

# AN ACTIONABLE RESEARCH AGENDA FOR INCLUSIVE LOW-CARBON TRANSITIONS FOR SUSTAINABLE DEVELOPMENT IN THE GLOBAL SOUTH

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## Gender



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# Preface

All countries now face enormous challenges posed by climate change. The consequences of continued greenhouse gas emissions are dire, particularly for countries in the Global South that are both more affected and more vulnerable to climate change at the same time as they have less capacity to adapt (AfDB, 2022). The realization that a low-carbon transition needs to be implemented also in countries in the Global South is well established and is also reflected in most countries' ratification of the Paris Agreement and in their Nationally Determined Contributions. In effect, most countries in the Global South are now confronted with the fastest and most dramatic transformation of their economies that they have ever experienced – or at least they would need to be.

The low-carbon transition in the Global South needs to be guided by research since such a transition is an inherently very knowledge-intensive process. This is why the Sustainable Inclusive Economies (SIE) Division of the International Development Research Centre (IDRC) has identified this area as particularly interesting to support. This report is commissioned by SIE as part of a bigger initiative to develop an actionable research agenda that IDRC can support to achieve a low-carbon transition with gender equity in the Global South.

Gender Equality and Women's Economic empowerment is part of the Research Agenda for Low Carbon Transition and Gender Equity in the Global South series of papers. The consortium that is working on this series of papers is global and consists of 60 researchers from a multitude of universities and institutions. This particular paper has been written by Victoria Plutshack and P.P. Krishnapriya from Duke University, Maria Del Pilar Lopez Uribe and Johana Castañeda from Universidad de Los Andes, and Sejal Patel and Tracy Kajumba from IIED.

This paper presents a description of the state of the art in terms of the gendered impacts of the LCT, how gendered decision-making impacts LCT policy, and the role of finance in supporting the LCT alongside gender equality. Based on this it then makes a series of recommendations in terms of research opportunities. We hope to receive constructive comments on this draft paper from IDRC, our networks and external scholars and practitioners. We will then revise the paper for validation by policy makers and senior civil servants in the Global South. Based on the reviews and validations we plan to prepare final versions of both the paper and the accompanying High-Level Research Agenda by March 2023. The ambition is that these papers will be useful both for donors and research institutions in supporting an even greater contribution by research to a much needed low-carbon transition with gender equity in the Global South in this crucial Decade of Action.

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# Gender equality and women's economic empowerment

## 1.1 Executive Summary

A low-carbon transition (LCT) has implications for gender equality, as shifts in technologies, practices and policies impact genders in different ways. This report takes aim at that intersection, outlining what we know and what we do not know about the relationship between the LCT and gender, the gendered impacts of the LCT, how gendered decision-making impacts LCT policy and the role of finance in supporting the LCT alongside gender equality. Addressing these gender dimensions of the LCT is core to ensuring a gender just transition.

The report takes gender to represent “the socially constructed roles, behaviours, expressions, and identities of girls, women, boys, men, and gender diverse persons,” and recognizes that gender is not binary (IDRC, 2019). However, research on the intersection of gender and development rarely, if ever, acknowledges evidence outside of that binary. The literature also tends to treat gender as synonymous with “women,” which limits our knowledge of the transition’s relationship to men and masculinity. Gender is also not monolithic, that is, not all women (or all men) share the same experiences, as gender intersects with other elements of identity, such as race, caste, income, and age. These intersections are woefully understudied in the LCT literature.

Reviewing the research on the likely impact of LCT transitions across various sectors, including energy, transportation, agriculture, forestry, and textile manufacturing, it is clear that a low-carbon transition will impact men and women differently. Men make up the majority of jobs in many high-carbon sectors, such as energy (78% of oil & gas jobs) and transport (85% of public transport jobs), which may anticipate job losses in the LCT (Godfrey and Bertini, 2019; IRENA, 2021). Meanwhile women are critical parts of forest economies, agriculture and textile manufacturing, but impacts on these sectors rarely acknowledge the gender dimension. To ensure that all genders are able to benefit from the LCT, it will be critical to identify the future sectors, skills and capacity needs of these transitions. Throughout,

women’s central role in the care economy is critical to gender equality. This is especially the case given that climate change is expected to increase care work as men migrate to urban areas in search of jobs, extreme weather events cause negative health impacts and subsequent shifts in demographics disrupt social services (MacGregor et al., 2022). Further research must acknowledge the role of care work, and evaluate how to manage the balance of care work and interventions so as to improve solutions for all genders.

Where women are in positions of power in low-carbon transition sectors, there is some evidence that they enact more sustainable policy or improve environmental, social, and corporate governance (ESG) reporting, but the literature is very limited to corporate governance and national parliaments. High-level policies rarely go beyond acknowledging the impact on, and role of, gender, while a few sector-specific policies try to mainstream gender into LCT-relevant sectors. However, gender mainstreaming has yet to achieve its aims – promoting gender-responsive and gender-transformative policy – and a lack of gender-related policy impact data curtails meaningful lessons learned.

Climate finance is a critical means for supporting gender equality alongside the LCT, but there is limited data on how much climate finance flows to gender-related programming, outside of the OECD. Even within that set of transactions, little climate finance is categorized as gender-responsive, despite interest in social returns on investment. In part this is because the gender equality impacts of projects have been generally unmeasured, and therefore, unmonetized. In terms of gender impacts, a heavy focus on loans has increased country-level debt, with links to social spending cuts, which have disproportionately negative impacts on women. Women remain underrepresented in climate funds and across financial decision-making bodies.

Finally, throughout the report, gender is represented as a set of ever-shifting power relations. The concept of “gender-transformative change” tries to create policies, projects and processes that disrupt power inequalities and redistribute power between genders more equitably. While some examples exist of the transformative power of projects that integrate women as central actors, there is a strong need for more holistic studies of gender and LCT to identify key opportunities for transformative change.

## 1.2 Gender and its frameworks

### 1.2.1 What is gender?

Despite the fact that the conception of gender varies across different geographies and time, gender has remained an

important part of an individual's identity (Kessler and McKenna, 1985). It is a critical dimension that shapes the personal, social, and cultural aspects of one's life (Connell, 2009). The gender of an individual is often based on the psychological, social, cultural, and behavioral characteristics associated with being a particular gender (Wienclaw, 2011). Gender can be viewed as a combination of one's own gender identity (i.e., how individuals see themselves) and learned gender roles (i.e., how society sees them and perceives them) (Wienclaw, 2011). Further, gender can be expressed along a continuum and includes both binary and non-binary gender identities including LGBTQIA+ identities (Baxter et al., 2022). In this report, we will use the term "gender-diverse persons" to encapsulate non-binary identities and non-woman marginalized genders.

UNICEF, in its report on gender equality, defines gender as follows (UNICEF, 2017):

*"A social and cultural construct, which distinguishes differences in the attributes of men and women, girls and boys, and accordingly refers to the roles and responsibilities of men and women. Gender-based roles and other attributes, therefore, change over time and vary with different cultural contexts. The concept of gender includes the expectations held about the characteristics, aptitudes and likely behaviours of both women and men (femininity and masculinity). This concept is useful in analyzing how commonly shared practices legitimize discrepancies between sexes."*

Gender roles in turn are thus determined by a range of factors: biology, cultural values, social norms, heredity, and environment. The differences in traditional gender roles and accepted behaviors leads to the propagation of gender-based inequalities (WHO, 2009). Women in gender unequal societies have less say in the decision-making processes, have less access to resources and institutions, and have lower status in the society. As a result, women typically bear the disproportionate burden of unpaid drudgery, low educational attainment, fewer economic opportunities, and adverse health outcomes. In addition, these rigid gender roles also make women more vulnerable to physical, emotional and

sexual violence (WHO, 2009).

Climate change and natural disasters exacerbate existing gender inequalities, while posing threats to women's livelihoods, health, safety, and security (UN Women, 2022a). This is much worse in fragile and conflict affected regions, where the negative impacts of climate change can rapidly intensify social, political and economic tensions (UN Women, 2022a). Thus, there is an urgent call for mainstreaming gender considerations in the drafting and implementation of climate adaptation and mitigation strategies that result in LCTs.

## 1.2.2 Defining women's empowerment & gender empowerment

### 1.2.2.1 Definition for this Report

This report follows IDRC's definition of gender, namely that gender is "the socially constructed roles, behaviors, expressions, and identities of girls, women, boys, men, and gender diverse persons. It is distinct from biological sex and outside of the gender binary" (IDRC, 2019). Despite the recognition that gender is not binary, the research on low-carbon transitions and gender overwhelmingly treats gender as though it were. Therefore, this report will regularly discuss "women and men" as a reflection of the empirical evidence that we have, rather than as a reflection of our definition of gender. One key recommendation from the report is that future LCT research must make efforts to collect data that does not sit within the gender binary and to include the study of gender-diverse persons.

### 1.2.2.2 Women's empowerment

The UN has asserted that gender equality is a fundamental human right that is "critical to every aspect of a healthy society" (UN, 2019a). Historically, however, the gender inequalities in societies have often resulted in men becoming empowered to the disadvantage of women and other gender-diverse persons (WHO, 2009). Empowering women and gender-diverse persons and attaining gender justice<sup>1</sup> is imperative to achieve gender equality (iED, 2021).

In most of the existing literature on development policies, gender equality is often treated as synonymous with (cis-gendered and heterosexual) women's empowerment. Yet, women's empowerment remains a complex and multidimensional concept, making gender equality tricky to achieve. Therefore, before we delve into the linkages between the low-carbon transition and gender equality, it is important

<sup>1</sup> Gender justice is a process that ensures everyone "the opportunity to structure their lives and thrive, regardless of gender, unlimited by gender stereotypes" (ACLU, 2022).

to understand the different pathways and drivers of women's empowerment.

There are multiple frameworks that define and explain the process of women's empowerment. Most of these acknowledge that women's empowerment has multiple dimensions. While some frameworks define dimensions as the stages of empowerment, in several other frameworks, dimensions correspond to realms or spaces within which an individual or the community can be empowered (Deshmukh-Ranadive, 2002). A prominent example of the former is the theoretical framework by Kabeer (1999) that conceptualizes empowerment as the "ability to make choices." These life choices must be real choices such that individuals are able to choose across a range of all possible choices that visibly exist (Kabeer, 1999). This ability to make choices is further expressed in terms of three interrelated dimensions: (i) resources, (ii) agency and (iii) achievement (Kabeer, 1999). These dimensions can be viewed as the process and outcome of empowerment when it was previously denied (Kabeer, 2005). The first dimension - the access to material, human and social resources - is a pre-condition for power, which in turn is governed by social norms, cultural beliefs, customs, values, and rules (Kabeer, 2005). Agency is a process of empowerment that enables individuals or communities to define their goals and make decisions regarding these goals. Kabeer further refers to the combination of resources and agency as capabilities, as defined by Sen (Sen, 1985). The third dimension, achievement, is the outcome of the empowerment process. It reflects the extent to which the capabilities are realized (Kabeer, 1999). This approach has been adopted by several development institutes and networks to link development outcomes with gender empowerment. Some examples are CGIAR's Research Program on Agriculture for Nutrition and Health for linking development outcomes with gender empowerment (Yount, 2017), and the Food Security and Nutrition Network (Friis-Rasmussen, 2012).

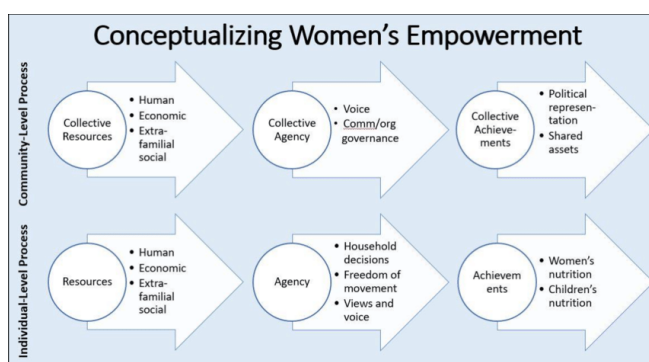


Figure 1 Kabeer's framework for empowerment. Source: CGIAR

(Yount, 2017)

Among the set of studies that frame empowerment across multiple spaces, Stromquist (1999) proposed that empowerment is a socio-political concept with four main dimensions: cognitive, psychological, political, and economic. Cognitive empowerment is the realization and understanding of one's condition of oppression and recognizing the drivers for this condition. Psychological empowerment involves developing feelings of self-confidence and self-esteem such that women believe in themselves and make decisions to improve their well-being. Political empowerment is the awareness of surrounding inequality and the ability to organize and mobilize resources to change the situations. Lastly, economic empowerment refers to the ability to engage in productive activities which make women financially independent. Each of these four dimensions are necessary for empowerment but not sufficient by themselves (Parpart et al., 2003; Stromquist, 1999). She further states that empowerment must happen at both individual and collective levels to lead to public actions. Deshmukh-Ranadive and Narayan-Parker state that women's empowerment can be achieved in physical, economic, sociocultural, and political dimensions within the domestic arena (Narayan-Parker, 2005). Friedmann (1992) defines empowerment as the confluence of three types of power: (i) social power, (ii) political power, and (iii) psychological power. Social power refers to individual or collective access to the resources of household production; political power is the individual or collective access to decision making processes; psychological power is the "individual sense of potency" that leads to achieving social and political power (Friedmann, 1992).

For this report, we use IDRC's definition of empowerment, which is not specific to the empowerment of women, describing empowerment as: "the process by which those who have been denied the ability to make strategic life choices acquire such an ability. The ability to exercise choice has three dimensions: resources and future entitlements, agency, and achievements or well-being outcomes" (IDRC, 2019).

#### 1.2.2.3 Research Gap: The constraints of the gender binary

The impacts of climate change will affect genders differently based on their role in society and their health (Dunne, 2020). Women and gender-diverse persons will be at higher risk of facing adverse impacts, given historical limitations on access to resources, agency, and well-being outcomes. These individuals are also often excluded from climate-based decision-making processes (IWDA, 2022). However, research that explores the links between gender and LCT strategies is almost exclusively confined to gender



binary definitions. Studies that consider gender-diverse persons and climate policies remains sparse, such as the study by Baxter et al., (2022). This gap in the literature underscores the need for more inclusive gender definitions, which would allow researchers and practitioners to identify the impacts of climate change on these underrepresented populations, which may help in further strengthening LCT strategies. Some toolkits exist that provide instruments to facilitate more inclusive gender mainstreaming into development studies and policies, such as the OCED Toolkit for mainstreaming and implementing gender equality (OECD, 2018), WHO's gender mainstreaming manual (WHO, 2022), the Bill & Melinda Gates Foundation's Gender Equality Toolbox (Bill & Melinda Gates Foundation, n.d.).

#### 1.2.2.4 Research Gap: Where are the men?

In a study on men, masculinities, and climate change, Söderström, (2015) notes that the mainstream gender and climate change debate and literature has almost exclusively focused on women's vulnerability. In areas where there is research, boys and men have mostly been analyzed as a monolithic group responsible for the negative effects of climate change due to their patterns of consumption and associated modern industrialization, and key aspects of hegemonic masculinities. Few studies look at the diverse and nuanced ways in which boys and men also impact and are impacted by climate change, including as heads of large corporate sector organizations that are the drivers of climate change, as energy consumers, as victims of environmental degradation, and as agents of change alongside women and girls. There is little recognition that men's diversity – according to social class, ethnic group, sexuality, and other intersecting factors – also affects not only the way that they live their lives, but the way that they drive or respond to climate change (Men Engage Alliance, 2016).

A growing body of evidence has demonstrated that differences in gender norms, roles, and expectations greatly influence the health and social advancement of women and girls, as well as men and boys. For example, in many parts of the world, the polarizing views of women as passive caretakers and men as in-charge providers influence women's and men's perceptions of their roles in society. These illustrative norms, stereotypes, and expectations shape the inequitable distribution of household chores, childrearing duties, income earning expectations, and risk-taking behaviors that disproportionately affect women's and men's access to resources including education, employment, and ownership rights. Around the world, such divisions of labor have development implications for men as well as other

genders (Greene et al., 2012).

Extractive industries are male dominated and this gender imbalance implies that the effect of resource shocks on non-primary employment can be qualitatively different for men and women. This possibility has largely been neglected in the academic and policy debate on the local economic effects of natural resources. However, understanding these gender-specific effects is important given the evidence linking women's relative labor opportunities to a host of other outcomes such as their political influence, intra-household bargaining power, fertility, and children's well-being. Findings suggest that when a mine closes, nonprimary employment increases for men, but decreases for women. The effects are sizeable and persistent. This crowding-out of women's employment is consistent with evidence of men and women laborers being substitutes in non-primary sectors (Aragón et al., 2018).

For example, in the case of UK coal mine closures, over 90% of displaced coal workers were men and coal jobs accounted for 20% - 35% of all the jobs held by male workers in the affected regions (OECD, 2019). Furthermore, the literature discusses some evidence of a crowding-out of female employment as a second-round consequence of the large job losses. The male-dominated workforce of extractive industries suggests a potential role for gender sensitive transition policies in certain regions. In the case of the UK, the available evidence on the consequences of the "gender skewed" coal mine restructuring suggests the presence of second round negative effects (i.e. crowding-out) on female employment that emerged within a generation or so. This time lag is justified by the authors, considering the evolving social norms and perception of "men's" and "women's" jobs.

The question for an inclusive low-carbon transition is if improvements in job quality, positions and income will also be available to women, youth, and other vulnerable categories. However, on the economic side, decarbonization will affect fossil fuel intensive sectors that may see significant job losses as these sectors contract. As these tend to be male dominated sectors, the low-carbon transition may have significant effects on men, which need to be better explored through a gender lens. The secondary effects of these job losses, for instance, on those towns and communities dominated by fossil fuel industries, will also need to be examined. Further research is also needed to focus on the role of men and the transformation of masculinities as it relates to climate change adaptation and resiliency (Men Engage Alliance, 2016).

### 1.2.3 What is intersectionality and where is it missing?

#### 1.2.3.1 Climate change, the low-carbon transition and intersectionality

Intersectionality describes how experiences overlap or intersect across identities, such as gender, sex, ethnicity, age, socioeconomic status, sexuality, geographic location, or disabilities. Gender identities, norms, and relations both shape and are shaped by other social attributes (Buolamwini and Gebru, 2018). In 1989, legal scholar Kimberlé Crenshaw coined the term intersectionality to describe how multiple forms of discrimination, power, and privilege intersect in Black women's lives, in ways that are erased when sexism and racism are treated separately. Since then, the term has been expanded to describe intersecting forms of oppression and inequality emerging from structural advantages and disadvantages that shape a person's or a group's experience and social opportunities (Crenshaw, 2018). Along those same lines, the Paris Agreement acknowledges that "climate change is a common concern of humankind" and that Parties should respect "the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity" (UN, 2015).

