# Healthy Oceans, Seas, Coastal and Inland Waters…

# …and their gender implications

## What gender dimension means and why it is important for healthy waters R&I

A gender dimension in the context of Horizon Europe missions refers to the **integration of sex/gender analysis methods in the research content**. It aims to stimulate excellence in science and technology by "fixing the knowledge". "Sex" and "gender" are two distinct terms that should not be used interchangeably.

**"Sex"** refers to the biological characteristics of beings, whether female, male, or intersex and for maritime populations, hermaphrodites. This involves different levels of expression: genes, gametes, morphology (primary and secondary sex characteristics).
**"Gender"** refers to socio-cultural processes that shape behaviours, preferences, values, products, technologies, knowledges, and so on, and how individuals and groups interact with their environment. Here, with ocean, seas, coastal and inland waters. Importantly, those two terms interact and influence eachother. There is no anteriority of one on the other but rather a co-influence. Analysing **factors intersecting with sex and gender** is key to avoid overlooking or overemphasizing sex or gender differences (e.g. age, disabilities, environment, ethnicity, geography, religion, sexual orientation, socioeconomic status…).

As Gendered Innovations[1] presents it: *"**[s]ex and gender can influence all stages of research or development processes**, from strategic considerations for establishing priorities and building theory to more routine tasks of formulating questions, designing methodologies, and interpreting data. Many pitfalls can be avoided—and new ideas or opportunities identified—by designing sex and gender analysis into research from the start. Sex and gender analysis work alongside other methodologies in a field to provide yet further "controls" (or filters for bias) providing critical rigor in science, medicine, and engineering research, policy, and practice"*.

An emphasis of this mission board has been put on the necessity to aim for "*lifelong gender-balanced learning opportunities for all ages to re- and up-skill a blue gender balanced workforce*" (p. 20 of the Interim Report). This may not be sufficient. **Gender should be included in all streams of actions as a cross-cutting issue**. Below, we discuss how sex or gender can be relevant regarding fishing, ocean acidification and pollution, women's representation in ocean science and marine governance.

## Examples of how sex and gender interact in relation to the Mission's challenges

### Unsustainable human footprint (incl. pollution, fisheries, tourism)

**Blue economy and gender**: the ocean, seas, coastal and inland waters are a life-support system for billions of people for food, jobs and resources, whether we talk about fisheries, maritime shipping, deep-sea mining, renewable energies or tourism. Gender needs to be taken into account.

- **Fisheries, climate change and gender**: In research, fishing has long been seen as a male activity but women have always had an important role that has been overlooked[2]. They can be found throughout the entire supply chain with pre-harvest activities (e.g preparing bait and nets), harvesting mainly in shallow waters (for family nutrition and supporting household income). They also dominate the processing and trade sectors (women compose 85% of the processing workforce)[3]. As climate change affects coastal biodiversity, it will affect women's fishing practices and livelihoods.
- **Sustainable fishery and gender**[4]: Studies show that sustainability and gender are linked with for example, women presenting more sustainable catches, better resources management and meeting high standards of sustainability.

**Human Ocean pollution disasters and gender**[5]: Fadigas (2017) shows through a case-study on the pre-2002 Prestige oil disaster that not only the entire coastal environment is at risk but that there are more vulnerable groups such as Galician shellfisherwomen. They were vulnerable already before the spill because of different causes (e.g. strong gender roles, pollution, lack of disaster response training, lack of risk perception…) that the

disaster made worse, forcing them to relocate or lose their jobs.

## Climate change and acidification

**Natural marine sciences and sex analysis**: There is a lack of sex-disaggragated data in marine sciences. Marine ecosystems consist of organisms with different reproductive qualities (female, male or hermaphrodite). Sex-based differences are interesting to understand the species better but also to understand the impacts global warming and ocean acidification can have on them, and consequently on us.

- **Ocean acidification (OA) and sex analysis**: Ellis et al. (2017)[6] showed that only 3.9% of the experimental OA studies assessed sex-based differences in OA responses. Plus, "*only 10.5% of studies account for possible sex effects by assessing males and/or females independently*". Moreover, it has been shown that "*ocean acidification results in 16% more female oysters over a single generational cycle, and increased aquatic pH results in more female cichlids*"[7] to give only two examples.
- **Global warming and sex analysis**: Some fish and turtles are known for relying on temperature for sex determination. "*Turtles originating from warmer northern Great Barrier Reef […] exhibit a female sex ratio of 99%, whereas cooler southern sites maintain a 68% female juvenile ratio*"[8].
- **Anthropogenic disturbances and sex analysis**: Anthropogenic disturbances include habitat destruction, pollution and overfishing. "*Primary sex differentiation has been shown to respond to a diverse range of these environmental factors in a growing number of species. Hypoxia, for example, has resulted in a higher ratio of males in zebrafish*"[9].

