OXFAM
RESEARCH BACKGROUNDER

Caring in a changing climate

Centering care work in climate action

Sherilyn MacGregor, Seema Arora-Jonsson and Maeve Cohen

Contents

OXFAM'S RESEARCH BACKGROUNDERS

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acronyms and abbreviations

CCA	Climate Change Adaptation
CGIAR	Consultative Group for International Agricultural Research
CIS	Climate Information Services
CSA	Climate Smart Agriculture
DRR	Disaster Risk Reduction
FANRPAN	Food, Agriculture & Natural Resources Policy Analysis Network
ATONU	Agriculture to Nutrition
FUNDAECO	Foundation for Ecodevelopment and Conservation
GBV	Gender Based Violence
GCA	Global Commission on Adaptation
GHG	Greenhouse Gas
GJCS	Gender Just Climate Solutions
GRAD	Graduation with Resilience to Achieve Sustainable Development
HHM	Household Methodologies
ICT	Information Communication Technology
ILO	International Labor Organization
IPCC	Intergovernmental Panel on Climate Change

IUCN	International Union for the Conservation of Nature
NGO	Non-governmental Organization
NREGS	National Rural Employment Guarantee Scheme
NTFP	non-Timber Forest Products
REDD+	Reducing Emissions from Deforestation and Degradation (and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries)
SDG	Sustainable Development Goal
SP	Social Protection
SSA	sub-Saharan Africa
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WEDO	Women's Environment and Development Organization
WGC	Women's and Gender Constituency

EXECUTIVE SUMMARY

The global care crisis is being exacerbated by the global climate emergency, with interlocking impacts that threaten lives and livelihoods in all parts of the world. These impacts are particularly severe in resource-based economies and make everyday life difficult for people living with scarce resources and low incomes in rural areas of the global South. Climate change intensifies the work involved in caring for people, animals, plants, and places. It reduces the availability and quality of public services in marginalized communities and directly compounds the unfair distribution of unpaid care work that sustains gender inequality.

Yet the intersections of climate change and care work have been overlooked in the development literature. A lack of research has led to gaps in climate policy and planning. Strategies for climate mitigation and adaptation have paid relatively little attention to how care work is affected by climate impacts, nor have they considered whether interventions improve or intensify the situation of carers. Instead, when designing “gender-sensitive” climate actions, the focus has been largely on women’s economic empowerment as opposed to alleviating or transforming existing distributions of care work.

The aim of this report is to fill a knowledge gap by examining the points of interaction between climate change impacts and the amount, distribution, and conditions of unpaid care work. We focus on care workers rather than those who are cared for, while stressing the relational nature of care and acknowledging that carers too require care.

We adopt a definition of unpaid care work that includes direct and indirect care for people as well as for living environments, as this work is central to people’s everyday lives in rural areas. Direct care refers to hands-on care for people; indirect care refers to provisioning of necessary goods and services for people. By environmental care work we mean activities that take place outside the household that are necessary for provisioning and subsistence (including caring for animals, plants, and common spaces on which households depend). We discuss these types of care as interconnected, often carried out simultaneously (with each other and with income-generating work) and notoriously difficult to measure.

We take a relational approach to gender, regarding it as a set of power relations, and rather than concentrating on individual women as carers we focus on the dynamics of care work in different contexts. Here it is important to recognize that the intersection of different axes of inequality (including class/caste, race, age, sexuality, and dis/ability) shapes the meaning of gender and the distribution of this work. We discuss differences in the roles and responses of men and boys in regards to care work, but note a lack of relevant empirical research to draw upon.

Our review of the literature on the existing and potential effects of climate change interventions finds that mitigation and adaptation strategies tend to prioritize the biophysical environment and technical fixes while ignoring unpaid care work. Climate change-related stressors exacerbate existing inequalities, but so do climate change programs that can reproduce, exacerbate, and introduce new inequalities. We identify a number of ways that climate interventions exacerbate or fail to redress care work burdens and inequalities, in part due to problematic understandings of gender relations.

For at least two decades, feminists have used a set of R words—recognize, redistribute, reduce, represent, and reward—to propose gender-transformative care policies. We apply this 5R framework to analyze the extent to which existing climate interventions make a difference to care work for people living with climate impacts in low-income rural settings in the global South.

Building on the 5R framework, we argue for care-sensitive climate actions that are gender transformative rather than merely responsive to existing gender norms. To be gender transformative, interventions should be care sensitive so that they make care work possible and rewarding for all genders, and integral to climate mitigation and adaptation. Recognizing and valuing the work of caring offers a counter-narrative to the dominant positioning of poor women as vulnerable victims of climate change. Redistributing care work so that it is not seen as women's work, or treated as a free natural resource to be exploited, but rather shared fairly in households and other spheres of society is a necessary step towards transforming existing gender injustices.

Increasing the representation of carers and enabling their active participation and leadership is an important strategy for redressing the use of simplistic narratives by development practitioners and researchers. However, more involvement will not automatically lead to transformative change unless it is facilitated by structural changes to support it. For example, projects that are demanding of women's time without a reduction in caring responsibilities will entrench rather than alleviate gendered disadvantages.

Climate change policies and programs may have moved from being gender insensitive to gender responsive, but there is still a long way to go to become gender transformative, largely because of an enduring assumption that care is a feature of gender relations (or "women's work") rather than a collective necessity that is as foundational to economies and human survival as agriculture. Gender-transformative policies are those that redress the underlying causes of gender inequality, two of which are the feminization and invisibilization of care work, so that the goal of gender equality can be realized and sustained.

These and other findings lead us to suggest potential pathways for the realization of care-sensitive climate actions, which we present as a set of policy arguments and areas for further research, including:

- Climate interventions must be care sensitive: they must accept, first, that care work is foundational to all societies (and economies) and, second, that efforts to respond to climate change will not be socially just unless the value of care work and the needs, experiences, and knowledge of carers are included at all stages and unless they are developed with both the 5Rs of the care framework and an intersectional-relational understanding of gender in mind.

- Physical infrastructure and labor-saving technologies that are compatible with the needs and practices of users and that facilitate daily care work, such as solutions for water access, low-impact cookstoves, and mobile climate information services, can make a positive difference and are essential for meeting the challenges presented by climate change impacts when they succeed at reducing the time demands and drudgery of care work.

- It is highly likely that the most gender-transformative way to redistribute care work is through provision of services, infrastructure, and social protection (in line with Sustainable Development Goal (SDG) 5: Gender Equality). Simply providing physical infrastructure and technologies is not enough: there needs to be increased state investment in policies and services that socialize the provision of care and collectivize the work involved.

- Gender-sensitive research does not necessarily lead (and thus far has not led) to adequate knowledge of the specificities of the care-climate nexus. Researching gender is not the same as researching care.

- The 5R framework is about care work with little consideration of the synergies as well as tensions and trade-offs between the different Rs (e.g., reduce, reward) for sustainable development or for tackling climate breakdown. There are potential “win-win” pathways, where climate actions can simultaneously contribute to gender-transformative change, but more research is needed to develop interdisciplinary, evidence-based, and contextual analyses of these potential pathways.