A large body of literature now documents how social divisions based on gender, race, age, (dis)ability or class determine who is more vulnerable to climate change and who has a greater ability to adapt. As a consequence of entrenched discrimination in society, one person's adaptation may be accomplished at the cost of another's increased vulnerability. However, taking an intersectional lens requires looking at the power dynamics of these different social divisions and how they work together to shape people's experience. Even within a sexually disaggregated labor force, it is important to be also aware how other identities intersect with gender, particularly education, wealth, race, and class disparities (WEDO, 2016).

For example, in OECD countries, an over-representation of older workers in "brown" industries face above-average displacement challenges that result in longer durations of unemployment and larger wage losses once re-employed. In addition, cultural bias against learning in old age and the shorter remaining professional life to recoup investment in skills upgrading may limit the participation of older workers in education and training programs (OECD, 2015). However, studies like these must also consider the difference in experience between older women vs older men and younger women vs younger men to capture the way in which different identities intersect to shape employment.

#### 1.2.3.2 Gaps in addressing intersectionality in low-carbon transition

Few studies do go beyond considering gender and other identities in isolation. Even studies that do consider the gendered impacts of a policy like carbon pricing do not evaluate how the distribution of impacts also breaks down within those groups by other social categories (World Bank, 2021a). The lack of a breakdown of the data by gender and other discrimination categories masks these distributional impacts and makes them challenging to address (Roehr, 2021).

Studies also note that there is limited literature that specifically looks at the experience of persons with disabilities within renewable energy transitions, although there are energy projects and initiatives targeting communities with disabilities (Johnson et al., 2020). Further research is needed to understand how the LCT can address access to opportunities across a number of categories, including people with disabilities.

One reason that intersectional approaches are rare is that intersectionality tools and frameworks are not clear, nor are there appropriate metrics of how such data can be collected. Indeed, the scarce availability of sex-dis-aggregated data and related analysis across stakeholder's groups, especially for impact assessments, is the biggest challenge to understanding low-carbon transition policies, including carbon pricing implications in terms of gender and intersectionality (IUCN, 2021; UN, 2018; World Bank, 2021a). It is important to understand the distribution of impacts in order to address inequality. Both emissions-trading schemes and carbon taxes have cost implications for disadvantaged groups such as indigenous peoples, but they can be designed in a way that compensates fairly for these impacts, using revenues from within or outside the pricing policy (Chalifour and Bubna-Litic, 2012; World Bank, 2021a).

#### 1.2.4 Intrahousehold Power Relations

Not all household members have the same preferences and therefore different individuals may disagree over choices to be made. Typically, household decisions follow from intrahousehold power relations among members. Understanding how these decisions are made is critical for low-carbon technologies that require household-level adoption. Although bargaining power is not directly observable, there is an extensive literature on ways of measuring intrahousehold power relations using various analytical and experimental approaches. Most empirical studies use variables that proxy for intrahousehold power such as labor force participation or income earning potential, asset ownership, educational



attainment, gender of the first child, decision making processes within households. That decision making process can be proxied by experimental game outcomes, if the women are able to make decisions about selling key assets, food preparation and consumption, and perceptions of social norms, etc. (Doss, 2013).

The empirical evidence on the linkages between gender-based intra-household relations and the adoption of climate adaptation and mitigation strategies by women and men, however, is limited. Existing studies indicate that intra-household decision-making and gender roles are important determinants of LCT within households (Das et al., 2020; Gould and Urpelainen, 2020; Sonne, 2016). Only a handful of studies focus on how different energy and LCT technologies are adopted by women and men based on intra-household power relations (Asibey et al., 2021; P. P. Krishnapriya, 2022). Furthermore, it is noteworthy that although some low-carbon technologies, such as improved cookstoves, may be used primarily by women, women may not choose to adopt these technologies due to bad designs that do not incorporate their needs. These choices reflect the preferences, energy needs and ability to pay of different genders.

Similar differences in the type of climate adaptation strategies adopted by women and men are witnessed in the agricultural context. Ngigi et al. find that the climate adaptation methods adopted by women and men depend on their abilities to deal with risk management (Ngigi et al., 2017). While women in this study adopt crop-related adaptation techniques, men use livestock and agroforestry-related methods. In addition, in a recent review article, Hung and Wang (2022) identify seven intrahousehold factors that may affect households' decisions in response to climate change. These are: (i) gendered division of labor, (ii) disagreements, (iii) conflicts and conflict resolution strategies, (iv) decision-making stages, (v) types of decision-making, (vi) interpersonal influence, and (vii) household life cycle. Nonetheless, studies that capture these factors in the context of climate change and LCT remain rare.

### 1.2.5 Connecting gender to the low-carbon transition

Globally, 70% of the 1.3 billion poor are women (UN, 2022a). Compared to men, women depend more for their livelihood on natural resources. In addition, due to traditional gender roles, women are central to household fuel collection, water collection, and food production (UN, 2022a). However, women have access to fewer resources. Women own only 10% of land, globally (UN, 2022a). There are also gender gaps in access to other resources such as credit, technology, training, and information. This lack of access to resources combined

with traditional gender roles and low agency make women more vulnerable to the effects of climate change and natural disasters (UN, 2022b). If issues of gender empowerment and gender equity are not considered, then climate adaptation and mitigation strategies can potentially generate “new chains of gendered vulnerabilities” (Pearse, 2017). Specifically, in an unequal society these strategies may reinforce gender disparities through unequal access to technologies and market-oriented governance (Pearse, 2017).

Nonetheless, women are critical agents for climate mitigation and adaptation strategies (UN, 2009). Based on their gender roles and dependency on natural resources, women in rural regions in the low-and-middle income countries are key repositories of traditional knowledge of natural resource management (UN, 2022b). Furthermore, evidence suggests that businesses with women in leadership roles increased their consumption of renewable energy and saw a reduction in GHG emissions (Altunbas et al., 2022; Atif et al., 2021). Women are active change agents in the low-carbon transition (Michael et al., 2020).

In this report, we aim to identify different the ways in which different sectors will manage the LCT and the gendered implications, alongside what we know about policies that address gender and climate, and the financial resources available to enact a gender-transformative low-carbon transition. Throughout, this report considers the role of women in society and their access to resources: natural resources, physical infrastructure, financial resources, and ICT. How will these be affected by the implementation or lack of different LCT strategies? Specifically, what are the potential risks and benefits of LCT strategies by gender, and the gaps in the existing evidence?

Addressing these questions will help provide useful insights on the gap in understanding gender-based impacts of LCTs, mitigating risks by recognizing gender specific impacts of LCT strategies, and carefully planning, designing, and implementing gender-sensitive and gender-inclusive LCT policies. This includes redistributing the risks of climate change such that the vulnerable population does not bear the disproportionate burden of adverse impacts. The ultimate goal is to support more equitable LCT strategies that also empower marginalized genders by providing more opportunities that help achieve gender equality.

## 1.3 The gendered economy & low-carbon transitions

The COVID-19 pandemic has had huge global economic impacts, hitting frontline and essential workers, increasing

care burdens, and accelerating the shift towards digital and remote work, with implications for the work and welfare. The UN predicts that the gender poverty gap for ages 25-34 will worsen from 118 women for every 100 men in 2021 to 121 women in 2030 (UN Women, 2020). In the African context, it has been noted that women often run smaller businesses that are more vulnerable to economic shocks, and that they are more often responsible when daycare or school closures occur (Danquah et al., 2020). In Asia, women's participation in the labor force decreased by 1.4% while men's decreased by only 0.8%, although in countries like India it was men's paid labor that was initially hit hardest (Deshpande, 2022). The broader trend in the region has potentially been attributed to women's roles in heavily impacted sectors such as textile manufacturing, education, public administration, wholesale and retail trade, and health and social services (Asian Development Bank, 2021). The same pattern occurred in Latin America, where 70% of health workers are women, who faced extreme conditions during the pandemic.<sup>2</sup>

At the same time, countries are seeing other large shifts in employment. It is expected that both men and women may see job losses as manual labor and service jobs give way to automation and digitalization. Men are expected to lose 1.7 million jobs from manufacturing, production, construction, extraction work, and gain only 600,000 jobs in architecture, engineering and computer and mathematical fields. Meanwhile women are expected to lose 370,000 jobs from the same fields but gain only 100,000 jobs in architecture, engineering, computer and mathematical fields (Badran, 2019; WEF, 2016). This is in part due to the significant gap in STEM education for women, which is leaving women and girls behind in an increasingly digital world (Badran, 2019). Women are also more likely to be found in informal sectors, outside the reach of state regulations, which comes with its own risks (Anderson and Fisher, 2022). Addressing the need to build capacity in key skills for the low-carbon transition among all genders is a critical element to envisioning a just transition that includes all genders.

Acknowledging that labor can be informal or formal, productive or reproductive, and paid or unpaid, women and men are both already integral to the global economy. This section considers how transitions across key sectors - energy, forests, agriculture, transport, textiles manufacturing and care work - are expected to be impacted by climate change,

how that will impact genders differently, and how these transitions can be made more inclusive.

### 1.3.1 Gender, Jobs & the LCT

A low-carbon transition is a movement from carbon intensive practices, technologies, and processes to less-carbon intensive approaches. These approaches are inherently gendered, through who makes decisions, who does the labor, and who is impacted. Gender equality is not an inevitable outcome of a low-carbon transition, and so in order to promote SDG 5, we need to understand the likely impacts of these new low-carbon approaches on all genders (Dupar and Tan, 2023).

At a high level, there is some evidence on where men and women exist in the formal labor force, but even identifying gendered labor composition in new low-carbon practices is challenging (IZA Institute of Labor Economics, 2022; NBER, n.d.). What will this transition mean for the gendered nature of jobs, what might the impact be of this transition for all genders, and what evidence is there of this impact?

Another broad narrative has emerged that posits that women leaders are more likely to lead to good climate outcomes. Advocates point to evidence that businesses with women on their boards are more likely to invest in renewables and reduce carbon emissions (BII, n.d.). At a more micro level, some evidence suggests that women in decision making roles improve forestry practices and reduce deforestation (Agarwal, 2010, 2009). This section synthesizes these findings within key LCT sectors.

**Table 1 Low-Carbon Transitions by Sector**

Sector	High-Carbon Tech & Practices	Low-Carbon Tech & Practices
Energy	Fossil fuels Traditional cooking	Utility scale & off grid renewables Clean and improved cooking
Forests	Deforestation	Afforestation Reforestation Improved Forest Management
Agriculture	Unsustainable Practices Land Degradation	Climate Smart Agriculture Sustainable Land Use
Transport	Internal Combustion Engine Vehicles Car-based planning	Electric Vehicles Public (electric) transportation Increased cycling infrastructure
Manufacturing: Textiles	Fast fashion production High-carbon fiber sources Carbon-intensive manufacturing Fossil-fuel based	Reduced demand Low-carbon fiber sources Spin-dyeing Energy-efficiency measures Renewables-based

<sup>2</sup> (ECLAC - covid report) – Citation from the LatAm Regional Review

### 1.3.1.1 Energy

Energy for household or industrial use represents the largest share of global GHG emissions (Ritchie and Roser, 2020). A low-carbon transition would reduce fossil fuels in favor of low-carbon or renewable energy, increase the adoption of off-grid electricity services and transition households to cleaner cooking technologies. Fossil fuels are still the source of over 60% of global electricity generation, although in 2020 there was almost 7% growth in electricity generation from renewable sources (IEA, 2021a, 2021b). At the same time, 770 million people live without access to electricity and 2.5 billion live without access to clean cooking solutions, the latter particularly impacting the health and time use of women and children (IEA, 2022a, 2022b).

Within research that has focused on gender and energy in LMIC contexts, the major focus has been on the relationship between improved cooking solutions and women's health and drudgery, finding that cleaner cooking technologies improve women's health and save time and effort (Barnes and Samad, 2018; Das et al., 2020; Ding et al., 2019; Jagger and Das, 2018; Jeuland et al., 2021; Jeuland and Pattanayak, 2012; Köhlin et al., 2011). However, even when messaging focuses on the health impacts, women may have a lower willingness to pay for clean cooking technologies (Beltramo et al., 2015). Further research is needed to clarify whether these improvements occur across contexts and to better understand the connection between these benefits and gender empowerment.

Less research has focused on the impact of electricity access on gender, but there is evidence that electric household appliances can save women labor and time (Afridi et al., 2023; Chandrasekaran et al., 2023; P.P. Krishnapriya et al., 2021) (see box 1.1.1.1). The expectation is that saved time could be devoted to income-generating activities, leisure, or education, which would positively impact women's empowerment (Cuberes and Teignier, 2014; DeGraff et al., 2017; Gornick and Meyers, 2003; World Bank, 2012). However, evidence is mixed on whether electricity access improves women's jobs quality and earnings (Akpandjar and Kitchens, 2017; Dasso and Fernandez, 2015; Dinkelman, 2011; Van de Walle et al., 2013). Finally, very little evidence exists about the relationship between renewable technologies and gender. There are certainly potential connections between renewables, land use and gender or else between fossil fuels, air pollution and gender, but very little research focuses on gender and utility-scale power generation.

Evidence also warns that access to electricity may actually only serve to alter time allocation, by creating the potential

for women to push tasks into the evening while undertaking the same hours of chores (Barnes and Sen, 2004; Lamb, 2019; Pueyo and Maestre, 2019). While daylight hours could be used for additional income generating activities, this leads to a 'second shift' wherein women still must manage domestic tasks in addition to market employment (Hochschild and Machung, 2012; Lamb, 2019). In high-income countries, the division of labor within households persistently places the burden of unpaid labor on women even as women have entered the workforce (Miller, C. C., 2020; OECD, 2019). In all cases, while energy technologies can affect the capacity for different time allocation, the actual allocation of time is moderated by social expectations and infrastructure (Dinkelman and Ngai, 2022; Pueyo et al., 2020; Pueyo and Maestre, 2019; Standal and Winther, 2016).

#### Case Study: Energy Services & Time Use

Increasingly, clean energy is being connected to how women use their time, particularly in the case of improved cooking technologies. Collecting solid fuel and cooking using inefficient stoves imposes real time and health burdens, which are disproportionately borne by women (Jagger and Das, 2018; Jeuland and Pattanayak, 2012; Köhlin et al., 2011). Recent research has found that households that use improved cookstoves save around 34 minutes a day, but critically, whether that time is saved by men or women varies across country contexts. In Rwanda, Cambodia and Myanmar, the most significant time savings are actually realized by men, while time savings in Nepal are driven by women (Chandrasekaran et al., 2023).

Similarly, a lack of access to electricity can hinder a household's adoption of domestic appliances, which researchers believe could save women time and effort (Köhlin et al., 2011). What little evidence we have does support the idea that electrification increases the time that women devote to market work and decreases participation in agricultural labor, suggesting that saving women time may occur concurrently with other economic transitions (Dinkelman, 2011; Grogan, 2016; Imelda and Verma, 2019; Pueyo and Maestre, 2019). Some historical US evidence suggests that the introduction of durable goods freed up women

to enter the workforce (Greenwood et al., 2005). It's possible that time-saving devices are also purchased when women have disposable income from labor market participation (Bose et al., 2021).

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There is also a growing body of literature on the relationship between mining, masculinity, and gender. Mining is a key sector in the low-carbon transition, whether through the phase-out of coal mining or the inevitable ramp-up of mining for minerals for clean energy technologies, such as graphite, lithium and cobalt. Women are more prevalent in small-scale or artisanal mining (Lahiri-Dutt, 2015). There is evidence that industrial mining shifts women's labor from agriculture to the higher paying service sector, although

total female employment decreases, as the service sector has fewer jobs (Kotsadam and Tolonen, 2016). But critically this is a sector where the impacts on men and masculinity are also explicitly explored (Lahiri-Dutt, 2011). In Chile, social networks around copper mines privilege masculinity while also offering a critical social respite for male copper workers (Barrientos Delgado et al., 2011). In the Democratic Republic of the Congo, men have moved to mining areas to find new sources of income, and conspicuous consumption, credit and debt dominate the lives of the men who work there, causing tension between this culture of masculinity and the expectation that they support their families back home (Cuvelier, 2017). In Australia, mining employment decreases income inequality among men but increases inequality among women (Reeson et al., 2012). Further research is needed to understand what gendered economic and social changes a low-carbon transition could enact on this vital sector.

In terms of the future of employment in the energy sector, there were 12 million renewables jobs worldwide in 2020, and it is anticipated that the global energy sector will grow to 114-122 million total jobs by 2050, with approximately 43 million in renewables (IRENA, 2021). Because women hold proportionately more jobs in the renewable sector, there is a common narrative that women can be more easily integrated into the sector (Nelson and Kuriakose, 2017). Certainly, empirical evidence has found that women perform as well as men in off-grid renewable energy enterprises (Barron et al., 2020; Klege et al., 2021). However, recent research found that women only make up 23% of the DRE sector in Kenya and 27% in Nigeria (Shirley et al., 2019).

Analysis also finds that women face both vertical segregation (into particular sectors) and horizontal segregation (into particular roles within those sectors). Women represent 32% of the renewables sector as opposed to 22% of the oil and gas sector (IRENA, 2021). Across the sector they are predominantly found in administrative (45%) and non-STEM positions (35%), which tend to be lower-paid than STEM positions (see Figure 2) (IRENA, 2021). Other aspects of identity can also constrain access to these jobs, such as caste or class-based social status (Stock, 2021).

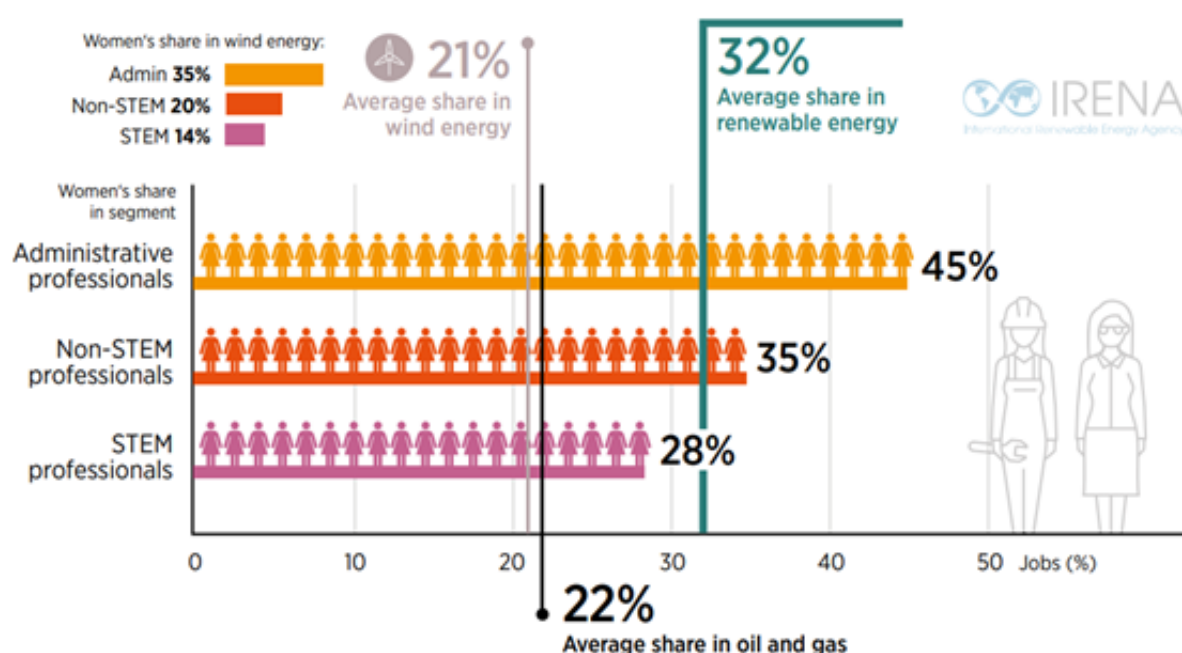


Figure 2 Women's share in the oil and gas, renewables and wind power workforce, with breakdown by STEM, non-STEM and administrative positions in renewables; Source:(IRENA, 2021)

The expectation is that growth in the sectors will focus on male-dominated, medium-skill positions, where women will only have access to a small number of new jobs unless they are trained in relevant fields. Of the 25 million new jobs that the ILO anticipates will be created by a sustainable energy transition by 2030, 19 million are anticipated to be held by men and only 6 million by women (IRENA, 2021) (see Figure 3). More research is needed to understand how this gender breakdown will manifest by sector, and particularly

by region or locality. This is a first step to identifying what training or re-training will be needed to support a gender-just transition in the sector, and to answer the question: what interventions will help women to overcome key barriers to entry into the renewable energy or utilities sectors in LMIC contexts? Training would have to sit alongside additional enabling environment support, such as family or child care policy, improved access to grants, and financing for training and education.

