessing funding is sometimes difficult and inflexible. With the new funding scheme, access to payments should be more flexible and there should be greater flexibility in the distribution of fishing opportunities (within the current relative stability mechanism). An analysis of the possibilities in the current EU funding framework (especially the EMFAF) may help MS to improve their capacity for reacting to this and future crises.

3) On EU and MS level, more information is necessary on the financial positions of companies in fisheries and aquaculture in 2021. These data should be collected and/or provided from/by bio-economic models during 2021, before the regular data collection for economic data for 2020 occurs in 2022. This would allow MS to react to any developments in the sector.

4) Although, for several segments in aquaculture, the direct effects of the pandemic on the economic performance of fish farms were limited, this does not mean it will also be true in 2021. For example, fish farms may have sold more fish in 2020 and will have fewer fish next year. Hatcheries were not able to sell juveniles in the same cycle as usual, which may reduce the possibilities for next year's farm restocking. MS could implement measures to address this issue, but for that, more qualitative and quantitative information should be collected during 2021.

4.7 Longer-term approaches supporting recovery

The changes in fish markets should only be temporary. However, it is unclear if 2021's sales will return to the same level as 2019's, how far alternative marketing channels will be used and whether stronger regional sourcing to avoid dependency on foreign markets is a good instrument for recovery. Due to other sectoral level shifts, like long-term changes in travel and tourism, Brexit and other market conditions, there may also be changes that have longer term effects, so the sectors may need support for these transitions. As there is only limited data on the value chain, an assessment of the effects of these changes on fisheries and aquaculture is necessary.

For aquaculture, long-term effects can be ascertained with a number of interviews and a limited assessment that applies a scenario analysis to price and demand developments. This information could be applied to the analysis and proposal of new market channels or utilised for the improvement of regional marketing. Some of the data collected during 2020, may also be useful to predict the predicted changes in 2021 and 2022, as fish production follows certain production cycles. The STECF has been receiving questions about adding information on the impacts of COVID-19 to its next report on the EU aquaculture sector (March/April 2021); evidently this information is required as soon as possible for both the EU and the industry at large.

5 EXAMPLES - FISHERIES AND AQUACULTURE

The impacts of the COVID-19 pandemic and MS's reactions have been diverse in what they have meant for the fishing and aquaculture sectors. In this section, we provide a number of examples of fisheries and aquaculture production system to summarise reported information from several MS. The aim of this section is to describe the impacts, the mitigation measures and knowledge gaps for specific fisheries and aquaculture production systems across MS, showing where similarities or differences occur within single systems between MS.

5.1 North Sea pelagic fisheries

Pelagic fisheries in the North Sea are diverse: there are a number of target species, including those of small pelagic species targeted for fishmeal and fish-oil production. The North Sea is only one of several fishing grounds for herring and mackerel. Most of the vessels used here are large and fish in other regional seas for other species. In several MS, fishing companies reported some restrictions on exporting fish from landing ports. Companies reported restrictions on changing crews in harbours outside of Europe due to restrictions on air travel. As many crew members come from a country outside of Europe, there were also problems for crew members returning home. Some companies have stored the fish in their own, local freezing facilities during times of lower demand, but this storage capacity was limited. Due to the short time frame for which export restrictions were imposed, this was not a long-term problem because the market for frozen fish returned to normal relatively quickly.

The reports from the MS suggest that the problems for the segments are rather limited. The Danish fleet fishing for reduction (i.e. to meal or oil) reported no changes. Companies from the Netherlands did not apply for relief funds due to the low level of support per day compared to their costs per fishing day. The markets were back to normal relatively quickly and, therefore, lower fuel costs, due to lower oil prices in spring 2020, led even to economic improvements for larger vessels (reported from Denmark). In Germany, it was also reported that canned fish sales, particularly herring, increased substantially.