- Research in this field should continue to use innovative participatory, household, and community-based methods that can amplify the voices of carers, capture evidence of the valuable knowledge and expertise they hold for developing climate solutions, and involve men and boys as equal partners in care work as well as in achieving gender-just climate solutions.

- There are gaps in the existing literature on care work that result from the tendency to focus on women and/or heterosexual couple households. We recommend more research on the role and practices of men and boys in care work. In addition, as in the field of development studies and policy more generally, gender-based analyses of the care-climate nexus should challenge heteronormativity by researching how sexual orientation, gender

identity/expression, and structural discrimination and violence against LGBTQI+ people affect the experience of caring in a changing climate.

1. INTRODUCTION

A wealth of research over the past four decades has shown that women and girls do the majority of unpaid and underpaid care work. Women do more than double the amount of care work as men, and if paid and unpaid work are combined, women's daily working time is longer than men's in almost all countries around the world (UN Women 2015; FAO and CARE 2019). Oxfam has emphasized the foundational nature of this work to the global economy, calculating that it adds value to the economy equivalent to at least US$10.8 trillion a year (Coffey et al. 2020,12; Mugehera and Parkes 2020). Women's disproportionate responsibility for care work is a major cause of their lower status relative to men, which is connected to gender discrimination, lower earnings, and less time for education, leisure, and political engagement (Rost et al. 2015).

In the international policy arena, care work has gained more attention since the 1990s and now features as a key concern in the United Nations (UN) Sustainable Development Goals (SDGs). Goal 5 on gender equality and women's empowerment calls on states to "recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate" (UNDP 2015). The recognition given to care work in the SDGs has been welcomed by feminist economists and gender and development scholars as a sign that one of the main drivers of gender inequality is finally being addressed. Most agree that tackling the exploitation and undervaluation of care work, locally and globally, must be part of any discussion of women's empowerment in public and private spheres of life. Moreover, there is a consensus among feminist experts that transforming "caring as usual" is essential for achieving gender justice (Rao, N. 2018; Elson 2017; Razavi 2007; Folbre 2006).

Most scholars who research care work agree that the exploitation and undervaluation of care (Adatti et al. 2018) has resulted in a global care crisis (Coffey et al. 2020; Dowling 2021). The impacts of global climate breakdown are exacerbating the care crisis in a number of specific ways we go on to discuss in this report. Extreme weather, flooding, pandemics, and droughts are especially serious in low-income countries and less industrialized, resource-based economies located in the global South.[1] These climate change impacts are

[1] We use "global South" to refer to countries geographically in Asia, Africa, and Latin/South America. The global South, as a term, indicates more than geography. It points to "an entire history of colonialism, neo-imperialism, and differential economic and social change through which large inequalities in living standard, life expectancy, and access to resources are maintained" (Dados and Connell 2012, 13). In that sense, as postcolonial and decolonial scholars have argued there are "pockets of the South" in the

widely acknowledged to exacerbate existing inequalities and make everyday life more difficult for people living in poverty without access to the support taken for granted in rich, more industrialized countries with CO_2-intensive economies and lifestyles (IPCC 2014). As the Covid-19 pandemic has made clear, some of the most severe impacts increase the level of care required while reducing the number of people who are able to undertake care work. Insofar as women's unpaid care work provides a "shock absorber" (Elson 1991) for all sorts of threats and crises, it is inevitable that climate change impacts make caring even more time consuming and difficult. While it is common to read that women and girls must walk longer distances to fetch water in climate-challenged contexts, this is only one example of the myriad challenges people of all genders and ages are facing. Yet, at present, there is scant research on the care work-climate change nexus (Butt et al. 2020).

We show how the lack of attention to the intersections of climate change and care inequalities means that strategies for mitigation and adaptation that are pursued by governments and organizations have paid very little attention to care work (Bee 2013; Gay-Antaki 2016). The Paris Agreement within the UN Framework Convention on Climate Change (UNFCCC) mandates that climate intervention strategies be "gender responsive" and contribute to building the capacity of women to be agents of change (UNFCCC 2015; UN Women 2016). In the process of designing climate actions that are responsive and sensitive to gender, governments and other actors have focused primarily on women's economic activities and overlooked how paid and unpaid care are interconnected or how intra-household distributions of care work are negotiated or entrenched (Westholm and Arora-Jonsson 2015). Efforts to be gender responsive, or to center women's empowerment in climate change programs, are not necessarily care sensitive in that they do not take the specific concerns of carers into account, much less try to redress problems stemming from care work burdens and inequalities. Developing an approach to climate action that is care sensitive requires systematic analysis of how climate change impacts and uncertainties affect the amount and distribution of care work as well as the factors that make care work more or less difficult, and more or less rewarding.

This report fills a knowledge gap by examining the points of interaction between climate change impacts and the amount and distribution of unpaid care work as well as the conditions in which it is carried out in rural households and communities in very low-income countries. We locate the analysis in these countries because of Oxfam's primary focus on these contexts,[2] and because

global North. In this report, as we explain further, we limit our focus to the low-income countries in the global South.

[2] The Scope of Work for this commissioned research paper states, "All of the research questions...pertain to *rural livelihoods, in extremely low-income contexts*" and specifies that the literature review should be limited to "*very low-income, rural contexts*" (no

these are the parts of the world where climate change impacts—and the impacts of mitigation and adaptation strategies—are most disastrous for livelihoods due to poverty and other colonial legacies. These hotspot areas are also the most vulnerable to extreme changes in climate due to a dependence on rain-fed agriculture, with countries of Sub-Saharan Africa (SSA) among the worst affected (WB 2013; Bryan et al. 2018). The overwhelming majority of the population in these areas is engaged in small-scale farming and gathering for their livelihoods (FAO 2012). Research on climate-driven livelihood stresses and climate adaptation, in both the academic and grey literature, is mainly situated in the global South, although there is an increasing amount of literature on Northern contexts.

There is also a body of research on how climate change impacts are gendered and how interventions that aim to redress these impacts have gendered results. It is less clear how interventions affect the work of caring in a changing climate. Our research looks at the extent to which existing climate change interventions make a difference to care work for people in rural areas of low-income countries in the global South where there is a lack of social and physical infrastructures to support people to cope with the most serious of climate impacts. Care work in these areas carries on largely unsupported and under ever-worsening conditions (Babugura 2017; UNHRC 2019; UN 2019). Analyzing the specific impacts that climate change has on care work in these systemically underserved and vulnerable places enables us to suggest actions that could potentially alleviate the negative outcomes and accentuate the positive outcomes. These care-sensitive actions are informed by the "5R framework," which (in varying forms) has been used for at least two decades by feminist researchers and advocates to develop policies for transforming gendered care work inequalities (Elson 2017; Esquivel 2014).[3] It consists of five verbs beginning with the letter "R"—recognize, redistribute, reduce, represent, and reward—that each call for a set of positive actions. As further elaborated in section 2.4 (p. 28), this framework provides important resources for understanding the challenges and opportunities for addressing gender inequalities by changing care work. They have been adopted by many organizations, including Oxfam.[4]

specific definition or criteria for inclusion is given beyond this). We have followed Oxfam's guidance and focused on low-income countries in the global South, specifically Sub-Saharan African, South Asian, and Latin American countries. However, we acknowledge that there are low-income rural contexts in the global North that we have not considered in this report.

