

Caring for soil is caring for life

Ensure 75% of soils are healthy by 2030 for healthy food, people, nature and climate

What gender dimension means and why it is important for our soils' health

A gender dimension in the context of Horizon Europe missions refers to the **integration of sex/gender analysis methods in the research content**. Its aim is 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. 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 our soils and the food they produce. Importantly, those two terms interact and influence each other. 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, comorbidities, disabilities, environment, ethnicity, geography, religion, sexual orientation, socioeconomic status...) and acknowledge heterogeneity within groups of the same sex and gender.

As Gendered Innovation¹ 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".

The Mission emphasises the importance of its **gender inclusive communication** (p.14). However, we argue that gender should be mainstreamed throughout the Mission and especially in its research and innovation content. Below, we present **examples of how gender and sex are relevant in agriculture, soil and health and international cooperation**.

Examples of how sex and gender interact in relation to agriculture and Soil health R&I

Gender equality in Agriculture

Agriculture has a key role in food production, environmental and landscape protection, Europe's resilience, and in income generation and employment. Differences between men and women persist in this area in Europe.

- **Farm ownership²**: Women are under-represented in farm ownership. They own smaller farms than men and represent only 27% of EU farms holders specialising in livestock rearing or crop production, and 24% of EU organic farm holders. A growing literature on gender equality and agriculture shows that equal access to resources and assets is correlated with economic growth.
- **Invisibilisation of women in agricultural and rural development³**: 3.3% of women are employed in agriculture compared to 5.2% of men. Women's input is often under-reported since they are not

asked to report by themselves, or farm work is narrowly defined as wage labour and therefore questions exclude activities predominantly performed by women without pay (e.g. processing, storage or caring services to farm workers and visitors). Women in rural areas also undertake most of house and care work which is often more intensive since facilities are often far, and children and the nearby living relatives (such as grandparents) rely on them for transport or errands. This invisibility and remoteness lead to the ignorance of women's needs of access to resources, social security, land rights and other facilities.

- **Women as sustainable agents⁴**: In Europe, it appears that workshops on sustainable soil management attract more men than women. This is probably due to the higher visibility of men in agriculture. European projects (SoilCare and RECARE) showed that men were more willing to invest in new technologies, increase productivity and profit while women focused on the future health of soils. This is

in line with a growing number of studies^{5,6,7} showing that women tend to have more environmentally friendly consumption patterns in terms of nutrition and transportation, and are more willing to change their behaviour due to environmental pressures than men.

Gender, Soil and Health

- **Lack of data, health impact of chemicals and focus on women⁸:** Literature reviews demonstrate that women are understudied in chemicals and health-related studies. The male default prevails. Additionally, women's exposure to pesticides and poisoning are underestimated. For example:
 - FREIA project⁹ showed how endocrine disrupting chemicals (ECDs) worsen the risks for women to develop reproductive health issues such as early menopause, breast cancer, polycystic ovary syndrome, endometriosis, infertility, or irregular menstrual cycles.
 - The FP7 project Reproductive effects of environmental chemicals in females (REEF)¹⁰ found out that environmental chemicals had an impact on fertility and bone homeostasis which affected more males than females.
- **Poor health and agricultural productivity¹¹:** Poor health and nutrition (micronutrient deficiencies, undernutrition) affect work capacity but also resistance to diseases such as malaria and HIV but also new zoonic viruses such as Covid-19. Women are especially vulnerable to those for different reasons such as changes in immunity during pregnancy, cultural norms reducing women's control over their sexuality thus increasing their risk to face STDs, work patterns increasing exposure to soil borne infectious diseases as they have a predominant role in acquiring and handling of water, wood, and food on all continents.

The mission Interim report highlights the importance of European global footprint and thus international cooperation in R&I.

Agricultural innovations for sustainability

Technological interventions and innovation towards more sustainable agriculture in developing countries can have harmful consequences if gender and social perspectives are not considered. On the other hand, positive outcomes can emerge if they are taken into account:

- **Mechanical and technological innovations¹²:** Examples from developing countries show that the introduction of technology without considering the cultural settings (e.g. restrictions on leaving the house) may have negative consequences, such as replacing women's work or increasing their workload (e.g. mechanical thresher, treadle pumping, seeder technologies). This negatively influences their economic status, health, and care work capacities. On the other hand, other innovations have been shown to have opposite outcome as it increased women's work opportunities.
- **Availability of more robust seed:** Innovations on seeds may help them become more resistant to drought and the lack of irrigation or to high temperatures; some unintended consequences of this were that the new seeds required longer cooking time, thus also more water and wood. This directly impacted women as they are usually in charge of acquiring and handling those items for the household.
- **Gender and "climate-smart" agricultural practices¹³:** Many of the 'climate-smart' agricultural practices and interventions, for example composting, vermiculture, and conservation agriculture may substantially increase women's workloads. This combined with the lack of access to resources is likely to hinder them to change their practices.

International cooperation in Soil R&I

Recommendations

- Include sex and gender analysis 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/innovation cycle from research design, methodology, to data interpretation and communication.
- Produce and cross-analyse sex-disaggregated data on women's participation in and contribution to agriculture (paid and unpaid work included), their access to key resources and assets, as well as on farm safety and health incidents, inclusion in sustainability efforts, differentiated by agro-ecological zones, types of farming, and conventional / organic agriculture.
- Make sure women and men are not addressed as homogeneous groups but systematically include their heterogeneity.
- Ensure gender balance in citizen engagement and co-creation, in Living Labs and the Lighthouse.
- Involve women who are locally active in agriculture, soil management and food security.

- For the evaluation process, include the integration of sex and gender in the research proposal, include gender experts among Mission project evaluators and ensure gender balance among evaluators.
- Include gender scholars in the relevant research domain in the research team and strive for gender balance in research teams.
- To improve women's participation and representation in agriculture and soil health studies and 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](#).
- Strategic Research options:
 - Alternative agriculture and gender: Reviewing what can be learned from alternative approaches to conventional agriculture in which women participate prominently (including organic or circular agriculture).
 - Modern agriculture, land uses and gender: Reviewing what can be learned about the relationship between 'modern' agriculture and land uses with degradation of soils, quality of produce as food, move away from soils in horticulture and urban farming warehouses, in combination with gendered impacts and inclusion.
 - Developing a framework to include relationships of agricultural production alternatives (farming systems), soil and people's health, (as differentiated by agro-ecological zones, types of farming, and conventional / organic agriculture) with gendered engagement, contributions, potential, needs, connections, decision-making, etc.

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1 Gendered Innovations (a collaboration between Stanford University and the European Commission): <https://genderedinnovations.stanford.edu/methods-sex-and-gender-analysis.html>.

This initiative 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 R&I. There is an upcoming contribution on agriculture that will be added in Gendered Innovation publication, website and policy recommendations.

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3 *Ibid.*

4 Food and Agriculture Organizations of the United Nations (2019), Mainstreaming gender for sustainable soil management, n°161. Available at: <http://www.fao.org/3/ca7525en/CA7525EN.pdf>.

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