5.2 North Sea flatfish fisheries

The North Sea flatfish fishing fleet includes mainly vessels from four MS: Belgium, Denmark, Germany and the Netherlands. The target species are all flatfish, but most of the fishing undertaken is for North Sea plaice and North Sea sole. The stocks' distribution areas include parts of the English Channel and the UK also has a substantial flatfish fishing fleet. Plaice and sole belong to two separate market segments: plaice belongs to the 'whitefish' segment, while sole is a high valued species with a specific market. All four MS reported severe drops in sales and prices for plaice and sole. Plaice prices were especially low, which lead to voluntary limits on fishing activities in several MS (e.g. Belgium, Germany). The main reason for the drop in plaice and sole sales was the closure of the HORECA sector, as most of the flatfish is sold to this market sector in the Netherlands via auctions. In Germany, the decrease in revenue was very different for the two species. While plaice revenue decreased by 50% in the first five months (from €3.2 mil. to €1.6 mil.), the revenue for sole increased by approximately 15% (from €2.6 to 3 mil.). Other MS, in contrast to Germany, reported a decrease in landings and revenues for sole (e.g. 40% in the Netherlands).

All four MS implemented mitigation measures for their fleets. Their main measure was a temporary cessation in fishing activity. In Germany, fishers received support for two periods, with a maximum of 30 days per period (based on a daily rate), while in the Netherlands, it was a maximum of five weeks (with a weekly rate). In Belgium, the Flemish government issued a 'shut down bonus' from its own regional funds (state aid), reportedly without using EMFF funding. In Denmark, the government issued a compensation for fixed costs. The exact amounts are not available at this point as the payments varied dependent on various criteria.

In all MS, it is expected that the segments have been impacted. However, after the lifting of restrictions, the activities along the supply chain have returned to normal rather quickly. That said, changes due to Brexit must be taken into account, too. Therefore, there is a concern that prices may stay low for some time.

5.3 Baltic Sea demersal fisheries

The Baltic Sea demersal fisheries face two crises at the moment: the low levels of eastern and western Baltic cod stocks and the COVID-19 pandemic. Therefore, several MS around the Baltic Sea reported that it was not possible to distinguish the reasons for changes in landings in 2020. Much of the decrease in landings could relate to the substantial reductions in TACs over the last few years.

5.4 Bluefin tuna in the Mediterranean

The Atlantic bluefin tuna industry cross-cuts the fishing and aquaculture sectors, and a number of MS in the Mediterranean. Due to the high value and importance of the fishery, measures appear to have been taken by MS to ensure the fishery continues. ICCAT Resolution 19-04 states that the purse seine fishing season should operate between the 26 May to 1 July and that 100% observer coverage is required on vessels, farms and traps for transfer and harvest. The impact of not allowing the fishery during this period would have stopped the caging operations for an entire year and, therefore, stopped the ranching stage of the business for the entirety of the next 12 months. Limited capture of bluefin tuna through traps and line vessels could have continued within quota allowances for the 2020/2021 season, but these operations do not make up a large part of the EU fleet targeting bluefin tuna.

Bluefin tuna companies in MS (primarily in Spain, France, Italy, Croatia and Malta) have worked with the ICCAT and observer programme suppliers to ensure that the required coverage level was met. Observer training and briefings were shifted online when possible and additional requirements for self-isolation when required were implemented. Only one MS (Malta) had a less than 100% rate of observer coverage during the fishing season. This occurred when an observer fell ill and a replacement could not be sourced due to restrictions of movement. Observers continued to operate on farms during the remainder of the year, as required.

Patrolling and inspections in the fishery still took place across MS, although exact rates cannot be verified.

This commercially and socio-economically, important fisheries have managed to continue operating throughout the COVID-19 pandemic. There have been changes to the operation of the tuna harvesting, with fewer harvests of fresh individual bluefin tuna from Japan.

Typically, these are of single, large fish ordered by size and quality and flown by air to Japan. These have been replaced by a smaller number of bulk harvests (Pers. Comm. Observer Programme Manager). Here, the majority, or entire cages of fish are harvested at once, blast frozen and transported by specialised refrigerated transport vessels, by sea, to market in Japan. Although this switch allowed operations to continue, profits are likely to be reduced, because bulk harvested fish, frozen and transported by sea have smaller profit margins than air freighted fresh tuna.

