

SILENT CURRENTS: GENDER BIAS BELOW THE SURFACE OF FISHERIES SCIENCE



Lucía Arranz¹, Margarita Rincón³, María Soto¹, María José Juan Jordá¹, Diana González¹, Lucía Rueda¹, Maria Grazia Pennino².

¹.Instituto Español de Oceanografía (IEO-CSIC), ².Institut de Ciències del Mar (ICM-CSIC), ³.Joint Research Centre (JRC)

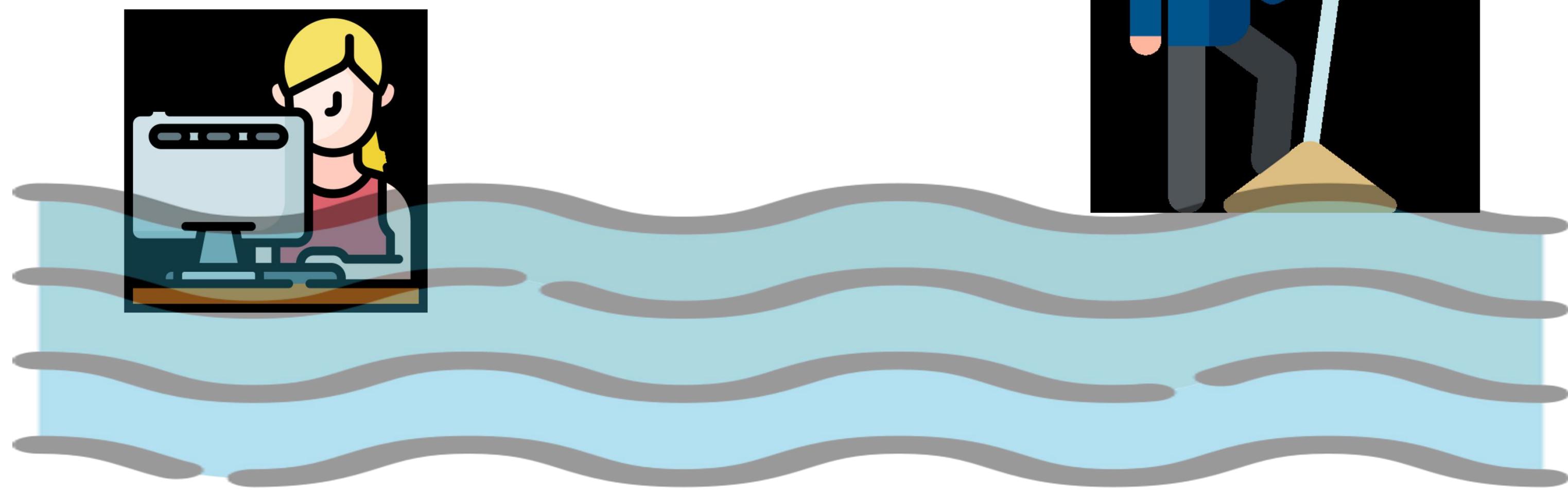
INTRODUCTION

Gender equity in science and international governance has gained attention, however disparities persist, particularly within fisheries science and decision-making bodies (Shellock et al., 2022; Giakoumi, et al., 2021).

“Beneath the surface, gender bias continues to shape who speaks for the ocean. Recognizing and reversing these silent currents is key to equitable science and sustainable seas.”

QUESTION

Is gender bias persistent in participation and leadership roles within the scientific assessment groups of Regional Fisheries Management Organizations (RFMOs)?



