

REPORT

Meeting: **2023 Fisheries Science Seminar: Citizens' Science to support fisheries**

Parties: **Fisheries stakeholders, EU Commission**

Date: **16 June 2023**

Location: **Musée Art & Histoire, Brussels, Belgium**

Rapporteur: **Tamara Talevska**

Commissioner Sinkevičius opened the event by noting that the driving forces of climate change are amplifying and there are major challenges and impacts on the marine ecosystems. The current and future management decisions will need to take into account the changes to the ecosystem and the status of fish stocks. For this to be done, the full potential of knowledge and aspirations must be captured. He noted that fishers' information and data are at the very least useful for setting the context for scientific advice. There are still large data gaps to be addressed, especially to foster ecosystem-based fisheries management (EBFM), and the Commissioner wondered how the potential of stakeholders could be harnessed. Empowering participation in fisheries science is vital to this end and the CFP itself encompasses the aim of strengthening EBFM through stakeholder engagement. There are still some misperceptions of citizens' science (CS), such as the questionable quality of data collected by stakeholders. However, the potential of marine citizens' science to improve stock assessments is huge and data quality can be addressed. Citizens' science also has a role in the understanding of fisheries science by its stakeholders i.e. those affected by scientific advice.

Commissioner's address was followed by a number of presentations.

Dr Anna Cristina Cardoso presented the 2018 report 'The potential of citizen science to inform policy: lessons from environmental monitoring.' The project was about providing opportunities for citizens to contribute to science and closing the loop from data gathering to monitoring policy impacts. A fitness check on environmental monitoring and reporting concluded that improvements can be made through the promotion and use of citizen science as complementary information on environmental research. Study of citizens' science for environmental policy assembled citizen science for policy and reflected on challenges, obstacles as well as opportunities and solutions. Building on these the Commission in collaboration with GIS and AI have found best practices for CS in environmental monitoring.

Several good practices are included in the Commission's report:

- Marine litter watch (facilitated by an app, contributing to monitoring of marine beach litter and supporting the implementation of marine litter policy) ;
- Initiative Sea Search, project led by Marine Conservation Society, which offers divers and snorkelers to learn about marine life around marine life in England, bridging the distance between citizens and authorities;
- Invasive alien species Europe app – facilitated by JRC, available in 14 languages and promoting engagements in identification of invasive species.

Cross-cutting benefits and challenges were identified. Benefits:

- improves knowledge base,
- cost-effectiveness,
- spatio-temporal granularity
- network and partnership creation
- detection of emerging issues
- more inclusive and open research.

Challenges:

- long term resources needed,
- resistance from public authorities due to perceived low quality;
- identifying policy linkages and knowledge gaps;
- feedback and acknowledgment (difficult for contributors to understand if it's actually used or not and acknowledging of citizens' contributions. Including issues relating legal use of such generated data);
- issues related to CS in governance,
- sustaining engagement of citizens communities.

Recommendations:

- Match environmental policy needs with CS.
- Promote awareness, trust and recognition;
- Promote data quality and interoperability standards and share tools;
- Support coordination, collaboration and resources for insuring policy impact.

Steven Mackinson from Scottish pelagic fishermen's association and previous CEFAS researcher, presented the role of CS in professionalizing science engagement of fishers as supporters of management decisions. He spoke about the development of self-sampling programme operational since January 2021, where the crew are executing the sampling, which eventually replaced national sampling programmes for pelagic species. This is due to the richness of data (on biomass) that the crew was able to provide in terms of time and space.

Lessons learned from their experience so far:

- people dynamics matter a lot – if there is a will, technical problems can be solved.
- Trust needs to be earned.
- Expectations need to be managed.
- Ownership and empowerment are crucial.
- The need to have the same shared goal – industry are concerned on what poor samplings would do for them, the science is afraid to have bad quality information. Both are driven by completely different incentives, but the same goal of improving information going into stock assessments.
- Mutual trust and respect are key. All people want to be valued.

A word of caution was given on digitalisation (i.e. REM), which can help CS, but it is not a substitute for engagement. It's a tool and has to be implemented in a way that engages people.

Anastasia Charitou from iSea presented projects conducted to increase knowledge of Greek marine biodiversity through CS. An example was provided on lion-fish where CS data helped to develop a model of future expansion of species in the Mediterranean. The MECO aims to create a network of elasmobranch sightings and through it first observations of angel sharks were recorded. Both projects are based on observations reported in a Facebook group "Is it alien to you? Share it!!!", 80 % by recreational fishers. Four and two entirely new alien species were discovered through both projects, respectively.