Importantly, the bluefin tuna sector managed to remain open and should be able to operate normally, or with the same restrictions in place in the 2021 season.

5.5 North Sea shrimp fisheries

Shrimp fisheries are a special case for the North Sea fisheries, with fishers from Belgium, Denmark, Germany and the Netherlands fishing this species. The Wadden Sea is the main distribution area for common shrimp (*Crangon crangon*) and, therefore, common shrimps are a speciality at the North Sea coast. Shrimp fishery has a long tradition (e.g. for Germany Döring *et al.* 2020) and is very important from a cultural perspective. It is not regulated by TAC and, therefore, there is no catch limit for individual fishers. In 2018, nearly all shrimp fishers from Denmark, Germany and the Netherlands were certified by the Marine Stewardship Council (MSC 2020). For all fishers, 2019 was a problematic year as prices and catches were quite low and, therefore, there was already a degree of economic pressure on the companies when the COVID-19 measures were implemented.

The introduction of strict hygienic rules for the peeling of shrimps by hand led to an outsourcing of the peeling, mainly to Morocco, and to a concentration in the processing industry. In 2020 and 2021, two large companies control the majority of the common shrimp market in Europe.

The move of peeling to Morocco created many problems because the COVID-19 restrictions led to a substantial reduction in factories' processing capacities. Only a third of the usual workforce was allowed in the factories for peeling shrimp. Processing companies reacted by restricting the buying of shrimp. In one instance, during two weeks in spring, fishers could not sell any shrimps, which meant that fishers were forced to stay in port. Fishers also implemented voluntary restrictions by not exceeding certain catch limits. In Germany, catches in the first five months reached only about 50% of the equivalent period in 2019. The Netherlands reported a decrease in catch by 45%. The turnover decreased less, from approximately €7.8m to €7.3m (BLE 2020). However, prices were very low in 2019 and turnover for the whole year was already at its lowest level in the last five years, with approximately €9.5m in Germany, compared to €19.3m in 2018 (BLE 2019).

Four countries reported that during the COVID-19 pandemic, effects on fishers were severe and they suffered substantial changes to their catch levels and earnings. Due to its dependency on relatively few processing companies, the sector was not very resilient to crisis. Denmark and Germany have already reported some bankruptcies. In Germany and the Netherlands, alternatives to peeling abroad are being explored, especially mechanical peeling. This would allow shorter value chains, better quality (as the shrimps would not have to be transported to Morocco, which requires preservatives) and increase value added in the coastal regions.

In Germany, fishers argued that the daily rates for temporary cessation were much lower than in the Netherlands[8] and this might lead to a problem of competitiveness of the German vessels. The government increased the daily rate for the second period of temporary cessations in autumn.

5.6 Seabass / Seabream aquaculture production

More documentation was available for the aquaculture of seabass/seabream in Greece, Italy and Spain than for many other aquaculture systems. This may be a reflection of the economic importance of these species to these countries. The decline of both export markets and the domestic HORECA sector resulted in a 50–60% reduction in sales, with exports of seabass and seabream from Greece and Turkey to Italy dropping by 50% (GFCM Secretariat, 2020). Local farms in Italy only experienced a 15% decline. One company, with a combined production of over 75,000 tonnes and annual sales of around €425m, noted significant declines in demand in European and US markets, primarily due to the closures of the HORECA sector. This was partly mitigated by a continued supply to retail/supermarkets. However, though, even here, demand has been varying from market to market and within retail chains.[9]

Around 80% of Greek aquaculture production is typically exported to countries like Italy, France, Germany and the US, which, due to the pandemic, have minimised orders. Sales have decreased by 40%, while companies more heavily exposed to the foodservice industry report declines of 60% to 90% (Hellenic Aquaculture Producers Organization (HAPO)).[10]

