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REPORT

EXPERT GROUP ON FISHERIES CONTROL

WORKSHOP ON DIGITAL TOOLS FOR SMALL SCALE FISHERIES (SSF)

BRUSSELS, 4-5 DECEMBER 2018

Introduction

The European Commission (DG MARE) organized in close cooperation with EU Member States (MS) a workshop on digital tools for small-scale fisheries (SFF) in Brussels on 4-5 December 2018. Representatives of DG MARE, MS, European Parliament, Council of the European Union, Advisory Councils and other EU stakeholders participated in the discussions. The workshop covered digital tools for vessel monitoring, catch reporting and a session focused on the European Maritime Fisheries Fund (EMFF) as a funding mechanism. The results of these discussions should inform the ongoing process for a revision of the EU Fisheries Control System.

Report

The workshop was opened by Francesca Arena, Head of Unit, DG MARE Unit D.4, Fisheries Control and Inspections, who noted the workshop would tackle several concerns raised by MS to share knowledge, best practices, trends and developments on digital solutions specifically to monitor and control the SSF. She underlined the necessity of technical finding solutions that suit small-scale vessels and their needs, while at the same time ensuring a better but also efficient monitoring of the fishing activities of those vessels by the relevant competent authorities of MS.

Session 1: Monitoring of the Small-Scale Fleet

Pascal Savouret (European Fisheries Control Agency, EFCA), the moderator of this session, underlined that the aim of the session was to explore technologies and solutions currently in place in some MS for monitoring the SSF activities, shedding light on best practices and options for the future. Monitoring refers here to "*reporting to a Fisheries Monitoring Centre (FMC) the position, course and speed at regular time intervals of a fishing vessel then aiming at collecting location and cinematic data in real time or near real time*". The moderator emphasized that electronic monitoring of the SSF may be perceived as an impediment but also as an opportunity in the much-disputed coastal area or facing traceability requirements.

Presentations:

VMS tracking device, Sophie Beudon, France: In France, vessels <12m are obliged to use a Vessel Monitoring System (VMS) device (signals per quarter of an hour) for certain fisheries, including fishing for common sole in the East Channel (vessels without a deck are exempt). This is a national measure and eligible vessels are offered financial support of 2,500 euros. Discussions included the relationship between gears and VMS, where Ms. Beudon noted that through the position given by the VMS it is possible to see how often the gear is used and in case of any doubt may lead to an inspection. On the dimensions of the VMS device, there is a desire to reduce it, while the use solar power has still to be tested to verify that it is sufficient for running the device.

AIS/VMS analytical tool, Hans Grimby, Sweden: For monitoring areas with fishing restrictions in Sweden (Bratten -MPA and Koster-National park) there is a requirement for all vessels to use AIS (Automatic Identification System). The current available monitoring tools (AIS, VMS) show the position of the vessel but do not indicate the activity of the vessel while it is the activity that determines if the vessel is permitted within the restricted area or not. Reported fishing activity cannot be validated in real-time and an analytical tool is used for an indicative picture (graph) of it. The fishing activity can only be known when submitted in the logbook, therefore gear sensors are necessary for better control. AIS data is received from the Coast Guard and Sweden monitors the entire fleet. There are no additional costs to this system (other than for the analysis itself). An Excel program suffices to process existing data.

Black box (Anchor lab), Soren Palle Jensen, Denmark: GPS and sensor data "Black Box" is installed on 55 vessels active in the Danish mussel dredge fishery. It is mandatory for these vessels to have the Black Box since 2014. The Black Box offers data for stock assessments, documentation of fishing activities, better control and surveillance of fisheries, mapping and documenting the impact of fishing in Natura 2000 sites, as well as increased food safety and traceability. The Black box collects data every ten seconds, includes movement sensors and batteries can be charged with land power.

Lite VMS, Gabriel Gomez, Spanish company Marine Instrument: VMS lite is composed of GPS (offering supervision of fishing areas and traceability), sensors (crew and boat safety) and alarms (smartphone or web reception). A pilot project is supported by the Xunta de Galicia and covers 120 vessels. Mr. Gomez clarified that the GPS is on the boat and there is a seal that breaks if the instrument is tampered with and an electronic signal is sent to Marine Instruments warning of a probable manipulation. The UK noted that this system has also been approved by the Marine Management Organisation in UK and is widely accepted by fishers who use it and whose main concerns have to do with data protection.

