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EDITED BY

Edmundo Gallo,
Oswaldo Cruz Foundation (Fiocruz), Brazil

REVIEWED BY

Hélder Tiago Da Silva Lopes,
University of Minho, Portugal
Maria Alzira Pimenta Dinis,
University Fernando Pessoa, Porto, Portugal

*CORRESPONDENCE

Denise Esteves,
✉ deniseesteves@ces.uc.pt

†These authors contributed equally to this work and share first authorship

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Exploring the nexus of gender and environment in the H2020 PHOENIX project: insights from the design of a gender equality plan

Denise Esteves*[†], Sheila Holz[†], Mónica Lopes[†] and Sinara Sandri

Centre for Social Studies, University of Coimbra, Coimbra, Portugal

Introduction: The H2020-funded PHOENIX project (2022–2025) aims to enhance democratic innovations to implement the European Green Deal (EGD) at local, regional, and national levels, focusing on key policy areas like farm-to-fork, circular economy, energy transition, and healthy soil. Despite the European Green Deal's ambitious goals for a climate-neutral Europe by 2050, it primarily emphasizes technological solutions and overlooks social vulnerabilities like gender, class, and race. In the light of the European Commission's efforts to promote gender equality in EU-funded projects through the implementation of Gender Equality Plans (GEPs), the study carried out a comprehensive literature review aimed at gaining insights into the intricate relationship between gender and the environment with a particular focus on the intersection of gender and research and innovation, especially within the context of the European Green Deal. Drawing on their experience as action researchers developing a Gender Equality Plan within the H2020 PHOENIX project, the authors emphasize the importance of gender-sensitive research in environmental projects and underscore the significance of a participatory approach in achieving effective gender change. The lack of reporting on experiences of incorporating a gender perspective has resulted in a significant knowledge gap regarding the various impacts that environmental actions can have on people's lives, based on their gender. The article endeavours to bridge this gap by achieving two main goals: highlighting the importance of gender-sensitive research in environmental projects and discussing how the gender gap is addressed in the H2020 PHOENIX project through its participatory approach to design the Gender Equality Plan.

Methods: This paper reports on the participatory approach adopted within the H2020 PHOENIX project to develop a Gender Equality Plan. This participatory approach draws from literature that underscores the advantages of collaboration in effecting change towards gender equality. This method entailed the active engagement of all project partners during a co-creation session for creating a gender equality plan held during the annual project meeting and has underpinned the comprehensive PHOENIX gender mainstreaming framework.

Findings and discussion: The results of the co-creation session for creating a Gender Equality Plan provided a robust foundation for the comprehensive approach to mainstreaming gender within the PHOENIX project that could guide the project towards a more gender-sensitive research. This analytical

and planning phase, despite being an early stage, became the cornerstone of the gender equality plan and also defined the specific steps and actions needed to address the gender topic effectively within the consortium. This process led to the identification of strategic goals and actions aligned with specific goals of the project and intertwined with the challenges of the Democratic Innovations' capacity of developing their full transformative potential when dealing with environmental topics. The strategic goals were then transformed by the PHOENIX partners into *levels of observation* and *specific actions* to be adopted within the consortium.

KEYWORDS

gender, climate change, environment, gender equality plan, European green deal

1 Introduction

The H2020-funded PHOENIX project (2022–2025) is an iterative learning process, aiming to enhance the transformative potential of democratic innovations to implement the European Green Deal (EGD) in local, regional and national levels. The project focuses on EGD key policy areas farm-to-fork, circular economy, energy transition, and healthy soil.

The European Commission's ambitious strategy for 2019–24, encapsulated in the European Green Deal, seeks to lead the continent towards a "climate-neutral, green, fair, and social Europe" by 2050. Despite the vast body of literature acknowledging the diverse impacts of climate change on individuals, the European Green Deal predominantly focuses on technological and market-driven solutions and falls short in addressing social vulnerabilities such as gender, class, and race (Díaz et al., 2019; Heffernan et al., 2021; Heidegger et al., 2021; Haas et al., 2022). This paper delves into the gendered implications of the European Green Deal, highlighting the need for gender-sensitive public policies in the fight against climate change. Current analyses reveal a "gender-blind" approach in the European Green Deal, where gender differences are either overlooked or inadequately considered in public policies. In response to these gaps, the paper explores the PHOENIX project efforts to integrate a gender equality approach within the framework of the European Green Deal. The paper proposes transformative actions within the strategic sectors of the European Green Deal under discussion in the project research.

The nexus of gender and climate change, explored in studies like Rainard et al. (2023), Heffernan et al. (2021), Strumskyte, Magaña, Bendig (2022), and the UNFCCC Report (2022), reveals a non-neutral landscape in climate solutions. This connection arises from the complex interplay of social roles, status, resources, and power dynamics between men and women. The UNFCCC Report (2022) accentuates the vulnerability of women to climate change effects, citing disparities in emissions, resource use, and land ownership. This urgency emphasizes the need for women's active involvement in environmental decision-making, recognizing their pivotal role in formulating climate solutions.

Aiming to a more gender-equal Europe, the European Commission established the EU Gender Equality Strategy to promote a gender-equal Europe. A pivotal shift from "fixing women" to "fixing the system" characterizes a transformative turn in EU Research and Innovation (R&I) policy. This shift underscores the need to tackle structural barriers, instigate institutional transformation, and integrate gender analysis into both basic and applied research.