HAPO mentioned that the situation in the industry remained difficult as of September 2020 and, despite the fact that several months have passed since the lifting of the lockdown, consumption continued to move sharply downwards. HAPO stated further that was great uncertainty about the course of recovery in the coming months. Losses in the period January – August 2020 reached 15% in terms of volume and 10% in terms of value, due to the large decline in the basic markets for Greek fish. Specifically, sales to France fell 15% and Italy, 25%, while sales to the US declined by 50%. It is indicative of the changes in market demand from different sectors that the demand for fish weighing more than 600g consumed mainly in catering has fallen. A different situation prevails in the supermarkets, where sales are moving upwards and even at levels higher than last year.

The situation in Greek seabass and seabream aquaculture would be much worse if it were not for the Spanish market, where there has been a huge increase in exports. Spain has shown an increase of 50% in Greek imports. This is only due to coincidence: it is due to Storm Gloria, which hit the Western Mediterranean in January 2020 and saw the Spanish seabass/seabream sector lose almost 30–50% of caged fish (depending on the source of the estimate) to escape from broken cages. Spain is the second largest European market for Greek fish farming (Italy is the first), as it absorbs almost 12.6% of Greek production

[8] (Fischerblatt 5/2020)

[9] https://www.undercurrentnews.com/2020/04/16/worlds-largest-bass-bream-farmer-navigates-uncharted-waters-of-pandemic/ Accessed 22/09/2020.

[10] https://www.mononews.gr/business/i-ispania-sozi-tin-partida-gia-tis-ellinikes-ichthiokalliergies-xefige-i-tourkia-me-paragogi-stous-200-000-tonous Accessed on 24/9/2020.

and represents 15.5% of total exports of Greek seabream and seabass. The industry was also concerned with the stagnation of prices for seabream and seabass. Greek producers expected a significant improvement in prices due to the momentum that the product had acquired at the beginning of the year. In Spain, in fact, they expected that prices would increase up to €1 per kilogram.

However, the current market conditions are not favourable for price increases. There are also issues with price increases owing to the increased supply from Turkish aquaculture into international markets. This is in part due to the incentives provided by the Turkish government. Turkish production has increased to 200,000 tonnes, compared to Greek production at 120,000 tonnes. For the valuable North American markets (USA and Canada), HAPO member companies export their fish using regular commercial flights. This was no longer possible, following the decision of the US Administration, which banned all incoming passenger flights from the European Union. This ban did not apply to Turkey, as a result of which, Turkish fish farming was indirectly supported. It was able to utilise the extensive network of Turkish Airlines that could still operate normally. NB: the fish were transported in the cargo space of passenger airlines as opposed to cargo flights.

A small number of MS aquaculture producers have been able to maintain production and sales better than others. This appears to be the result of established supply chains that allow them to sell directly to supermarkets. In these cases, these producers have production lines established to meet the requirements of processed and pre-packaged products for sale. For example, Italian seabass and seabream farms have been unaffected.[11]

Recent reports[12] have been more hopeful. Sources from Mediterranean aquaculture firms have reported that higher retail sales have partly compensated for lower foodservice demand and that seabass prices have been rising.

[11] http://www.oecd.org/coronavirus/policy-responses/fisheries-aquaculture-and-covid-19-issues-and-policy-responses-a2aa15de/ Accessed 14/12/2020.

[12] https://www.undercurrentnews.com/2020/08/12/med-bass-bream-sector-on-road-to-recovery-despite-covid-19-execs-claim/ Accessed 14/10/2020.

6 COVID-19 IMPACT ASSESSMENT

An assessment of the overall level of risk of the COVID-19 pandemic on fisheries and aquaculture in MS has been conducted using a risk assessment approach, (impact – likelihood) though it has not identified individual risks. This risk assessment was conducted at the level of the fisheries or aquaculture sector for each of the MS. It demonstrates the high levels of risk (high likelihood and/or severity of effects) that estimated across MS. For many MS, the lack of information has resulted in the estimation of severity of the effects being high or a likelihood of longer duration of the effects and lower levels of reversibility.