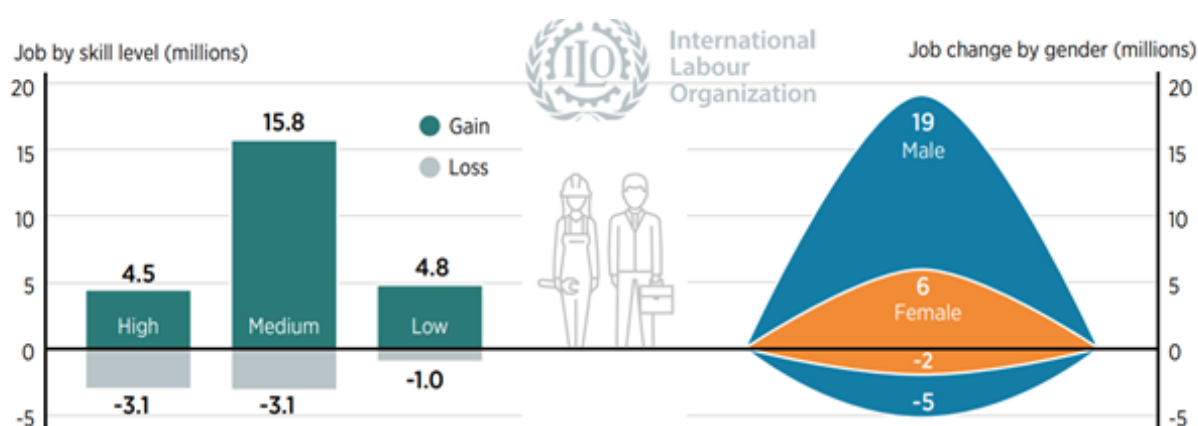


Figure 3 Jobs created and destroyed in an energy sustainability scenario to 2030, Source: (IRENA, 2021)



At the same time, women remain underrepresented in leadership roles across energy industries. Women make up only 11% of senior management roles in the renewables sector, which is actually slightly less than in the oil and gas sector (IRENA, 2019). The utilities sector does best with 17% of senior leadership roles filled by women, and renewables lag behind even oil and gas at 13% (IEA, 2020).

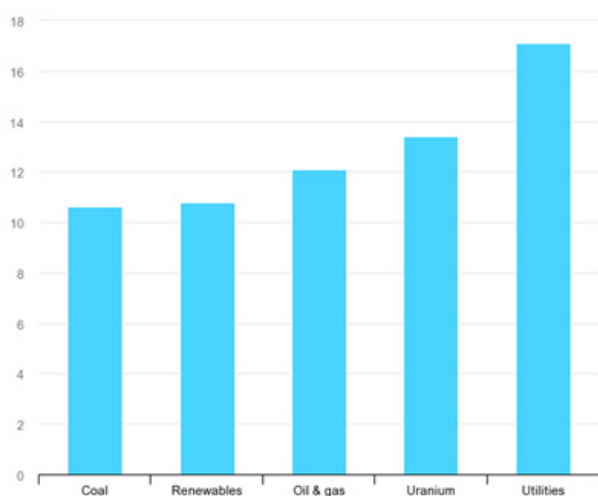


Figure 4 Women in senior management roles by energy sector, 2019; Source: (IEA, 2020)

Women's leadership is perceived as especially valuable because some studies find that women's social and political power is correlated with stronger clean energy outcomes. At the household level, women with increased bargaining power and empowerment indicators adopt more sustainable energy solutions (Alem et al., 2020; Choudhuri and Desai, 2020; Fingleton-Smith, 2018; P. P. Krishnapriya, 2022; Tsagkari, 2022). However, women may be more sensitive to price and more likely to put the needs of the household above their own preferences. At the government level, there is also some evidence from Africa that women in positions of political power also increase the deployment of renewables (Opoku et al., 2021). More research is needed to determine whether empowering women inevitably leads to more sustainable energy outcomes (Miller and Mobarak, 2013; Zahno et al., 2020).

### 1.3.1.2 Forests

Unlike the other sectors in this report, which are net contributors to climate change, forests are actually a net carbon sink of 7.6 billion metric tonnes of CO<sub>2</sub> annually (Harris and Gibbs, 2021). However, forests can become carbon sources when they are cleared or degraded, often through the course of deforestation. Today's forests emit an

average of 8.1 billion metric tonnes of CO<sub>2</sub> every year (Harris and Gibbs, 2021). A low-carbon transition would minimize deforestation and support afforestation or reforestation (a potential saving of up to over 10 PgCO<sub>2</sub>e per year) and improved forest management (up to 1.5 PgCO<sub>2</sub>e per year) (Griscom et al., 2017).

A long history of literature has focused on the impacts of deforestation on women (Dhali, 2008; Manmohan and Jasleen, 2010; Mishra and Mishra, 2012; Rawat, 1995), with more recent research focusing on potential solutions: increasing women in decision making, land tenure interventions, and promoting better practices (Aluko et al., 2020; Salahodjaev and Jarilkapova, 2020; Savari et al., 2022; Stiem and Krause, 2016; Tseng et al., 2021). Digging into a few case studies, it is clear that the negative impacts of deforestation are felt by both men and women, but responses to land change and subsequent migration are very gendered (Heyzer, n.d.). Logging can force populations to shift cultivation practices and encourage out-migration of men, leaving women to pick up the labor shortages, and female children to take over greater childcare responsibilities (Heyzer, n.d.). Evidence generally finds that men migrate, often to urban areas, in order to find work and that women are left in rural areas to take on more care and subsistence agricultural labor (see Section 3.2). That being said, in the context of the Ecuadorian Amazon, research has found that deforestation pushed men to migrate deeper into rural areas to continue deforestation practices while young women were more likely to migrate to urban centers (Barbieri and Carr, 2005). In the Andes, illicit crops and cattle raising are key drivers of deforestation, connecting the forest sector to the agricultural sector (Hoffmann et al., 2018).

Less research focuses on the gendered impacts of reforestation, afforestation or improved forest management. Even in improved forest management programs, where women are assumed to benefit, women are asked to take on implementation without regard for the other care labor that they are also responsible for (Westholm and Arora-Jonsson, 2015). Further work is needed to explore solutions that take this labor into account while also engaging women in forestry programs. More evidence is also needed on the impact of low-carbon forestry practices, reforestation and afforestation programs on women and men, particularly taking into account impacts on indigenous communities.

In terms of employment, we know that the formal timber industry employs over 13 million people worldwide (World Bank, 2016). In almost all cases, logging is a man's job, and therefore changes to logging practices are most likely to impact men's work. That being said, it is important to note



that changes in men's labor also affect women's labor (Heyzer, n.d.). Women's engagement in non-logging forest work is much more heterogeneous. In some contexts, such as Burkina Faso, women are heavily involved in the production and trade of non timber forest products, but in other contexts that is the work of men (Aguilar et al., 2007; Westholm and Arora-Jonsson, 2015). Researchers will first need to disentangle where women and men work in the forestry and forest goods sectors before understanding how changing practices will affect gendered livelihoods.

In terms of impact, reforestation has the potential to add jobs to the economy. In the US context, researchers found that every \$1 million invested in forest management and reforestation could create nearly 40 jobs (Rudee, 2020). But more research is needed on the expected impact of shifts from traditional practices to new practices in LMICs, where men and women are in the forestry sector and what these changes will mean for their livelihoods. It is also critical to study the interplay in changing employment opportunities and the balance of paid and unpaid labor. Additionally, while women are active participants in many reforestation projects, they continue to have less access to land ownership and titles (Gay-Antaki, 2016). Further work is needed to understand the interplay between gendered land ownership, reforestation, and labor.

In terms of leadership, women have been a critical part of forest management and forest conservation conversations for decades (Aguilar et al., 2007; Shandra et al., 2008). In the late 20th century women led the afforestation charge in East Africa through the Green Belt Movement of Wangari Maathai and the afforestation program of Mama Watoto Women's Group in Kenya (Green Belt Movement, 2022; Nyasimi, 2014). In Cameroon, women have led resistance movements against logging (Veuthey and Gerber, 2010). In Zimbabwe, women's groups play a large role in managing forest resources (Aguilar et al., 2007). However, the logging industry itself excludes women from decision making (Minter and van der PLOEG, 2022). Reviews of REDD+ programming also find that women had limited participation in discussions of these issues, because of underlying power dynamics (Brown, 2011; Khadka et al., 2014). This is critical, because evidence suggests that women's leadership in forest management matters: the studies of Agarwal suggest that women's engagement was correlated to improved forest governance and resource sustainability, including reducing deforestation (Agarwal, 2010, 2009; Manginsela et al., 2021; Nhem and Lee, 2019; Salahodjaev and Jarilkapova, 2020). This research implies that increasing women's access to decision making power in

forestry projects could lead to better low-carbon outcomes. But much more research is needed to determine whether this holds in all contexts, and how to increase women's role in decision making without overburdening actors who already must balance significant care labor responsibilities.

### 1.3.1.3 Agriculture

Agriculture currently represents around 11% of global GHG emissions (Arcipowska et al., 2019). A shift from traditional practices to climate smart agriculture comprises dozens of disparate, highly localized practice changes. This makes it much more challenging to understand the likely trends in gendered employment within the sector. A low-carbon transition would have to address soil nutrient management, conservation agriculture, solar irrigation, integrated tree-crop-livestock systems, high yielding and drought resistant seeds, agriculture insurance, and improved climate information systems (Griscom et al., 2017; Partey et al., 2018). What we do know is that women are very present in this sector alongside men, and that there is some evidence about the synergies and tradeoffs between climate smart agricultural practice and gender. Yet enough information to identify what the expected labor impacts might be on gender nor enough information to solve the emergent problems.

There is evidence that climate-smart agricultural (CSA) practices may have unintended consequences, specifically on drudgery, food security, residue use, and mechanization, but the focus has not been on these potential impacts on gender (Afridi et al., 2022a; Beuchelt and Badstue, 2013). Instead, research focuses on the role that gender might play in technology or practice adoption. Evidence suggests that women in West Africa are more likely to adopt zai technology than men, and that women in East Africa are more likely to adopt a climate-smart push-pull technology, because it better matches their preferences (Murage et al., 2015; Ndeke et al., 2021). In Bangladesh, women were less inclined to adopt weather-index insurance, because they had a lower level of trust in insurance institutions and lower financial literacy (Akter et al., 2016).

In agriculture, there are large constraints to overcome: women lack access to finance or resources, men have greater access to information and extension services, and many adaptation strategies create greater labor for women (Jost et al., 2016). One study that explored climate-smart agriculture in Uganda, Ghana and Bangladesh found that new practices, such as composting, were labor-intensive and often fell to women (Jost et al., 2016). A major constraint to changing practices is land ownership, which is far less common among women but has a large influence on who makes agricultural

decisions (Agarwal et al., 2021; Kang et al., 2020; Twyman et al., 2015; van den Bold et al., 2015; Yokying and Lambrecht, 2020). Additionally, in the case of extreme weather events, women's incomes are less resilient, given that they may have less access to non-farm work opportunities (Afridi et al., 2022b). More research is needed to determine whether CSA practices could improve women's resilience in these circumstances. Beyond this, even reviews acknowledge that there is little research on gender and climate smart agriculture (Chandra et al., 2018; Rosenstock et al., 2016).

This matters because women and men are both critical actors in agricultural value chains. Women make up an average of 43% of agricultural workers, with two thirds of women employed in farming in the least developed countries (CGIAR, 2021). Women and men are therefore both equal stakeholders in changing practices, and organizations aim to engage women in interventions. However, one CSA intervention in Nepal noted that although the adoption of new technology seemed to have improved empowerment outcomes, there was limited participation from women, particularly from women who were underprivileged, implying that interventions need to develop a "caste friendly" approach to participation (Khapung, 2016). Future studies could explore the complex relationship between technology adoption and labor, considering gender and intersectional elements such as caste, income or education.

In general, given that women are active participants in agriculture across the world, it is likely that changes in labor requirements or income related to CSA practices would have an impact on women's lives, potentially shifting the burden on agricultural labor along gendered lines. Historical examples of mechanization, for example, have found that these technologies can displace women's labor (Afridi et al., 2022a). However, very limited research considers what these future changes would look like and how they might differ by gender, particularly considering how they may impact wealthier women's opportunities as compared to poorer women's work.

#### 1.3.1.4 Transport

Transport is the second largest contributor of GHG emissions, representing 24% of global CO<sub>2</sub> emissions (IEA 2022). Three quarters of those emissions come from road transport alone, followed by aviation and shipping (IEA 2022). Road transport is a more significant proportion of emissions in Asia than in Africa or Latin America where road density is lower (Calderón et al. 2018). As income increases across LMIC countries, car ownership is expected to increase and, along with it, carbon emissions attributed to

automotive vehicles. To avoid this, countries are pushing for greater access to affordable electric vehicles, increased public transportation, and improved cycling infrastructure.

While a great deal of evidence exists on women's experiences on public transportation, little evidence exists on the gendered impact of these green transport transitions. Men tend to take single, direct routes to and from their primary place of work, while women take multiple, shorter trips as they combine tasks, but transport infrastructure is not well-designed for this type of mobility (Borker, 2022). Evidence from across the world, including LMICs, suggests that women's harassment on public transport is a global issue - from Nepal to Pakistan, New Zealand to Colombia (Chowdhury and van Wee, 2020; Hoor-Ul-Ain, 2020; Infante-Vargas and Boyer, 2022; Neupane and Chesney-Lind, 2014; Quinones, 2020; Tripathi et al., 2017). While harassment occurs for both the young and the old, poor, already marginalized women face greater vulnerability (Infante-Vargas and Boyer, 2022; Lorenzo, 2008; Neupane and Chesney-Lind, 2014).

Improvements to public transportation could improve women's economic prospects significantly, as several studies have found that increased public transport improves women's employment opportunities (Martinez et al., 2020; Matas et al., 2010). Taken together, the research above has found that women tend to feel less safe on public transportation than men and use it less, but, conversely, they are more reliant on it for transportation, limiting mobility and its subsequent employment options. More studies are needed on the types of public transport infrastructure that will make public transport more accessible to women, particularly in a wider variety of country contexts. There also needs to be more research on how public transportation can be made more appealing to men.

Concerning other transportation options, like cycling, evidence from Latin America suggests that women perceive greater risk than men do, and poor women are less likely to cycle while poor men are more likely (Aguilar-Farias et al., 2019; Montoya-Robledo and Escovar-Álvarez, 2020). In India, as incomes increase so do trip lengths for men and women, but wealthier women also use paratransit while wealthier men use personal motor transport (Mahadevia and Advani, 2016). While e-rickshaws may provide women another comfortable transport option, there is little evidence of gendered adoption at this time, and essentially no other evidence on the relationship between gender and e-mobility in LMICs or the potential impact of the impact of electric vehicles in Latin America, sub-Saharan Africa and Southeast Asia (Kawgan-Kagan and Popp, 2018; Singh et al., 2021).

These LCT transport transitions will also impact employment in the automotive and transport industries. These are both male dominated-sectors. In the US, the second largest car manufacturing nation, 76% of auto employees are men. This is emblematic of low female employment in the sector globally, although proportions vary widely from 15% women in Turkey to 45% in Vietnam (ILO, 2020a). This is matched by low rates of female membership on automotive company boards. A sample of firms in China found that 27% have only one woman on the board, 18% have two, and 2% have more than two women (Horak and Cui, 2017). Women make up less than 8% of all execs at top 20 auto companies (20 First, 2018).

As the share of electric vehicles increases, any associated job losses are likely to hit men's jobs the hardest. Electric vehicles need fewer parts, have a longer lifespan, require fewer hours to manufacture and less maintenance and repair, which is why Germany is expecting to lose up to 400,000 auto jobs as EV sales increase (Dawson et al., 2019; Miller, 2020; OECD, 2022a). Despite this, the ILO expects that increasing EV production to 50% of vehicles will actually add nearly 10 million jobs to the global economy and 500,000 jobs to the transport industry, although almost all those jobs will be in the Global North (ILO, 2020a).

Asian countries are currently leading in EV automotive markets, which may mean a loss of automotive jobs elsewhere (Mexico, Brazil), but increases in China, Japan and South Korea. Recent investments in African car manufacturing is turning Morocco into a hub for electric vehicle production, and Volkswagen is conducting an e-mobility pilot in Rwanda (Harper, 2021; Volkswagen, 2019). This represents an opportunity to encourage women to go into the automotive industry, but more research is needed on what barriers women face in LMIC contexts and how to overcome them (ILO, 2020a; Lytle et al., 2019).

In terms of public transportation, women represent only 15% of global jobs even though women are highly dependent on public transportation (Godfrey and Bertini, 2019; ITF, 2019). Although there are no estimates of women in leadership roles in public transport, the World Bank believes that poor investments in public transport safely stem from male-dominated decision making and call for greater evidence on the relationship between gender and transport (Legovini et al., 2022). Once again, the ILO expects that increasing investment in public transport could create over 2.5 million transport jobs, most of which currently will go to men (ILO, 2020b). Some cities have made particular efforts to address this trend, such as Bogota. Bogota's TransMilenio rapid bus

transit system prioritized hiring women and vulnerable social groups, resulting in a quarter of TransMilenio employees being women, 62% of whom are single mothers (Ghojeh and Coccoli, 2019). While some efforts have been made to understand barriers for women in this sector, academically rigorous data and evidence from LMICs is lacking, as are studies of successful programming to incorporate women in the sector (ILO, 2013).