This paper explores the Gender Equality Plans as a strategic instrument, systematically setting priorities and objectives for structural change, aligning with the goals of the European Research Area. These plans aim to remove obstacles, address decision-making imbalances, and enhance the integration of a gender dimension in research. The H2020 PHOENIX project aligns with these objectives, emphasizing gender-sensitive research to address environmental conflicts. Recognizing the underrepresentation of women in decision-making, PHOENIX adopts a participatory approach, promoting gender balance and integrating gender-responsive research for inclusive and effective environmental solutions. The GEP's participatory approach, spanning analysis, planning, implementation, and evaluation, is highlighted, with a particular focus on the March 2023 consortium brainstorming exercise. During the meeting, a 2-h slot was dedicated to collecting the partners information which latter was systematised and analysed by the coordination team.

In line with European Research Area objectives and Horizon 2020 gender equality goals, PHOENIX actively develops a cross-cutting approach. Three key strategies for mainstreaming gender are defined, involving inclusive participation, gender analysis in innovation content, and gender-sensitive communication. PHOENIX's participatory approach leverages co-creation techniques to operationalize these objectives, setting specific goals tailored to the project's implementation context.

The paper underscores the importance of gender-sensitive research within environmental projects, utilizing the PHOENIX project as a case study. It addresses a significant research gap in the design and implementation of gender equality plans within Horizon 2020 projects, emphasizing the need for further documentation to support gender equality in H2020 environmental initiatives. The search covers two interconnected themes: the integration of gender equality within EU R&I policies and EC-funded projects and the current state of gender equality in environmental contexts.

2 Background

The H2020-funded project *PHOENIX: The Rise of Citizens Voices for a Greener Europe*¹ (2022–2025) can be conceptualised

¹ Grant Agreement number: 101037328

as an iterative learning process for different actors in different countries, whose overarching objective is to increase the transformative potential of democratic innovations under the European Green Deal, addressing farm-to-fork, circular economy, energy transition, and healthy soil policy areas. In its activities, the project aims to bridge the multiple dimensions of the gender gap on participatory and deliberative methodologies and is also committed to reflecting on the intersectionality of gender and environmental challenges, by integrating a gender sensitive approach.

2.1 The gender and the environment

As extensive research demonstrates (Heffernan et al., 2021; Strumskyte, Magaña, Bendig, 2022; Rainard et al., 2023), the gender-climate nexus highlights how solutions and causes of climate change are not gender neutral. Gender and the environment are inseparable due to men and women's different social roles, status, resources, and power (Heffernan et al., 2021; UNFCCC, 2022). These gender norms significantly influence how individuals impact the environment, how environmental degradation impacts people, and who has access to and control over natural resources (Detraz, 2016; UNFCCC, 2022).

The gender-differentiated impacts of extreme weather events due to climate change are underlined in the latest UNFCCC Report (2022) under the framework on Climate Change. The report emphasises how gender and social norms interact, making women increasingly vulnerable to the effects of climate change. Studies focussing on vulnerability underscore the multifaceted sources of inequalities related to climate change effects, while also identifying the influence of power dynamics in this context (Barnett, 2020). Women often face heightened susceptibility to climate-related risks due to their limited access to resources and lack of educational opportunities and economic empowerment.

When combining these vulnerabilities, women are more affected by climate change than men and it is therefore imperative to recognise that the effects of climate change exhibit gender-related patterns. The UNFCCC Report (2022) demonstrated, for instance, that there is a marked gender disparity in emissions, with men generally responsible for more emissions than women, often attributed to differences in mobility and dietary patterns. Furthermore, the research consistently highlights the differentiated experiences of women and men in environmental contexts, such as disparities in use of resources, land ownership, and vulnerability to climate change impacts (UNFCCC, 2022) argument also present in the Heffernan et al. studies (2021). Conversely, women tend to rely more on public transportation. These disparities are further exacerbated by the unequal distribution of economic power, leaving women more vulnerable to experiencing energy poverty (Heidegger et al., 2021).

This situation calls for women to play a greater part in environmental decision-making, as this will advance both gender equality and environmental action. In fact, as emphasized in Rainard et al. (2023), the process of transforming systems yells for a re-evaluation of relationships that extend beyond traditional hierarchies. In this sense, while gender equality is not a universal solution, it can play a role in reconfiguring these power relationships. Paradoxically, while women bear a disproportionate

burden of the effects of climate change, they concurrently emerge as pivotal agents in formulating climate solutions (Strumskyte et al., 2022). Their vital contributions encompass roles in natural resource management, agriculture, and the development of adaptation strategies at community level. Their knowledge and active participation stand as invaluable assets in fortifying resilience and fostering sustainable practices (Strumskyte et al., 2022).

A more environmentally friendly profile and greater commitment to promoting behavioural changes make women particularly important in the design of strategies aimed at mitigating the effects of climate change. As shown by Rainard et al. (2023) through a qualitative analysis, the link between gender equality and climate and social justice illustrates how greater gender equality is indicative of more equitable societal structures, which are essential for attaining sustainable futures.

Moreover, the UNFCCC report (2022) also explores how empowering women and marginalized groups in decision-making can aid the creation and execution of effective, enduring climate-resilient policies, showcasing ongoing initiatives and projects as examples, and underscoring the ongoing importance of such endeavours.

Research has also shown that the presence of women in political decision-making is linked to more ambitious climate goals and policies related to the United Nations Framework Convention on Climate Change (UNFCCC, 2022). Findings from the OECD working paper (2022) reveal that women on corporate boards consistently prioritise environmental, social and governance issues, including climate and sustainability. This document emphasised that women worldwide are creating powerful networks to combat environmental degradation and tackle climate-related disparities in civil society. Despite these benefits, women are often excluded from decision-making processes related to the environment whilst suffering the environmental impacts, meaning they have little control over decisions that directly affect them.