Closure of cod tracking app (MOFI), Lutz Wessendorf, Germany: Small vessels (<12 m, 20 m depth line) exempted from closure periods of Western Baltic cod must use an app that monitors their position as well as gears (setting/retrieving). Almost 100 fishers use this app with its electronic monitoring system certified by the German Control Authority. It is free of charge and adaptable for other languages. The software works similarly to VMS and records the route. Next steps: using the application to register catch data and arrange the system in a way that can be a waterproof box. The EMFF support was not used as Germany felt there was not enough time to get co-funding and because the project was not included in the German EMFF operational programme.

VMS system for the scallop fishery in Wales, Tim Croucher, UK: Since 2012, in Wales, all British fishing vessels with a scallop dredge onboard must "(a) have a tracking device installed onboard that boat; and (b) transmit the required information to the nominated receiver at least once in every ten-minute period whilst that boat is at sea." The system is a web-based monitoring system which can help in e.g. targeting vessels for inspection at landing. In terms of data, Mr. Croucher noted that in the future, there will be more data and that the idea is to take advantage of a system based on cloud storage. Data will also be transmitted through the UK VMS.

Monitoring SSF- detecting fishing events, Oliver Tully, Ireland:
A pilot project was launched in Ireland in 2014 to identify fishing events through fishing gear sensors and data analysis (iVMS), with a number of different output users. The fleet profile in Ireland is composed by approximately 2000 vessels and the users are 100 dredgers (mandatory) 60 potters and 3 netters (voluntary). Mr. Tully noted several recommendations for VMS, gear sensors and SSF monitoring such as the importance of VMS being independent of vessel power, low cost systems being sufficiently reliable, data visualization on mobiles needing to be improved, the need for gear sensors to be wireless, data integration and management having a significant cost and also considerations of the scale of costs (100 vessels vs 1000). He suggested that perhaps the data analytics are a key element.

Discussions among participants included the following issues:

- Having these systems on board can cost a lot and if the systems are not certified for control, the vessel owner runs the risk of losing many days of fishing, maybe even jeopardizing the whole fishing season.
- Some boats do not have a cabin or engines on board/integrated. As the monitoring boxes presented need an electric connection, this point has also to be taken into consideration. It is unclear to which extent solar power could be a solution.
- SSF means only 1% of the fishing activity for some MS and therefore the costs of additional control measures might be higher than the benefits. Moreover, many of the operators are elderly fishers and they could run the risk of jeopardizing their safety, when e.g. they are alone on the boat.
- Another important aspect in electronic monitoring is investing in artificial intelligence, which could be a possible pre-treatment tool for data, and how to process all the extra data generated. Cloud storage systems were suggested as solutions. MS also exchanged information about the possibility of using this data in court cases of this data.
- The certification and standards for these new devices, the human costs of implementing new systems and the fact that management plans would be affected by these provisions.
- Applying a monitoring system at various sites is useful if the area is limited and the volume of catches can be assessed. Some participants felt that problems could arise in relation to the capacity of the system when the fishing area is not small and a larger number of boats are involved.

Wrap-up from the session by Francesca Arena, Unit D4: It is important some flexibility in the legislation so that any provisions allow for the future development and use new technologies. The presentations showed that several tools exist already or are being developed/tested and that cost is not the key issue. Most tools presented had multiple purposes and apart from monitoring of the fleet, were also used to manage the fisheries, to provide information to scientists and, services to operators (e.g. for safety issues). Some presentation also highlighted the importance of those tools to support traceability and food safety. Artificial intelligence and machine learning processes were mentioned to ensure an efficient use of the data by the competent authorities and those could be subjects for future workshops of this type.

Session 2: Digital Catch reporting Tools for Small Scale Fisheries

Ms. Marta Moya Diaz, Deputy Head of Unit, DG MARE Unit D4, highlighted that central to the amendment of the Control Regulation is the phasing out of paper-based (monitoring and reporting) tools. The purpose of this panel was to explore existing solutions and to look at the "state of the art" in terms of which tools have been developed.

