

WORKING GROUP ON SOCIAL AND ECONOMIC DIMENSIONS OF AQUACULTURE (WGSEDA)

VOLUME 2 | ISSUE 78

ICES SCIENTIFIC REPORTS

RAPPORTS
SCIENTIFIQUES DU CIEM



International Council for the Exploration of the Sea Conseil International pour l'Exploration de la Mer

H.C. Andersens Boulevard 44-46
DK-1553 Copenhagen V
Denmark
Telephone (+45) 33 38 67 00
Telefax (+45) 33 93 42 15
www.ices.dk
info@ices.dk

The material in this report may be reused for non-commercial purposes using the recommended citation. ICES may only grant usage rights of information, data, images, graphs, etc. of which it has ownership. For other third-party material cited in this report, you must contact the original copyright holder for permission. For citation of datasets or use of data to be included in other databases, please refer to the latest ICES data policy on ICES website. All extracts must be acknowledged. For other reproduction requests please contact the General Secretary.

This document is the product of an expert group under the auspices of the International Council for the Exploration of the Sea and does not necessarily represent the view of the Council.

ISSN number: 2618-1371 | © 2020 International Council for the Exploration of the Sea

ICES Scientific Reports

Volume 2 | Issue 78

WORKING GROUP ON SOCIAL AND ECONOMIC DIMENSIONS OF AQUACULTURE (WGSEDA)

Recommended format for purpose of citation:

ICES. 2020. Working Group on Social and Economic Dimensions of Aquaculture (WGSEDA).
ICES Scientific Reports. 2:78. 11 pp. <http://doi.org/10.17895/ices.pub.7500>

Editors

Gesche Krause • Cornelia Kreiss

Authors

Karen Alexander • Suzi Billing • John Dennis • Imke Edelbohls • Lucia Fanning Sebastian Ferse • Ramón Filgueira • Sophie Girard • Jon Grant • Jordi Guillen • Lina-Marie Huber • Teresa Johnson • Hauke Kite-Powell • Gesche Krause • Cornelia Kreiss • Doug Lipton Sandra Marín • Eirik Mikkelsen • Molly Miller Laura Nahuelhual • José Perez • Michael Rust Selina Stead • Åsa Strand • Nardine Stybel • Sebastian Villasante



ICES
CIEM

International Council for
the Exploration of the Sea
Conseil International pour
l'Exploration de la Mer

Contents

i	Executive summary	ii
ii	Expert group information.....	iii
1	List of Outcomes and Achievements of the working group in this delivery period	1
2	Progress report on ToRs and workplan	3
3	Revisions to the work plan and justification	4
4	Next meetings	5
Annex 1:	List of participants.....	6
Annex 2:	Resolutions	9

i Executive summary

The Working Group on Social and Economic Dimensions of Aquaculture (WGSEDA) addresses the question of how to balance the negative and positive socio-economic consequences of aquaculture development. A special focus is placed on identifying the socio-economic benefits of aquaculture through its supply of food and other commercially valuable products while providing jobs and creating incomes.

In this report, the group summarizes their explorative work on social (i) and economic (ii) indicators to assess aquaculture impacts and gives an overview on emerging and COVID-19 (iii) pandemic impacts for the North Atlantic area.

Case studies applying the defined set of social dimensions (i) indicate a scale effect. A minimum farm size was required to have an impact of a visible scale for the different social dimension categories. Further, finfish aquaculture seems to be more social impactful than rope mussel farming, although the latter can hold important cultural values. In general, it could be shown that aquaculture boosts a potential significant pull-factor to incentivize people to remain in the area. Economic indicators (ii) for aquaculture management were found to be most relevant on local and regional level. Thereby, data availability and data needs were identified to be especially poor for indirect economic effects and on local level. In general countries with a larger aquaculture sector seem to have more economic aquaculture-related data than those with a smaller sector. The group sees benefits of expanding the economic data collection for this sector.