2.2 The European Green Deal and gender issues

In its endeavour to combat the advance of climate change and thereby establish environmental justice, the European Commission's strategy for 2019–24 underscores the pressing need to construct a “climate-neutral, green, fair, and social Europe” (European Commission, 2019). Notably, in 2019, the President of the EU Commission, Ursula von der Leyen, expressed the hope that EU climate neutrality would be achieved by 2050, by launching the European Green Deal. It has been put into action to accomplish these goals and has three fundamental pillars: 1) achieving net-zero greenhouse gas emissions by 2050; 2) decoupling economic growth from resource consumption; and 3) ensuring an all-encompassing and equitable transition, leaving no individual or region marginalized. This document functions as an “action plan” or “roadmap”, and a unifying narrative for all existing and forthcoming EU regulations, policies and directives. The EU Commission is steadfast in its commitment to “sustainably transform the EU economy,” effectively turning environmental and climate challenges into opportunities while ensuring an

equitable and inclusive transition for all (European Commission, 2019).

These commitments are frequently presented as the need for a “just transition” towards a climate-neutral economy that prioritizes the wellbeing of people and ensures that no one is left behind (EU Commission, 2019). The European Commission President, Ursula von der Leyen, stated that “It is about making systemic modernisation across our economy, society, and industry. It is about building a stronger world to live in.” (von der Leyen, 2020).

Although a vast body of literature recognises that climate change will impact individuals in varying ways, depending on their cultural, economic, environmental, and social circumstances (e.g., Tschakert and Machado, 2012; Djoudi et al., 2016) and that the impacts on women and men are different, due to their different roles and duties within the family and society (Sundström and McCright, 2014; Rainard et al., 2023), the European Green Deal focuses more on technological innovations and market-based developments than on social vulnerabilities such as gender, class and race (Díaz et al., 2019; Heffernan et al., 2021; Heidegger et al., 2021; Haas et al., 2022).

Narrowing the analysis of European Green Deal down to gender combined with other forms of social vulnerability exposes the need for gendered public policies when creating public policies to fight climate change (Kajiser and Kronsell, 2014; Djoudi et al., 2016). Therefore, public policies that do not incorporate gender equality measures are less capable of tackling climate change effectively, potentially leading to the failure of the proposed actions as a result of not dealing with the different vulnerabilities.

However, analysis of the European Green Deal policy areas incorporating a gender perspective, undertaken mainly by environmental and feminist organisations, shows that the European Green Deal has a “gender-blind” approach, as other EU environmental policies lack analysis of complex socio-political issues. Moreover, even when gender differences are recognised, public policies tend not to take them into account appropriately (Heffernan et al., 2021; Heidegger et al., 2021).

Hence, the increasing endeavours directed towards the integration of a gender equality approach across the entire spectrum of policy formulation and execution seek to include a gender-sensitive approach to new policies and initiatives operating within the framework of the European Green Deal (EGD), which also impacts PHOENIX research and methodological approach.

2.3 Gender sensitive approach research

A gender-sensitive approach and an intersectional process towards a just transition, as advocated by the European Green Deal, should extend beyond a few temporary distributive measures and seek to address the root causes of different forms of inequality. This approach rebalances the existing power structures, centring on the most marginalised in Europe and globally (Heffernan et al., 2021). According to Heffernan et al. (2021), achieving a gender-just and inclusive transition to a carbon-neutral Europe requires transformative action and develops opportunities in the three strategic sectors of the European Green Deal due to their contribution to carbon emissions: energy, transport, and agriculture. Some of the measures listed by the authors could be presented and promoted

in the context of PHOENIX, as they fall within the scope of the project’s work:

- Introducing systematic gender budgeting, making the allocation of resources and their impact on gender equality visible, and increasing gender equality through targeted allocation.
- Institutionalizing and facilitating gender balanced representation in all negotiations and decision-making in the most climate-relevant sectors, such as transport, energy, construction, and agriculture, e.g., by setting quotas and targets for public and private decision-making bodies.
- Ensuring that civil society, representing workers, consumers, climate and environmental activists, and gender equality advocates from all generations, in all their diversity, is empowered to advocate.

As recalled by authors such as Rainard et al. (2023) and Strumskyte et al. (2022), integrating a gender-sensitive perspective into environmental projects is essential for promoting environmental justice, which does not exist without gender justice, both cornerstones of sustainable societies. Gender-sensitive research helps in identifying and addressing gender inequalities, ensuring that the needs and perspectives of women, men, and gender-diverse individuals are considered. It sheds light on the specific challenges faced by marginalised groups, such as indigenous women, rural women, or women in poverty, who often bear the brunt of environmental degradation and lack access to decision-making processes (Strumskyte et al., 2022). By incorporating gender-sensitive approaches, environmental projects can promote inclusivity, empower marginalized groups, and contribute to more equitable outcomes.

Gender-sensitive research provides critical insights for designing and implementing effective environmental initiatives. It enables a deeper understanding of how gender shapes behaviour, attitudes, and responses to environmental challenges. By considering gendered perspectives, environmental projects can develop contextually relevant strategies, interventions, and policies. For example, in recognizing women’s roles as key stewards of natural resources, projects may incorporate women’s traditional ecological knowledge into conservation efforts. Gender-sensitive research also highlights the importance of engaging men as allies in promoting gender equality and environmental sustainability. By integrating gender considerations into project design, monitoring, and evaluation, environmental initiatives can be more responsive, impactful, and sustainable.