All of these factors impact marine populations. It poses risks to sex ratios, demographic stability and viability of the species. This will impact the overall functioning of the oceans and waters and its capacity to absorb CO2, and hence impact us. If we do not take into account sex analysis methods, we cannot fully understand how these factors influence waters.

**Gendered vulnerabilities to impacts of climate change:** Emerging research indicates that climate change impacts on women and men often differ and are more pronounced or severe in developing countries and for some local communities and indigenous peoples[10]. In most societies, women and children are among the poorest segments, the most ill-equipped to cope with and adapt to climate change, and thus the most impacted by its effects[11]. In addition, they are less likely to be in positions of power to influence action to address climate change, even though they usually have distinctive knowledge due to their roles in coastal work and communities.

## Lack of understanding and connection

**Recognising the impact of women in marine conservation**: Although marine R&I and policymaking has historically been a male-dominated environment, women have been at the forefront of marine conservation. Using these examples as role models for girls and boys for ocean literacy could help achieve a gender-balanced Blue workforce:

- **Rachel Carson,** one of the pioneers who initiated the contemporary environmental movement with her three bestsellers (Under the Sea-Wind, The Sea Around Us and The Edge of the Sea).
- **Sylvia Earle,** first woman to create an all-female team of aquanauts in the 1960s.
- **Elisabeth Mann Borgese,** internationnally-recognised German expert on maritime law and policy and environment protection.

## Inadequate Governance

**Women's inadequate participation in decision-making**: As the examples above attest, women have experiences, skills and knowledges about ocean and maritime sustainability that should not be ignored in decision-making at all levels. Moreover, because women tend to have higher environmental concern than men[12] [13], they may promote more sustainable group outcomes if given the opportunity to participate in decision making[14].

**A gender dimension in maritime security strategies**[15]: The current instruments are gender-blind. They should respond to a human security approach, including the principle of gender equality explicitly. This should address, *inter alia*, actions against the illicit acts against girls and women at sea in addition to gender-balanced law enforcement rescue teams that will be able to better protect them from gender-based violence.

**Migration and human trafficking at sea and gender** has not been mentioned in the Mission's Interim report. It has not yet fully caught the attention of law enforcement.

- **Illegal, unregulated and unreported fishing (IUUF) and human trafficking**[16]: The majority of forced labour in IUUF are male and children. But women are also reported to work on vessels or offshore in supply chains and are subject to sexual abuse, as the "fish-for-sex" phenomenon has shown (women engaging in sexual work with fishers in order to obtain fish to sell and support their families). There are many shortcomings in international maritime law described in this article.
- **Climate change induced migration**[17]: *"Some scholars argue that due to relatively higher levels of female poverty and broadly unequal power relations, climate change will disproportionately impact women (Beuchler 2009)*", pushing them to relocate. Girls and women's vulnerabilities in migration have to be recognised.

## Recommendations

- Include sex and gender analysis in animal studies where relevant and on topics affecting human populations as a default requirement. If sex and gender are not relevant, an explanation must be provided why not. Sex and gender must be included in the entire research cycle from research design, methodology, to data interpretation and communication.
- Tool to integrate gender perspectives in marine research and innovation: GenderWave[18].
- Include the integration of sex and gender in the research proposal as part of the evaluation process.
- Include gender scholars in the relevant research domain in the research team where relevant.
- Include gender experts among Mission project evaluators and ensure gender balance among evaluators.
- Strive for gender balance at all levels in research teams and in decision-making / governance.
- Include women who are locally active in marine or water-related fields or actions.
- Address sexual harassment and gender-based violence at sea, during expeditions, on vessels[19].
- To improve women's participation and representation in ocean science and the blue workforce, we advise you to take a look at our policy papers on structural change, disruptive measures for gender equality in R&I and on the role of Research Funding Organisations in making gender equality happening.