[3] The model started out as the Triple R framework, first developed by Elson (2009),was further elaborated by Esquivel (2013, 2014), and has since expanded to become the 4 and 5R frameworks.

[4] The fifth R—reward—is a topic of debate. Many organizations and projects, including Oxfam's WE-Care, use the 4Rs (probably) because they prefer not to advocate

1.1 LITERATURE REVIEWED AND METHODOLOGY

The report is the product of an extensive review of both grey and academic literature published in English. We collected grey literature by exploring the archives of leading organizations producing work on climate change and gender, using keyword searches. We then searched the reference lists of relevant reports for more related literature until saturation was reached. Recent reports by major organizations, networks, and think tanks, including UN Women, the International Labour Organization (ILO), the International Union for the Conservation of Nature (IUCN), the Intergovernmental Panel on Climate Change (IPCC), and the UNFCCC's Women's and Gender Constituency (WGC), which are themselves based on comprehensive literature reviews, were used to check comprehensiveness. In addition, we reviewed a number of relevant Oxfam Research Backgrounders and briefing papers on care work, poverty alleviation, energy access, and responses to climate change in low-income, rural, and agrarian settings in the global South.

The peer-reviewed academic literature was collected in a similar way. We drew on our own expert knowledge of the most up-to-date academic research, enabling us to identify key articles and reports. Through keyword searches in Google Scholar and the use of up-to-date literature reviews, we compiled an extensive library of articles. We compared the bibliographies of existing literature reviews and reports until a large sample of relevant recent research was found. We did not apply methods of a systematic review but instead conducted contextual and theoretical analysis using our own social scientific expertise. In order to consolidate the information and evidence, and to draw attention to key themes in the literature, we developed tables. Our presentation of evidence in these tables is synthetic and indicative rather than comprehensive because climate impacts are highly contextual.

Because the question of how care work has been affected by climatic changes has not been a focus in the grey or academic literature, we draw on intersecting bodies of literature to conceptualize and reflect on the care-climate nexus. First, we draw on literature on care that comes from feminist economics/social policy; second from studies on gender and climate change that have focused on the differentiated impacts of climate change; and third, the body of work on adaptation and mitigation that conceptualizes the differentiated impacts of climate policies, strategies, and projects. Scholarly work on gender inequalities and care work is concentrated in four main clusters of approaches, namely: feminist economics/political economy (including feminist ecological economics

remuneration for unpaid care work. We use the 5R for reasons explained in section 2.4 (p. 28).

and ecofeminist political economy); feminist social policy; gender, development, and environment studies; and feminist political ecology/ecofeminism.

Our search in the academic literature found relevant articles in an eclectic range of journals. Among the more frequently cited journals are *World Development, Climate and Development, Global Environmental Change, Gender & Development,* and *Women's Studies International Forum*. There appears to be a degree of overlap between academic and policy-focused research in this field, as several leading feminist economists and social policy experts produce reports for different institutions and organizations (e.g., the UN, IUCN, ILO, Food and Agriculture Organization of the United Nations (FAO), Oxfam, CARE, etc.).

We concentrated on evidence from low-income countries, many of which are in the global South. While much of the literature focuses on low-income countries as defined by the World Bank,[5] because the literature on care and climate change is scarce, we also refer to examples and experiences from other countries in the global South and do not follow a strict definition of "low-income country."

1.2 LIMITATIONS

Some limitations of this research should be noted. First, there is the obvious limitation of being able to review only literature published in English. Although this means we did not have access to evidence published in other languages, because the working language of academic journals, UN agencies, and other transnational organizations is English, much of the translation work to capture findings from non-English-speaking contexts has been done prior to publication of the sources reviewed. We acknowledge that a disproportionate amount of academic sources are both in English and written by academics based in the global North.

A second limitation is the time available for carrying out a review of what is a vast body of literature. While there is a lack of literature on the climate-care work nexus, the bodies of literature on care work, on climate change interventions, and more broadly on gender and climate change in the global South is extremely large. We provide a comprehensive review of the grey and academic research on the themes closely related to the research questions, but there are additional bodies of potentially relevant literature that we have not had the time to cover as extensively. For example, the research on the design and delivery of social

[5] World Bank country and lending group classifications: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519 (last accessed August 31, 2021).

welfare and protection policies/programs such as cash transfers might have allowed for more detailed recommendations for care-sensitive climate action. Similarly, we did not delve into research on climate finance to consider how it might be relevant to care work; there is almost no academic literature on this connection, but there may be resources within the grey literature. The timing of this project was such that we have not been able to reflect on the impacts and implications of the Covid-19 pandemic, nor have we incorporated findings from the IPCC's Sixth Assessment Report (delayed by the pandemic and set to be published in 2022).

While the use of evidence reviews and research backgrounders in the grey literature was expedient for our research, we also have to be aware of the existence of what colloquially might be called "zombie facts," which is a third limitation. These are "well-intentioned but statistically unfounded" facts (i.e., myths) that tend to be uncritically reproduced across the literature and therefore are to be treated with caution (Doss et al. 2018, 69). We discuss this point and give some examples in section 3.4 (p. 46).

For some readers our focus on women's unpaid care work might be interpreted as a limitation. We specify that women should not be treated as a homogenous group, and we have problematized the tendency in the gender and climate change field to equate gender with women. At the same time, we also accept the overwhelming evidence that, globally, the devaluation and drudgery of care work affect women and girls significantly more than men and boys (Adatti et al. 2018). We mention and cite relevant research about the roles and experiences of men and boys vis-a-vis care work where possible across the report, and we problematize the dominance of heteronormative[6] treatments of care inequalities in both the gender and care work and gender and climate change literatures. However, due to the shortage of resources to draw on (especially on LGBTQI+ people, care, and climate), we have not been able to integrate these dimensions into this report. We do, however, recommend these as areas for future research on care work and climate change.

1.3 REPORT STRUCTURE

The next section 2 (p. 12) provides a discussion of how we conceptualize care work for the purposes of this report and sets out the main elements needed for an analysis of the care work-climate change nexus. We offer a detailed discussion of the contextual factors that shape the performance and distribution of care work before providing specific examples of how climate change affects care work; the rationale for this decision is provided below. In section 3 (p. 32)

[6] Heteronormativity refers to the positioning of heterosexuality as normal and natural (Butler 2017).

we present and discuss the findings of our analysis of how climatic changes in low-income and primarily rural settings affect the amount and distribution of unpaid care work, as well as the conditions in which people do this work. In section 4 (p. 50) we consider whether and to what extent various climate change interventions, both for mitigation and adaptation, are sensitive to gender relations and care work inequality and how gender-insensitive interventions affect unpaid care work. Section 5 (p. 64) identifies interventions that researchers and organizations believe are important for integrating the goals of climate mitigation and adaptation with goals of transforming the root causes of gendered care work inequalities. Because there is a lack of attention to how these interventions could or should be designed to limit the negative impacts of climate change on care work, we argue for developing a care-sensitive approach. Finally, we offer suggestions for how Oxfam might highlight the need for more care-sensitive climate action through its influencing and advocacy work.