#### 1.3.1.5 Manufacturing: Textiles

The textile industry - clothing and footwear production - generates 10% of global greenhouse gas emissions (European Parliament, 2022). Women represent 80% of the world's garment workers, a trend that has been in place for decades (Kabeer, 1991). The industry is already expecting climate change to increase gendered challenges: namely, heat stress and increasing care responsibilities (ILO, 2021). Women in the industry tend to be segregated into low-paying, low-skilled sectors and have little negotiating power or voice within their workplace (ILO, 2018a). DFIs are seeing manufacturing as an opportunity to support women's career opportunities while also promoting sustainable development (BII, 2020).

For the past two decades, scientists have been developing technologies to minimize the energy use and carbon emissions of textile production, with a heavy focus on garment manufacturing in South and Southeast Asia (Hasanbeigi and Price, 2015; Hong et al., 2010; Schnitzer et al., 2007; Zabaniotou and Andreou, 2010). More recently, studies have sought to connect the textile industry to the SDGs although few studies appear to connect gender equality to sustainable textile manufacturing processes (Cai and Choi, 2020; de Oliveira Neto et al., 2019). Some studies that use life-cycle assessment have considered how these processes could reduce their environmental impacts, including energy use (Moazzem et al., 2018; Woolridge et al., 2006; Zamani et al., 2018; Zhang et al., 2015). There are consumer policies that lower emissions, such as washing clothing at lower temperatures and encouraging less clothing consumption (Morgan et al., 2018; Seebauer et al., 2016). Shifting to spin-dyeing textiles can reduce emissions (Terinte et al., 2014). One study has suggested that a carbon tax could encourage the selection of lower-emission textile suppliers (Choi, 2013). But the most commonly recommended action for lowering emissions in the industry is improving energy efficiency (Subic et al., 2013). A recent study found that to achieve a 50% emission reduction, the industry would require either a 78% renewable energy target or a 72% energy efficiency target (Quantis, 2018).

There is evidence that current practices can lead to respiratory symptoms, with chronic cough and chronic bronchitis being

more common among men and upper respiratory tract symptoms more common in women (Schachter et al., 2009). However, there are no academic studies on the gendered impacts of improved practices. There are basically no studies on the impact of these practices outside of environmental impacts, despite potential connections to gender. Switching to lower-emissions practices could potentially lower indoor air pollution, and may reduce exposure to dangerous chemicals and improve working conditions, which would affect the large scale workforce of women. Depending on whether new approaches involve easier or harder physical tasks, practices could either affect workplace injury or whether women are hired for those tasks. For example, men are given more opportunities in sub-fields that require more technical skills. However, there is no evidence on the impact of lower-emission textile production practices on gender in the workforce. Finally, there is some acknowledgement that “fast fashion” style hyper-consumption of garments is unsustainable, and some research suggests decreasing garment consumption (Peters et al., 2021). There is little evidence on the impacts of lower demand on employment in the sector, and whose jobs may be lost.

There is evidence that women are more concerned than men about the environmental impact of “fast fashion” consumption trends. Gazzola et al., 2020, found that women, especially women between 18 and 34 years old who were either students or well educated, were more likely to be knowledgeable and concerned about sustainability issues in the fashion industry (Gazzola et al., 2020). This has been found in other studies (Niinimäki and Hassi, 2011). This may imply that increasing women’s leadership in the sector could support a transition to lower-emissions practices, but more research is needed to determine this relationship.

### 1.3.2 The Care Economy

Care work is a critical part of a healthy economy, and it is anticipated that climate change will both increase the amount of care work required and also increase its difficulty. Additionally, those responsible for care work are already adapting to climate change in different ways than those without care responsibilities, making it a critical dimension of climate adaptation. Here we define care work as both direct and indirect acts of care whether paid or unpaid. Direct acts include bathing, feeding and engaging with people in need of care, whereas indirect acts cover necessary activities for engaging in direct care such as cooking, cleaning and shopping (MacGregor et al., 2022).

Because care work is often “invisible,” climate and development interventions that target women risk exacerbating

inequalities by ignoring women’s disproportionate care work and inadvertently overburdening them. In order to create low-carbon interventions that support gender equality, we need to better understand the scope of climate change’s impacts on care work and test intervention models that acknowledge and support care activities.

#### 1.3.2.1 What is the impact of climate change on care work?

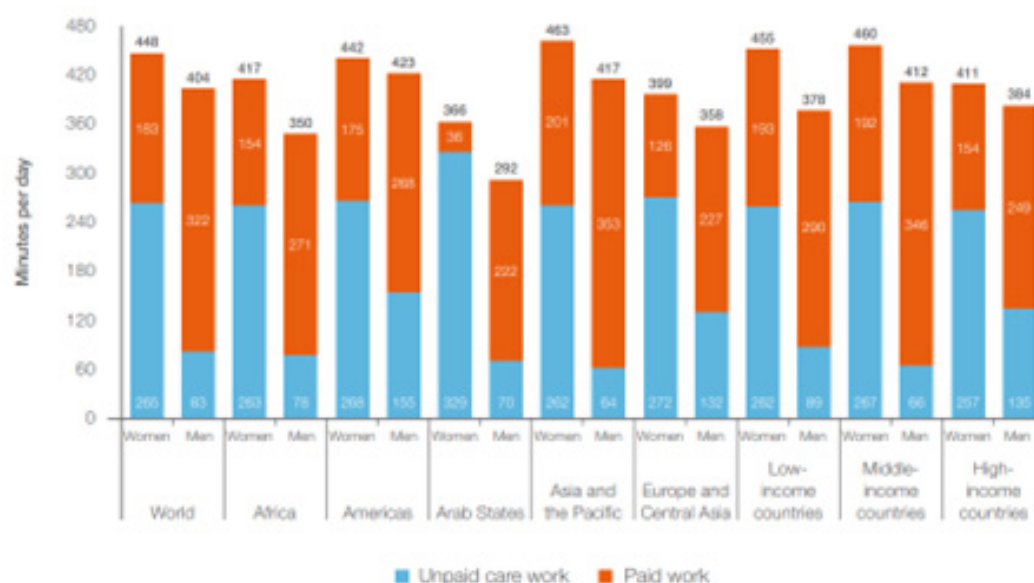
The scale, challenges and division of care work are impacted by a range of contextual features, including gender norms, social safety nets, physical infrastructure, health, migration and displacement, and the environment (MacGregor et al., 2022). Climate change is anticipated to increase the amount of care work required and make that work more arduous, although there is a lot we don’t know about where impacts will be felt most, which segments of society will be most impacted, or what the impacts might be on paid care work.

Oxfam America’s backgrounder “Caring in a changing climate: Centering care work in climate action” is the most comprehensive study on the relationship between climate and care work to date (MacGregor et al., 2022). This report details the evidence that we have on the impact of climate change across direct, indirect and environmental care work. It finds that climate change is likely to increase unpaid care work as people must manage climate-related health impacts (Aguilar et al., 2015; FAO, 2016; IPCC, 2014; UNFPA, 2015; UNHCR, 2019), take greater efforts to secure food, water and energy sources (FAO, 2016; Meyiwa et al., 2014; Otzelberger, 2014; Oxfam, 2019; UNFPA, 2015), manage the loss of care infrastructure (UN, 2019b), including breakdown of personal networks and support, and the loss of those networks leading to women and even children taking over care work alone (Oxfam, 2020, 2017; UNFPA, 2015). Climate impacts are already causing large-scale migration, leaving more work for women carers left behind when family members (mostly men) migrate for paid work, including caring for dependents left behind (Babugura, 2019; Rao et al., 2020; Richards and Bradshaw, 2017; UNFPA, 2015). Finally, there is the ongoing risk of losing technical, indigenous and agricultural knowledge as people are displaced or knowledge-holders migrate (Aguilar et al., 2015; Rao et al., 2020; Richards and Bradshaw, 2017; Slavchevska et al., 2016; UN, 2019b). Balancing all these needs means prioritizing some over others (Resurrección et al., 2019).

#### 1.3.2.2 Who does care work?

Care work is performed predominantly by women in all countries across the world. On average, women perform 76.2% of total care hours and there is no country in which men and women perform an equal share of care work (ILO,

2018b). On average, women in low- and middle-income countries do a greater proportion of care work, especially unpaid care work, as opposed to those in high-income countries (Figure 5).



Note: See Chapter 2, figure 2.8 (64 countries).

Source: ILO calculations based on Chames, forthcoming.

Figure 5 Time spent daily in unpaid care work, paid work and total work, by sex, region and income group, latest year; Source: (ILO, 2018b)

The COVID-19 pandemic has laid bare the gendered and vital role of the care economy (Heintz et al., 2021). Findings from Britain, Australia, the United States and other high income countries showed that women, especially women with children, disproportionately increased their care work even when both men and women worked from home (Adisa et al., 2021; Craig and Churchill, 2021; Power, 2020; Yildirim and Eslen-Ziya, 2021). Some scholars see a link between the impacts of COVID-19 and the future impacts of environmental crises, wherein women act as economic “shock absorbers” during difficult times, taking on more unpaid labor in order to support families and communities (Heintz et al., 2021).

Paid care work represents a growing sector of the global economy, which will be expanding in the coming years as

climate change increases its impact on local economies. As of 2015, 151 million care worker jobs existed in education, health and social work (ILO, 2018b). By 2030, even without additional support for these sectors, it is expected that that number will increase to between 189-299 million workers. If additional support is given, it is expected that care workers in those sectors will represent 251-400 million jobs by the end of the decade (ILO, 2018b).

While women make up the majority of employees in the paid care economy, women’s participation varies across different sectors and regions. Globally, women make up 69.6% of health and social workers, 60.6% of educators and 70.2% of domestic workers. However, looking just at education, in Africa women make up 54% of educators, while in Eastern Europe women make up 77% of educators (ILO, 2018b). This



does not consider that men may hold higher paying positions across these sectors, and evaluations of the impact of climate into employment in these sectors must take this dynamic into account.

More research is needed to understand the impacts of climate change specifically on care activities, and the impact of climate change on paid (in addition to unpaid) care work. How might climate impacts affect the need for paid care work, such as increasing health impacts managed by the healthcare systems, or the impact of climate migration on education systems? Additionally, greater research is needed around migration and care. We know that the majority of migrants work in services (63.4%) (King-Dejardin, 2019). What is the impact of climate change and migration on the make-up of the care economy labor force? What are the potential vulnerabilities of migrant care workers in response to climate change?

### 1.3.2.3 How can care work support a low-carbon transition?

Because the care economy is a low-carbon sector, and care is the backbone of a functioning economy, it has been suggested that the care economy is in a position to support low-carbon transitions (Aronoff, 2021; Palladino and Gunn-Wright, 2021). However, there is almost no data or studies to move from the conceptual relationship to action-oriented approaches. More research is needed to articulate the relationship between care work and climate resilience.

Based on the studies above (MacGregor et al., 2022), investments in the care economy can support a healthy society through disasters and health scares, and may improve the resilience of changing local economies. For example, if youth leave rural areas to pursue urban jobs in the wake of agricultural impacts of climate change, rural communities may need additional care infrastructure to support the elderly and those unable to migrate. Therefore, there is a posited relationship between the care economy and climate resilience. Another key narrative is that the care economy is a low-carbon sector, and therefore investments in care work can support a transition to a low-carbon economy (Aronoff, 2021; Palladino and Gunn-Wright, 2021). There is some evidence from Europe, which finds that the total GHG emissions of investing in the construction industry, but there is little understanding of whether this trend holds across regions (De Henau and Himmelweit, 2020). Finally, decarbonizing the care economy could decrease those GHG emissions even further, with hospitals and large-scale health work assumed to be the most carbon-intensive sector of the care industry, but more research is needed to identify the best solutions for decarbonization (Palladino and Gunn-Wright, 2021).

### 1.3.2.4 How can low-carbon transitions support care work?

Low-carbon transitions can support care work by decreasing its burden and freeing up time, in addition to offering additional local income opportunities that prevent migration and improve community resilience. However, almost all of these connections are theoretical, as little empirical evidence exists to connect LCTs to the care economy. Instead, studies find that LCT interventions risk exacerbating gender inequality by offering solutions that neglect women's care burdens. It is only by first recognizing how care is distributed and conducted that LCT interventions can be designed to support women's labor.

As climate change increases the burdens of both paid and unpaid care work, shifts to low-carbon technologies can help support care workers. As health impacts increase, solar direct drive refrigerators and the electrification of health care facilities through standalone solar systems can improve health care infrastructure. As climate events affect animal grazing and caretaking, solar irrigation can support environmental caretakers. As droughts and desertification make firewood harder to reach, improved cooking technologies can lighten the burden. Access to clean electricity can make life easier - keeping people engaged in care work connected, informed and in greater control of their time. Both electricity and improved cooking technologies could save women time and improve time flexibility (see box 3.2.4.1). However, these connections are theoretical, as little evidence exists (outside of energy and time use) to connect low-carbon transitions to the care economy.

A key framework for supporting care solutions is the 5R framework, which advocates for 1) recognizing care work, 2) reducing care work, 3) redistributing care work, 4) representing care working and 5) rewarding/remunerating care workers (ILO, 2018b). Table 2 outlines how the 5R framework can be applied to climate interventions.

**Table 2 Connecting the 5Rs to climate change, adapted from (MacGregor et al., 2022)**

Framework	Climate-related modification
Recognize	<ul style="list-style-type: none"> <li>• Make care inequalities visible so that they are not inadvertently exacerbated by climate change interventions that require additional responsibility, work, and time by carers</li> <li>• Recognize the role of care work in moving to a low-carbon economy</li> <li>• Recognize the knowledge that comes from environmental care work</li> <li>• Recognize the role of carers and the work they do to enable household resilience</li> </ul>



Reduce	<ul style="list-style-type: none"> <li>• Provide labor-saving domestic and agricultural technologies that reduce time and effort of care work tasks</li> <li>• Increase access to climate information services that make it easier for carers to anticipate and plan for climate events</li> </ul>
Redistribute	<ul style="list-style-type: none"> <li>• Address assumptions about men/boys' and women/girls' roles in households in ways that lead to greater sharing of care work</li> <li>• Deliver state-provided health and child care services; embed these care services in national climate policies</li> <li>• Promote the benefits of care collectivization (in households and via community co-ops) for gender equality and climate mitigation goals</li> </ul>
Represent	<ul style="list-style-type: none"> <li>• Include carers in climate action planning so that their care-specific concerns and needs can be embedded from the start</li> <li>• Conduct participatory research with carers to amplify their voices in climate change interventions and lobbying</li> </ul>
Reward	<ul style="list-style-type: none"> <li>• Integrate cash transfers (and other financial mechanisms) that remunerate care work into climate finance schemes such as carbon trading programs</li> </ul>

Without that first step - recognizing care work - climate interventions can have a negative impact. Recent evidence suggests that forest conservation REDD+ projects/non-timber forest products (NTFPs) can restrict men's work in forests which increases needed labor from women in order to compensate for loss of livelihood (Khadka et al., 2014). Economic empowerment programs that run side by side with these projects aim to bring women into non-timber forest products, but rarely acknowledge the care work already being carried out by women, so women may end up working more hours in total - doing a "second shift" at home (Arora-Jonsson et al., 2016; MacGregor et al., 2022; Westholm and Arora-Jonsson, 2015). Even research that touches on these issues rarely makes data collection on women's experiences of care work pre- and post- intervention a central piece of study (Westholm and Arora-Jonsson, 2015). Nevertheless, investment in time- and labor-saving technology and infrastructure is a critical component of a gender just transition (IDRC, 2017).

### 1.3.3 The Digital Divide & the LCT

ICT can support a transition to low-carbon economy by improving the efficiency of production, distribution, and consumption of goods and services and helping decentralize human activities and interactions (IISD, 2010). However, if ICT is increasingly a part of the low-carbon transition, policy makers must also grapple with the reality of the digital divide: some segments of society, especially women, have demonstrably less access to ICT technologies and services (Badran, 2019; Rashid, 2016). There is a clear divide in internet access along gender lines: in South Asia 37% of men

have access to internet compared to 18% of women, while in sub-Saharan Africa 38% of men have access compared to 28% of women (Web Foundation, 2020). In low- and middle-income countries, women are 8% less likely to own a mobile phone and 20% less likely to own a smartphone (Aranda-Jan et al., 2020). Of a recent survey of 15 countries, Bangladesh had the greatest gap, with 86% of men owning a mobile phone compared to 61% of women. Meanwhile, Brazil was the only country in which more women (85%) owned a mobile phone than men (84%) (Aranda-Jan et al., 2020). In general, there is a larger digital divide in mobile phone usage in Asian countries than in African countries (Vimalkumar et al., 2021). As mobile phones, and especially smart phones with internet access, become increasingly important to access pay-as-you-go technologies, climate smart agriculture knowledge sharing, and information sharing in general – e.g. job postings, public transport information, safety and security during travel, etc., – this digital divide is likely to exacerbate inequalities even as ICT advances the low-carbon transition (Jamil, 2021). Shocks such as COVID-19 have also revealed the impacts of the digital gender gap (Mathrani et al., 2022).

Access to ICT intersects with a number of key demographics, with age, education, urban vs rural, and gender being the key factors that have appeared in the literature (Adeleke, 2021; Ancheta-Arrabal et al., 2021; Bornman, 2016; Lembani et al., 2020). Class or caste is another factor that intersects with gender and other demographic elements (Sarkar, 2016). Gender influences access to ICT in part because women are typically less educated than men, they are less aware of the opportunities that mobile phones offer, and they have less digital knowledge and functional literacy (Chen, 2021; Mariscal et al., 2019). However, social expectations can also play a role in limiting women's access to ICT (Mariscal et al., 2019). In one study in Pakistan, women interviewed noted that a lack of access to mobile technology was caused by a lack of trust from male guardians, and in particular that there was a belief that women could not be trusted to have an unobserved social life (Jamil, 2021). The key research question that has yet to be answered, is what does the digital divide mean when increasing technology adoption/digitization is an LCT solution?

### 1.3.4 Intersectionality in the Gendered Economy

Many of the studies reviewed in this section also explored other elements of identity, particularly considering whether trends held across ages, income and region. However, few studies explicitly explore the intersection between gender and these identities. In terms of age, surveys on sustainable textile

manufacturing do find that young women, and particularly young, educated women, cared more about sustainability in fashion (Gazzola et al., 2020). On public transportation, young women face harassment while older women face mobility issues (Hoor-Ul-Ain, 2020; Infante-Vargas and Boyer, 2022). Age also impacts migration trends in the Amazon, where deforestation drives young men deeper into the forest, and young women into urban centers, as they look for jobs (Barbieri and Carr, 2005).

Looking at income, in India, higher incomes are correlated with longer travel, and the wealthiest women use paratransit while the wealthiest men use private motor transportation (Mahadevia and Advani, 2016). In studies on climate-smart agriculture, low-income participants are often the inadvertent victims of the project's success. In Bangladesh, poor and landless women had their work replaced by mechanical threshers but could not leave their homes to look for alternative work and lost income (Paris and Pingali, 1996). In Vietnam, educated wives were present in households that were more likely to adopt plastic row seeders, but the seeders eliminated the need for rice planting labor, which was a critical income source for half the women in poor farming households (Beuchelt and Badstue, 2013; R. Paris and Chi, 2005). In Nepal, a program to adopt new technology left out women who were underprivileged and of a lower caste (Khapung, 2016).