HYPOTHESIS

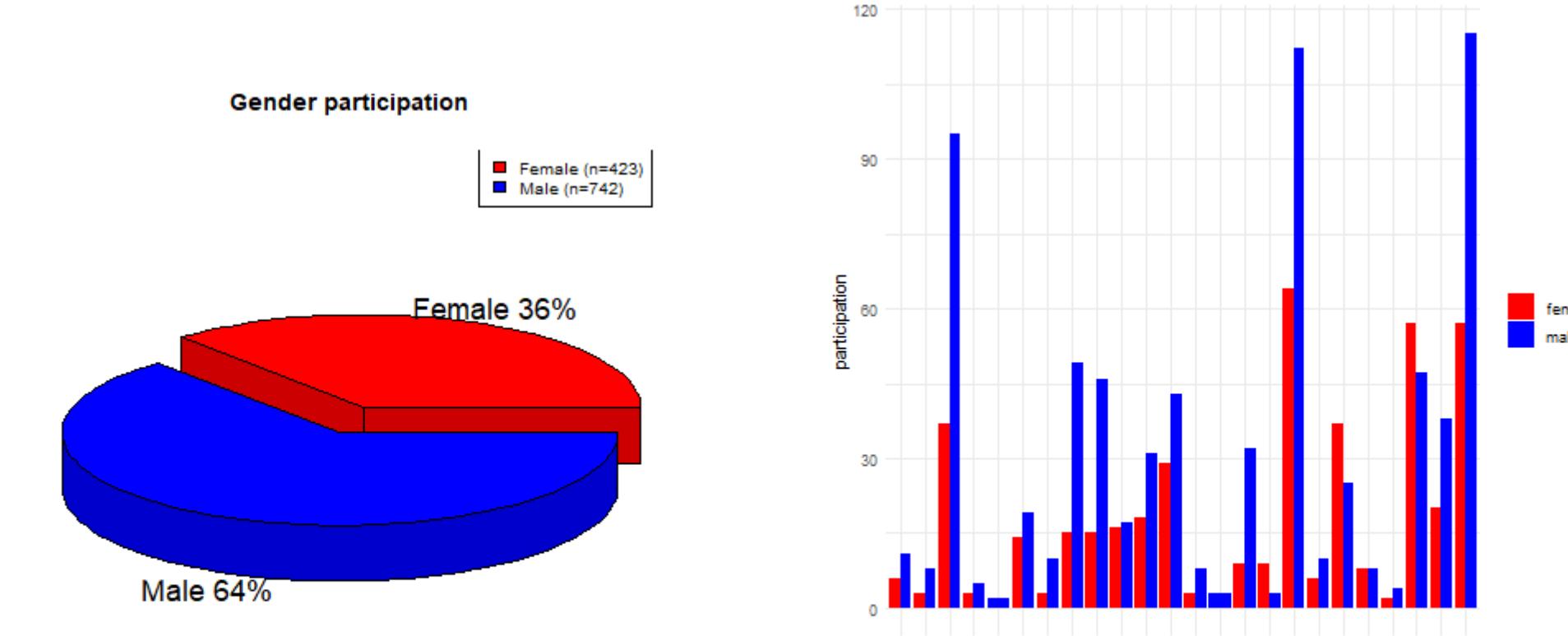
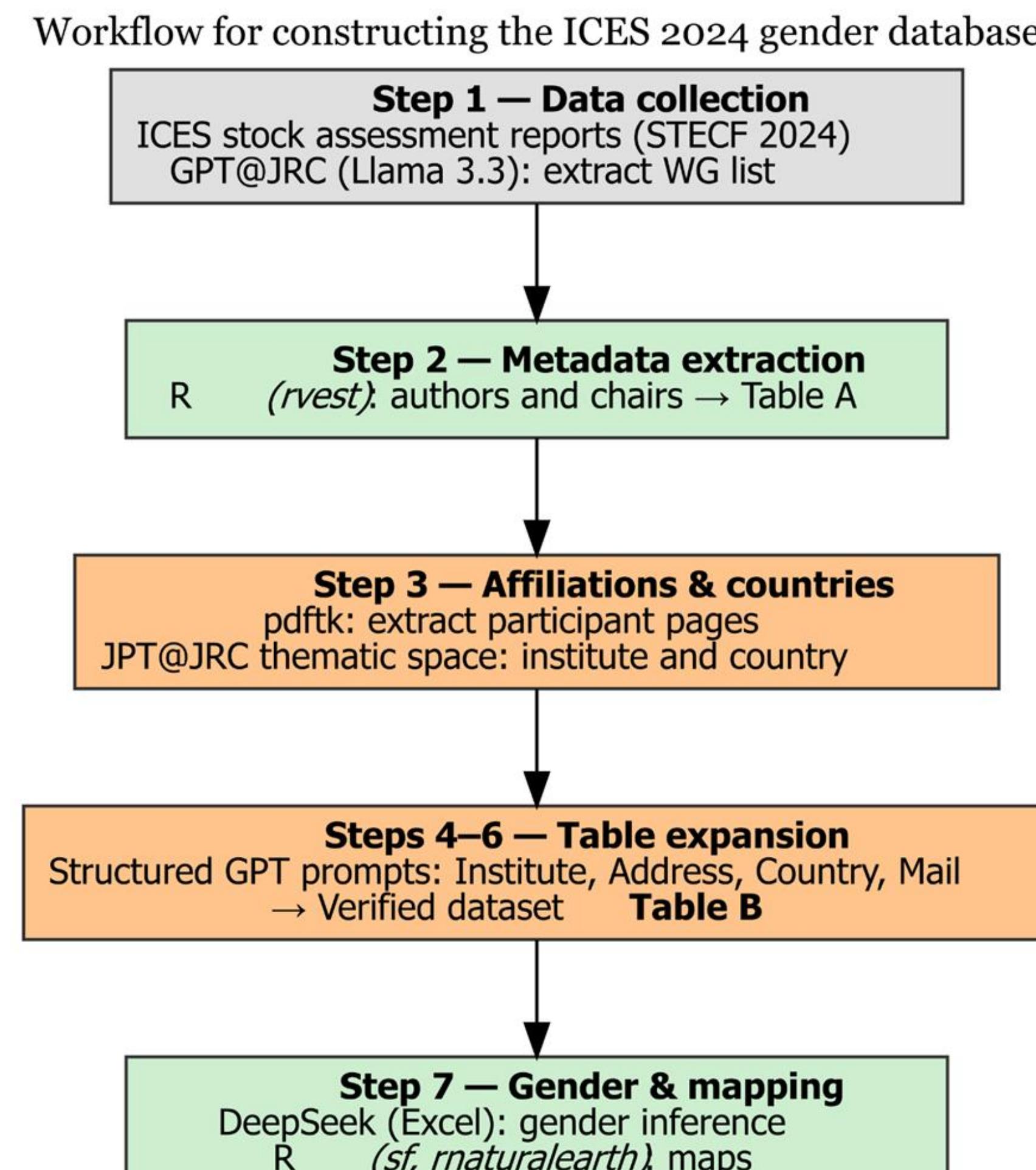
Gender bias is more persistent on leadership roles than in participation roles in assessment groups of RFMOs