## Reference

European Commission (2020), *Regenerating our ocean and waters by 2030, Interim report of the Mission Board healthy oceans, seas, coastal and inland waters*, Publications of the European Union, Luxembourg. Available at: https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/d0246783-b68a-11ea-bb7a-01aa75ed71a1

World Maritime University (2019), Third WMU International Women's Conference: Empowering Women in the Maritime Community. WMU Report. https://commons.wmu.se/lib_reports/62/.

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1 Gendered Innovations (a collaboration between the Stanford University and the European Commission): https://genderedinnovations.stanford.edu/methods-sex-and-gender-analysis.html. This inititiative provides with a wide range of terms explanation, methods, checklists and case studies in science, health & medicine, engineering and environment with regards to the integration of a gender dimension in research and innovation. We highly recommend to consult the case studies on Water Infrastructure: http://genderedinnovations.stanford.edu/case-studies/water.html#tabs-2

2 Gissi, E., M. E. Portman, and A. -K. Hornidge. 2018. 'Un-Gendering the Ocean: Why Women Matter in Ocean Governance for Sustainability'. Marine Policy 94: 215–19.

3 WWF (2019), Policy Brief "Empowering women in marine communities to mitigate the impacts of climate change". Available at: https://www.wwf.eu/?uNewsID=353458.

4 Gissi, E., M. E. Portman, and A. -K. Hornidge. 2018. *Ibid*.

**5** Fadigas, Amanda B.M. 2017. 'Vulnerability Factors of Shellfisherwomen in the Face of Oil Spill Events: An Analysis of the Prestige Case'. International Journal of Disaster Risk Reduction 24: 560–67. https://doi.org/10.1016/j.ijdrr.2017.07.010
**6** Ellis, Robert P. et al. 2017. 'Does Sex Really Matter? Explaining Intraspecies Variation in Ocean Acidification Responses'. Biology Letters 13(2). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5326506/ (August 26, 2020).
**7** Tannenbaum, Cara et al. 2019. 'Sex and Gender Analysis Improves Science and Engineering'. Nature 575(7781): 137–46.
**8** *Ibid*.
**9** *Ibid*.
**10** IPCC. 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. CB Field, VR Barros, DJ Dokken, et al. (eds.). Cambridge and New York: Cambridge University Press. Available at http://www.ipcc.ch/report/ar5/wg2.
**11** Munoz Boudet, A. M., Buitrago, P., Leroy De La Briere, B., Newhouse, D. L., Rubiano Matulevich, E. C., Scott, K., Suarez Becerra, P. 2018. Gender differences in poverty and household composition through the life-cycle: a global perspective (English). Policy Research working paper; no. WPS 8360. Washington, D.C. : World Bank Group.
**12** European Commission (2017) Special Eurobarometer 459: Climate Change Brussels: European Union.
**13** European Commission (2017) Special Eurobarometer 468: Attitudes of European Citizens towards the Environment Brussels: European Union.
**14** "Diversity in decision-making" (News & Views), 18 March 2019, Nature Climate Change. Available at: https://www.nature.com/articles/s41558-019-0441-9.
**15** Lirola-Delgado, Isabel. 2019. 'Maritime Security Strategies from a Gender Perspective: Implications for United Nations SDG 5 Implementation'. WMU Journal of Maritime Affairs 18(4): 537–55. https://doi.org/10.1007/s13437-019-00175-x
**16** Becker-Weinberg, V. The protection of women in illegal, unregulated and unreported fishing. WMU J Marit Affairs 18, 531–535 (2019). https://doi.org/10.1007/s13437-019-00189-5
**17** Hunter, Lori M, and Emmanuel David. 2009. Climate Change and Migration: Considering the Gender Dimensions. Institute of behavioral science, University of Colorado. Boulder, CO, USA. https://genderandsecurity.org/sites/default/files/Hunter_David_-_Climate_Change_Migratn.pdf.
**18** This tool was developed by the Horizon 2020 funded project Baltic Gender. Available at: http://oceanrep.geomar.de/50308/1/GenderWave_FINAL_11.08_page%20numbering.pdf
**19** Find examples of good practice to involve more women in decision-making and on how to tackle sexual harassment and sexual violence at sea in Baltic Gender's brochure "Gender equality in marine sciences, Best practices on structural change". Available at: http://oceanrep.geomar.de/44349/. They also developed three tools on sexualised violence at sea to help institutes and vessels implementing their guidelines: http://oceanrep.geomar.de/49888/.