2 CONCEPTUALIZING AND CONTEXTUALIZING CARE WORK

The report begins with an extended discussion of care work before looking at examples of how climate change affects care work in section 3 (p. 32). The rationale for starting with a section on care rather than climate is threefold. First, it is important to situate the analysis within the vast body of feminist research on gender and care work that pre-dates a focus on climate change by several decades. There is, in fact, very little research on gender and climate change that looks specifically at care work. Second, we contend that because climate impacts exacerbate already existing inequalities and dimensions of care work, starting with the climate-care nexus before examining care work risks creating the perception that its contours are unique or novel.

Third, we wish to resist any hint of a "climatization" of care work analysis that could be perceived as a rebranding of long-standing problems (Doyle et al. 2015). In academic environmental politics literature, critical scholars have analyzed the power relations involved when actors based in the Global North reframe long-standing features of global injustice as "new" problems to be solved as part of the climate mitigation and adaptation agenda. Akin to what Jinnah (2011) calls "climate change bandwagoning," these moves are problematized by "critical adaptation" and postcolonial scholars for paving the way for managerial and/or technocratic strategies that serve the interests of economic elites (Mikulewicz 2020). This is not to question Oxfam's interest in how climate change is affecting care work and care workers, but rather to explain why this report prepares the analytical ground with a contextual-conceptual discussion instead of jumping straight to examples and evidence.

Oxfam has published a number of reports on care work in recent years (e.g., stemming from the 2014 women's empowerment and care project "WE-Care;" see: Karimli et al. 2016; Newth 2016; Rost et al. 2015). Two in particular serve as valuable references for the present discussion of concepts and contexts. Esquivel's (2013) background paper "Care in households and communities" provides a concise discussion of conceptualizations and debates pertaining to care and care work, drawing on a comprehensive review of academic and grey literatures. It offers both a conceptual framework for analyzing the relationship between care work and gender inequality and an examination of methods for measuring care. Coffey et al.'s briefing paper "Time to care" (2020) builds on and extends the 2013 backgrounder by examining a wider range of care work (underpaid and unpaid) and presents evidence of how care shapes and is

shaped by intersecting axes of inequality—from the global to the local—that determine the intensity and distribution of care work across the world.

Our report takes these two Oxfam backgrounders as a starting point and engages with their content. It consolidates evidence and insights from existing research, offering critical analysis where appropriate. Since neither of these documents systematically considers the impacts of climate change on care work, or how Oxfam's work can respond to the challenges and potential opportunities presented by these impacts, our report fills a gap. In addition, drawing on feminist scholars who have been influential in this field, and our own expertise as such scholars, we suggest an expanded definition of care work that includes environmental labor. This section establishes the foundations for the in-depth discussion of the care work-climate change nexus that is presented in section 3 (p. 32).

2.1 DEFINING CARE WORK

Because the concept of care work is defined and referred to in different ways in academic, policy, and practitioner literatures, it can be confusing to research. Esquivel claims that "in recent international debates, care is more widely used than care work, because it conveys broader meanings" (2013, 10). While this may be true in general discussions, the importance of treating care as a form of work is well established in approaches for which inequality is a focus. For example, the "Time to care" report, which examines the relationship between care work and the global crisis of inequality, the concept of "care work" is used throughout. A distinction is made between paid and unpaid care work, but all forms of care work are treated as foundational to the human economy (Coffey et al. 2020).

In academic scholarship, care work is widely used alongside and/or interchangeably with a set of related concepts such as "caregiving" and "care services" (Razavi 2007), "domestic labor" (Molyneux 1979), "sustaining services" (Perkins 2007), and "social reproduction" (Bakker 2007; Bhattacharya 2017; see also Rao, N. 2018 for a discussion). In feminist political economy scholarship, "social reproduction" refers to the daily and generational renewal of life that is essential to sustaining societies and their economies. It originates in a critique of mainstream economics/political economy for recognizing only the monetized and "productive" aspects of the economy and ignoring the multiple processes and range of non-monetized activities on which societies depend (Himmelweit 1995). Although there are terminological differences and debates within the field, the common aims in care work literature have been to valorize and make visible unpaid reproductive work.

Razavi, an important voice in gender and development debates, argues for treating care work as exclusively related to caring for humans, paid or unpaid. For her this includes “direct care of persons” (bathing, feeding, talking, etc.) as well as activities that provide the necessary conditions for caregiving, including cooking, washing clothes, and shopping (Razavi 2007, 6). This definition resonates with that offered by the feminist economist Folbre (also oft-cited) who distinguishes between direct/interactive (hands-on) care work and indirect/support care work (provisioning of necessary goods and services) for people (Folbre 2006, 2014, 2018). Care responsibilities can include caring for sick and elderly people outside of the immediate family, and this is more common in some cultural contexts than others. A major report by the ILO says unpaid care work is performed without any explicit monetary compensation and that it almost always takes place “within the household.” However, the report accepts that care work is also done voluntarily and for no remuneration for non-family members in community settings (Adatti et al. 2018, 53).

However, boundaries between paid and unpaid, and direct and indirect, care are often porous and difficult to draw. Different forms of care work are regularly performed simultaneously in low-income settings. Feminists have long pointed to the analytical links and transmission channels between paid and unpaid work and how women’s multiple and overlapping roles within the productive and reproductive spheres tend to be disregarded (see, e.g., Mies 1986; Beneria 1992; Waring 1999; Folbre 2006; Elson 1991, Fraser 2013; Esquivel 2014; Nelson and Power 2018). This is especially so in relation to the care of the environment.

Ecofeminist, feminist political ecology, and gender and development research in the 1980s and early 1990s was crucial in bringing to light rural women's indispensable, yet invisible, contributions to food production and environmental care (Sen and Grown 1987; Shiva 1989; Agarwal 1992; Rocheleau et al. 1996). More recently, feminists working on the environment (e.g., Arora-Jonsson 2013; Graddy-Lovelace 2018; Yurco 2018; Gay-Antaki 2016) have shown how women’s environmental care includes caring for animals, plants, and common spaces (e.g., village commons, forests, neighborhoods, gardens, pastoral homes), and multiple, gendered spaces and levels where resources are managed. This work takes place within the home but also outside the immediate household and often collaboratively, with other family and community members, and sometimes contributes to household incomes. Such work highlights the entanglements of human-nature relationships, the disregard of which has led to the climate crises today. This primarily unpaid work of care props up the hidden infrastructure of environmental use and governance. It is crucial for maintaining healthy environments, and resisting environmental and gendered violence (Arora-Jonsson et al. 2019; 2021).

Arora-Jonsson (2013) makes a case for recognizing care work more broadly, and women's environmental care specifically, in questions of environmental governance. The reverse is equally important. There is a need to address the environment in conceptualizing care. That this has been disregarded may be the case because such work is not "for" people in private households; it could be called subsistence work instead. Some contend that activities like caring for domestic animals produce goods for family consumption but also for markets and does not always count as "unpaid;" indeed it might well be counted in Systems of National Accounts (SNAs) (Charmes 2015, 14).[7] Still others might include it but refer to activities such as fetching fuel and water as "ancillary." (Chopra and Zambelli 2017, 3).