Recognising the link between gender and the environment can also improve environmental outcomes and reduce inequalities, while increasing the acceptance of socially just policies. In this sense, it is worth considering proposing a methodological approach that uses an intersectional analytical perspective, not only questioning the impact of environmental policies on women, but also their impact on other conditions that create inequality, such as income, age, ability/disability, racialisation or sexual identity.

All these aspects are fundamental to the H2020 PHOENIX project, which has identified the need to integrate gender-sensitive research to ensure that gender considerations are

systematically embedded throughout the entire research and innovation process, and within the project consortium. However, it is important to deepen the understanding of these dimensions as part of the search for innovations in participatory mechanisms for resolving environmental conflicts, considering the expansion of gender equality in decision-making processes and climate change mitigation policies. In fact, it is well known that despite progress in various sectors, women remain underrepresented in decision-making positions and face significant barriers in accessing opportunities within the green economy (Littig, 2017; Nhamo and Mukonza, 2020).

The EU funded H2020 PHOENIX project incorporates a gender-sensitive perspective by adopting a multifaceted and participatory approach. Firstly, it aims to promote gender balance in research teams and decision-making bodies, advocating equal representation of women and men. By diversifying perspectives and harnessing the talents of both genders, PHOENIX intends to foster more inclusive and effective solutions to environmental challenges. In addition, the project addresses the need to develop gender-responsive research and innovation. This involves integrating gender analysis into the design, implementation, and evaluation of research, ensuring that gender dimensions are adequately considered. By systematically examining the differential impacts of environmental policies and solutions on women and men, the project can develop more inclusive and effective strategies.

2.4 Empowering change: gender within horizon framework in research and organisations

Over the past 2 decades, the European Union (EU) has crafted an EU Gender Equality Strategy (GES) as a comprehensive and cross-sectoral policy on gender equality that extends its reach into the domains of science, research, and higher education. These endeavours stem from a recognition that, despite its foundational principles of meritocracy, objectivity, and the pursuit of excellence, scientific research remains susceptible to the influence of social distinctions (Anagnostou, 2022), rendering excellence a nuanced and discursive realm rather than an entirely objective one (van den Brink and Benschop, 2011). In fact, a substantial body of evidence, exemplified by the European Commission's *She Figures* reports (European Commission, 2019; European Commission, 2021a), continues to demonstrate the entrenched gender disparities within science and academia. These disparities permeate various facets of scientific research, including resource allocation, access to opportunities, recognition, and the interpretation of research outcomes. This acknowledgement underscores the imperative to critically analyse the social context in which scientific knowledge is both produced and interpreted. In response to these compelling concerns, the European Commission has undertaken efforts to strengthen gender equality and integrate a gender perspective into research within the European Research Area (ERA) (European Commission, 2022). One of the central mechanisms employed to catalyse this transformative change involves the endorsement and active promotion of Gender Equality Plans within academic and research organisations (European Research Area and Innovation Committee, 2021). This marks a shift in EU

R&I policy from the previous “fixing women” approach to the “fixing the system” and “fixing the knowledge” approach over the last decade (Schmidt and Cacace, 2017; Anagnostou, 2022), emphasising the focus on addressing structural barriers, establishing institutional transformation, and integrating gender analysis into both basic and applied research (Caprile et al., 2012). It is increasingly acknowledged that achieving excellence in research requires more than merely increasing the representation of women in science; it also necessitates a fundamental reconsideration of how institutions are organized and structured, as well as a transformation of the modes of knowledge production (European Commission, 2020).

Gender Equality Plans are defined as a systematic and strategic instrument that establishes priorities and concrete objectives (based on a thorough *status quo* assessment) and the specific measures that will be implemented to improve gender equality within organisations and in the field of R&I (EIGE, 2022). These plans serve as tools for effecting structural change (Anagnostou, 2022), with a particular focus on achieving three core objectives aligned with the European Research Area's goals for gender equality: removing legal and practical obstacles hindering the recruitment, retention, and career advancement of female researchers; addressing gender imbalances in decision-making processes within academic and research settings; strengthening the integration of a gender dimension within research (EIGE, 2016b).

The main channels for supporting the implementation of Gender Equality Plans include European research and innovation framework programs, such as FP6, FP7, Horizon 2020, and the current Horizon Europe. The Horizon 2020 (2014–2020) programme represented a significant milestone in gender equality in academia and research institutions. It was the inaugural framework program for promoting gender as a general concern, with one of its fundamental objectives being the seamless integration of the gender dimension into research and innovation content (Bencivenga, 2017). With Horizon Europe (2021–2027), the European Commission reaffirms its commitment to gender equality in research and innovation, making it a cross-cutting priority and introducing strengthened provisions. This includes making access to the funding program for research organizations contingent on having a Gender Equality Plan (GEP) and making the integration of a gender dimension into research and innovation content a default requirement, unless the topic description explicitly specifies otherwise (European Commission, 2021d; European Commission, 2021c).