Collated observed effects on aquaculture of the CoViD-19 pandemic (iii) in their respective countries revealed differing impacts, but showed overall that the shellfish sector was more severely affected compared to finfish (salmon) and hereby especially the oyster sector was hit hard. On the other hand, also examples of adaptation to, and within, local marketing, were observed.

In order to contribute and expand on the current frameworks, two main work priorities were initiated focusing on: a) social opposition and acceptance for aquaculture production in the North Atlantic area; b) social, economic and ecological implications of regionalized aquaculture value chains arising from the emerging calls for regionality in the context of CoViD-19 restrictions.

ii Expert group information

Expert group name	Working Group on Social and Economic Dimensions of Aquaculture (WGSEDA)
Expert group cycle	Multiannual fixed term
Year cycle started	2018
Reporting year in cycle	3/3
Chair(s)	Gesche Krause, Germany
	Cornelia Kreiss, Germany
Meeting venue(s) and dates	28—31 May 2018, Oban, Scotland (9 participants)
	13—17 May 2019, Halifax, Canada (12 participants)
	11—14 May 2020, Virtual meeting (25 participants)

1 List of Outcomes and Achievements of the working group in this delivery period

The work of the WGSEDA in the course of the 3-year-term resulted in two scientific contributions. One scientific paper published in *Marine Policy* (Krause et al. 2020) and one scientific paper with *Aquaculture Reviews* (Mikkelsen et al. 2020):

Krause, G., Billing, S.L., Dennis, J., Grant, J., Fanning, L., Filgueira, R., Miller, M., Pérez Agúndez, J.A., Stybel, N., Stead, S.M., Wawrzynski, W. (2020). *Visualizing the social in aquaculture: How social dimension components illustrate the effects of aquaculture across geographic scales*. *Marine Policy*, 118, <https://doi.org/10.1016/j.marpol.2020.103985>.

Abstract

Until very recently, governments of many countries, as well as their supporting organizations, have primarily addressed the biological, technical and economic aspects of aquaculture. In contrast, social and cultural aspects of aquaculture production have taken a backseat. Drawing on the observation that aquaculture development in Western Societies has largely failed to address these social effects across different scales and contexts, this paper offers a new way of capturing and visualizing the diverse social dimensions of aquaculture. It does so by testing the ability to operationalize a set of social dimensions based on categories and indicators put forward by the United Nations, using several case studies across the North Atlantic. Local/regional stakeholder knowledge realms are combined with scientific expert knowledge to assess aquaculture operations against these indicators. The approach indicates that one needs to have a minimum farm size in order to have an impact of a visible scale for the different social dimension categories. While finfish aquaculture seems to be more social impactful than rope mussel farming, the latter can hold important cultural values and contribute to place-based understanding, connecting people with place and identity, thus playing a vital role in maintaining the working waterfront identity. It could be shown that aquaculture boosts a potential significant pull-factor to incentivise people to remain in the area, keeping coastal communities viable. By visualizing the social effects of aquaculture, a door may be opened for new narratives on the sustainability of aquaculture that render social license and social acceptability more positive.

Mikkelsen, E., Fanning, L., Kreiss, C.M., Billing, S.-L., John, D., Filgueira, R., Grant, J., Krause, G., Lipton, D., Miller, M., Perez, J., Stead, S., Villasante, S. (2020). *Availability and usefulness of economic data on the effects of aquaculture: A North Atlantic comparative assessment*. *Aquaculture Reviews*, <https://doi.org/10.1111/raq.12488>

Abstract

This paper focuses on the availability of economic indicators and metrics to assess effects of marine aquaculture production in the North-Atlantic area (the EU, Norway, Canada and USA), including social and environmental effects. We map the availability of economic information to inform national or local/regional level decision-making. In the subsequent analysis we considered how aquaculture planning and management is organized in the different countries and examined the corresponding need for information to address different types of effects at different geographical levels. We have focused on data that is publicly available and collected for public authorities or through research. We find that the availability is generally good for national and regional data on the direct economic effects of aquaculture. Data on how aquaculture-related