Beyond age and income, other forms of marginalization are also mentioned, but rarely measured. International reviews of the care economy note disproportionate impacts on marginalized women, and particularly women of color and immigrants in the US context, but data is lacking on migration and care in the LMIC context. There is evidence that marginalized communities based on race or ethnicity have greater energy vulnerability, but this research also focuses on the US (Churchill et al., 2020; Churchill and Smyth, 2020; Ngarava et al., 2022; Sunter et al., 2019). Studies on deforestation often address indigenous communities, but these communities are considered less in other sectors (Dhali, 2008). Finally, one study implied that the social exclusion of gender-diverse persons, such as hijra in Bangladesh, could also be related to access to services, in the context of social stigma as it relates to the digital divide (Aziz et al., 2020; Aziz, A. and Azhar, S., 2019). As we can see, this is already several degrees removed from actually studying gender-diverse persons and their inclusion or exclusion from the low-carbon transition and represents the greatest gap in the research that purports to study gender.

## 1.4 Gender & Policy

Policies that address a low-carbon transition, from Nationally Determined Contributions to fuel taxes to forestry programs, can all impact populations differently, depending on gender. These types of policies can also be responsive to the needs of different segments of society, including different genders. Finally, gender can also influence the support that policymakers have for specific policies, especially given the narrative that women are more likely to support environmentally friendly actions. These three dimensions are reviewed in this section, making note of where further research is needed.

### 1.4.1 Gender Mainstreaming & its Critiques

Gender mainstreaming appeared in over half of the NDCs reviewed in this report, and it is increasingly common in discussions of integrating gender into LCT programming, but what does “gender mainstreaming” mean and what do we know about its challenges and successes? In 1997, the UN defined it as:

*“Mainstreaming a gender perspective is the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels. It is a strategy for making women’s as well as men’s concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality.” (UN, 1997)*

This concept emerged in the follow up to the 1995 Fourth World Conference on Women in Beijing, which acted as a turning point for integrating gender considerations into international policy. After the conference, “gender mainstreaming” became a term in use across the world, spread by international NGOs and transnational women’s networks (True and Mintrom, 2001).

Over twenty years later, evaluations of gender mainstreaming have found it to be a promising concept that has failed to deliver across a number of fronts, despite its current popularity in development discourse (Alston, 2014; Rao and Kelleher, 2005). The major institutional critiques focus on the fact that the more gender efforts are made palatable to governments, the less transformative they become (Milward

et al., 2015). As gender mainstreaming enters organizations, it can be co-opted by existing ideologies and interests (Prugl and Lustgarten, 2020). Additionally, although gender mainstreaming typically tries to make substantive process changes by creating “gender units” within institutions, these units are usually underfunded and weak. Another institutional concern is that organizations already have a gendered structure (typically, men in positions of power, women in administrative or less powerful positions) and it is unclear whether this structure can create transformative change (Shrestha et al., 2019).

In terms of process, there is a complaint that gender mainstreaming efforts can lose sight of the results, getting caught up in the organizational dynamics. Although gender mainstreaming is supposed to have two parts - an internal awareness raising and external implementation - there is little evidence on whether gender-aware programs are successfully implemented. Recently, frameworks to measure progress across multiple dimensions of inequality, gender and development have been put forward as a means of quantifying the success of gender efforts in sustainable development and addressing the gap between policy and outcomes (Azcona and Bhatt, 2020). Finally, it is worth noting that funding has an important role to play: if gender mainstreaming programs are expected to be funded by international partners, this expectation can shift the focus of outcomes onto ensuring that the projects are good “value for money” for an external audience (Milward et al., 2015).

Some of these general critiques have been echoed in the energy sector, where advocates of gender have evaluated mainstreaming efforts, despite a slow start to including gender. One interesting finding is that male employees of institutions are more likely to support gender policies when they see them also benefiting men (Clancy and Mohlakoana, 2020). In Africa, it has been noted that gender mainstreaming has focused heavily on the policy level, rather than considering the various levels - societal, organizational, household and individual - that need to better address gender (Musango et al., 2020). One approach to overcoming this challenge has been to undertake gender audits, which have led to the adoption of gender-aware policies in organizations that have

been audited (Clancy and Mohlakoana, 2020). Even as more energy policies engage with gender, there is a gap between policy text and implementation, which may be caused by a range of issues – from inadequate involvement of women in the planning process to a limited understanding of structural gender barriers (Clancy, 2020; Helbert, 2020; Özerol and Harris, 2020; Rojas and Prebble, 2020; Taylor, 2020).

In order to better address structural gender barriers (like social norms), as opposed to focusing solely on visible gender gaps (including access to technologies), there has been a shift towards discussing “gender transformative” policy and programming (McDougall et al., 2021). Gender transformative policies specifically try to address structural gender barriers by focusing on gendered power dimensions (IDRC, 2019). Existing reviews of gender transformative programs have found that they better address shifts in gender attitudes, multiple improvements in gender relations, and simultaneously contribute to other development outcomes (McDougall et al., 2021). Section 6 on Transformative Change goes into greater depth on this concept and its execution.

#### 1.4.2 Incorporating Gender into LCT policy

##### 1.4.2.1 Nationally Determined Contributions

In the latest round of NDCs, countries have been encouraged to consider the gender dimensions of climate change following the Enhanced Lima Work Programme on Gender and its Gender Action Plan (IUCN, 2021). There has been a general consensus that gender was not adequately considered in the first round of NDCs (UNDP, 2017; Women Gender Constituency, 2021). Even in the second round of NDCs, analysis has found that only 30% of countries were actively engaging in processes to integrate gender into NDCs and climate-relevant policy (WEDO, 2020)(IUCN, 2021). It is worth noting that the regions with the least NDC gender inclusion are MENA, Eurasia and Highly Industrialized Economies, while Latin America and sub-Saharan Africa have done the most work to include gender (IUCN, 2021). Within the NDCs, gender is most associated with agriculture (mentioned in 33% of NDCs), energy (25%) and health (21%), and appears least in sections about transport (10%), the green economy (10%), tourism (7%) or the blue economy (2%) (IUCN, 2021).

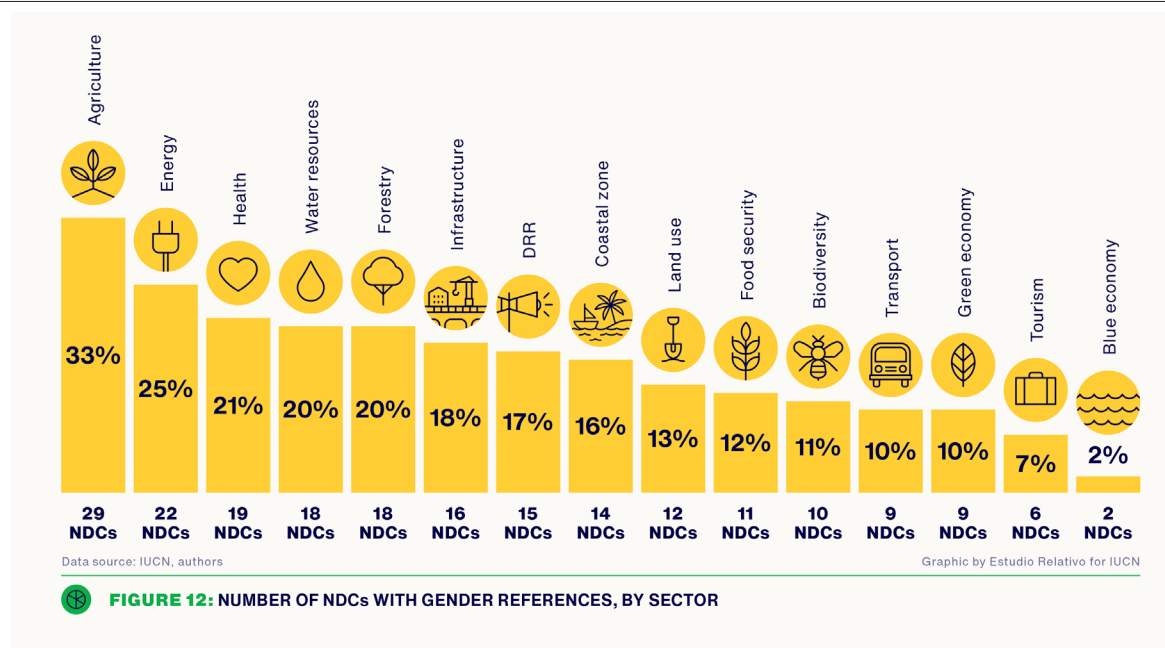


Figure 6 Number of NDCs with gender references, by sector, Source: (IUCN, 2021)

Efforts to better mainstream gender into the NDC process include work by the NDC Partnership, including technical assistance for gender-responsive NDCs: developing/using existing gender equality policies, supporting gender budgeting, conducting risk assessments, developing monitoring and accountability mechanisms with gender indicators, conducting gender analysis, collecting and analyzing sex-disaggregated data, supporting intersectoral coordination and consultation (NDC Partnership, 2019). The UNDP NDC Support Programme also notes the need to consider policy alignment between climate policies and sectoral policies in a gender context (UNDP, 2019).

Within countries included in the Regional Policy Reviews, gender is discussed in all the NDCs, although in Brazil, gender is only mentioned in reference to vulnerable populations. In the African and Asian NDCs reviewed, the focus was strongly on adaptation over mitigation, a trend that holds in other reviews of gender and the NDCs (IUCN, 2021). There was generally little mention of capacity development, and basically no mention within the NDCs reviewed of gender as it relates to finance in Africa, Asia (except Jordan), Latin America (except Costa Rica & Honduras). Across Asia and Africa, it was more common to see references to women as agents of change than in Latin America. In general, reviews of the NDCs note that women are most commonly characterized as a vulnerable group, as opposed to stakeholders or agents of change (WEDO, 2021).

There are short case studies available on countries that have gone above and beyond on gender, such as Nepal and Antigua and Barbuda, and CARE maintains a scorecard on the quality

of gender incorporation into NDCs (CARE, 2021; Dupar and Tan, 2023). However, further research is needed to articulate how gender may relate to the many aspects of the NDCs and to understand the impact of NDC implementation on gender outcomes. Additionally, researchers can help to identify how decision makers can encourage gender diversity in stakeholder engagement around the NDCs and LCT policies and how to scale up best practice.

#### 1.4.2.2 National Adaptation Plans

The connection between gender and adaptation has historically been drawn more clearly, since early discussions of climate change and gender focused on women as victims of a changing climate. However, evidence from reviews of National Adaptation Plans in sub-Saharan Africa find that gender activists are present in discussions, but less likely to see their positions realized in the final NAP (Holvoet and Inberg, 2014). In the case of Bangladesh, while adaptation policy recognizes gender vulnerability, planning and implementation to address that issue is missing, a common sentiment across gender mainstreaming work (Shabib and Khan, 2014).

One approach to addressing these weaknesses is to support greater gender analysis related to the NAPs, which may be happening already as more adaptation planning engages with the Green Climate Fund's Readiness Programme, which integrates gender considerations (Dekens and Dazé, 2019). The major elements that need to be addressed in improving the gender approach of NAPs also echo frustrations of gender mainstreaming advocates: namely, that gender is still interpreted as "women" and there is limited male engagement, a lack of coordination, limited capacity on

gender analysis, absence of monitoring and evaluation, and missing intersectionality. Additionally, there is a lack of recognition that women inhabit multiple roles:

“Owing to the focus on women, there has been a shift among women to embrace productive roles on top of the reproductive and community management roles without a corresponding shift to embrace reproductive roles among men, even in cases of loss of employment leading to time poverty among women.” (Chingarande et al., 2020)

This connects to broader arguments recognized in section 3.2 on the care economy, which acknowledge that gender often determines the roles that people inhabit within an economy and community, and require policies to acknowledge the responsibilities that people, and especially women, may have to also undertake in addition to environmental programs.

#### 1.4.2.3 Low-Carbon Transition Policies

Gender is missing from considerations of other low-carbon transition policies. This is a large research gap, both because women are an integral part of the transition and their role and impacts on them should be considered, but also, critically, because men make up the majority of jobs and decision makers in the key sectors for an LCT. Any changes to these sectors will have an immediate impact on the health and livelihood opportunities of men.

In Latin America, 68% of public policy documents related to the energy transition do not mention gender (Energy HUB, 2021). Most of the country's whose policies were reviewed in LatAm, (Brazil, Uruguay, Peru, Ecuador, Guyana, Costa Rica, Nicaragua, Belize, Jamaica, and Bahamas) do not mention gender or have specific documents for gender and energy (Energy HUB, 2021). In Asia, there are some energy policies that have been recognized as having a strong impact on women, such as Indonesia's Kerosene-to-LPG Conversion Program, but reviews of gender in energy policies typically equate gender with women, ignoring men (Bharati et al., 2021; Thoday et al., 2018).

There is a great need to marry the efforts of climate change policies with gender narratives. In the Asian countries reviewed, gender inequality appears only in the Philippines' 2009 Climate Change Act and the subsequent National Climate Change Action Plan 2011–2028, where a section is devoted to gender mainstreaming. In Vietnam, a review of renewable energy policies found almost no mention of gender (ISPONRE, 2021). While India and Nepal have done better, a recent review found gender was only referenced in 4 of the 14 Indian electricity policies and 6 of the 23 Nepalese policies (Govindan et al., 2020).

Gender is not missing from these policies because of a lack

of interest in gender within countries. Gender Equality plans exist across Africa, Latin America and Asia - with many countries having a Gender Plan or Policy drafted in the last two decades (CEPAL, 2019; Government of Uganda, 2007; Republic of Ghana, 2015). The challenge is that these policies are developed by Departments or Ministries of Women, Gender or Social Inclusion, who typically are not considered core stakeholders of climate policies. More work needs to be done to answer the question: what are the synergies between these policies and climate policies? How do we find connections across ministries, sectors and siloes, between gender and climate policy?

The gendered impacts of LCT policies have also been understudied. There is evidence from the World Bank on how carbon pricing policy may have impacts distributed differently across genders (World Bank, 2021a). In the case of South Africa's carbon tax, some analysis holds that the tax will diminish welfare for poorer households, although there is no explicit mention of gender (Were, 2020). In the case of large-scale hydropower, there is evidence of projects in Laos and Vietnam leading to displacement of populations, which makes it harder for women to find new jobs in comparison to men (Hill et al., 2017). In India, there is evidence that land loss from a large hydro project led to increased alcoholism and domestic violence (Levien, 2017). These studies are the rare exception, as few analyses of policy impacts assess the gendered distribution of positive and negative impacts.

#### 1.4.3 Gender-specific policies

Gender-specific policies do exist to address sectors interested in a low-carbon transition, but they are still rare. This section reviews some of the major categories of policies and what the scholarship reveals about their development, implementation, and impacts.

##### 1.4.3.1 Climate Change Gender Action Plans

Since 2010, IUCN has partnered with countries to develop Climate Change Gender Action Plans (ccGAPs). There are 13 ccGAPs, developed between 2010–2018 (IUCN, 2012a). They cover a range of topics, responsive to the priorities of countries, including but not limited to sustainable agriculture and food systems, Forests and REDD+, Water, Energy, Health, Urbanization, Tourism, and comprehensive disaster management (IUCN, 2018, 2013, 2012b). Within these documents, intersectionality is only mentioned in 23%, and in no cases are there explicit plans to address gendered issues with an intersectional lens. However, in 5 ccGAPs the plan also includes other vulnerable or marginalized communities, such as indigenous communities, within the document, but does not discuss how these identities co-exist alongside gender



(See Nepal 2012, Liberia 2012) (IUCN, 2012c, 2012b).

Scholarly research on these documents acknowledge their relationship to climate disaster planning (Hasan et al., 2019), their role in gender and climate policy in Latin America (Revelo, 2021), and compares their incorporation of gender in the NDCs (van Duijn, 2021). Findings essentially note that these ccGAPs are responsive to the ambitions of each country, mirror the same frame that women are more than victims of climate change, and often exist in contexts where the national NDCs barely mention gender (van Duijn, 2021). However, in the past ten years of ccGAPS little to no research focuses solely on the ccGAPs, their process of development, stakeholder relations, nor their implementation or successes.

Outside of the IUCN's guided ccGAPs, in 2020 the Nigerian Ministry of Environment's Department of Climate Change developed its own National Action Plan on Gender and Climate Change. The policy is ambitious in its scope, with five key objectives: increasing the understanding of climate change impacts among women and other vulnerable groups, promoting gender mainstreaming across all policies, programs and processes related to climate, advocating for the integration of gender into the implementation of the Paris Agreement and Nigeria's NDC, promoting the implementation of gender-responsive adaptation and mitigation, and establishing monitoring and evaluation systems for collecting and sharing sex disaggregated data on climate change issues (Federal Republic of Nigeria, 2020). It is worth noting that, in the African context, gender policies like this are responding to regional frameworks like the Maputo Protocol on the Rights of Women in Africa and East African Community Gender Policy, 2018, as well as to national gender policies. Further research is needed to understand to impact of ccGAPs on climate and gender policy implementation.

#### 1.4.3.2 Lima work programme on gender

At an international level, the UNFCCC has integrated gender through the Lima work programme on gender, which was initiated at COP20 in 2014. In its initial incarnation, the Lima work programme included a two-year work programme that required an annual review by the Climate Secretariat of the implementation of gender-related UNFCCC decisions. In 2016, at COP22, the Lima work programme got a three-year extension. In 2019, at COP25, parties agreed to a 5-year enhanced Lima work programme on gender and its subsequent gender action plan (UN, 2020). This work programme and gender action plan assigns activities to a variety of stakeholders - from Parties to relevant organizations to gender focal points - under a number of topics: capacity-building, knowledge management and communication;

gender balance, participation and women's leadership; coherence; gender-responsive implementation; and means of implementation, monitoring and reporting (UN, 2019c).

Discussion in the academic literature is mostly limited to acknowledging international interest, although one study of the twitter discussions about the Lima work programme on gender did find that the UNFCCC, while technically not lobbying for any particular policy outcome, was central to the online conversation about gender mainstreaming (Jørgens et al., 2016). An intermediate review of this work plan was scheduled to take place on June 6-16, 2022, in Bonn, Germany. However, there are as of yet not publicly available outcomes from that discussion. It is unclear what the impact of these efforts are, and little research discusses the impact, or even the development, of the Lima work programme on gender.

#### 1.4.3.3 Gender & Energy Policies

Outside of national climate policies and the UNFCCC agreements, there are new developments in gender-related policy in Africa, which are contributing to an LCT by incorporating women into the energy transition. In 2017 the Economic Community of West African States (ECOWAS)'s Centre for Renewable Energy and Energy Efficiency (ECREEE) developed a regional policy, the Policy on Gender Mainstreaming in Energy Access (PGMEA). The PGMEA was developed with support from NREL, and meant that all 15 member states of ECOWAS were responsible for developing their own National Action Plans (Morris et al., 2019). To date, 13 countries have done so. There are five objectives of the policy: 1. widespread understanding of energy and gender considerations, 2. ensure that all energy policies, programmes and initiatives are non-discriminatory and gender-inclusive, 3. increase women's public sector participation in energy-related technical fields and decision-making positions, 4. ensure women and men have equal access to energy-related fields in the private sector, and 5. a comprehensive monitoring and accountability framework (ECOWAS, 2017).