Integrating gender as a strategic orientation led to a marked proliferation of research topics categorized as “gender-flagged” throughout the H2020 program (European Commission, 2017), underscoring a palpable commitment to addressing and ameliorating gender imbalances within the scientific domain. Between 2014 and 2015 and 2020, this increase amounted to a substantial 20.3% (European Commission, 2020). It also provided the context for complementary tools such as the Gender Equality in Academia and Research (GEAR) online tool, which is designed to inform and guide research institutions in establishing and implementing Gender Equality Plans (EIGE, 2016a; EIGE, 2022). Nevertheless, the comprehensive execution of a policy striving to integrate the gender dimension into research has been slower than anticipated, with a limited number of funded research proposals

effectively integrating sex/gender analysis (European Commission, 2020). According to the She Figures report (European Commission, 2021b), on a European level only approximately 1.7% of all H2020 projects successfully integrated the gender dimension.

Finally, the importance of developing participatory approaches for the design and implementation of Gender Equality Plans (GEPs) has been widely emphasized in the literature focusing on gender mainstreaming in scientific settings (e.g., Palmén and Schmidt, 2019; Linkova and Mergaert, 2021; EIGE, 2022; Mergaert et al., 2022). Such approaches not only serve as catalysts for change, but also as integral components of the process of change itself (Schmidt and Cacace, 2018: 3) and play a crucial role in both promoting and preventing resistance to gender-related changes (Palmén and Schmidt, 2019; Bustelo, 2023). Dialogue, negotiation to establish common ground, and commitment are key elements in facilitating effective change (Linkova and Mergaert, 2021).

2.5 PHOENIX gender equality plan as a strategy for a gender sensitive research

This study builds on the experience of the H2020 PHOENIX project in order to explore and discuss the integration of gender perspectives within environmental research and innovation through the implementation of a Gender Equality Plan. The creation of a Gender Equality Plan followed a participatory approach to identify priority gender issues for PHOENIX and involved several stages and decisions: i) the analysis and planning phase; ii) the implementation phase; iii) monitoring actions and evaluation. This article focusses on the results of the analysis and planning phase, which included a brainstorming exercise during the project meeting in March 2023 involving all the consortium members, which aimed to shed light on the gender balance within the consortium.

The paper stands as a significant collaborative achievement within the H2020 PHOENIX consortium, focusing on the key intersection of gender and environmental issues. The results of the literature research on gender equality plans, performed in February and October 2023, yielded limited findings, highlighting a significant research gap in the design and implementation of gender equality plans within the context of Horizon 2020 projects. It became evident that the available literature inadequately addresses the challenges associated with fostering gender equality within H2020 projects centred on environmental and climate change topics. This gap underscores the need for further documentation to better inform and support efforts to promote gender equality within the framework of EU funded Horizon projects environmental initiatives. The paper aims to address this gap by providing a comprehensive exploration of this multifaceted topic, involving the combined expertise of researchers and teams contributing to the project. It investigates two interconnected themes: firstly, the integration of gender equality within European Union R&I policies and EC-funded projects, a crucial aspect of advancing social and environmental sustainability; secondly the current state of gender equality in the context of environmental issues, shedding light on the existing challenges and opportunities.

PHOENIX recognize that integrating gender considerations into the system policy areas is crucial for advancing sustainable practices and policies. This would allow for the development of targeted

strategies to empower women, enhance their resilience, and promote their active involvement in sustainability efforts. PHOENIX adopts a participatory approach, empowering individuals to take ownership and fostering shared responsibility for gender equality. In this context, the project aims to bridge the multiple dimensions of the gender gap and is also committed to reflecting on the intersectionality of gender and environmental challenges. By integrating gender issues into the overall project, PHOENIX addresses specific gender-related barriers and inequalities.

In order to comprehensively address all project activities, and in line with the objectives outlined by the European Research Area and the gender equality objectives of Horizon 2020 (European Commission, 2021a), PHOENIX is actively developing a cross-cutting approach to incorporate a gender perspective by developing a gender equality plan. Three key strategies for mainstreaming gender within PHOENIX have been defined: i) Fostering inclusive and gender-balanced participation in research and innovation processes; ii) Integrating gender analysis/gender impact assessment into innovation content (Enriched Democratic Innovations); iii) Ensuring inclusive and gender-sensitive communication. In order to operationalize these objectives effectively, PHOENIX has implemented a participatory approach that leverages co-creation techniques to set specific goals and define measures and actions tailored to the project implementation context.

3 Methods and data

PHOENIX aims to make participatory processes more deliberative, and deliberative processes more participative. The project will design and test methodologies in 11 pilots, at the local, regional and national levels in six European countries. Each pilot will implement a territorial commission aimed at co-designing the participatory and deliberative methodologies, to ensure the continuous participation of citizens in different stages of the project. These commissions will gather citizens from different backgrounds, policymakers, experts and organised civil society, ensuring gender balance (see more in the project website <https://phoenix-horizon.eu/>).

The PHOENIX Gender Equality Plan embraced the project collaborative approach, and draws from literature that underscores the advantages of collaboration in effecting change towards gender equality (Schmidt and Cacace, 2018; Palmén and Schmidt, 2019; Linkova and Mergaert, 2021; Mergaert et al., 2022; Thomson et al., 2022; EIGE, 2023). This method entailed the active engagement of all project partners and has underpinned the comprehensive PHOENIX gender mainstreaming framework, illustrated in Table 1, which served as a reference for further refinement and operationalization. The foundation of this framework is rooted in a twofold approach to gender-sensitive research (European Commission, 2011) that not only emphasizes the importance of incorporating the gender dimension into the content of research and innovation, but also highlights its significance in the processes and contexts within which research is conducted (Pollitzer and Schraudner, 2015; Trbovc and Hofman, 2015). In essence, the framework seeks to enhance gender equality not only in research outcomes, but also in the processes and

TABLE 1 The project PHOENIX gender framework.