Presentations:

M-Log-book, Mislav Sokol, Croatia: From a total fishing fleet of around 3000 vessels, 700 vessels are currently equipped with electronic logbooks. These include all vessels over 12 metres using purse seines, trawls and dredges, and all vessels over 8 metres with Bluefin tuna (BFT) and swordfish (SWO) quota. The fleet of 2100 vessels under 10 metres are obliged to submit monthly paper catch reports, putting a huge burden of work on fisheries staff. An application (app) based catch reporting system, M-Logbook, was launched in July 2018 on around 100 vessels (20 SWO vessels under 8 metres, and 80 5-8 metre vessels using purse seines and shore seines), with the aim of phasing in the device for all users of catch reports in the next 2 years (2019-2020). The app is installed via Google Play and updated automatically. Each vessel has a vessel ID, username and password. The app requires real time entry of details on Port of Departure, Fishing Activity, Port of Arrival, Port of Landing, name and details of the master and fish species. The app took 9 months to develop with development costs around 12000 EUR, annual costs (support + development) of 16000 EUR as well as un-estimated running costs (internet link + electricity). The app generates a personal record but sales and related documents must be validated. A major challenge is training an aging population of SSF fishers who do not normally use smart phones or computers and many hours were spent training and correcting errors.

The presentation raised questions about iVMS, which was installed, the use of EMFF, and that a help desk is crucial. Also fishing positions were discussed, with a choice of 12 zones and 40 sub zones in a drop down menu.

E-Lite app, Joost van den Akker, Netherlands: E-Lite is a web-based application developed for vessels under 12 metres. This fleet segment amounts to 378 vessels accounting for 1% of national landings. The system was inaugurated on 1 January 2018 and is now obligatory for all vessels under 12 metres; prior landing notification is required 2 hours before landing via the system and registration of the fishing activity within 24 hours after landing. A paper logbook is no longer required for vessels less than 10 metres, but is required for vessels between 10 metres and 12 metres. Data is automatically transferred to the national electronic recording and reporting system (ERS). Paper logbooks were noted as ineffective for control, were often lost and require a significant manual input. Data recorded includes fish species, quantity and catch area. There has been training for users as well as inspectors. There is a need to improve helpdesk operations and website performance, but the system provides for a significantly improved control and oversight as well as outreach to fishers. Development costs have amounted to 43200 EUR with annual maintenance and inspection/ follow-up costs of 4000 EUR and 96000 EUR respectively, per year.

Short discussions took place on issues of fraud being reduced by cross-checking leaving and returning to port notifications and by inspectors monitoring movements in and out of the harbour. Training of users has been intensive. The problem of recording data is not just a fishers' problem, but can also be due to poor performance of the website. The Netherlands is now looking at the possibility of linking e-Lite to an app that records data information before landing.

ERS Lite, Keno Kaasiksoo, Estonia: ERS Lite is an app driven web-based tool, providing both a catch reporting system and prior notification of landing. Available in both Russian and Estonian, the tool structures reports to reflect the fishing realities. It replaces cumbersome paper logbooks (23000 sheets) and phone-based departure, return and prior notification reports. It incorporates a user-friendly interface, menu driven and with images of fish species. Choice of device possible (laptops, tablets smart phones etc. can be used). Catch reporting is automated, using information from previous fishing trips; facility for reporting if gear retrieved or re-set, and for recording species and quantity caught. This automatically goes into a personal record, which can be used as the basis for catch reporting ashore. The device does not require network connection to function; it can store data and transmit once a connection is regained.

The discussion noted that the app is voluntary and only used by a small section of the fleet. With many open boats in the fishery, fishers are reluctant to use the app on the water, or with generating a personal record guesstimate to within 10% of the actual catch and with a pressure to send the report from ashore. Mr. Kaasikso noted that EMFF funding was used and that the process was not too complicated. App development costs around EUR 80000; fishers use their own hardware.

Monitoring and catch reporting system tool, French company Fishfriender, Gregory Tordjeman: In France the app is being applied to the recreational fishery for seabass. It generates a catch declaration form, transmits data to the fisheries administration, and issues a catch report receipt. The app can be installed free of charge, is compatible with different operating systems (iOS, Android etc.), can use voice recognition, can record catches on the web and works offline. It was noted that offline functioning adds complexity to applications and their future improvements. The app also enables the user to choose which information to share, can access weather and other web based information and can link to social media. Combines active data input (on species, quantity, etc.) with passive data input (GPS position, time, speed, direction). Catch data is stored on web. App allows for closed areas to be defined by administrators, and programmed to send signal when/if fisher is in the defined areas. Information could be used by fishers to e.g. analyse data and/or link to markets, providing an incentive for fishers to use the app.