product or input markets are affected is however poorly available, as is economic data on external effects from aquaculture. Countries with a larger aquaculture sector seem to have more economic aquaculture-related data than those with a smaller sector. However, France seems to have relatively poor economic data availability given the size of its aquaculture sector. The set up of management and planning for aquaculture varies a lot across the countries we have studied, including the structure of their authority hierarchical levels involved in different policy areas. We conclude that most relevant economic data for aquaculture management should be on local and regional level rather than on the national level. The match between data availability and data needs are consequently poor in general. While not all economic effects of aquaculture are cost-effective or meaningful to assess, our study points towards the benefits of expanding the economic data collection for this sector. Future studies should analyse how different types of economic data are used for aquaculture management and planning, and how valuable these are in order to enhance data collection prioritization for authorities.

Next, the group collated observed effects of the COVID-19 pandemic in their respective countries under the umbrella of ToR d – emerging issues:

Summary of discussed COVID-19 impacts and new emerging issues of socio-economic aspects of aquaculture within ICES countries

The COVID-19 pandemic has affected aquaculture sectors in various ways and with differing impacts, but some overall common trends were identified. The shellfish sector was more severely affected compared to finfish (salmon) and hereby especially the oyster sector was hit hard. The loss of restaurant sales and high value-markets such as oyster bars has resulted in a general hardship for many shellfish farmers. Thereby point of harvest and already existing vulnerabilities often determine the level of impact. The more fortunate shellfish farmers had their harvest already sold at the beginning of March, others have market-ready stock that will soon grow out of shape, or otherwise lose value and damage farm structures. Farmers that are planning to harvest at a later point of the year might find better marketing conditions, but are still at risk that direct marketing options are reduced or restrictions intensify. On the other hand, there were also examples of shifts to local marketing, direct and online sales, mail delivery and contact-free pick-up initiatives as well as educational programs to teach the public how to prepare seafood at home.

- For salmon, export routes were partly restricted and airfreight costs increased. In few cases a price decrease was observed (Ireland). A drop in restaurant sales was observed, but has in general been compensated with an increase in retail sales e.g. in supermarkets with stable prices.
- Governmental support is structured very differently between member states, but focuses more on shellfish than finfish (salmon) producers.
- Other emerging issues concern for example growing interest in seaweed cultivation, social acceptance of the sector as well as multi-use of sea space for aquaculture and renewable energy. Specific issues for the Norwegian salmon sector include the auctioning of production licenses, the involvement of communities as beneficiaries, the introduction of an aquaculture fund and an upcoming (controversial discussed) tax scheme.

2 Progress report on ToRs and workplan

ToR a - Identify and develop methods to determine the socio-economic effects of aquaculture

- *A new method of capturing social indicators of aquaculture development was developed within the course of the 3-yr term and was published as scientific paper with Marine Policy*

ToR b - Assess and identify trajectories of socio-economic concerns of aquaculture development

- *moved further by working on the review paper on available economic data for aquaculture and setting results into context – a scientific publication related to these efforts is published with Aquaculture Reviews*

ToR c - Identify knowledge transfer processes that are available and employed for socio-economics of aquaculture

- *the group identified an increase in the science arena to include stakeholders and other forms of knowledge holders into the research process to make findings more applicable to real-world situations. However, this is yet an emerging field thus no further insights could be generated as yet.*

ToR d - Identify new emerging issues of socio-economic aspects of aquaculture

- *this ToR in general proved to be extremely helpful to start group discussions on emerging trends and patterns of aquaculture development across countries. Several trends related to the CoViD-19 pandemic were identified and listed in this report.*
- The existing ToRs were revised and new ToRs were defined for the next 3-yr period of WGS-EDA. It was decided to focus on three avenues within the group, that is on merging methods that capture socio-economic effects, to identify trajectories of socio-economic concern as well as to review governance and economic interventions that effect (future) aquaculture development.
- *Hence the following changes were done as follows: ToR a was kept, former ToR b and ToR d were merged as follows: ToR b - Identify and assess trajectories and emerging issues of socio-economic concerns of aquaculture development and a new ToR c was included: ToR c - Assess how different governance and economic interventions affect socio-economic dimensions of aquaculture and its future development*
- *Cooperation with Advisory structures – Anne Cooper participated in parts of the meeting and provided an overview to current efforts of ICES and beyond on aquaculture issues*