MATERIAL, METHODS AND RESULTS

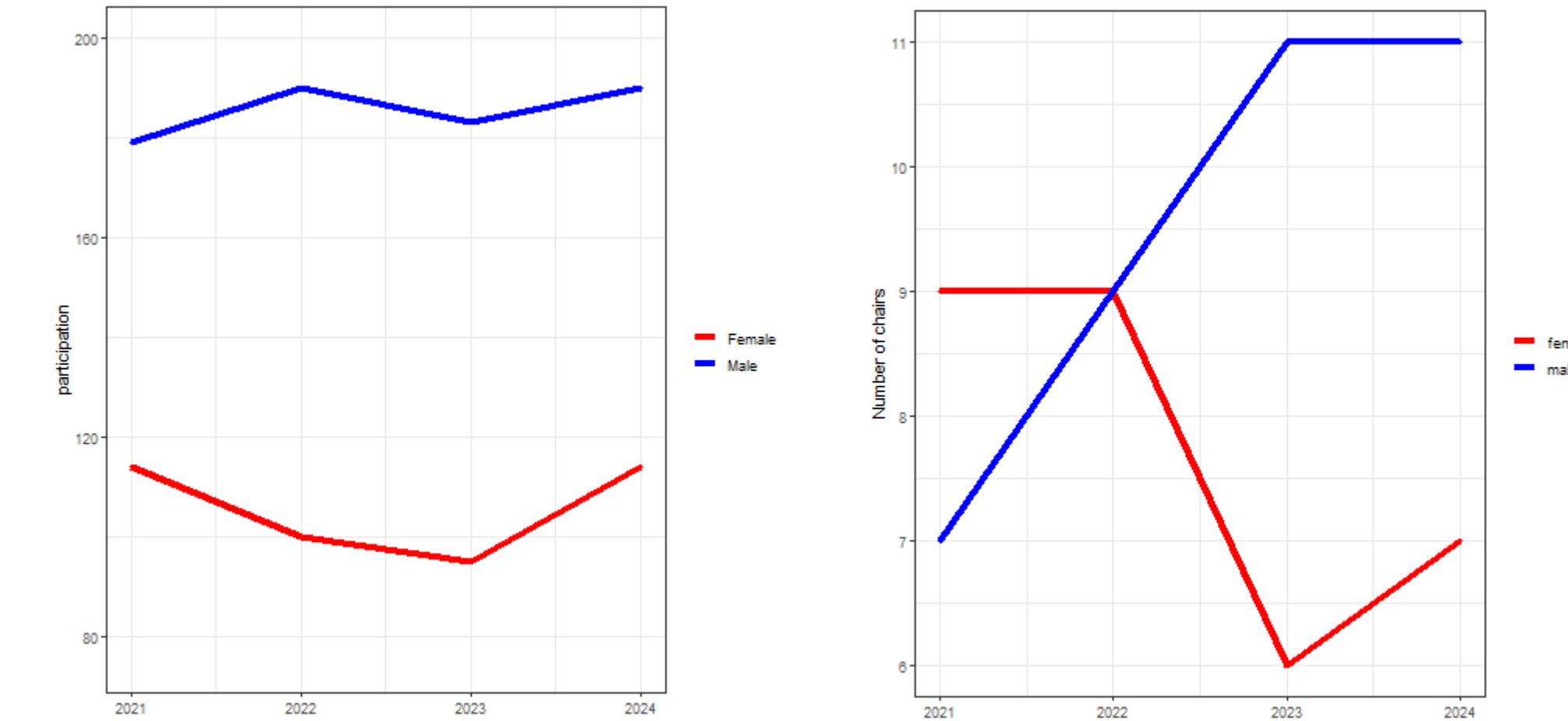
Initial data from reports: participation (2021–2024) in the International Council for the Exploration of the Sea (ICES) Advisory Committee on Fishery Management, focusing on the composition of its stock assessment Working Groups (WGs).

Data base construction: participants and chairs from ICES stock assessment relevant working groups, using a multi-step workflow combining R coding and artificial intelligence (AI) (Fernandez-Machado, 2025).

*Study limitation: inferring gender from name



GENERAL DATA OVERVIEW



GENDER TRENDS OVER TIME

CONCLUSIONS

- Overall underrepresentation: Women remain underrepresented across all years.
- Country-level trends: Mild weakening of male dominance but still a clear overall imbalance.
- Convergence participation: only Spain and Portugal.
- Female trajectory: Decreased from 38.9% (2021) to 37.5% (2024), with the lowest values in 2022 (34.5%) and 2023 (34.2%).
- Male trajectory: Maintained a consistent majority (61–65%) with a peak in 2022 (65.5%) and modest normalization afterward.
- Leadership concern: The number of female chairs has dropped significantly, highlighting persistent inequality in decision-making positions.
- Slight improvements in some groups and countries, male remains the dominant gender across most working groups and leadership roles. The period 2021–2024 reflects a landscape of slow convergence but enduring male predominance, underlining the need to address gender equity in marine science and governance. Despite incremental progress in some countries and working groups, men continue to dominate both participation and leadership within ICES scientific groups.
- The 2021–2024 period reflects slow convergence but enduring male predominance, emphasizing the need for institutional measures to promote gender equity in marine science and governance.