Given the porous boundaries between paid work for household incomes and unpaid care work both in households and in the care of the environment, we include in our definition of unpaid care work activities care for "the environment." The environment includes other species and living beings (e.g., trees), things, and places (e.g., water sources, common land, village spaces, and community activities). Including environmental care beyond the household sphere enables greater attention to men's engagement in unpaid activities that protect and sustain the natural world. For example, Chopra and Zambelli (2017, 19) find a high rate of sharing between men and women in care for animals. Kristjanson et al. (2017) report that more men than women engage in water and soil conservation practices. However, because care is feminized (cf. Lau et al. 2021), the environmental care work that men do is rarely labelled as such. Drawing on ecofeminist literature, Barca (2020, 36) argues for a broad understanding of environmental care that includes the everyday work and political resistance struggles of women, peasants, and Indigenous people; she also recognizes that this work can be a cause of marginalization, exploitation, and vulnerability to climate change for all those who do it.[8]

A further point to note concerning the conceptualization of care work in our report is that care work activities are not limited to physical tasks. Our definition includes responsibility for care, which is difficult to measure but is nonetheless important in determining how people organize their time and attention on a daily basis (Folbre 2014, i136). Some feminist literature uses the concept of

[7] In some of the literature by economists, there is a tendency to define work in reference to how it is treated in the System of National Accounts (SNA). We are not doing that here because economic analysis is not our remit (or expertise) and we do not consider this debate to be directly relevant for answering our research questions.

[8] Lau et al. (2021) offer a useful discussion of problematic gender assumptions and stereotypes that hinder climate policy, including the myths that "women are more caring, connected to the environment" than men. However, we reject their assertion that these myths originate with ecofeminists in the 1970s. As Barca (2020) and many other ecofeminist theorists have explained, these myths are a product of—and functional to—processes of capitalist-colonial-patriarchal accumulation (cf. Mies 1986; Salleh 2009).

“emotional labor” for the essential work of attending to the non-material (e.g., psychological) well-being of people and relationships (Tronto 2013). For example, parenting children combines physical and affective activities, usually simultaneously, and it is important to include both when referring to it as work. Emotional and psychological aspects of care can be extremely taxing, especially in times of hardship, disaster, and stressful circumstances. There is a lack of research on these dimensions of care work, especially in very low-income country contexts.

Table 2.1 presents a summary of the above discussion of how care work is defined in this report. This typology of unpaid care work and associated activities is an analytical device that helps to make different dimensions visible. It should be read with awareness that, as shown in time use surveys, these types are frequently overlapping and coincidental, especially in the everyday lives of people in rural areas of the global South (Rost et al. 2015; Oxfam 2018).

Table 2.1 Conceptualizing three types of unpaid care work

Type of unpaid care work	Activities
Direct care for persons.	Hands-on caring for the well-being of people in one’s family or household, including children, elderly and sick relatives as well as non-kin people in one’s community via volunteer work. Responsibility for care (planning, management, anticipation). Emotional labor (love, support, worry, maintaining relationships).
Indirect care for persons.	Household/domestic work that provides the (pre)conditions for direct care. Household chores (cleaning, waste disposal, washing clothes, bedding). Provisioning of food, water, clothing, energy, shelter. Preparing and cooking food.
Local environmental care. Caring for the commons.	Care beyond the domestic “indoor” space, including: • Direct care for animals and plants for own/communal purposes; small-holding; • vegetable gardening; • keeping animals (e.g., chickens and goats); • collecting and carrying fodder and water for animals; • manure application to fields, weeding and pest control; • managing woodland and water sources; • managing village commons and keeping them clean; • community gardens.

2.2 ANALYZING UNPAID CARE WORK AS RELATIONAL AND CONTEXTUAL

The literature on unpaid care work makes clear that it is never a solely private matter: it is foundational to economies and societal well-being. In most countries,

the state has an interest in supporting or delivering care. Analyses of unpaid care work should involve the care worker as an individual, the beneficiaries or recipients of care in relationship with the carer, as well as the conditions and environments in which it is being conducted. Unpaid care work is embedded in a web of relations and an assemblage of actors that together constitute what Razavi (2007) calls “the social organisation of care” that is distributed across families, the state, the market, and the community.

The concept of “care economy” is a term commonly used by feminist economists to situate unpaid care work in a system that is made up of a mix of different actors, relationships, and spaces that together organize and ensure social reproduction (cf. Folbre 2006, 2014; Elson 2017). It is used to understand how inequalities and divisions of paid/unpaid labor within families are connected to and influenced by external factors, including institutions and cultural norms (Esquivel 2014, i129). This conceptualization necessarily avoids individualizing care work.

Given that analyses of unpaid care work in households and communities are inevitably also analyses of gender differences and asymmetries, we adopt a feminist approach that treats gender as a category that helps to analyze how power relations between men and women intersect with dimensions of power (including class, ethnicity, race, sexuality, urban or rural residence, occupation) to produce outcomes in different contexts. We avoid reifying gender or equating gender with women and attempt, where possible, to highlight how different men and women (though primarily women since most of the research on care and/or gender has focused on women) experience climate change and care based on their intersecting identities. By extension, we consider the experiences of men and women when possible/relevant, while still recognizing inequalities. By focusing on the conditions and dynamics of care work rather than on individuals, we recognize that both women and men are involved in care work, albeit in different ways. This recognition is central to the care-sensitive approach we develop in this report.

Central to this approach is the feminist insight that intersectional inequalities shape the very meaning of gender, so single-axis analyses are problematic and to be avoided. Class-based differences may be as significant as gender when analyzing unpaid care work because income level determines whether it can be carried out with relative ease (even outsourced) or in relative drudgery. Also important is recognizing non-binary gender and non-heteronormativity, even though research is scarce in the climate change literature.[9]

[9] A review article on gender equality in climate change policy published in *Nature Climate Change* does not mention or cite any research on non-binary gender or LGBTQI+ people (Lau et al. 2021). See Mason (2018) for a discussion of why there has been silence on LGBTQI+ experiences in development policy and research, as well as how scholars in

Current care work scholarship acknowledges the fact that care work is a concept that is both context-dependent and contested (Esquivel 2014). It does not mean the same thing universally, and there are empirical as well as theoretical and normative dimensions to any examination of care work. Nitya Rao stresses the importance of understanding unpaid care work, as well as debates over it, in relation to national context: "varying geographies, governance systems, economic structures and social relations" (2018, 738). Chopra and Zambelli's study of unpaid care in Nepal, India, Rwanda, and Tanzania finds both similarities and differences, leading them to note that "patterns are driven by country-specific variations, reflecting the context-specific nature of gender norms across these countries" (2017, 22). Chung et al. (2019) emphasize that both regional variability and diversity of lived experience of unpaid care work in different global South contexts should be taken into account in research, policy-making, and practice.

Table 2.2 illustrates our multi-level approach and the key factors that we consider in this report. This approach enables the analysis to be attentive to the implications of care work on the individual lives of women and men as well as recognizing that care work is relational and context dependent. Here again we note that it is important to treat this as a tool that separates what are in reality intertwined aspects for analytical purposes.

Table 2.2 Multi-level approach to unpaid care work

Levels/sites of care work	Who/what is involved in care work
Individual carers	Minds and bodies, agency and autonomy of individual carers.
Family and household	Relations between givers and recipients of care work. Spouses/partners, parents and children. Grandparents and other extended relations. Domestic animals (pets).
Local community and environment	Groups outside the private household. Networks, informal groups. Collective actions. Forests, pastures, water sources. Livestock animals (chickens, goats).

the field of queer development studies have responded through their research and activism. We note that neither care nor climate change appear in the index of this otherwise comprehensive *Handbook of queer development studies* (Mason 2018).