3 Revisions to the work plan and justification

WGSEDA envisions for the next 3-year term to continue its work on the realm of reviewing and advancing methods to develop integrative assessments of aquaculture. In addition, special attention will be placed on understanding trajectories of socio-economic concerns and the identification of related emerging issues within the ICES member states. Furthermore, the impact of governmental and economic interventions on socio-economic dimensions of aquaculture and its future development will be explored. The outputs of these activities shall be created by a report and (review) paper(s)

The group agreed on proposing the following terms of reference to ICES that will be addressed in the new period of the WG (2021-2024):

- ToR a - Identify and develop methods to determine the socio-economic effects of aquaculture
- ToR b - Identify trajectories and monitor emerging issues of socio-economic concerns of aquaculture development
- ToR c - Review governance and economic interventions important for socio-economic dimensions of aquaculture and its future development

4 Next meetings

The WGSEDA will be meeting in Castletownbere, Ireland in May 2021. It is intended to meet thereafter in Spain (Galicia) and/or France – however, both sites need to be confirmed.

Annex 1: List of participants

List of Participants 2020

Name	Institute	Country (of institute)	E-mail
Gesche Krause	Alfred Wegener Institute Helmholtz Centre for Polar and Marine Science (AWI)	Germany	Gesche.krause@awi.de
Suzi Billing	Scottish Association for Marine Science (SAMS)	UK	Suzi.Billing@sams.ac.uk
José Perez	French Institute for Exploitation of the Sea (Ifremer)	France	jose.perez@ifremer.fr
Eirik Mikkelsen	Nofima	Norway	Eirik.mikkelsen@nofima.no
Lucia Fanning	Dalhousie University	Canada	Lucia.Fanning@dal.ca
Cornelia Kreiss	Thünen Institute of Sea Fisheries	Germany	Cornelia.kreiss@thuenen.de
Molly Miller	University of Maine	USA	Molly.miller@maine.edu
Doug Lipton	National Oceanic and Atmospheric Administration NOAA	USA	Douglas.Lipton@noaa.gov
Selina Stead	Head of the Institute of Aquaculture University of Stirling Chief Scientific Adviser, UK Government Marine Management Organisation	UK	selina.stead@stir.ac.uk
Jon Grant	Dalhousie University	Canada	Jon.Grant@dal.ca
Ramón Filgueira	Dalhousie University	Canada	Ramon.Filgueira@dal.ca;
Nardine Stybel	Coastal Union Germany (EUCC-D)	Germany	stybel@eucc-d.de
Sandra Marín	Instituto de Acuicultura, Universidad Austral de Chile	Chile	smarin@uach.cl
Sebastian Ferse	Leibniz Centre for Tropical Marine Research (ZMT)	Germany	sebastian.ferse@leibniz-zmt.de
Jordi Guillen	Joint Research Centre (JRC), European Commission	Italy	Jordi.Guillen@ec.europa.eu
Lina-Marie Huber	Thünen Institute of Fisheries Ecology	Germany	Lina-marie.huber@thuenen.de
Imke Edelbohls	Thünen Institute of Sea Fisheries	Germany	Imke.Edelbohls@thuenen.de
Teresa Johnson	University of Maine	USA	Teresa.Johnson@maine.edu
Karen Alexander	Institute for Marine and Antarctic Studies (IMAS), University of Tasmania	Tasmania	karen.alexander@utas.edu.au

Michael Rust	National Oceanic and Atmospheric Administration NOAA	USA	mike.rust@noaa.gov
Hauke Kite-Powell	Marine Policy Center Woods Hole Oceanographic Institution	USA	hauke@whoi.edu
Sebastian Villasante	University of Santiago de Compostela	Spain	sebastian.villasante@usc.es
Sophie Girard	French Institute for Exploitation of the Sea (Ifremer)	France	Sophie.Girard@ifremer.fr
Laura Nahuelhual	Instituto de Acuicultura, Universidad Austral de Chile	Chile	laura.nahuel@gmail.com
Åsa Strand	Swedish Environmental Research Institute (IVL)	Sweden	asa.strand@ivl.se
Anne Cooper	ICES Secretariat	Denmark	anne.cooper@ices.dk