Apart from filling the gaps, CS projects are a strong tool to keep recreational fishers involved. Most enthusiasts are involved in removal of invasive species, responsible seafood consumption, and designing guides for species that should/ should not be targeted thereby creating a progress loop from active involvement to conservation measures.

Identified opportunities were:

- record of species with no regular occurrence,
- develop collab on other topics based on local ecological knowledge,
- explore means of communication to raise awareness on environmental protection.

Identified challenges were:

- data accuracy and validation – to overcome validation of observation through CS is conducted by species experts. All information on which there are second thoughts should be excluded.

Dr Cathal Callagher: Project with Ireland's inland fisheries

A project used CS to collect data from recreational fisheries providing information on the conservation status of salmon and whether legislation has to be put in place and how. In addition, the ICCAT tuna-tagging programme contributed to understanding on how the species moves.

Citizens involved in angling contribute to standard scientific process with the data in their catchment and on conservation. Both, environmental and socio-economic data need to be collected to get a holistic picture of the ecosystem and the drivers.

In general, it was noted that CS programs are about education, which is not free, but it is at significantly lower cost than official research programmes. It is easier to justify data collection to stakeholders when they see that their data is used in management decisions.

Identified benefits if the projects were:

- education and empowerment of the citizens;
- Contributing to filling key gaps in data poor areas;
- Citizens can drive/own management decisions (i.e. salmon);

- Enhanced conservation efforts with data (species protection, MPAs, monitoring etc.);
- Support sustainable development (i.e. ORE) and citizens understanding
- Contributing to fulfilling Data Collection requirements under Reg (EC) No 199/2008;
- Low cost when compared to traditional sampling methods and complementing same.

During Q&A questions were posed on how easy it is to convince recreational fishers to engage in CS and it was noted that if they are engaged correctly, it is relatively easy as they do understand that if there's pressure on vulnerable species, they won't be able to catch them in the future. The vast majority of fishers is genuinely concerned about the state of the stocks and become advocates for the species. However, it was suggested that there's always "the good" and "the bad" extremes in every sector. Motivations to engage are mainly intrinsic with number 1 driver being genuine concern and curiosity. Attempt to establish historical knowledge and giving fishers opportunities to tell the story with data, because they've seen the changes as they've been fishing for decades. An important aspect is also socialisation with other fishers fostering exchange of knowledge.

There was a question from the audience whether the CS data is also being used for new insights, such as for example the climate change implications. The speaker responded that indeed, novel information which otherwise wouldn't be attained are gathered through CS. What is also very important is the elaborate feedback, to which lots of time needs to be dedicated. Every fisher gets individual feedback reports as well as also on a fleet basis. Comparative analyses and charts can thereby be produced. Important is also identifying a clear need that is specific and after a successful completion one is building capacity that can subsequently be deployed in new projects.

A panel discussion with stakeholders followed on "How to better harness the potential of citizen science to support the CFP, what possible actions should be considered" with the following panellists: Dr Nathalie Steins, Prof. Anna Helene Rindorf, Dr Eoin Mac Aoidh.

The panellists exchanged views on CS as interest driven or data driven and concluded that there are always trade-offs to be made regarding data quality, depending on what data is used for. It was highlighted that data quality issues is not unique to CS and there are data bias also in regular science.

It was also noted that while there is lots of coordination ongoing in individual member states, this is less prevalent across countries and should be improved. International framework is needed to tackle wide-range data gaps. DG MARE is looking into this. At the moment Horizon Europe has a dedicated CS platform, an umbrella for all CS related projects.

Another issues was that to motivate citizens/fishers to collect data and contribute to science, it needs to be made interesting for them.

Data quantity and quality are both interesting aspects to look at. CS has grown and many people are now involved. With a large sets of data, one can filter out data that is less relevant (outliers), but the scope remains enormous, so the trade-off is positive. Whereas the lack of reliability can be addressed with more collaboration and coordination between the citizens and researchers. EMODNET is one of the platforms using coordinated CS data.

It was also noted that CS has developed organically so far and it was necessary to preserve that. Too much or too rigid framework can be stifling and might discourage participation.

In addition, fisheries science is becoming more experimental, beyond only providing data, such as co-development of selective gear etc. This should be encouraged and fostered. There are lots of other opportunities once you establish a trusted relationships with fishers.