The majority of MS that reported usable data for fisheries reported high levels of risk of effects and indicated a likelihood of longer-term irreversible effects (see Table 3). Mitigation measures that reduce the level of inherent risk have been identified in 12 MS, but the level of risk still remains high or severe in 16 of the 22 coastal MS.

Similarly, the risk assessments for the aquaculture sector demonstrate high levels of severity of risk (see

Table 4). Again, some MS have been able to identify a high level of risk, but for many, the lack of information results in a default high risk level for effects and likelihood being assumed. The majority of MS have reported high levels of risk of effects and likelihood of longer-term irreversible effects. Mitigation measures that reduce the level of inherent risk have been identified in 13 MS, but the level of risk still remains high or severe in 22 of the 27 MS.

Key for Tables 3 and 4:
For impact and livelihood:

Low	
Medium	
High	

For risks:

Very low	
Low	
Medium	
High	
Severe	

Table 3 Fisheries risk assessment.

MS	Impact	Likelihood	Inherent Risk	Mitigation	Risk
Austria					
Belgium					
Bulgaria					
Croatia					
Cyprus					
Czechia					
Denmark					
Estonia					
Finland					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Luxembourg					
Malta					
Netherlands					
Poland					
Portugal					
Romania					
Slovakia					
Slovenia					
Spain					
Sweden					

Table 4 Aquaculture Risk Assessment.

MS	Impact	Likelihood	Inherent Risk	Mitigation	Risk
Austria					
Belgium					
Bulgaria					
Croatia					
Cyprus					
Czechia					
Denmark					
Estonia					
Finland					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Luxembourg					
Malta					
Netherlands					
Poland					
Portugal					
Romania					
Slovakia					
Slovenia					
Spain					
Sweden					

7 CONCLUSIONS

For all MS, we received information on the effects of COVID-19, quantitative and qualitative information on the effects, duration of the effects and mitigation measures put in place. From this information we have drawn conclusions for the timeframe March-September 2020.

All countries reported that there are some negative economic effects for many fleet segments and aquaculture production systems. The impact assessment supports this conclusion. For fisheries, there were also reports of changes in control activities and that MS have experienced problems implementing some of EU regulations due to the COVID-19 restrictions. We can draw the following preliminary conclusions from the information received.

The information collected was limited to a specific period from March 2020, when effects of the COVID-19 pandemic started to affect the fisheries and aquaculture sectors, to September 2020 when its effects were documented and mitigation measures put in place. This time period, at project inception, was thought to be sufficient to cover the majority of the COVID-19 pandemic, but the subsequent waves of pandemic have resulted in an impact period longer than the study. Effects are still being reported and mitigation measures extended.

7.1 Fisheries

1) There were substantial changes in control activities due to COVID-19 restrictions. MS around all regional seas (North- Baltic Seas, Celtic Sea, Western Waters, and the Mediterranean and Black Sea) reported restricted on-board inspections and physical control of logbooks.

2) Some regulations could not be fully implemented and some implementations were changed to comply with the COVID-19 restrictions. Several MS reported changes in reporting requirements.

3) Many demersal fleet segments report losses due to the closure of fresh fish markets (e.g. plaice). Due to the closure of the HORECA sector, demand for fresh fish decreased in all MS. Additionally, auctions could not operate as usual due to COVID-19 restrictions. Therefore, roundfish fisheries around the EU faced lower demand and prices. This led to longer periods in port and losses in turnover.

4) Flatfish fisheries in the North Sea showed that depending on the target species, huge differences could exist between species as demand and prices for plaice decreased substantially, while the effects for sole were not that severe.

5) Pelagic fleet segments (e.g. Denmark, the Netherlands, Baltic States and Portugal) reported problems with exchanging crews and in some export markets. Those problems were, however, more short term. Operations returned to normal relatively quickly. Lower fuel costs during the summer were even an advantage for these fleet segments.

6) In the Baltic Sea, demersal and pelagic fleet segments were impacted but it was not easy to distinguish between losses due to decreasing quotas and lower fishing effort due to the pandemic.

