



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 Reseach 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).

Workflow for constructing the ICES 2024 gender database

Step 1 — Data collection
ICES stock assessment reports (STECF 2024)
GPT@JRC (Llama 3.3): extract WG list

Step 2 — Metadata extraction
R (*rvest*): authors and chairs → Table A

Step 3 — Affiliations & countries
pdfkit: extract participant pages
JPT@JRC thematic space: institute and country

Steps 4–6 — Table expansion
Structured GPT prompts: Institute, Address, Country, Mail
→ Verified dataset
Table B

Step 7 — Gender & mapping
DeepSeek (Excel): gender inference
R (*sf*, *rnaturalearth*): maps

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 tRFMO 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.

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CONTACT

lucia.arranz@ieo.csic.es