As the ECOWAS policy is very recent, there are only a few papers that review its development. These papers find that the policy was aimed at "changing the mind-sets" of stakeholders, but the constituent governments will have to provide incentives for implementation (Maduekwe et al., 2019). Another finds that ECOWAS has a great deal of procedural legitimacy in the West African context, but may have less interaction with ministries, departments and agencies, which may be required for successful implementation (Maduekwe and Factor, 2021). While the PGMEA's objectives target both the public sector and private sector, stakeholder engagement analysis suggests



that the major actors in development are the public sector, and that the private sector is largely missing from consultation, begging the question of whether the private sector can or will implement the fourth objective on gender mainstreaming in the private sector (Plutshack et al., Forthcoming).

At the same time, in 2019, the Kenyan Ministry of Energy released its Gender Policy, which shares most of the same policy objectives as ECOWAS's PGMEA, but also explicitly promotes clean cooking solutions (Government of Kenya, 2019). No papers yet address the development, implementation, or impacts of this Gender Policy. Further research could focus on how effective these types of gender mainstreaming policies are at expanding capacity in the public sector and at addressing the gender gap in the private sector.

Across all these gender-specific policies, there is a need to greater understand how they could better address intersectionality, moving beyond acknowledgement of its importance and towards analysis and further action. Additionally, with the inclusion of monitoring and evaluation objectives within these policies, what are the possible tools, methodologies, guidelines, and indicators for the monitoring, reporting, and verification of the development and implementation of gender responsive climate policies?

#### 1.4.4 Assessing the gendered impacts of LCT policy

Low-carbon transition policies can impact different genders differently for a number of reasons, mostly due to the social roles that gender dictates across the world. Firstly, women usually have fewer resources than men, and generally women are poorer than men (UN Women, 2022b). Men are more likely to migrate to get jobs, while women typically have more care responsibilities, which can make them less mobile and more time and resource-constrained (Babugura, 2019; Rao et al., 2020; Richards and Bradshaw, 2017; UNFPA, 2015). Therefore, policies will naturally affect women and men differently. There are even sector-specific factors that cause impact differences. Women are more reliant on public transportation to access job opportunities (Martinez et al., 2020; Matas et al., 2010). Men are more likely to work in LCT sectors like energy, transportation and other infrastructure, while women are heavily involved in agriculture and forestry sectors (Aguilar et al., 2007; CGIAR, 2021; ILO, 2020c; IRENA, 2019). Some evidence even shows that the “natural resource curse” - that countries with more natural resources having less economic growth, less democracy, or worse

development outcomes - extends to women's economic and political power (Simmons, 2016). However, there are few studies that specifically compile the expected impacts of LCT policies on gender, and, to the best of our knowledge, none that look at multiple policies working in tandem.

There is a great need for integrating gender analysis into policy impact assessments. As much of women's labor takes place in the unpaid care economy, it is critical to acknowledge the impact of economic policies on the domestic sector in addition to the public and private sectors (Himmelweit, 2002). There are multiple guides for conducting Gender Impact Analysis, from universities, governments and NGOs (ILO and UN Women, 2021; Stanford, n.d.; Victoria State Government, 2019).

Integrating gender into required impact assessments may be a more effective method for mainstreaming gender analysis (Sauer, 2018). However, integrated gendered impact assessments can encounter resistance, poor consultation, lack of communication, poor gender-related data collection, and poor auditing and monitoring systems (Carol Bacchi et al., 2010; Kuo, 2015). In addition, policy impact assessments and evaluations need to also incorporate intersectional analysis. Rather than study impacts on gender, wealth, age, and other elements of identity in isolation, evaluations should consider the intersection of these identities (i.e. the impact on poor men or old women, etc.).

#### 1.4.5 Gender diversity in policy making

##### 1.4.5.1 Where are women in decision making roles?

Increasingly, literature is recognizing that women are not just impacted by climate change or a low-carbon transition, but are active stakeholders in these phenomena. Relatedly, there is the perception that women are more sensitive to environmental issues, and therefore that greater gender diversity in decision making would improve environmental policy and outcomes. This section reviews what we know about where women sit in decision making in the three regions, and the evidence that we have that greater numbers of women lead to better sustainability-related outcomes.

We can see that political empowerment is the weakest element of gender equality, globally, when compared to health, education and even economic participation (see Figure 7). Of our subregions, Latin America and South Asia have the highest scores (27.1% and 28.1%, respectively) compared to sub-Saharan Africa (20.8%), East Asia and the Pacific (13.5%) and MENA (12.1%) (WEF, 2021).

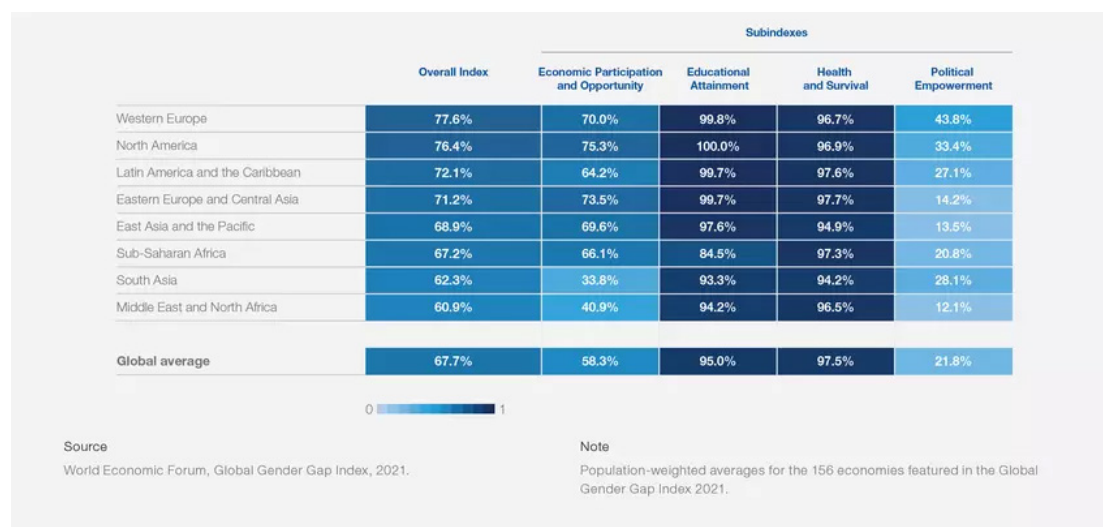


Figure 7 Global gender gap index by region and subindex; Source: (WEF, 2021)

As SDG 5.5 targets “Ensuring women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life,” the UN collects data annually on local, national and economy-wide gender diversity in leadership. Findings show that national leadership roles for women vary within SSA, from 16.9% women in parliament in West Africa to 31.8% in East Africa. In Latin America, 29.5% of parliamentary positions are women in Central America, 30.1% in South America and up to 39.7% in the Caribbean. Finally, in Asia, the percentage of women in parliament ranges from 16.7% in South Asia to 26.1% in Central Asia (IPU, 2022). At the local government level, statistics are harder to come by, but the global average is 27.7% - 20.9% in Asia, 31.0% in Africa and 30.5% in Latin America, based on the limited number of countries that self-reported (UN, 2022c).

In Latin America and in Africa, there have been efforts to ensure female representation by introducing gender quotas in government. In 2019 and 2020 alone, ten countries in Latin America enacted gender parity political-electoral laws (UN Women, 2021). However, Colombia is still struggling to reach its gender quota for ministerial positions (Portafolio, 2022). In terms of environmental leadership, in Latin America and the Caribbean, 6 out of 33 environmental ministries are led by women (UNEP, 2022). In Asia, of the countries reviewed, the gender gap in political leadership is largest in Vietnam and Armenia, where women are almost absent from the ministerial positions. Data on representation in lower levels of government is limited – although evidence suggests that women’s representation in local government is higher than in parliaments (UN Women, 2022c). As decentralization is increasingly promoted as potentially able to better reflect local needs, more evidence is needed to determine whether

women are also represented in this space.

In terms of senior and middle management positions, the global average is 34.4% women. However, in the energy sector that number is lower. In Latin America and the Caribbean, only 9% of executive director positions in renewables are filled by women, 7% of non-executive director positions, and 17% of senior management roles (IEA, 2017).

In terms of civil society, we know women are overrepresented in international NGOs but underrepresented in leadership. In a survey of mostly large, international NGOs, women represented 63-70% of the workforce, but less than half of leadership positions (FAIR SHARE, 2021). Women’s voices have been most present in NGOs that focus on women’s rights, peace, and security (Buxton, 2009; Caitilin McMillan et al., 2020; UN Women, 2022d). In Africa, there has historically been a great deal of female involvement in NGOs, particularly in terms of women’s rights advocacy (Kang, 2014; Moghadam, 2003; Stefiszyn, 2005; Walsh, 2009). Tripp (2019) in particular details the rise of Women’s Political Movements and Civil Society in relation to developments within African states (Tripp, 2019). In Latin America, feminist NGOs are increasingly coopted by state governments to act as gender experts or implementing organizations, to the criticism of those who valued their feminist advocacy from without (Alvarez, 1999). While there are certainly also strong examples of women’s leadership in environmental issues, there is little research on the impacts of this leadership or how to foster it (Green Belt Movement, 2022; Veuthey and Gerber, 2010).

Research is lacking on understanding who typically ends up in decision making roles both in terms of civil society as well as politics, although it is clear that education and wealth are big factors (Ferreira, 2001). When we think about

intersectionality in LCT and gender, research needs to ensure that it is also evaluating which women are in positions of power.

#### 1.4.5.2 What is the impact of gender diversity on environmental policy?

As mentioned above, there is a general belief that women have greater sensitivity to environmental harms, and that therefore women in positions of power will enact more sustainable policy, seeing women as “efficient environmental managers within the development process” (Braidotti et al., 1994; Noguchi, 2011). The most rigorous testing of this belief looks at the relationship between gender diversity on boards and environmental policy, but predominantly in high-income contexts. Findings suggest that gender diversity does at least lead to greater ESG or CSR reporting, if not always better environmental policy (Arayssi et al., 2016; Fernandez-Feijoo et al., 2014; Galbreath, 2011; Glass et al., 2016; Li et al., 2017). On a much smaller scale, there is evidence from Nepal that women are more careful consumers of energy in terms of energy preferences (Shrestha et al., 2020).

There is some evidence that greater female representation in national parliaments leads to the adoption of more stringent climate change policies, resulting in lower emissions (Mavisakalyan and Tarverdi, 2019). However, there is a need for more research on political power as it relates to environmental decision making outside of companies, which is critical to understanding if there is a positive relationship between gender diversity and environmental policy, and in what circumstances. If that is the case, then even more attention should be paid to barriers to entry for women into political power or environmental leadership roles.

## 1.5 Gender, Climate Finance, and Inclusive Low-Carbon Transitions

### 1.5.1 Introduction

At the 15th Conference of Parties in 2009, developed countries committed to a collective goal of increasing climate finance mobilisation to US\$100 billion per year by 2020 to developing countries for the purpose of climate mitigation and climate adaptation. In the end, however, only US\$83.3 billion was mobilized by 2020 (OECD, 2022b). The agreement was for the financing to go to where it was needed the most – to support the most climate-vulnerable countries, communities,

and individuals. As well as failing to mobilise sufficient funding at the global level, very little climate finance has been delivered to the poorest and most climate-vulnerable groups, including women, girls, and gender-diverse persons. Despite the fact that climate change will have great negative impacts on women, girls, and gender diverse persons, these groups have had the least access to climate finance (OECD, 2016a).

### 1.5.2 Climate finance flows to gender activities

The OECD recognises that the devastating impacts from climate change are not gender-neutral, acutely affecting women and girls. In order to better combat these effects, overseas development aid (ODA) should be better leveraged to support gender-responsive climate action.<sup>3</sup> In order to track gender-responsive climate action, the OECD breaks down ODA activities as being principally targeting gender, significantly targeting gender or not targeting gender (OECD, 2016b).

Similarly, at the 23rd session of the Conference of the Parties (COP23) to the UNFCCC, Parties adopted the Gender Action Plan, which uses two different terms to categorize gender in climate action.

- **Gender-related climate action** refers to climate action that has a relation to gender – meaning that at least some portion of the intended outcomes will support gender equality in some way. Gender-related climate action shows some sensitivity to gender differences, but is often not addressing the systemic and larger issues at hand.
- **Gender-responsive climate action** goes beyond sensitivity to gender differences. It seeks to actively promote equality – this often involves specific actions to empower women in their households, communities and societies as well as in broader political and planning processes.

The categorisation of gender as a significant or principal objective of an action does not necessarily map onto the categories of gender-related or gender-responsive action. An action could be categorised as having gender as a significant objective and still undertake gender-responsive climate action. The definition of gender-related and gender-responsive climate action describes how the activity is designed and delivered, whereas the OECD’s monitoring of gender action in development finance flows related to how much of an intervention is related to gender. Developing tracking of development finance that measures the quality as well as

<sup>3</sup> This figure just tracks climate-related development finance or ODA and, as such, only partially overlaps with climate finance tracked by the OECD towards the \$100 bn figure.

the quantity of delivery in supporting gender is essential to tracking, monitoring, and learning in order to improve the quality and quantity of finance.

OECD analysis finds that the total volume of ODA to climate action over the period 2018-19 was USD 33.1 billion, and climate ODA integrating gender equality accounted for 57% (USD 18.9 billion). However, climate ODA dedicated to gender equality as the 'principle' objective was only USD 778 million in 2018-2019 – that is a little over 0.04% of all climate-related ODA (OECD, 2022c). These figures only give us a small snapshot of the finance gaps for gender-related climate finance. Further work is needed to determine how much finance is gender-related as opposed to gender-responsive, and to move beyond exploring gender in climate-related ODA (only \$33.1bn) to look at gender's role in the global scale of climate finance (\$632bn). More research is needed to determine which other gendered indicators should be collected within all climate finance governance structures, programs and procedures in order to ensure that climate finance is supporting gender equality.

### 1.5.3 Unpacking gender in financing approaches

#### 1.5.3.1 Mitigation vs Adaptation

In 2020, 58% of the \$83.3bn in OECD climate finance flowed to mitigation projects, and half of that was to the energy and transport sectors (OECD, 2022b). This split between mitigation and adaptation finance is not gender neutral. Within climate-related ODA (\$33.1bn), over 60% of adaptation programs integrated gender objectives compared to only 46% of mitigation programs, suggesting that gender is seen as more relevant in the space of adaptation (OECD, 2022c). This is likely related to which sectors women work in and the prominent narratives that decision-makers hold around women's participation in various activities.

Gender has been only marginally considered in climate mitigation financing and policy (Zusman et al., 2016). The majority of mitigation financing has gone to energy efficiency or renewable energy projects, and these projects have tended to not consider gender as a relevant component, with few conceptualizing women as potential employees in the sector. Certainly, some mitigation areas could support gender equality, such as projects in water filtration plants, mass transportation, and agroforestry that tend to primarily benefit women. These types of projects improve women's access to clean water (which can help free up women's time), improve mobility options (which is critical for employment options for low-income women) and improve food security and creating alternative means of income through agroforestry. All the while such activities also deliver mitigation

benefits (UNDP and GGCA, 2016). Instead of considering these ancillary gendered benefits, mitigation projects tend to be large, utility-scale deployments that are implemented in a top-down manner and lack engagement with local people, communities and actors, which can leave women out of mitigation projects (Colenbrander et al., 2018). Small-scale low-carbon technologies or approaches tend to take more inclusive approaches. For example, most women's groups tend to operate at the local or grassroots level, which precludes them from participation in large, capital-intensive mitigation projects, but work well with small scale, contextualised actions and interventions (Gupta and Leung, 2010; Jayasinghe et al., 2020). High-carbon sectors are also often sectors that employ a higher percentage of men (see Gender & the Low-Carbon Economy).

However, it has been noted that there is a lack of research on gender and mitigation, with research instead focusing on how women have been involved in climate adaptation activities in agriculture and development (GGCA, 2016). How can utility scale mitigation projects better build in gender and intersectionality lenses and improve the sustainability and justice of their delivery? Are there examples of this in practice? Further study is needed to understand both how all genders can be better incorporated into mitigation programs as well as the impacts of mitigation projects vs adaptation projects on all genders (Zusman et al., 2016).

#### 1.5.3.2 Locally-led Action

Evidence suggests that climate projects that are locally-led can better incorporate women, girls and marginalised communities into the design and implementation of climate response actions (UN Women, 2022c; UNHCR, 2019). The meaningful, informed and effective participation of women and girls with diverse backgrounds in relevant decision-making processes lies at the heart of a rights-based, gender responsive approach to climate action (UNHCR, 2019). Communities' needs and risks vary, and experiences differ depending on gender, age, ethnicity, religion, disability, wealth, socio-economic status, and other intersectional aspects (Adaptation at Scale in Semi-Arid Regions (ASSAR), n.d.). Incorporating local diversity and lived experience into policy design are crucial for adapting to highly uncertain climate and nature risks (Eriksen et al., 2021; UNHCR, 2019).

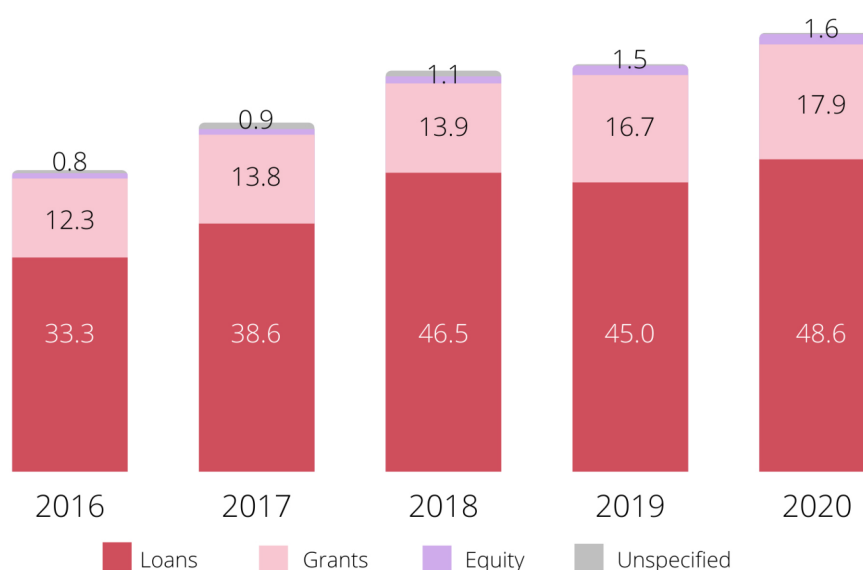
A 2021 IIED review found that only 46% of climate finance committed from international sources for climate adaptation to least-developed countries was intended to give agency to local actors (Soanes et al., 2021). The review found that even in these cases, there was little evidence of local actors fully

leading adaptation interventions. The analysis found that social groups facing structural exclusion – including women, youth, persons with disabilities, and indigenous peoples – were even more side-lined from playing leading roles in influencing funding decisions. It found that less than 3% of the financing was intended to primarily tackle gender inequalities, only 2% targeted indigenous peoples, and less than 19% prioritised non-state enterprises and nongovernmental organisations respectively (Soanes et al., 2021). Further research is required to better understand the gender impacts of finance to youth-led programming, programs targeting populations with disabilities and programs targeting indigenous peoples, as well as to understand the barriers preventing this finance from flowing.