Axes of action	Challenges
1. Ensuring gender-balanced representation	1) ensuring gender-balanced representation in the research team at all levels and in leading roles, in recruiting participants to be involved in the democratic innovations and in all co-designing activities and evaluation processes
2. Integrating gender analysis/gender impact assessment into innovation content (Enriched Democratic Innovations)	2) offering gender-sensitive working/participation conditions
	3) exploring gender-based similarities and differences throughout the research process (differentiated psycho-socio-cultural constructions of nature, participation cultures, and impact of the European Green Deal transition pathways in different groups of women and men) (RESEARCH)
3. Ensuring inclusive and gender-sensitive communication	4) addressing the realities of different genders from diverse ethnicities, age groups, and socio-economic groups in (Enriched) Democratic Innovations Design to maximise their relevance, quality, validity, and utility (INNOVATION)
	5) Adopting a gender-sensitive approach in communication and dissemination strategies and practices

environments that shape them (European Commission, 2012). This approach ensures that gender (intersectional) considerations are systematically controlled throughout the entire research and innovation process (Korsvik and Rustad, 2018; Schiebinger, L., 2021).

3.1 The gender framework within project PHOENIX

This framework consisted of three primary axes, targeting five global challenges (as listed in Table 1). The brainstorming activity within PHOENIX focused on three key areas in which gender balance played a pivotal role: i) ensuring gender-balanced representation within the research team and in leading roles; ii) integrating gender analysis/gender impact assessment into innovation content (Enriched Democratic Innovations); iii) ensuring inclusive and gender-sensitive communication.

Regarding the first axis of action, ensuring gender-balanced representation not only means addressing specific challenges such as, existing imbalances, but also proactively promoting diversity in recruitment, leadership roles, decision-making processes, and public representation. In championing gender balance, the aim is to harness the full spectrum of talent, perspectives, and experiences to drive positive change and foster a more just and equitable society.

Furthermore, concerning the second axis of action, incorporating a gender analysis and gender impact assessment into the content of enriched democratic innovations is an essential step towards ensuring that these innovations are truly inclusive and equitable. By systematically examining how different genders may experience and benefit from these innovations, it is possible to identify and address potential biases, barriers, and inequalities that might otherwise go unnoticed. This proactive approach not only promotes gender equality but also enhances the overall effectiveness of democratic innovations (Pollitzer and Schraudner, 2015), as it helps to craft solutions that are responsive to the diverse needs and experiences of all individuals (Pollitzer and Schraudner, 2015; European Commission, 2020; Schiebinger, L.,

2021). In doing so, a more robust and resilient democratic framework is created that empowers everyone to participate fully and meaningfully in shaping their collective future.

Finally, adopting a gender-sensitive approach in project communication and dissemination strategies and practices is paramount to ensuring inclusivity, reach, and impact. Communication and dissemination are crucial to sharing project outcomes, engaging stakeholders, and driving societal change.

These *Axes of Action* and *Challenges* were the essential cornerstone of the collective efforts. In delineating the essential areas of focus and identifying the primary obstacles, they provided the working groups with a clear and structured roadmap to guide their collaborative endeavours. The axes not only established a common understanding of the objectives, but also stimulated the shared commitment to directly addressing the most critical issues. Essentially, they were the key starting point that enabled us to align our focus on gender within PHOENIX.

3.2 The participatory activity and the co-creation session

In order to facilitate this co-creation process, a 2-h participatory activity was designed by one element of the project team to be delivered during the annual project meeting (first—third of March 2023) to ensure the involvement of, at least, two members from each partner organization, totalling 45 participants within the consortium.

In the first phase of the gender co-creation session and following a presentation on the gender mainstreaming framework of PHOENIX, the project coordination team conducted a brainstorming session on gender balance, wherein each partner was invited to collectively reflect on gender balance within the consortium. Partners were prompted to report on the gender composition within their institutions for the PHOENIX project, as well as, the representation of women in leadership positions. This collective reflection enabled us to examine the subject of gender from two angles: within the project team, and in the context of gender within PHOENIX research topics.

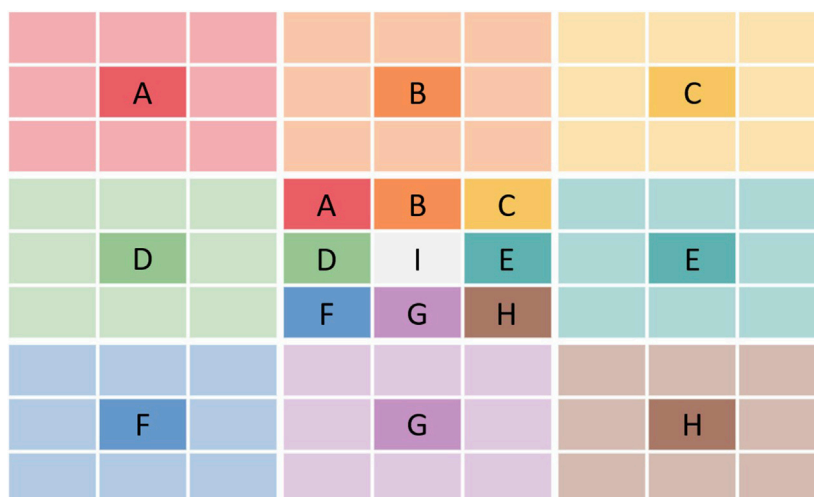


FIGURE 1
Lotus blossom diagram.