In terms of development, a prototype app was developed in one year. Several points to consider when developing an app were presented, such as time to develop, what to think about, the technology aspects and finally, some problems to solve through technical solutions.

Mobile app for catch reporting ACERGA (Asociación de Armadores de Cerco de Galicia), Manuel Suárez, Spain: ACERGA is the Galician association of surround seine fishermen, whose members own 102 vessels, including relatively small vessels with 2 crew, and larger vessels with 15 crew. They fish in ICES Areas 9A, 9B, and 9C and 65% of the vessels use e-logbooks. Electronic catch reporting has considerable advantages over paper logbooks, especially for monitoring use of quota, and planning fishing activity accordingly. Paper logbooks are complex to complete, may take days to be received by authorities, difficult to input data and cannot be scanned. Most ACERGA members use smart phones (92% Android, 7.5% iOS, with the rest using a web or desktop app). 60% have PCs on board to help with navigation and the average age of fishers is 40 to 60, with little knowledge of computers as tools. The ACERGA electronic catch reporting system is a direct electronic access (DEA) type web based system, with a two way exchange of information (between the vessel and ACERGA); it provides information to the association and is a tool for the fishers. The most important/ useful characteristic is providing catch data in real time. This enables the association to show the dependence of vessels on species, and to map catches by ICES fishing areas, species and date. It enables users to monitor use of quotas in real time in each fishing zone, and for ACERGA to manage its quota

effectively. The ACERGA office can keep track of quota use by zone; gross tonnage caught, number of crew on board; landings by size of vessel, port, GT, vessel age etc.; to keep track of a highly mobile fleet using multi-zones; predict seasonality of landings in ports; make catch forecasts by species and season, e.g. mackerel which does not spend much time in zone, and has to be caught quickly. The app can be combined with GPS and VMS systems to fix vessel position, speed and direction. It can provide access to sales notes from the fish auction (lonja), and offers possibilities to include further (voluntary) information on depth, position, direction etc.

Greek company Pelagic Data Systems, Tryfon Sompolos, and Spyros Kouvelis, Greek Fishermen's Association: Comprises a small, compact, lightweight, tamper proof, solar powered, rugged tracking system, designed for SSF. Using an ultralight sensor and a gsm signal, this vessel tracking system provides a high-resolution recording (600 locations per hour) of the vessel's position. Essentially a tracking system, the device is multifunctional (providing information of interest and use to fishers, markets, authorities, scientists etc.), and compatible with other mobile devices using apps for catch reporting and other data uses. In Greece it has been used by small-scale fishers in the Cyclades in a pilot project. It can work without charge for up to one month and can store 1 year worth of data (data is compressed and encrypted before sending). It does not require any training for its use (fully automated), and is offered in 8 languages. The device does not require a functional cellular network; it can store data until contact is established, and data is stored in the cloud. Here it is accessible to all authorised users via a secured data portal or secured application programming interface (API). Cost to install is USD 300, and another USD 300 per annum for data services. The company has invested 6 million USD in its development.

The presenters discussed the use of this data for legal purposes and noted that there is no reason why electronic logbooks cannot be integrated with VMS data.

Discussions among participants included the following issues:

Discussions included if catch reporting should be made from sea or from land, with issues raised in terms of sea safety, manipulation problems, inaccurate data, etc., if at sea. There were several objections raised to catch reporting from sea in small vessels while technologies, such as drop down menus, automatically filled fields and voice recognition were also noted as solutions.

Several MS (FI, UK, LT and FR) mentioned that e-catch reporting systems are in the pipeline. In the UK an inshore monitoring and catch reporting app is to be rolled out to record quota, non-quota and invasive species.

- There was some caution on adding an additional work burden on fishers, especially in mixed fisheries. It was also mentioned that there is a need for stable APIs for a proper architecture to be in place, and to remain cautious with homologation, which may be counterproductive.