#### 1.5.4 Primary tools and mechanisms

Financial instruments are not gender neutral. Their use, and the conditions of their delivery affect the type of activities

that are supported, as well as affecting their intersectional and gendered impacts. Across all of these instruments, it is worth noting that long-term funding that is patient, predictable and accessible funding is particularly important for supporting women, girls and other marginalised groups (IIED, 2021). Long-term funding helps build the capacities of these actors to then continue beyond the intervention period. Projects with insufficient time to establish long-term financing mechanisms can result in decision-making structures that are fragile and unsustainable, which can also lead to negative outcomes for climate-vulnerable and marginalised groups (E Holland, et al., 2022). Long-term funding supports women and other marginalized groups plan further ahead than the short term, which brings in the perspectives of building capabilities, capacities, and more inclusive and formalized decision making structures.



Note: The sum of instruments may not add up to totals due to rounding.

Source: Based on Biennial Reports to the UNFCCC, OECD DAC and complementary reporting to the OECD.

Figure 8 Instrument split of public climate finance in 2016-2020 (USD billion) (OECD, 2022b)



#### 1.5.4.1 Loans

Eighty-two percent of the finance mobilised from developed countries towards the US\$100 billion goal was public finance, 71% of which was in the form of loans (OECD, 2022b). Loans as instruments are not conducive for supporting climate activities that do not harness financial returns – meaning that they may be unsuitable for many climate adaptation activities. However, adaptation activities are critical for supporting sectors where women work, and therefore may have greater impacts on women, such as agriculture and forestry. Since projects need financial returns to repay loans, finance delivered through loans also limits support for activities such as capacity and capability building, livelihoods assistance, and other welfare activities, which can support women who typically have much larger share of unpaid care work.

At the individual level, women have less access to loans than men, and the cost of the credit can be more expensive for women (Montoya et al., 2020; Ongena and Popov, 2015; Parrado, 2020; Seema et al., 2021). Women are also more likely to work in lower paying sectors, less likely to be paid an equal wage, to have access to bank accounts and credit services, or to be approved for a loan. Studies find that female-owned firms are more frequently discouraged from applying for bank credit and more likely to rely on informal finance (Ongena and Popov, 2015). This stems from a number of causes, on the supply side, it can be because of entrenched and unconscious biases, because women tend to have lower access to collateral, and because women more commonly work in sectors that expect lower returns. On the demand side, the study finds that female owners are also less likely to apply for a loan and finance a lower portion of their firm's operating expenses with bank credit, because of their belief that their credit application will be denied, a belief that the study finds is stronger in societies where cultural attitudes favor males even if credit markets do not reflect that discrimination. Globally, 20.7% of women as opposed to 24.4% of men have borrowed money from a financial institution or used a credit card over the age of 15 (World Bank, 2022). This gender gap varies widely by country, with the biggest gaps in Central America, North Africa, Eastern Europe and South and Central Asia (World Bank, 2022). Lack of access to credit also intersects with other categories, such as ethnicity (Gonzales Martínez et al., 2020).

Providing the majority of climate finance in the form of loans also adds to the growing debt burden of countries. The debt burdens across developing countries have been rising since the 1990s, increasing rapidly after the great recession (2007-2009) and recently rising to record highs with the impacts of the COVID-19 pandemic and the Ukraine conflict (World Bank, 2021b). As a result of pressures on budgets, fiscal consolidation that is achieved through cutting social spending and increasing regressive taxes can generate unequal and undesired outcomes. Past international debt relief packages linked to IMF agreements with associated conditionalities have actively impacted women more adversely than men and disproportionately disempowered women. This is because debt management policies effectively rely on the gendered division of labour and the unpaid and underpaid work of women to cushion the impacts of fiscal austerity (Ghosh, 2021). More research is needed on the gendered impacts of high debt burdens, on how these can be mitigated and how gender-responsiveness can be built in to country's economic recovery policies.

#### 1.5.4.2 Grants

Grants can be a highly effective instrument for supporting gender equality. Twenty-six percent of public climate finance was delivered as grants (OECD, 2022b). Since grants do not require financial returns they allow for the prioritisation of actions with social benefits, such as adaptation actions, capacity and capability support, livelihoods support, and other welfare related activities (Mierovich et al., 2013).

However, grants still also need to be delivered on terms that support gender equality objectives. For example, UN Women and UNFPA find that while disasters and conflict increase the number of female-headed households, many women report not being able to receive assistance or recovery grants because their government only recognizes male-headed households (UN Women and UNFPA, 2020). Recent evidence also finds that female research grant applications receive lower rates of acceptance, with biases stemming to difference in words used in titles and descriptions (Goldstein, 2019; Kolev et al., 2019). Many climate funds provide technical assistance grants to implementing agencies to strengthen their gender integration with the purpose of trying to reduce such effects.<sup>4</sup>

However, there is a very limited supply of grant funding, and it is a challenge to increase the amount of grant funding

<sup>4</sup> See Adaptation Fund call for grants to support NIE capacity to assess, mainstream and manage gender related issues in projects and programmes in line with the Fund's Gender Policy <https://www.adaptation-fund.org/instructions-for-applying-for-the-technical-assistance-grant-for-the-gender-policy-ta-gp/>



significantly over time. Whilst bilateral providers, such as the Paris Club, provide the majority of their climate finance as grant funding, economic shocks and resulting slowdowns over recent years limit the potential to significantly increase the volume of grant financing. This also limits their support to innovative tools for increasing grant provisions, such as debt for climate swaps. Because needs for gender-responsive climate action grant financing outstrips supply, blended finance and other tools may provide a means of using grant financing to leverage further financing from other sources. Blended finance is an emerging area, but still requires exploration and development, particularly in developing how to providing financing without losing key elements of public benefits provided through grant financing.

Further research is needed to review the impact that the technical assistance grants have had on implementing agencies and whether they have supported gender equality in delivering financing, highlighting areas for improvement. Further research could also look at the range of available grant funding for climate finance and gender equality: of the US\$17.9bn of public climate finance grants provided in 2020, how much went to support gender equality and for what purposes? Was there flexibility for recipients to define what was needed in supporting gender equality, or is the funding only made accessible for a few pre-defined areas? These questions are important in understanding how the provision of grant funding can be improved.

#### 1.5.4.3 Equity finance

Equity finance is the provision of public or private finance in the form of equity stake/shareholder investment to support an enterprise or one of a series of discrete projects. Equity investments are less commonly used than other investment instruments, but can be valuable for early-stage enterprises to provide growth capital to help enterprises harness climate investment opportunities. The World Bank notes that equity finance is particularly valuable in less developed financial markets (World Bank, 2020). However, in 2020, less than 2% (US\$1.6bn) of public climate finance was invested as equity finance (OECD, 2022b).

Given the large composition of women-led micro, small, and medium enterprises (MSMEs), equity investment could be a useful instrument to support scale women-owned businesses (IFC, 2017). Since the flows of equity are very small, there is not much by way of evaluation or literature on their use and learnings and lessons for supporting gender outcomes. In 2019/2020, 60% of global climate equity investments went to energy projects, 31% to low-carbon transport, and 9% to buildings and infrastructure, sectors which are male-

dominated (CPI, 2021). Further research would be useful in understanding where the US\$1.6bn in public climate finance was invested, and explore more deeply who the recipients were. Research could also usefully look at what the current barriers are to enabling larger volumes of equity finance to flow to developing countries, including if guarantees or insurance instruments could help de-risk equity investments.

#### 1.5.4.4 Guarantees

Guarantees are commitments in which a guarantor undertakes to fulfil the obligations of a borrower to a lender in the event of non-performance or default of its obligations by the borrower, in exchange for a fee (Mierovich et al., 2013). In 2020, 19% of private climate finance was channeled as guarantees (OECD, 2022b). Given their risk mitigation role, guarantees can be important particularly in contexts where actors have little to no track record and where access to finance is low – in the most climate-vulnerable and marginalised communities, including in women-run small enterprises. Further research could look to outline a design for pilots for guarantee use for the purposes of supporting women-led enterprises and other climate and gender responsive areas, in seeking to improve the accessibility and awareness of this instrument.

While guarantees can promote the development of initiatives in high risk areas that might be critical for climate and gender objectives, they increase contingent liabilities, may impact fiscal deficits, and require highly specialised information about new market and technical capacity that may not be in place. One study found that a multilateral sovereign guarantee mechanism could leverage the effect of public funds for low-carbon carbon investments to two to four times the scale of the US\$100 billion Paris Agreement goal (Hourcade et al., 2021). However, such mechanisms do not discuss social or distributional impacts. How would local beneficiaries be involved as part of the decision-making processes from the start? Will they be able to access the benefits or will such financing further entrench unjust systems? There is therefore further research needed on the use of large-scale as well as small-scale guarantees.

#### 1.5.4.5 Blended finance

Blended finance tries to increase the viability of investments that would otherwise be too risky for commercial investment by using a mix of public and private financing. It achieves this through leveraging concessional financing (public and philanthropic) to draw in market-rate private capital. Blended finance aims to support social and environmental outcomes that would not have otherwise occurred, but few investors assess social and environmental additionality with

any rigor (Bhattacharya, D. and Khan, S. S., 2019; OECD, 2021a; Pereira, 2017). Without this data, it is not possible to assess the impact on social outcomes, including gender considerations.

### 1.5.5 International Climate Finance

#### 1.5.5.1 Centering gender equality in climate finance

The lack of climate action impacts women, men, girls, and boys differently. Centering women and girls alongside men and boys in decision making processes is a key part of the solution, and this needs to be reflected in the institutions that are delivering climate finance. This includes paying particular attention to the small-scale and community-based actions in which women are better-represented, including in the informal sectors and as owners of MSMEs, as well as ensuring that the benefits of concessional public funding is passed to women as beneficiaries (Schalatek, 2022). In mitigation, this means a focus on providing energy access via renewables and decentralised systems as a way to address the persistent energy poverty of many women (Perera and Garside, 2019).

#### 1.5.5.2 Multilateral Climate Funds

In Multilateral Climate Funds (MCFs), centering gender equality means developing and implementing a robust set of social, gender and environmental safeguards and guidelines, and capacity-building support for their implementation. There are three lenses through which to consider gender mainstreaming in MCFs: gender representation, the gender breakdown of investees and the gendered impacts of investments.

Recent efforts have been made to increase the gender diversity in climate funds. A 2015 review found that women's representation in the governing bodies of the major climate funds was, on average just 22% (UNDP and GGCA, 2016). Since then, the Green Climate Fund has put in place a mandate for gender balance for its staff and board (GCF, 2017). The Climate Investment Funds' most recent gender policy also includes expanding staff and requiring improvements in the gender considerations in investment plan preparations, review and submission procedures (Schalatek, 2020). The CIF's Gender Action Plan Phase 3 (FY21-24) additionally sets out plans for increasing country-level gender technical support for the development of investment plans and project design, and monitoring and reporting of gendered outcomes (CIF, 2020).

The MCFs have also been improving their inclusion their gender considerations in procedures for investees in recent years (Schalatek, 2020). The GCF's Gender Policy and Action Plan (2019) specifies that the Fund's allocation for adaptation and mitigation projects and programs address

gender equality and women's empowerment, and provide gender-sensitive solutions. This Plan also states that the Fund will support women's climate change adaptation and mitigation initiatives. Looking at procedures for evaluating gendered impacts, GCF considers the following elements in project proposals – (a) all feasibility studies and environment and social impact assessments must include gender issues; (b) a gender expert must be a study team member; and (c) before the project is implemented, sex-disaggregated data must be collected. However, the GCF's 9th report to the COP in 2020 largely provided a description of the procedures involved in implementing the gender policy in project preparation, without any qualitative or quantitative gender equality outcomes, or gender-differentiated beneficiary numbers (Schalatek, 2020).

The Adaptation Fund, Global Environment Facility and Climate Investment Funds all have gender policies in place that mandate gender considerations in projects and programming, and these have been translating to gender-sensitive projects and programming in some cases. However, these policies are still in need of strengthening, as evidenced by a review of the Adaptation Fund, which showed that less than half of surveyed Implementing Entities, board members, Designated Authorities and NGOs thought that policies and programmes sufficiently consider gender (Adaptation Fund, 2019). Since the vast majority of these Gender Policies have come about only in recent years, there are few studies (outside of Schalatek's work) that evaluate their efficacy.

#### 1.5.5.3 Multilateral Development Banks

Given the large role that MDBs play as intermediaries in channelling financing and resources and in supporting implementation, it is important that they also have robust gender policies, guidelines, and indicators, as discussed with the international climate funds. The MDB's Working Group on Gender hosts a biennial Global Gender Summit to facilitate dialogue and exchange of good practices, lessons learned, and driving the global gender agenda (MDB WGG, 2022). Major MDBs have gender policies or strategies that are regularly updated (AfDB, 2021; World Bank, 2015).

While monitoring, evaluation and learning are typically a part of these strategies, there has historically been little gender disaggregated evaluation and monitoring of climate finance projects (Schalatek, 2011). Monitoring, evaluation, and learning (MEL) frameworks are most effective when they combine top down and bottom-up processes and frameworks to align national indicators with reporting from the community level (B. Smith, 2020). In addition to the MEL framework developed within the programme or project,

independent monitoring, and verification of outcomes by civil society is an important aspect of accountability. Civil society groups can help improve gender outcomes by monitoring the activities and impacts of climate interventions and feeding that back in the public space. This can help improve the visibility, transparency and accountability of the interventions (Global Initiative on Fiscal Transparency, 2021).

There are typically only few gender-related indicators in MEL systems. How can MEL frameworks be improved and better monitored? Further research is needed to understand how effective MDBs have been at incorporating gender criteria in performance objectives and results measurement frameworks and for the evaluation of funding options. Finally, further study is required to understand how MDBs can help increase access of climate finance to support gender-responsive approaches and mechanisms, such as supporting local women's groups.

#### 1.5.6 Domestic Climate Finance

While scrutiny of international climate finance is essential, particularly in the context of mobilisation towards the US\$100 billion goal, the majority of climate finance is mobilised at the national level. In 2019/2020, over 75% of tracked climate investments flowed domestically (CPI, 2021).

##### 1.5.6.1 Gender & Climate Budgeting

One tool for tracking where domestic climate finance is supporting gender equality is gender-responsive budgeting. Gender-responsive budgeting is the “technical task of investigating to what extent the government budget provided the resources to implement gender-responsive policies and programs” (Budlender, 2014). It can be used for awareness raising, management and accountability purposes, including identifying and tracking gender-related spending, impact evaluation, and toward the improvement of planning and implementation.

As governments in climate-vulnerable countries have sought to improve their public finance systems and practices to respond to climate change, there have been early efforts to learn from the gender-responsive budgeting experiences. A recent evaluation of gender and climate budgeting in Bangladesh and Mexico found that policy development on gender and climate did not necessarily translate to shifting budget allocation, and that much more work is needed to improve the transparency of budget and climate reporting at the national level (Patel et al., 2021).

Gender and climate responsive budgeting can help strengthen and support further access to finance for these areas. For example, Indonesia provides a good example of mainstreaming gender in domestic climate finance policies. At

the local level, government and non-government organizations are collaborating through gender-related capacity building and awareness creation. However, several financial mechanisms in Indonesia lack monitoring and evaluation that would allow for understanding program impacts (Atmadja et al., 2020). CIFOR (2020) reviewed adaptation and mitigation action at the sub-national level, which included budget items tagged in the Indonesian Climate Budget Tagging system (CBT), and across different national funds. The study assesses whether climate financial flows and climate actions contribute to long-term gender transformative change and pro-poor co-benefits on the ground (CIFOR, 2020). However, this is a rare study more evaluations are needed to determine the gendered impact of domestic climate flows on beneficiaries.

Climate and gender budgeting and related tools are important, among other reasons, for tracking and identifying financing going to these areas. This is used in understanding how much is flowing and to what uses. However, it is also important to understand how those flows fit within the full budget. Patel et al. (2022) find, for example, that while some post-COVID-19 recovery spending across countries supporting the climate and environment, there was also spending in those budgets that will likely have negative climate impacts (Patel et al., 2022). Such budgeting tools are therefore also important in understanding where flows are also harmful to gender and climate outcomes.

##### 1.5.6.2 Fiscal Policy

Fiscal policies such as setting taxes and adjusting spending priorities can support climate action as well as incentivize or provide investment directly for gender-responsive climate activities. Fiscal policies have an impact on distributional equity and so need to consider gendered impacts and be designed to avoid negative impacts on the poorest and most marginalised groups.

Removing or reducing fossil-fuel subsidies is an example of a fiscal policy adjustment that could have mixed positive and negative impacts on gender equality. Removing these types of subsidies can reduce the incentives to invest further in fossil fuels, as the funding essentially helps artificially lower the cost of using fossil fuels. However, implementing policies such as this can result in economic decline for the targeted areas, which impacts upon the people who work in that area (World Bank, 2019). For example, removing LPG fuel subsidies for households may negatively impact women (Greve and Lay, 2023). The government would need to incorporate support for workers and social groups likely to be negatively affected by such policies as part of a just transition. There are important gender considerations that should be incorporated into such

support. The support should consider the different impacts on women and men from these types of subsidies. While fossil fuel activities such as mining or working on oilrigs are typically male dominated jobs, the loss of those jobs can have important impacts on, for example, women by relation. There is evidence of increases in domestic violence increasing during times of fiscal austerity (Sanders-McDonagh et al., 2016). A loss or reduction of income can also present stresses, such as a reduction in the ability to buy sufficient food, that can be passed on to the female members of a household.

Likewise, carbon taxes use price signals to discourage emissions intensive activity while promoting innovation and investment in cleaner, more efficient technologies (World Bank, 2019). This type of fiscal policy can have similar impacts to removing or reducing fossil-fuel subsidies – i.e., reductions in emissions intensive activities can affect the workers in that area, that could be directly women, or women related to affected men. The poorest and most marginalised groups are likely to be working with or depending on carbon intensive-related areas as fossil fuels are commonly the cheapest fuel sources and so the most accessible for small enterprises or for companies who have hired many low paid staff (GSI and IISD, 2013). More research is required to identify how carbon taxes could be implemented to also ensure that gender inequalities are not exacerbated from their use.