An example was made about an industry survey with Dutch fishers on turbot and brill. During the Covid pandemic scientists couldn't go onboard to collect data due to Covid restrictions. Instead, they asked fishers to collect data. What was interesting was the fishers reaction: they were surprised that they were being trusted to such a degree as to provide fisheries data. The lessons learned was to not be shy about working with fishers.

In addition, getting citizens involved in collecting the data makes people more connected with the environment and ensures buy in into the necessary policy.

There was a questions on how much technology is involved in CS and how can small scale fishers get involved. Spekaers responded that digitalisation does open doors for CS, as mostly one only needs a smartphone. In addition, this democratises CS in developing countries.

It was noted that open-source would be best and a suitable coordination.

Representative of the Commission said that the CS must be as broad as possible. The Horizon Europe Mission Oceans presupposes that by 2025, 20% of the data will have to come from CS. He added that the recently announced Fisheries Package and in particular the Action plan and CFP report have one common theme and that is the need for more data and analyses. The issue to be solved is how to integrate the data with ICES, STECF as it's becoming more accurate. Complementary source of data will be producing much more complete picture that could be used in ecosystem-based management processes.

It was also noted that currently the share of data collected and then actually used is very low due to concerns about data quality, applicability, and perceptions about getting the data from people with vested interest (i.e. fishers). While some of the problems are real, the speaker noted, they are real also for general science and bias is controllable. So there is indeed very little difference between regular science and CS. ICES was mentioned as the science institution that started opening up and embracing CS data. Last but not least, change at the institutional level is vital.

One important aspect mentioned was that if you lose the relationship (with fishers) you lose the data, which severely threatens the system, or at the very least makes it less reliable and robust. In an era where data is imperative and ever more data will be needed in the future, CS will need to grow to accommodate this.

There is a lot of added value to CS. While CS is not free of charge (trainings and coordination are needed), it is a lot cheaper, provides opportunities for monitoring of many different spatial and temporal units, and provides high-resolution data in real-time. So, the added value is enormous.

Also pointed out was that adhering to science ethics is important, including the ethics of the involvement of stakeholders. Furthermore, positive incentives are important, and in particular, expressed recognition of the effort and results. While technology is important, engagement is crucial.

Artificial Intelligence (AI) will provide important processing power to absorb all the data acquired by CS.

To the survey question "How do make sure the data collected from citizen science activities is fit for policy making?" 51% of respondents believed that supervision by researchers and policy makers was crucial here (through it was noted that indeed scientists and policy representatives were prevalent in the room, hence subject to bias), 17% responded that provision of trainings would facilitate CS, 11% thought that assessing the quality and quantity of data would help. 20% believed that other factors were at play.

It was added that it's not the bias itself that is a problem, but *perceived* bias. Speakers did not believe that there was lots of purposeful tampering of data going on in general.

It was noted that social scientist should be involved to close the gap between citizens and researchers.

On the question of the involvement of citizens in analysis and data dissemination, the speakers noted that citizens are already ambassadors of their data, but that it was difficult to avoid the criticism of industry being involved in science.

It was also highlighted that co-management is not the same as CS. While CS is about gathering evidence, management is a much more complex concept. However, there is natural synergy i.e. developing capacity for CS is a stepping stone for co-management. Nevertheless, a one size fits all co-management is not possible and should be developed on a case-by-case basis. Co-management needs to be organic, but enabling framework is needed, providing conditions for them to flourish.

The seminar was closed by Director-General Charlina Vitcheva, who noted that "The sheer number of CS engagement projects shows how much citizens (fishers) care about the environment." She proposed the notion of fisheries stakeholders as 'the stewards of the sea', providing data that are wider, and using data in a more holistic manner.

While Data Collection Framework (DCF) is a regular way of collecting data, more and more diversified data is needed to feed the EBFM. Availability of data is an issue and DCF is not enough. Precautionary advice indicates that alternative data sources are needed.

She also noted that structured dialogue between citizens and scientists is crucial. She particularly stressed structured dialogue between stakeholders and advice providers, such as ICES and STECF. This could further strengthen the credibility of science.

She mentioned the digital twin ocean, a new tool for engagement with citizens with three objectives:

1. Conservation of biodiversity

2. Curbing pollution

3. Enabling carbon neutral blue economy

The two enablers for this are science and citizens' engagement.

She concluded with a proposal for the next commission to establish a more integrated approach to policy (as opposed to work in silos).