The outcomes of this collective reflection enabled us to progress to a second phase which entailed designing and facilitating a co-creation session with all partners, using the Lotus Blossom Method.

The Lotus Blossom Method is a **brainstorming technique** that involves building ideas around a central theme and then breaking them down into deeper sub-themes. The Lotus Blossom Diagram (Figure 1) is a map consisting of nine 3×3 square grids. This method established the main priorities and specific actions required for integrating the gender dimension across the various domains of the PHOENIX project.

The aim of the exercise was to find solutions to the challenges identified in the gender mainstreaming project framework. The challenge to be addressed is placed at the centre of the Lotus Blossom (I). The first stage of the exercise included discussing the challenge at the core of the template (in the inner grid: from A to H) in small groups. The exercise then evolved into brainstorming for eight measures (priority issues/areas) to be implemented to address the challenge and placing the words directly on the grid surrounding the core challenge (in the outer grid: from A to H). The group was then asked to copy these ideas to the next level (transfer the eight words from the central square as the core idea of the corresponding outer grids). As the Lotus Blossom expanded to the outer grids, new ideas (specific actions) emerged.

4 Findings and discussion

The collective reflection that was developed with the co-creation session served as a creative and collaborative platform where the project partners collectively contributed to the detailed planning and structuring of the gender mainstreaming framework. This phase became the cornerstone of the gender equality plan and also defined the specific steps and measures needed to address this effectively. Thus, having a reflective and customized participatory approach that fosters a sense of “ownership” of the Gender Equality Plan process (Palmén and Wroblewski, 2022; Bustelo, 2023) proved to be essential. Specific emphasis was placed on the use of participatory

and co-creation techniques, strategic framing, and the broad mobilization of stakeholders. These strategies collectively contributed to the effective design and implementation of measures and specific actions, ensuring that gender equality initiatives are not only introduced, but also successfully carried out, ultimately leading to meaningful and sustainable change (Wroblewski and Palmén, 2022).

Furthermore, a participatory approach empowers individuals and organisations to contribute their unique perspectives and insights, leading to more contextually relevant and effective strategies. This approach recognised that gender equality is not a one-size-fits-all solution, and that different sectors, regions, and communities may have varying needs and challenges. By engaging diverse partners in the design process, gender equality plans were collectively tailored to address specific contexts and ensure their practical applicability. Therefore, by incorporating their perspectives, it was possible to identify and address intersectional issues and develop strategies that encompass the experiences and challenges faced by all individuals.

Indeed, the results of these co-creation session provided a robust foundation for the comprehensive approach to mainstreaming gender within the PHOENIX project. After discussing the proposed framework for mainstreaming gender within PHOENIX, partners addressed the main priority gender topics within the project through the co-creation process described in the previous section. The interest and engagement of the partners were translated into written contributions from each group in the collaborative exercise. The session was highly participatory, fostering dialogue among the participants in a subject that is not foundational for all partners. It successfully created an inclusive space for discussion, learning, and cooperation. The written contribution from each group were then clustered, and a thematic analysis was conducted to assess the eligibility of all contributions from the 45 participants. The brainstorming process played a pivotal role in pinpointing strategic goals and actions that steer the project towards a more gender-sensitive research approach. From the collaborative effort, three strategic goals emerged. These goals were intertwined with the six challenges

TABLE 2 Strategic goals, levels of observation and actions for the PHOENIX Gender Equality Plan.

Strategic goals	Levels of observation	Actions
1) Ensuring gender-balanced representation in the research team at all levels, in leading roles, in recruiting participants to become involved in the democratic innovations and in all co-designing activities and evaluation processes	Ensuring gender-balanced representation	1) Analysing and recommending procedures for ensuring equity within teams, either during the pilot implementation or the TCCD implementation
	1) in the research team and in leading roles	2) Guaranteeing representation in Steering Committees
	2) In recruiting participants to become involved in the democratic innovations and all co-designing activities and evaluation processes	3) Ensuring representation of all genders in pilots and outputs: equal representation in interviews, focus groups, and target groups
	3) In the democratic innovations and all co-designing activities and evaluation processes	4) Ensuring EDI initiatives provide flexible time options and accommodate the different schedules of participants 5) Encouraging diverse forms of expression beyond traditional formats 6) Ensuring diversity among facilitators and providing them with appropriate training
2) Adopting a gender-sensitive approach in communication and dissemination strategies and practices	1) Avoiding reproduction of gender stereotypes and roles, promoting more diverse and inclusive representations	1) Providing general recommendations to partners for producing communication materials and dissemination of results
	2) Avoiding technical jargon	2) Giving priority to the dissemination of women's outputs
	3) Adopting gender-sensitive language, inclusive language and images, using inclusive pronouns and avoiding the reinforcement of a gender binary	
	4) Ensuring the visibility of work from all genders, promoting equal participation, amplifying diverse voices, reducing patriarchal behaviour, and recognising women's contribution to science	
	5) Ensuring a gender perspective when developing technological tools	
3) Addressing the realities of different groups in Enriched Democratic Innovations (EDI) Design	1) Addressing the realities of different groups of men and women in EDI design (innovation)	1) Ensuring EDI initiatives provide flexible time options and accommodate the different schedules of participants

of Democratic Innovation's capacity to develop their full transformative potential when dealing with environmental topics: i) ensuring gender-balanced representation; ii) adopting a gender-sensitive approach in communication and dissemination strategies and practices; iii) addressing the realities of different groups of men and women in (enriched) democratic innovations design (innovation). These three strategic goals defined by the PHOENIX partners were unfolded into *levels of observation* and *specific actions* to be adopted within the consortium. Table 2 summarises the strategic goals, the levels of observation, and the actions to be taken.