7) Shrimp fisheries in the North Sea provide a good example for the low resilience of the small-scale fishing segments to shocks and where reliance on external actors has caused problems in the supply chain. Nearly all shrimp catches are transported to Morocco for peeling. This makes fishers very dependent on processing companies and the peeling capacities in Morocco. When the capacities were cut to one third of previous levels, fishers could not fish anymore and prices dropped.

8) Small-scale fishing segments were most affected by the closure of the HORECA sector, as most depend on direct sales to it.

9) Small-scale fleet segments tried to search for alternative marketing channels by using online platforms, for example, and were able to sell fish directly to consumers in some cases. This market adaptation may continue after the pandemic.

10) The effects on the fishing fleets were very varied, dependent on market segments and species. For example, the lack of flexibility to change target species, due to the relative stability principle did not impact the large-scale pelagic fisheries as their markets did not change much. For fresh fish demersal fisheries, this was different, as their market channels closed (i.e. auctions closed and sales to HORECA sector decreased substantially). It was not possible for these fishing companies to switch to other species.

11) Nearly all MS reported mitigation measures. In fisheries, the EMFF budget was utilised by at least 11 MS. However, fishers were also eligible to apply for general COVID-19 relief funds.

12) As a consequence of the experiences with the mitigation measures in 2020, fishers in many countries asked for an emergency mechanism in the new EMFAF. There were also complaints about complicated access to national funding schemes and late payments when these funds were accessed. Companies requested that this should be also addressed with respect to the future implementation of emergency measures.

13) Different levels of support relating to mitigation measures (e.g. temporary cessation, reported as a measure by nine countries) raised concerns in some countries that different levels of support in other countries may affect competitiveness after the crisis.

7.2 Aquaculture

1) Many MS reported that fish were not harvested and remained in the water due to reduced sales of certain species (e.g. trout and carp). The retention of larger fish in farms increased costs and led to problems for hatcheries and nurseries when selling their juvenile fish (including markets outside of Europe).

2) For many species, demand decreased for a while, but countries also reported an increase in direct sales to consumers, including direct sales of smaller fish, which will not be available on the farms to grow further this year. This may create problems with the supply of larger fish in 2021.

3) Imports of Norwegian salmon increased. This led to low prices for all salmonid species within the EU (especially trout).

4) In 15 MS, governments issued mitigation measures with support from the EMFF. Nearly all countries reported that mitigation measures were sometimes only supported by national funds.

5) In some MS, (e.g. France, Greece, Spain), companies claimed that the change in markets and access to them (as exports may be decreased for some time) may have larger effects in 2021 than it had in 2020. Some of those changes may lead to companies sourcing differently or some countries (like Turkey) strongly subsidising their industries, which will lead to lower prices for imports in the EU.

7.3 Knowledge gaps

1) In 2020, no information was available on the impact on the status of stocks and the economic position of companies in this crisis. Only an initial indication is available in a STECF nowcast exercise. In 2021, information on the status of stocks (including discard levels, gears used and illegal activities) will become available from ICES or GFCM.

2) The assessment of changes in stocks and fleet activity could be used to predict the economic impact on fleets, but for that it is necessary to apply bio-economic models. This would require a substantial data collection effort to collect quantitative and qualitative data in 2021. The regular data collection for economic data for 2020 will be in 2022.

3) How the sector reacted to the changes due to pandemic is not known in detail. A data collection exercise would be necessary to close some of these gaps. This would allow the analysis of mitigation measures, how far the sector is back to 'normal' and how far reactions on the crisis could be positive for improving resilience of the sector to shocks and changes in general. NB: Any changes would need to be carefully assessed to ensure additional contributory factors were accounted for (e.g. Brexit).

4) At the time this report was drafted, Europe was encountering a second wave of COVID-19 and there was a second round of lockdowns in many MS. This included a second closure of the HORECA sector. Information on the effects of those second closures and governments' reactions will only be available during 2021.

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