2.3 UNPAID CARE WORK IN RURAL AREAS IN LOW-INCOME COUNTRIES: CONTEXTUAL FACTORS

There are a number of contextual factors shaping care work in rural settings in low-income countries in the global South, which should inform a review of how climate change impacts affect unpaid care work. Listed in Box 2.1 are six factors that are important for understanding how climate change impacts affect unpaid care work. Each is explained in detail in this section.

Box 2.1 Contextual factors shaping care work

Gender norms and divisions: Unpaid care work is primarily done by women and girls.

Everyday environmental relations: Subsistence work is done alongside care work.

Social safety net (SSN) policies: When there are no state SSNs, such as child and elder care, unpaid care work falls to private households.

Physical infrastructure: Lack of infrastructure and technologies (plumbing and electricity) increases the drudgery of doing everyday care work.

Health, fertility, and mortality: The amount and type of care work depends on household make-up (very young, very old, very sick).

Migration and displacement: The amount and type of care work done and needed by people left behind is affected when family members migrate; displacement increases physical and mental stresses, which make care work more difficult.

A review of the literature suggests that these factors have been central to research on gendered dimensions of care work for many decades, even before a focus on climate impacts emerged. It is important to review them here, not only because they shape the amount, distribution, and conditions of care work in low-income global South contexts, but also because starting this discussion with climate change impacts would incorrectly suggest that climate-related pressures on care work are in some way unique or new.

The academic feminist literature generally accepts that it is difficult to measure accurately the amount of work that takes place in informal and domestic contexts given its invisibility (cf. Esquivel 2013; Folbre 2006; Waring 1999). The literature frequently points out that the lack of empirical research on this topic remains despite the push by gender and development specialists for improved data collection since the 1995 Beijing Declaration (N. Rao 2018). Whereas countries

such as India and China have implemented time-use surveys of unpaid care work, Folbre (2014) notes that most Sub-Saharan African countries do not have the necessary data for thorough analyses. Many forms of unpaid care work continue to be invisible in national accounts (e.g., gross domestic product (GDP)) because they are not considered economically productive. The ILO report "Care work and care jobs" is the most useful recent source of data on the amount of hours spent in care work, and these data are disaggregated by gender and country income category (i.e. low, middle, high) (Adatti et al. 2018).

As demonstrated in section 3 (p. 32), climate change exacerbates already existing inequalities and challenges for those who do care work, while also creating new ones (Butt et al. 2020). We therefore look more closely at climatic changes as an important contextual factor that shapes the demand for care as well as the conditions in which care work takes place.

Gender norms and divisions

In most countries, even though it is less invisible than it once was, unpaid care work is taken for granted, treated as an extension of the family's and, more specifically, women's natural role. This is especially so in very low-income countries given that there are fewer systems in place to provide care other than informally by family members and/or by informally paid care workers in household contexts (Rao et al. 2020).

Research on gender divisions of labor in global South contexts tends to focus on unpaid care work because this accounts for the bulk of women's work (Folbre 2018, 1). Women have relatively lower levels of participation in waged work in the formal economy, so their time is spent in informal and home-based production and social reproduction (Folbre 2018, 6; Adatti et al. 2018; Mies 1986).[10] In countries with low levels of economic development, there tends to be a high degree of gender differences in total hours worked, with women working more hours than men when time spent in paid work, unpaid care work, and subsistence work is combined (Folbre 2014, i140; Budlender 2008; FAO and CARE 2019). Women in rural areas of low-income and less-industrialized countries spend the most amount of time on unpaid care work of any women (Coffey et al. 2020). Time use studies suggest they may spend five times more hours engaged in unpaid care work than men, which can be up to fourteen hours a day in some areas (Coffey et al. 2020). Another statistic is that women spend

[10] Folbre's study focuses on the very lowest-income region of the world: Sub-Saharan Africa (SSA). It is important to note that alongside women's unpaid care work there is also a feminization of paid labor occurring all over the world and in a range of different sectors. In addition, 61 percent of the global labor force works in the informal economy. A significant percentage of those employed in the informal economy are women. According to a report for the ILO, women are often missing from labor statistics, namely those women who work outside the home, but identify themselves as "homemakers" because they devalue and under-report their paid work (Adatti et al. 2018, 73).

19 percent of their time on unpaid care work, compared to 8 percent for men (High-level Political Forum on Sustainable Development 2017, 2). Women's informal work in the economy is extremely high in countries in the global South (Adatti et al. 2018). There is also a great deal of overlap between their paid and unpaid work.[11]

Gender norms, the informal social rules that determine socially acceptable behavior for men and women, make caring women's duty (N. Rao 2018). These norms operate and must be understood in a very specific, localized context, even though general patterns exist. For example, all people may engage in care work, but women are primarily responsible for unpaid care work, with men found generally to "help out" sporadically or in emergencies (Budlender 2008; Chopra and Zambelli 2017; FAO and CARE 2019; Adatti et al. 2018). Similarly, local norms about farming practices may vary but, in most countries across the world, a gendered pattern exists where men are regarded as farmers, women as "farmer's wives" or subsistence growers/gatherers instead (Hillenbrand and Maruka 2019; Babugura 2010, 2017).

In addition to efforts to quantify unpaid care work in economic and temporal terms, and developing a profile of who does the most, there are two key themes in the literature that are worth summarizing because they are relevant to subsequent analysis in the report.

First, the literature explains that unpaid care work is carried out by both women and men but there are differences in the types of work as well as how they are valued socially (Esquivel 2014; Coffey et al. 2020). For example, the gender division of unpaid care work tends to follow a gendered pattern whereby indoor/household and provisioning work is seen as women's work, with direct care for family members mostly performed by women, although men participate to some extent in care for their own children. This division is sustained intergenerationally, with girls and older women carrying out significantly more unpaid care work relative to boys and older men.[12] On the other hand, women's care of the environment and village spaces is not seen as "work" (Arora-Jonsson 2013). Such differences stem from and sustain asymmetrical power relations between men and women, where men as a group are more powerful than women as a group, especially in formal and public spheres of life. The value of care and allocation of duties by gender impacts on individuals, maintaining

[11] For a discussion of time-use survey methodologies see, e.g., Rai et al. (2014).
[12] The ILO report by Adatti et al. provides comprehensive statistical data on the amount of care work performed by women/girls and men/boys. By way of summary, they write: "Women spend more time in unpaid care work than men in every region, ranging from 1.7 times more in the Americas to 4.7 times in the Arab States. Globally, unpaid care work is most intensive for girls and women living in middle-income countries, those married and of adult age, with lower educational achievement, resident in rural areas, and with children under school age" (2018, xxx).

systems and ideologies that tend to lead to women having lower status compared to men.