Through this exercise, a series of actions were established, steering the consortium away from the traditional "fixing women approach" (Schiebinger, 2021), which historically focuses on preparing women to conform to the male-dominated *status quo* (Tildesley et al., 2023). Instead, the approach shifted towards one that seeks to transform discriminatory social structures and gendered norms, addressing the root causes of unequal outcomes (Benschop and Verloo, 2011). This involves changing the structural mechanisms within research processes and the content of research itself, recognizing them as part of the problem that perpetuates gender inequalities (Bustelo, 2023). This evolution aligns with the changing policy approach to gender equality within the European Commission (Ferguson, 2021). Simultaneously, recognizing the significance of a gender balance representation in environmental projects for effective and equitable

outcomes (Castaneda et al., 2013; Asteria, et al., 2020), led participants to come up with a series of actions addressing balanced representation within the consortium and involving processes for citizen participation in the development of democratic innovations.

Firstly, these actions focused on actively avoid reproducing harmful gender stereotypes and roles that maintain women's disadvantage (Tildesley et al., 2023). The actions proposed promoting diverse and inclusive representations that challenge preconceived notions and highlight individuality. Secondly, these actions revolve around avoiding technical jargon in communication and engagement efforts, ensuring that messages are accessible to all, regardless of their background or expertise. Thirdly, these actions centred on adopting gender-sensitive communication, using inclusive pronouns and refraining from reinforcing a binary gender construct. Indeed, the co-creation exercise, emphasised the importance of the already existent inclusive language across the management and internal/external communication of the project. The attention given to this topic aims to contribute to the construction of realities that accurately represent the diversity of experiences (Lewenstein, 2019; De Jesus et al., 2021). Moreover, in the methodological design of democratic innovations to be tested in the project pilots, it is crucial to address the unique realities and perspectives of various groups of men and women. Recognising that individuals within these groups may have distinct needs, challenges, and experiences, is a key approach in PHOENIX.

5 Conclusion

Integrating a gender perspective into projects, particularly those addressing environmental issues, is highly important and deserves greater attention. PHOENIX project has recognized the need to incorporate a gender-sensitive research to ensure that gender considerations are systematically embedded throughout the entire research and innovation process and within the project consortium. This text highlights the primary findings from a participatory approach used within the H2020 PHOENIX project to design a Gender Equality Plan. The experience reported in this paper includes the integration of gender perspectives through a participatory and inclusive approach that is sensitive and tailored to the realities and experiences of the project partners. This approach reflects a steady commitment to gender equality, thus making the project more inclusive and relevant to society.

The analysis of the literature on climate change, gender, and the European Green Deal underscores the existence of a significant gap in reporting experiences associated with integrating a gender perspective into environmental projects, particularly those aligned with the European Green Deal. This article bridges this gap, by sharing the experience of PHOENIX in integrating a gender perspective, not only within its internal consortium management, but also within its research processes and outcomes. Thus, by reporting on this specific experience and designing measures tailored to its partners' realities, it is a good practice for future projects to guarantee the inclusion of a gender perspective within research projects.

Although in its early stages, the incorporation of a gender perspective into the project has proven effective in refining the results and assessing its medium and long-term impacts. Evidence in the research protocols indicates a commitment to collect disaggregated information by sex/gender and the incorporation of indicators sensitive to the gender perspective. Furthermore, the incorporation of a gender perspective has influenced the establishment of rules for balanced gender representation in on-site actions, such as Decision Committees. This approach also plays a pivotal role in recruiting participants for co-designing activities and pilots to test the methodological approach, as well as, in the evaluation processes, engaging individuals of all genders is considered a priority.

To advance the Gender Equality Plan (GEP) and make substantial progress towards project's strategic goals, a series of focused actions are planned, involving defining specific targets, timelines, and responsibilities. Engaging all partners in the discussion by maintaining a participatory approach is a key element for ensuring an inclusive decision-making process, cultivating a sense of ownership among partners, and guaranteeing a sustained commitment to the transformative journey towards gender equality. Emphasizing gender equality issues within the project involves creating informative content and implementing various communication channels to reach a broader audience, fostering a culture of inclusion and gender equality.

The absence of similar published experiences in the field of environmental projects that would allow comparing results, along with the initial stage of the process presented here for

the effective integration of gender perspective requires that the results presented in this article be interpreted solely in the context of this project. What is more, as previously mentioned, this article focuses only on the analysis and planning phase of a more complex process of integrating a gender perspective within an H2020 project, which is going to be followed by the implementation phase and concomitant monitoring and evaluation phases. The outcomes of the entire process have not yet been documented. As so, the project is going to step forward to the implementation of a monitoring and evaluation framework, which is crucial for tracking progress and measuring the effectiveness of gender equality initiatives. By taking these next steps, the project progresses towards the strategic goals of the Gender Equality Plan.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

DE: Conceptualization, Formal Analysis, Investigation, Methodology, Validation, Writing–original draft, Writing–review and editing. SH: Conceptualization, Investigation, Methodology, Validation, Writing–original draft, Writing–review and editing. ML: Conceptualization, Formal Analysis, Investigation, Methodology, Validation, Writing–review and editing. SS: Validation, Writing–original draft, Writing–review and editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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