Similarly, governments can incorporate a ‘shadow price of carbon’ into their decision making and investment appraisal processes or use their procurement power to encourage the market penetration of low-carbon, climate resilient products. This can have similar distributional equity and gender impacts as carbon taxes, and so with a gender-responsive lens, governments would need to consider and mitigate the negative impacts on the men and women (World Bank, 2019). Across all these fiscal policies, greater research is needed to identify the distributional impacts and options for improving the equal distribution of those impacts through policy design.

### 1.5.7 Private Climate Finance

At present, in emerging markets and developing countries, 80% of infrastructure investment is public and mostly publicly financed (Independent Expert Group on Finance, 2020). However, as private climate finance increases, it is important to ensure instruments are being designed in ways that will support the most climate-vulnerable and marginalised groups, including women, girls, and gender-diverse persons.

Little climate finance currently targets SMEs, despite this being a sector of the economy where women are very prevalent (Phillips et al., 2022). Women are particularly represented in the informal sector, which has even fewer resources and support (Bonnet et al., 2019). Women and men do not have equal access to resources (e.g. property rights, technology, opportunities to develop their skills, banking, access to credit) and these are key barriers in maintaining and developing SMEs (IFC, 2017, p. 201; Schiff et al., 2013). Further research is needed on how to overcome barriers to women’s access to finance for SMEs. Women in SMEs and the informal sector are regularly a part of women’s saving groups, which can act as a critical intermediary for access to credit and funds (Brody et al., 2015; de Hoop and Desai, 2021). However, even as researchers explore how women’s groups function with health programs and enterprises, more work is needed on the efficacy of working with women’s groups on low-carbon technologies (Desai et al., 2019). Partners of women’s groups tend to be philanthropies or development organizations, so further research is also necessary to explore the best models for private sector investment to flow through women’s groups.

#### 1.5.7.1 Impact Investing & Gender Lens Investing

The aim of impact investing is to create additional positive social or environmental outcomes that would not otherwise be financed. This has traditionally indicated investing with an expectation of lower financial returns, but that is not explicitly the case, and indeed many investors self-identify as impact investors while expecting market rate returns.<sup>5</sup> The total assets under management for the impact investing industry is estimated at USD 502 billion as of the end of 2018 (GIIN, 2020).

However, there is very limited information on the social and environmental impact, including the impact on gender equality, being made through impact investment. Although some impact investors use tools like the IRIS metrics or the SDGs as frameworks for measuring impact, information about social and environmental impacts are limited to case studies that offer little detail. To the best of our knowledge, there are no studies comparing these investments’ impacts on gender.

Gender Lens Investing (GLI) is a sub-set of impact investing. GLI is a strategy or approach to investing that takes into consideration gender-based factors across the

<sup>5</sup> The Global Impact Investor Network (GIIN) finds that 67% of its members expect to make market-rate returns, when adjusting for risk (GIIN, 2020).

investment process to advance gender equality and better inform investment decisions. Gender lens investing covers two broad categories: improving gender-sensitivity in the investment process or focusing on investee enterprises that incorporate gender enterprises with respect to vision or mission, organization structure, use of data and metrics (GIIN, 2019). Some of the reasons for investing in both gender and climate include risk mitigation, revision and fulfilment of fiduciary duty as well as meeting expectations of investors, long-term value, finding new avenues for investment and the amplification of societal impact (Biegel and Lambin, 2021). However, few analysis have rigorously evaluated the efficacy of gender lens investing activities by impact investors to evaluate the best practice approaches (Gender Smart Investing, 2022).

There is some evidence that makes the case for gender lens investing – from reducing poverty to adding \$12 trillion to the global economy (Acumen and ICRW, 2017; Woetzel et al., 2015). In response, private investors are increasingly adopting gender policies and protocols and highlighting women in their investee companies (Calvert, n.d.; G-SEARCh, n.d.; Root Capital, 2021). There is some evidence that supporting investees with technical assistance programming geared towards improving women's employment within companies or better meeting the needs of women clients can improve business outcomes (G-SEARCh, 2022).

However, although investing in women-led businesses is a key objective of gender-lens investing, less evidence has focused on how private investors target women-led businesses. There are a handful of examples of best practice, such as maintaining quotas for women-led investees in early decision rounds or creating separate funds for women-led businesses (Phillips et al., 2022), but little rigorous analysis has identified the most effective approaches to increasing investments in women-led companies. Further research is needed on the effectiveness of adjusting decision processes,

reevaluating collateral requirements or shifting financial and social expectations or targets.

## 1.6 Transformative Change

### 1.6.1 What is gender-transformative change?

As a process, gender-transformative change tries to move beyond the improvement of the lives of individuals towards a more systemic change that addresses power dynamics and structural inequality. Transformative change means going beyond the symptoms of inequality to try to address the norms, attitudes, behaviors, and social systems that cause them (Hillenbrand et al., 2015). For example, including all genders in formal decision-making or supporting shifts in gender norms. It is critical to address a range of actors – from community leaders to activists to business spaces – since norms, rules, attitudes, and behaviors are created and reinforced in all these spaces, and can prevent marginalized genders from identifying or acting on all the choices available in their lives (IDRC, 2019). Gender-transformative change therefore requires engaging groups in critically examining, challenging and questioning gender norms and power relations that underlie visible gender gaps. This type of change is unpredictable and non-linear and involves diverse actors and agencies (Batliwala, 2007; Kantor and Apgar, 2013).

The term “transformative” began to be included in dialogue and policies about gender in the mid-1990s, and in the early 2000s it was used in the health and HIV/AIDS sector and other development programming (Batliwala, 2007; Gupta, 2001; Kabeer and Subramanian, 1996). The shift represented a focus on collective and sustained transformation of gender power relations (Moser, 2017). Growing from these earlier roots, the term “gender-transformative” was not widely adopted by development organisations until sometime later (Water for Women, 2020). Now we can conceptualize gender-transformative on a spectrum of gender integration approaches (Figure 1-9).

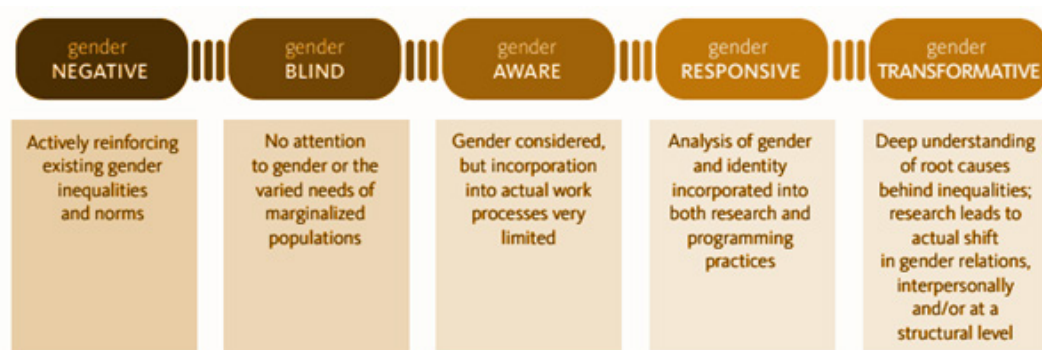


Figure 9 Continuum of Gender Integration; Source: (Mullinax et al., 2018)



Despite the multidimensional nature of gender-transformative change, there have been some efforts to operationalize the term. Gender-transformative change can be measured across three key dimensions: agency, relations and structures (Hillenbrand et al., 2015). Agency refers to an individual's or a collective's capacities, attitudes, critical reflection, assets, and actions. Relations include the dynamics in the relationship between an individual, home, community, market or state. Structures refers to the rules that govern collective, individual and institutional practices, such as environment, social norms, recognition and status (Hillenbrand et al., 2015; Martinez and Wu, 2009; Morgan, 2014). By measuring transformative gender change across these three dimensions, projects can demonstrate the impact of addressing root causes and structural barriers to gender equality. Examining, analyzing, and building an evidence base to inform long-term practical changes helps to encourage stakeholders from different horizons to invest in human capital, institutions, and funding resources.

In other projects, measures of women's empowerment across multiple levels of power has been used to evaluate gender-transformative change. For instance, the African Union's Agricultural Technical Vocational Education and Training for Women (ATVET4W) considers four dimensions of empowerment (ATVET4W, 2020) (Figure 10). These four dimensions have been used as a monitoring and evaluation tool in projects developed in Africa to make claims about women's increased confidence, communication and opportunities.

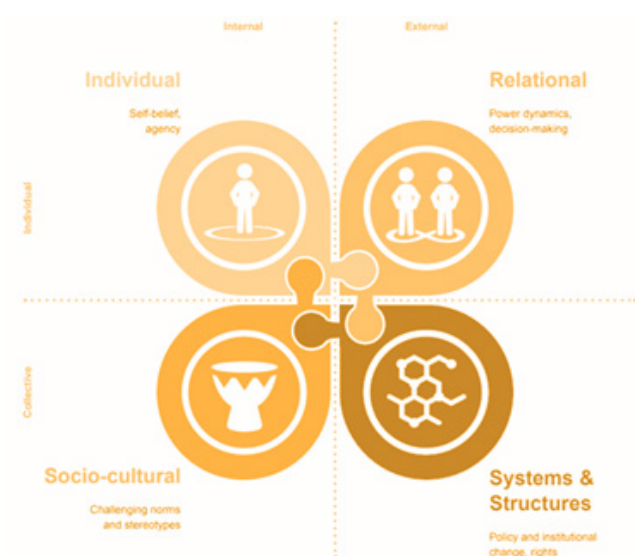


Figure 10 The quadrants of change, Source: Gender-Transformative Change in Practice (ATVET4W, 2020)

These four dimensions sit on two axes: collective vs individual actions and internal vs external empowerment. Thus, self-belief and agency trigger shifts in power dynamics and community decision-making that can transform norms and stereotypes as well as laws, policies, or rights within institutional structures. Several agricultural entrepreneurs in the ATVET4W project found that participation enabled them to access and control resources, including leasing land, seeking credit, and controlling expenditure. Other women gained support from their households and spouses and were included in the household decision-making. Some were recognized as leaders in local groups or county government, and they took on their new roles with confidence (ATVET4W, 2020).

#### 1.6.2 How can gender-transformative change support a low-carbon transition?

The discussion around LCTs is increasingly incorporating gender, but primarily in a gender-aware or gender-responsive manner by trying to engage women in development projects or LCT sectors without attempting to address the structural barriers that have kept women from these sectors. The a decade of literature acknowledges how work in low-carbon development is rarely gender-transformative, as it ignores factors like women's care responsibilities, gendered social expectations, childcare needs, and educational barriers such as a lack of STEM training (Agarwal, 2010; IDRC, 2019, 2017; IRENA, 2021). The case study in this section features gender-transformative programming to unpack ways in which these barriers can be addressed. It is likely that some low-carbon development pathways offer more opportunities for gender-transformative change, but without a bigger evidence base evaluating the transformative impacts of interventions in different sectors, it is challenging to identify those pathways or sectors.

This section has focused primarily on empowering women, but gender-transformative change also addresses men. Considering men in gender-transformative change is critical for two reasons. First, men also participate in norm creation and entrenchment, and therefore changing their attitudes is a crucial aspect of community attitude change. Second, and equally as important, men are also constrained by social norms around masculinity, which can result in negative outcomes for men as well as women. Gender-transformative change aims to improve outcomes for all genders. These common norms of masculinity include the belief that men should be the breadwinner in the family, that men must earn more than women, that men must not do unpaid domestic labor, and that men must dominate household and reproductive decision

making (OECD, 2021b). To measure norms of masculinity, the OECD has offered a set of indicators that consider legal rights, attitudes and impacts on the empowerment of women (OECD, 2021b). Of course, these norms will be influenced by a range of intersectional identities, such as age and career stage as well as marital status, and more research is needed to catalogue the impact of gender-transformative programming on the interplay between norms of masculinity, intersectional identities and impacts on female empowerment.

#### Case study: Agricultural Technical Vocational Education and Training for Women

In Africa, various structural inequalities and socio-cultural barriers persist, limiting women in accessing technical and vocational training, formal employment and entrepreneurial activities. Additionally, women's wages in rural areas are up to 60% lower than men's, which impacts their ability to overcome these limitations (AU and FAO, 2018).

The Agricultural Technical Vocational Education and Training for Women (ATVET4W) initiative was developed by the African Union Development Agency and supported by GIZ. Its aim was to achieve gender-transformative change in six countries (Benin, Burkina Faso, Ghana, Kenya, Malawi, and Togo) through interventions that focus on actively questioning established norms and gender stereotypes and through dismantling existing structural inequalities (ATVET4W, 2020).

In Benin, a law passed in August 2017 stipulates that all descendants, whether male or female, could inherit land. However, putting the law into practice has proven challenging. Even where men favor the application of this law, most of the land granted to women is of poor quality. In order to improve land quality, 208 women and 10 men were trained on how to make and apply green compost. This training included compost-making, from basic techniques to advanced levels of economic management. Impact evaluations found that several women saw their incomes increase after the training. Afterwards, women experienced an increase in the crop yield up to 200%, and other women have found that their products rot less quickly and now sell at higher prices (ATVET4W, 2020). Compost production became a new income-generating activity for women and could help to reduce socio-economic and cultural inequalities in the future.

As for the gender-transformative part, the women were also championed as role models, showing men that they can improve the soil health of their land and changing local attitudes towards women's agricultural expertise. Despite having inherited poor land, women have managed to increase soil fertility through the manufacture of compost. Participants report that they feel more self-reliant and useful to their community (ATVET4W, 2020). This training worked in tandem with the legal change to be truly transformative: allowing women land inheritance and making that land fertile and productive (ATVET4W, 2020).

Few projects, policies or processes have considered their intervention as part of an ecosystem of gendered structures. One reason for this is a lack of gender expertise among key stakeholders, both in terms of misunderstanding the causes of gender inequality and in terms of a lack of commitment in addressing them (Benschop and Verloo, 2006; Ely and Meyerson, 2000; Meyerson and Kolb, 2000). Stakeholders must understand gender as relational and built into patterns of social practices and dynamic social structures that need to be changed to achieve equality.

A significant number of the reports, case studies, and literature reviewed and included in this section provide recommendations after having used gender transformative change as an approach for actionable agendas. However, gender-transformative change is complex and cannot be achieved just by a certain project or set of activities; projects and activities should be seen as complementary to other ongoing processes that may shape transformative change, as in the ATVET4W Case Study where training supported the cultural change that was necessary to fully enact the new inheritance law. FAO has compiled fifteen gender-transformative approaches that have seen positive results in changing attitudes and outcomes, which range in scale, focus and technique (FAO et al., 2020). Some of these approaches – like Farmer's Field and Business Schools – are based on the relevant sector, but many are highly flexible and tailored to the needs of the community. For example, CARE's Social Analysis and Action approach relies on baseline evaluation of key gender norms, validated by the local community, which are then discussed and evaluated in group meetings and can be tied into other development programs, like Village Savings and Loan Associations (FAO et al., 2020).

Several international organizations now purport to take a gender-transformative approach to programming, but

the challenge lies in implementation. For instance, the characteristics of gender-transformative change - multi-dimensional, multi-level, multi-scale, long-term, non-linear, multi-actor and relational - can be difficult to reconcile with donor-driven practices of development influenced by result-based management. A gender-transformative approach is dynamic and adaptive, yet donors typically expect linear and pre-defined change outcomes to be achieved in a short time period (Water for Women, 2020). Further research must attempt to capture successful models of gender-transformative programming while also being sensitive to its dynamic nature, which makes impact evaluation challenging.

### 1.7 Conclusion

Gender is a complex, multidimensional social construct that shifts across time and space, challenging our ability to make definitive statements about the relationship between gender and the various technologies and practices of the low-carbon transition. Despite this, the gender that individuals inhabit influences our roles in the family, in society and in the economy. Recognizing where women, men and gender-diverse persons reside in our communities and market structures can help us unpack that impacts of the LCT on different genders and identify how future programming can support gender equality alongside the LCT.

To address this intersection of gender and the LCT, this report reviewed the latest academic and grey literature on gender, climate change and various high-impact sectors involved in the LCT. In reviewing this literature, it became clear that there were a handful of key, high-level gaps in our knowledge. First, studies on gender and the LCT were predominantly focused on women's vulnerability to climate change. This leaves out the importance of how men and masculinity influences and is influenced by low-carbon technologies and practices. At the household level, there was a clear need for further research on how power dynamics within households influences technology adoption, especially given that low-carbon transitions will often take the form of household-level changes. Finally, across all topics, there was a recognition that studies should do a better job of identifying how impacts differ across intersectional identities, such as gender, race, class, ethnicity or age.

These intersectional identities all play a role in where women, men and gender-diverse persons work in the economy. A common narrative is that a low-carbon transition will offer opportunities for improved gender equality, but evidence suggests that there are many sectors of the economy that will need thoughtful policy support to promote both the LCT

and favorable gender outcomes. Men are prevalent in many high-carbon sectors, such as energy and transport, and their livelihoods are most likely to be impacted by a shift to low-carbon technologies and practices. However, other genders will face secondary impacts from job losses. In sectors where women are more prevalent, such as agriculture and forestry, there are more studies on gendered impacts. In all cases, the impacts of climate change and the low-carbon transition on the care economy will have an outsized impact on women. Across the board, more analysis is needed on the impacts of LCT solutions to move us beyond our understand of the impacts of climate change alone.

In order to achieve these LCT solutions, policymakers across the world will need to come together in support of more sustainable policies and practices. There is some limited evidence that women in positions of power on corporate boards or in national parliaments are more likely to lead to better environmental policy outcomes. However, those studies are narrow and need to also consider sub-national and local governance as well as the impact of women and other gender-diverse persons in power in civil society, business and community leadership. National and international climate policymaking has made a concerted effort to mainstream gender in climate and sector-specific policies, but there is still a need to scale best practice. Broadly, gender mainstreaming has yet to achieve its aims – promoting gender-responsive and gender-transformative policy - and further research is needed to link policy to gender-related outcomes.

Finance, in particular climate finance, is critical to implementing a low-carbon transition, but there is limited evidence about financial flows to gender equality activities and the outcomes of that finance. The OECD collects data on how much overseas development aid flows to gender and climate activities, but this represents only a tiny portion of the universe of climate finance. Whether or not finance is tagged as “gender-responsive,” financial flows will have an impact on which projects and which sectors receive investment, which will impact genders differently. For example, women are more present in sectors that are critical for climate adaptation, such as agriculture, but climate adaptation faces systemic underinvestment, in part because of concerns about risk and lower returns on investment. Climate finance has also channeled investment heavily through loans, which increase country-level debt, potentially triggering social spending cuts, which evidence suggests disproportionately impacts women. Throughout financial decision-making bodies, women and gender-diverse persons are underrepresented.

As the report highlights, gender is multifaceted and our

social construction occurs in many social and economic spaces. Addressing gender equality cannot be successful if it does not consider the underlying social structures and systems that create and reinforce inequalities. Acknowledging that, some international and local organizations have developed best practices for “gender-transformative change” that tried

to disrupt power inequalities and redistribute power across genders more equitably. These individual case studies and programs offer opportunities for scaling up transformative programming to create a gender just transition alongside a low-carbon transition.

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