Second, the literature details a range of ways the responsibility for unpaid care work affects the lives of individual carers (cf. Chopra and Zambelli 2017). Care work can provide a measure of authority as well as power and esteem for the caregiver. Engagement in collective environmental care work has provided women's groups with recognized space for agency from which to challenge harassment and inequalities (Arora-Jonsson 2013). However, the undervaluing of their care work in the formal economy shows that women and girls are more disadvantaged economically. The majority of the literature emphasizes the drudgery related to care work (Chopra and Zambelli 2017; Butt et al. 2020). Empirical evidence overwhelmingly shows that women and girls are more disadvantaged economically by care responsibilities than men and boys (Coffey et al. 2020; Adatti et al. 2018). The undervaluing of care work creates a vicious circle of economic inequality wherein women's contributions to society are regarded as less worthy of support, leading to lower wages, institutional barriers to bank loans, credit, extension services, and lack of access to technologies and land (see Yadav and Lal 2018 for comprehensive discussion).

Cross-national research finds that care workload adversely affects women's quality of life, reducing their overall well-being (Adatti et al. 2018). Time poverty and lack of rest and relaxation caused by juggling many different types of work (often multi-tasking by, for example, taking care of children while preparing food and engaging in craft work at home to earn money) is endemic (Irani and Vemireddy 2021). In low-income countries, it is well known that poor rural women lack time to gain education (Coffey et al. 2020) and opportunities for the kinds of activities needed to maintain physical and mental health and psychological well-being (Folbre 2014, i146). The report by Chopra and Zambelli (2017) "No time to rest" details the poor quality of life and health implications of women's time poverty and heavy daily workloads. Razavi (2007, iii) explains that although the toll it takes on women and girls is high, "their own needs for care tend to be downplayed and neglected."

A further aspect that is well documented in the literature is the effects of women's care burdens and time poverty on children. When women are unable to carry their load, due to paid work or health reasons such as pregnancy and childbirth, children may be required to step in to do the essential work. Consequently, children, especially girls, lack time for rest, play, and education (Lam 2019). For example, the UN finds that 15 million girls never gain a school education (compared to 10 million boys) because they are needed at home to do care and domestic work (UN Women n.d.; see also Yadav and Lal 2018; Lam 2019). Lack of education then leads to lack of paid work opportunities, which in turn means that girls and women have no choice but to carry on with unpaid care work, and in some cases early marriage, and the cycle continues to the next generation.

Inequality and poor quality of life caused by specialization in unpaid care combine to be the main cause of women's disempowerment (Folbre 2014, i142; FAO and CARE 2019). This is a dominant view in a great deal of gender and development scholarship, drawing on the work of feminist economists, backed by empirical evidence from low-income countries (DAWN 1995; Esquivel 2014; Elson 2015, 2017). Other forms of disempowerment include lack of ability to make strategic life choices and speak up against exploitation, as well as non-participation in decision-making in political or community life alongside men. Gender-based violence can impede women's self-assertion, leading to male-biased perspectives on household needs. Disempowerment means women cannot escape from violent relationships or resist misogynist abuse (Roseborough et al. 2009).

In addition to gender norms and divisions, any analysis of care work in low-income rural, primarily agrarian, settings must take into account the following factors that shape the context of and demand for care work and the ability of people to provide care in the informal care economy.

Everyday environmental relations

In many rural communities, men and women spend a high proportion of their everyday lives involved in forest- and agriculture-related activities (Resurrección 2019; Babugura 2017; FAO and CARE 2019). The relationship between women and the environment, especially in less-industrialized contexts in the global South, has been at the heart of debates on development and a central question for sustainability.

In Sub-Saharan African countries, such as Burkina Faso, Benin, Tanzania, and Rwanda, for example, women spend a significant proportion of their days in small-scale agricultural activities for family provisioning. They often engage in food production or forest work at the same time as supervising children (Arora-Jonsson et al. 2019, 158). They are also involved in informal income-generating craft production in the household, which they combine with household tasks in order to take advantage of energy use (Rewald 2017, 10; Clancy and Dutta 2005). This means that the subsistence work of agriculture, forestry, animal husbandry, or income-generation activities in the home are often interconnected and take place simultaneously (Irani and Vemireddy 2021; Chung et al. 2019; Arora-Jonsson et al. 2019; Mies 1982). As discussed above, this environmental care work that is performed by women is vital in sustaining environments and their communities as well as in coping with myriad stresses and threats (see also Arora-Jonsson et al. 2019). However, scholars have pointed to the critical gap between the work of care and the well-being of those who perform it. There is a lack of attention both to individual carers and to the households and communities in which care work takes place. In the absence of the recognition of the value of care, the neglect of individuals, households, and communities engaged in this

work remains understudied. Thus, it cannot be easily mapped, and the consequences remain unaddressed (Rai et al. 2014).

Writing on Indigenous women in Latin America and their contribution to traditional agricultural systems, Lopez-Alzina (2020) argues that women are often the keepers of seed diversity and knowledge about traditional agricultural systems. Yet the significance of their contributions is largely ignored because they are not regarded as economically productive. Similarly, Yurco's (2018) study on pastoralists in Kenya shows how most mainstream studies on pastoralism focus only on rangelands and the men who manage them, underemphasizing women's roles in managing livestock-related resources as well as the spaces beyond the rangelands such as the pastoral home where livestock is managed. That this disregard recurs across different fields can be seen in international agricultural biodiversity conservation where environmental care work with significant gendered implications is ignored in training and programs (Graddy-Lovelace 2018). It also leads to an increase of economic vulnerability that in times of crisis exacerbates the social costs of market failure (Rai et al. 2014).

Drawing on the work of early feminist political ecologists, as well as her own collaboration with rural women's groups, Arora-Jonsson (2013) points out that women's work in the environment often takes place in "in-between" spaces such as such as hedgerows or the understory in coffee or cocoa plots cultivated by them or where tree tenure could be wholly separate from underlying land rights (Rocheleau and Edmunds 1997; Fortmann and Rocheleau 1985; Fortmann and Bruce 1988). She also points to the "in-between" times in which such work takes place, such as between routine activities such as meal preparation, fuelwood collection, care of children, or work on their agricultural plots and thus is easily disregarded. Seasonal patterns are an important dimension in how this work is organized and carried out in/by low-income families, as well as its intensity and drudgery (Butt et al. 2020). How seasons and other natural cycles shape care work becomes even more relevant when considering the effects of climate change and so is a key theme discussed with examples in section 3 (p. 32). Further, as we show in sections 4 and 5 (p. 50 and p. 64), climate programs and their accompanying "climate assemblages," including actors from across different levels (global, national, and local), are taking on increasing importance in such everyday relations of environmental care and in the lives of men and women in rural contexts in the global South (see Peluso and Lund 2011; Arora-Jonsson et al. 2016). Thus, in spaces of unpaid, informal, and paid labor, actors far beyond the local contexts, through their decision-making on local environments, are assuming an as-yet-unstudied role in the everyday work of care.

Social protection and social safety net policies

Some scholars refer to social safety net (SSN) policies and other state-provided services as "social infrastructure" (Kumari and Sharma 2017; Gnade et al. 2017; de Henau and Himmelweit 2020). Weak government institutions, and lack of

public services and other social infrastructure—also known as social protection and social safety net policies—in low-income countries mean that it is assumed that families and communities will provide the care required for social reproduction. The concept of "care deficit" captures the lack of provision and coordination of care services across all sectors of societies (Schatz and Seely 2015; Upton 2003). However, it has been noted that when there are care-related social protection policies, such as paid maternity leave, they are limited to jobs in formal employment, which means only a small percentage of the population even benefit from them (Peterman et al. 2019).