List of Participants 2019

Name	Institute	Country (of institute)	E-mail
Gesche Krause	Alfred Wegener Institute Helmholtz Center for Polar and Marine Science (AWI)	Germany	Gesche.krause@awi.de
Suzi Billing	Scottish Association for Marine Science (SAMS)	UK	Suzi.Billing@sams.ac.uk
Wojciech Wawrzynski	ICES Secretariat	Denmark	Wojciech@ices.dk
José Perez	French Institute for Exploitation of the Sea (Ifremer)	France	jose.perez@ifremer.fr
Eirik Mikkelsen	The Norwegian Institute for Food, Fisheries and Aquaculture Research (NOFIMA)	Norway	Eirik.mikkelsen@nofima.no
Lucia Fanning	Dalhousie University	Canada	Lucia.Fanning@dal.ca
Cornelia Kreiss	Thuenen Institute of Sea Fisheries	Germany	Cornelia.kreiss@thuenen.de
Molly Miller	University of Maine	USA	Molly.miller@maine.edu
John Dennis	Ireland's Seafood Development Agency (BIM)	Ireland	dennis@bim.ie;
Doug Lipton	National Oceanic and Atmospheric Administration NOAA	USA	Douglas.Lipton@noaa.gov
Jon Grant	Dalhousie University	Canada	Jon.Grant@dal.ca

Ramón Filgueira	Dalhousie University	Canada	Ramon.Filgueira@dal.ca;
-----------------	----------------------	--------	-------------------------

List of Participants 2018

Name	Institute	Country (of institute)	Email
Gesche Krause	Alfred Wegener Institute Helmholtz Center for Polar and Marine Science	Germany	Gesche.krause@awi.de
Wojciech Wawrzynski	ICES Secretariat	Denmark	Wojciech@ices.dk
Selina Stead	Newcastle University, Faculty of Science, Agricul- ture and Engineering	UK	Selina.stead@ncl.ac.uk
Eirik Mikkelsen	Nofima – The Norwegian In- stitute for Food, Fisheries and Aquaculture Research	Norway	Eirik.mikkelsen@nofima.no
Lucia Fanning	Dalhousie University	Canada	Lucia.Fanning@dal.ca
Cornelia Kreiss	Thuenen Institute of Sea Fisheries	Germany	Cor- nelia.kreiss@thuenen.de
Molly Miller	University of Maine	USA	Molly.miller@maine.edu
Suzannah-Lynn (Suzi) Billing	Scottish Association of Ma- rine Science	UK	Suzi.billing@sams.ac.uk
John Dennis	Ireland's Seafood Develop- ment Agency (BIM)	Ireland	dennis@bim.ie

Annex 2: Resolutions

Working Group on Socio-Economic Dimensions of Aquaculture (WGSEDA)

2017/MA2/ASG02 The Working Group on Social and Economic Dimensions of Aquaculture (WGSEDA), chaired by Gesche Krause, Germany, and Cornelia Kreiss*, Germany, will work on ToRs and generate deliverables as listed in the Table below.

	Meeting dates	Venue	Reporting details	Comments (change in Chair, etc.)
Year 2018	28 May–1 June	Oban, Scotland, UK	Interim report by 10 July	
Year 2019	13-17 May	Halifax, Canada	Interim report by 1 July	Additional Chair in 2019: Cornelia Kreiss, Germany
Year 2020	11-15 May	By correspondence	Final report by 26 June to ACOM and SCICOM	