- Issues were raised in terms of running costs, which may be more of a problem than installation costs for fishers; if a system goes down, it may impact on earnings of fishers during critical seasons if they are prevented from fishing. Participants also noted a problem in declaring the quantities during the fishing trip: it is not easy for fishers to transmit data while they are fishing (e.g. when they are alone on a boat, they are facing harsh weather conditions, or in boats without engine) and stressed that the declaration should be done at the end of the fishing activity.

- Finally, some participants noted the importance of e-logbooks and electronic monitoring systems to be of multi-use, with clear benefits for fishers as a motivation to use them.

Wrap-up from the session by Francesca Arena: It is important that reporting tools are user-friendly (in this sense mobile systems seem to be the most promising ones, also with voice recognition) and ideally should bring a benefit to fishers (e.g. provide data for more efficient fishing operations, such as real-time consumption of quotas or data on access to markets). Some of the solutions proposed are also used in recreational fisheries. Discussion on when the best time for reporting is has seen a lot of exchange and there has been the mention of duplication of data to be reported by fishers. Training, helpdesk and IT skills are other points of importance for digitalisation processes and the correction of data (by whom, when and how).

Session 3: EU Funding Digital Tools For Monitoring And Reporting (EMFF)

Anna Zito, Deputy Head of Unit, DG MARE Unit D3, CFP and Structural Support, Policy Development and Coordination, introduced the session with an overview of what the European Maritime and Fisheries Fund (EMFF) can do to support the development, acquisition and use of digital tools by boat operators or responsible authorities, thus how the EMFF can help moving towards a culture of compliance.

Presentations:

EMFF, Vincent Guerre from DG MARE, Unit D3, detailed the numerous funding possibilities available under the EMFF, either under ring-fenced amounts reserved for the promotion by the MS of control and enforcement or of data collection programmes, or under the support to Community Led Local Development (CLLD). There are several forms of support, which are really meant to be tailor-made: direct grants to individual beneficiaries, collective projects, local partnerships, as well as pilot projects and technical assistance. He explained how MS could use these means to carry out their control and inspection obligations and to help fishers invest in the necessary equipment to take advantage of new technologies, innovative ideas and good practices to demonstrate compliance with fisheries management rules. He also explained that EMFF support is implemented through national programmes (sometimes further detailed in regional programmes) managed by MS. These programmes develop a specific strategy according to MS needs, eligibility rules and selection criteria. The EMFF Regulation simply describes the overall scope of the support, its main objectives and principles. For fisheries control, the Commission has proposed that post-2020, the rate of public aid be set at 85% of total costs but at 100% for projects undertaken by small-scale fishers. It has also proposed that the EMFF provides 85% of this public support and the MS only 15%.

Green Box system ("Caja verde"), Margarita Perez Martin, Junta de Andalucia, Spain: She presented the now fully operational Green Box system ("Caja verde") developed over the last decade by the Regional Government of Andalucía. She explained how a Global Positioning System using solar power permanently installed on board small-scale fishing vessels provides real time information. This information is then used not only to demonstrate the respect of restricted fishing areas but also to contribute to maritime safety and, through cross-referencing with fishing sales, to fish resources management. She detailed the costs involved in the development of this system and in the related investments borne by boat operators largely supported by successive EU fisheries funds. She also highlighted the numerous advantages derived by the small scale fisheries sector from the implementation of this system, not only in terms of greater compliance with fisheries rules but also of improved fisheries resources protection and security at sea.

Drones, Damir Grgić, Croatia: In his presentation on the drones used by Croatia for fisheries inspection purposes, Damir Grgić, Head of the Fisheries Monitoring Centre Unit explained how a programme using Unmanned Aerial Vehicles (UAV) has been developed jointly by the Ministry of Agriculture and the Ministry of Defence. After 3 years of preparation a public call for tender has seen the purchase by the Ministry of Agriculture of 6 electric drones and 3 pick-ups for some 5 M€, 70% of which came from the EMFF. These drones are operated by the Ministry of Defence all along the Croatian coast and its thousand islands: 60% of their flight time is dedicated to detecting illegal fishing (including lack of VMS, AIS, etc), controlling spatial time closures as well as restrictions in bluefin tuna and small pelagic night time fishing. As for the remaining 40% of their flight time, it is dedicated to such purposes as search and rescue (SAR) and immigrants rescue at sea, piracy or firefighting operations, as well as law enforcement in a variety of domains.