KEY MESSAGES

- Women remain underrepresented in fisheries science leadership
- Men outnumber women nearly 2 to 1 in ICES scientific groups
- Female participation shows small gains but fragile progress
- Leadership gap widens — fewer female chairs since 2022
- Equity is not just about participation — it's about power
- Invisible barriers shape who speaks for the ocean
- AI and open data can expose the silent gender currents

FUTURE

Future Directions / Ongoing Work

- Expand the analysis beyond ICES to include other RFMO scientific bodies (ICCAT, IOTC, IATTC, WCPFC).
- Assess intersectionality — explore gender alongside career stage, discipline, or geography (e.g., Global North vs. Global South).
- Investigate drivers of disparity: publication productivity, mentoring, institutional culture.
- Evaluate policy impact — link gender representation to outcomes in advice quality or inclusivity of management recommendations.
- Build an automated monitoring dashboard using AI (e.g., R + GPT pipelines) for annual gender-balance tracking in marine science.
- Develop policy briefs for ICES, FAO, or RFMOs with measurable equity targets.

Early-Stage Researchers

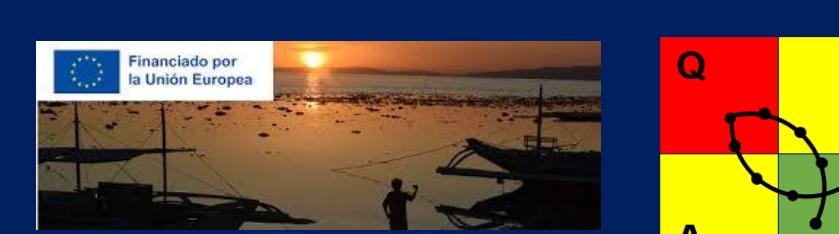
- Mentorship matters: visibility and role models can accelerate equity.
- Collective action: form or join Women in Marine Science and Diversity in RFMOs networks.
- Data transparency: push for gender-disaggregated data in all RFMO reports.
- Skill empowerment: promote training in data science, leadership, and negotiation for young women.
- Allyship: encourage male colleagues to support equitable participation and challenge bias in meetings.

REFERENCES

- Fernandez-Machado, R., Amaral-Garcia, S., Duch-Brown, N. Workplace Adoption of In-House GenAI Tools: The Case of GPT@JRC at the European Commission, European Commission, Seville, 2025, JRC 143418.
- (0.51 MB - PDF)
- Giakoumi, S., Pita, C., Coll, M., Fraschetti, S., Gissi, E., Katara, I., Lloret-Lloret, E., Rossi, F., Portman, M., Stelzenmüller, V., and Micheli, F. 2021. Persistent gender bias in marine science and conservation calls for action to achieve equity. Biological Conservation. 10.1016/j.biocon.2021.109134.
- Shellock, R., Christopher Cvitanovic, Mary Mackay, ..., Nataša Vaidianu, Mona Webber, Mary S. Wisz. Breaking down barriers: The identification of actions to promote gender equality in interdisciplinary marine research institutions 2022, One Earth 5, 687–708. <https://doi.org/10.1016/j.oneear.2022.05.006>.

ACKNOWLEDGEMENTS

This work has been co-funded by the European Union through the European Maritime Fisheries and Aquaculture Fund (EMFAF) within the National Program of collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy. This study is a contribution



CONTACT
lucia.arranz@ieo.csic.es