ToR descriptors

ToR	Description	Background	Science Plan codes	Duration	Expected Deliverables
a	Identify and develop methods to determine the socio-economic effects of aquaculture	<p>Aquaculture can offer employment and income earning opportunities to local, often rural and marginal, communities. However, questions pertaining to i.e. social site-selection criteria, community impacts, right of access, ownership, taxation, liabilities of the negative repercussions from the environmental effects on society, ethical issues, to name but a few, have remained largely untackled in a comprehensive, integrated manner. Practitioners note that sustainable aquaculture must not only maximize benefits, but also minimize accumulation of detriments, as well as other types of negative impacts on natural and social environment.</p> <p>However, the systematic assessment of the socio-economic effects of aquaculture is still in its infancy. The question how and by which methods to capture the social repercussions of aquaculture are central here.</p>	5.8, 7.1	3 years	Review Paper
b	Assess and identify trajectories of socio-economic concerns of aquaculture development	<p>The social transformations caused by new technological innovations that competes, and threatens to replace, a capture fishery imbued with history and mythology about traditional practices is a major challenge that science is facing today. If aquaculture is to play a vital role in the well-being of coastal communities, it must be better integrated into social life. So far, aquaculture productions can be outright failures due to a lack of stakeholder</p>	7.1, 7.3	3 years	Review Paper/Policy brief

		<p>participation, acceptance and/or understanding of social influences on ecosystems and of ecosystems on humans and society. Most interpretations of the social and economic dimension of aquaculture production are also highly context-specific, each following different trajectories and outcomes. This makes the issue of a general strategy for sustainable aquaculture that endorses the relevant context-based social issues so difficult.</p> <p>Whilst addressing the interactions and feedbacks between issues (e.g. economic, social and environmental consequences of aquaculture) in a spatial planning context, it becomes evident that many of these play out over time (i.e. in past, present and future contexts) and space (i.e. at local, regional and ecosystem/global scale)—these are referred to as ‘cross-scale’ or ‘multi-scale’ processes. Processes commonly unfold at different geographical scales and over different time-scales: the more aggregated the geographical scale (e.g. the regional ecosystem scale), the slower a system's dynamics unfold. Conversely, at a less aggregated geographical scale (e.g. the local scale) the social-ecological dynamics are more responsive. To capture this increased complexity in the context of sustainable aquaculture and its interrelation with socio-economics, this ToR aims to identify central socio-economic trajectories of aquaculture development.</p>			
c	Identify knowledge transfer processes that are available and employed for socio-economics of aquaculture	For WGSEDA to be able to address present and emerging issues and provide the most relevant science advice to promote the sustainable use of living marine resources, it must become familiar with respect to how knowledge is transferred in a bi-directional manner, focusing on socio-economic aspects.	7.5	3 years	Review Paper
d	Identify new emerging issues of socio-economic aspects of aquaculture.	This activity will identify and rank issues identified by the group as a whole that may require future attention by the WGSEDA or other related ICES Expert Groups, either alone or through collaborative work. The task is to highlight new and important issues that may require additional attention by the WGSEDA and/or another Expert Group as opposed to providing a comprehensive analysis. Proposals for Theme Sessions for the Annual Science Conference may evolve from this activity.	5.8, 7.1	1-3	Report

Summary of the Work Plan

WGSEDA envisions for the next 3-year term to work especially on the realm of reviewing and advancing method development for integrative assessments of aquaculture. In addition, special attention will be placed on trajectories of socio-economic concerns and the identification of related emerging issues within the ICES member states. Furthermore, knowledge transfer processes that are accessed and used for socio-economics of aquaculture shall be subject to analysis to gain a better understanding on science-stakeholder interaction processes that are of particular relevance for the social and economic dimensions of aquaculture development. The outputs of these activities shall be created by a report, policy brief and review paper(s).

Year 1	Review Paper
Year 2	Report
Year 3	Policy brief and review paper

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 8-15 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	ACOM
Linkages to other committees or groups	There is a very close working relationship with all the groups of ASG and EPISG. It is also very relevant to the Working Group for Marine Planning and Coastal Zone Management (WGMPCZM) and the Working Group on the History of Fish and Fisheries (WGHIST).
Linkages to other organizations	EU COST Action OPP and EU COST Action OceanGov