Weighing and reporting of small-scale fisheries catches, Randall Caruana, Malta: He presented the automatic weighing, labelling and reporting system implemented for small-scale fisheries catches in Malta. This weighing system complete with emergency power supply, cooling system and internet connection, includes an easy-to-use software to produce landing and take over declarations and labels to ensure the reporting, weighing and traceability of the catches as well as the recording of undersize fish for the landing obligation. The investment in this system (35.000 €/unit) was supported to the tune of 90% by the EMFF and despite the initial scepticism, it has proved so useful that fishers are now requesting that this equipment be made more widely available.

Discussions among participants included the following issues:

- The three presentations show that a number of MS have successfully managed to cover the costs involved in the implementation of digital tools for fisheries monitoring and control with EU public money, including the development, investment and training costs. They have also confirmed that innovative data management and monitoring systems have contributed to addressing the challenges of the CFP by saving scarce resources: time, money and energy.
- When considering all the 16 projects presented in this workshop, it appears that various projects developed as, or evolved from commercial ventures, or as collective organisation projects when others developed on short notice or as pilot projects to respond to fairly specific needs. However, they come from a sample of 12 MS of which no more than half appear to have taken advantage of EU support.
- Possible explanations for such a low uptake of EU financial support earmarked for fisheries monitoring and control range from the lack of knowledge of EU support options, to the lack of time and administrative burden involved in securing such support and in the case of professional organisation, to the lack of seed resources and of communication between national administrations concerned.
- To compensate for such difficulties, responsible services should thus share information on good practices and existing solutions already implemented, as well as on difficulties faced by other control services. Improved communication and/or cooperation is also needed between services, equipment providers &/or stakeholders.
- As for reducing the problems linked to excessive administrative burden for funding purposes, the possibility to integrate on-going operations into larger scale projects should be explored whenever feasible, as should be the possibility to take fuller advantage of the benefits resulting from digital tools, in particular increased availability of data that could contribute to fisheries management purposes.

- In conclusion, MS were strongly encouraged by DG MARE services to make greater use of EMFF resources earmarked for control purposes, to enhance innovative ideas and to encourage good practices among fishers. This will help developing a culture of compliance, beyond the strict enforcement of regulations. Collective cooperation projects should also be encouraged, in particular at local level.

Session 4: Final discussion and conclusions

- In general, MS are favourable to technological innovation, but have reservations with regard to costs and scales of economy in equipping a larger fleet as well as judicial acceptance (as evidence in court) of any new technology.
- Where or at what stage of the chain of custody digital tools should be used and at what level of detail (zone, area, etc.), without losing sight of control objectives? With technological solutions a possible risk is trouble-shooting the technology rather than focusing on the control objective of the fishery. The cost and affordability could differ depending on what control authorities are looking at controlling. From this point of view, it is also important to ensure appropriate quality and target the right data. Having separate streams of data is a problem and it was suggested to steer towards simplicity, completeness and affordability.
- Artificial intelligence (AI) and self-learning systems are emerging, with AI and algorithm patterns of fishing activity helping control authorities to target their interventions.
- Analysing more data also means increased risks for control authorities while digital tools are also useful beyond control issues, for fisheries management as well as for marketing and traceability purposes. The potential for capturing data is huge, but there is perhaps a need for shifting the current practises in fisheries control and working together with further partners for fisheries data. This could also distribute the cost of any digitalisation over several stakeholders.
- With a bigger flow of data, cross-checks will become even more important in data processing and validation.
- The skewed age distribution of much of the fishers of the SSF was also mentioned and what this means for successful digitalisation. It will be important to balance keeping the skills and experience of the fishing sector while developing any tools within it.
- The importance of facing the transition from paper to digital tools was highlighted. The high cost of paper registration (monetary and administratively) vs the income saving possibilities of using new technologies has to be considered. Participants agreed that it was important to eliminate paper logbooks and to work with the sector/industry in finding technical solutions.
- The workshop showcased many good examples of digital tools but it was clear that further utilisation of the EMFF would be beneficial.
- Finally, technical details such as the margin of tolerance and weighing practises were highlighted and the need to perhaps further discuss such points in another workshop in the future.