The provision of social safety net programs has been expanding over the past decade in Africa and other parts of the global South (Peterman et al. 2019), and to some extent they have been combined with climate adaptation as well as disaster risk reduction programs. Support for poor and vulnerable people through various forms of cash transfer and programs tackling food insecurity is increasingly being provided by governments and is often targeted at women as those responsible for care of children and other dependent family members (cf. UNICEF 2017).

Even though the situation is changing, the need for more social protection to reduce care work burdens on women as a target for meeting SDG 5 suggests that there is still a long way to go in many parts of the global South (Adatti et al. 2018; Rao et al. 2020). Less than one-third of the world's population enjoy full access to social protection, whereas three-quarters are covered partially or not at all, and women are overrepresented among the unprotected (UN Women 2015). There is a need for more attention to the impact of social safety net policies on gender equality.

Physical infrastructure

It is important to consider how the availability and accessibility of physical infrastructure and technologies affect unpaid care work. The ILO uses the phrase "care related infrastructure" to refer to the water, sanitation, and energy sources that make it possible to do care and domestic work without excessive drudgery (Adatti et al. 2018, 38) In rural areas of the global South, the lack of this infrastructure and the lack of domestic labor-saving technologies are well researched. Rewald's (2017) Oxfam background paper on "Energy and women and girls" gives a comprehensive overview of the extent of energy poverty in these settings, as well as the way care burdens are intensified as a result. For example, she notes that "lack of transportation technologies, water pumps, modern cooking fuels, electrical appliances, and other tools that require energy access mean that women in poor households have to exert much more of their own energy" (Rewald 2017, 12). A report by International Fund for Agricultural Development (IFAD) (2016) discusses both the lack of labor-saving technologies that reduce unpaid care and domestic work as well as the barriers to their access, use, and acceptability in rural areas in global South contexts.

A common theme in the development literature on unpaid care is the drudgery of women having to walk long distances and carry heavy loads, and to work long hours, in order to carry out their daily domestic chores (e.g., Sultana 2011; Gururani 2002). Numerous studies indicate that a lack of physical infrastructure increases the time and stress of care work. Conversely, investments in physical/technological infrastructure, as well as availability of some types of labor-saving domestic appliances, have been found—in some contexts and under certain conditions—to reduce time poverty, leading to benefits for those responsible for care work (Chopra and Zambelli 2017; see also IFAD 2016). Rost et al. (2015) note that time saved by having access to water taps or cookstoves is used by some women to do more direct care, thus having minimal effect on the overall amount of care work. In other contexts, research has shown that labor-saving technologies can increase working hours by changing expectations (e.g., of cleanliness, productivity) or requiring additional effort to learn, maintain, and repair appliances (Bittman et al. 2004). Oxfam's research in the WE-Care initiative finds that unintended consequences can be negative if the introduction of technologies is not combined with changes in social norms, or if it not approached in a participatory way at every stage from design to implementation (Aranas et al. 2020).

Health, fertility, and mortality

The amount and type of care work that people do depends on numbers of very young and very old people and sick people requiring care as well as family size and composition. The concept of a global care crisis captures the fact that the overall number of people needing care is growing steadily, with an estimated 2.3 billion, mainly children and elderly people, requiring care by 2030 (Adatti et al. 2018). Across the global South, growing demand and lack of state provided services mean that women, in particular, become shock absorbers for the extra care that needs to be undertaken. Children and older people must also carry out significant amounts of care work, especially girls and older women, and especially when families are under health- or environment-related stress.[13]

Serious health crises in low-income rural contexts, such as in southern African countries, have a significant effect on women's and girls' unpaid care and domestic work, especially in households with incomes too low to afford paying for help or other forms of assistance (Razavi 2007, 10). The number of sick and

[13] We have decided not to discuss them in this report, but it is important to acknowledge that connections are commonly (increasingly?) drawn between population growth, environmental stresses, and climate change, with many non-governmental organizations (NGOs) calling for more funding for family planning and contraceptives as part of climate mitigation and climate finance measures. Feminists have long cautioned against playing into neo-Malthusian and racist-misogynist attitudes and insist on centering reproductive rights whenever such connections are made (see, for example, Sasser 2018). We acknowledge that there is need to be cautious but also not to avoid doing feminist and decolonial research and advocacy in this area.

disabled family members in a household increases the time required to care. It is mentioned frequently in the literature that demand for care work is high in countries where HIV/AIDS and other epidemics have increased mortality rates and the need for long-term care, combined with lack of access to health care services (IFAD 2016; Sellers 2016). Women and girls in households affected by HIV/AIDS can bear a significantly higher burden of care (Sellers 2016; Razavi 2009). It is around caring for HIV/AIDS patients that a lot of political mobilization around care has been seen in southern African countries. The intensified burden on families has led to marked increases in women's economic vulnerability (Razavi 2007, 22; Coffey et al. 2020). But, according to Razavi (2007), when the state steps in to offer alternative forms of care, it mostly uses low-paid home-based female workers who are very poorly supported to do the work. Research in Latin America also shows health inequalities related to unpaid care work and paid work that depend on the interaction between gender and informal employment. Policies need to consider both the labor (increasing social security coverage) and domestic spheres (co-responsibility of care) to reduce such inequalities (Lopez-Ruiz et al. 2017).

Migration and displacement

Migration, for paid work or because of displacement due to conflict, development, and climatic changes, is a fact of life in low-income and less-industrialized areas of the global South (King-Dejardin 2019). Many countries have seen an increase in long-term male out-migration that has affected the distribution of gender roles, responsibilities, and resources (Rao, Lawson et al. 2019; Rao, Mishra et al. 2019). The literature we reviewed suggests that migration affects care work in two significant ways. First, there are increased care responsibilities and work when family members are left behind when people migrate for care work to support their family (Lam 2019). Men are more likely than women to migrate for work, leaving women (in heterosexual couple families) to assume the position as household head and sole parent (Bryan et al. 2018; Coffey et al. 2020, 33). Rao, Mishra et al. (2019) give the example from Kenya where, when men migrate with cattle, women are left behind and struggle to manage without milk either to sell or feed to their children. They quote a woman: "My husband is sometimes away for four to five days. I manage the shop, cook, and look after the children. I have no help" (p. 967).

Second, a growing number of women are migrating to find paid jobs in care work, including migrating to high-income countries where domestic workers are insufficiently protected by rights/laws and so are at high risk of exploitation and abuse (as reports on modern slavery evidence) (Coffey et al. 2020, 15). This international division of care work highlights the intersection of gender, class/caste, and racialization in that it is poor women in the global South who make up the majority of migrant care workers in the global North (King-Dejardin 2019; Lam 2019). Care workers who do work in domestic settings for people not related to them are a significant part of the picture in low-income countries where

families depend on remittances (Razavi 2007; Hennebry et al. 2019; Bastia and Piper 2019).

Challenging the claim that the feminization of agriculture leads to greater empowerment, Clement et al. (2019) show that in Bangladesh, Nepal, and Tajikistan, increased control over decision-making within the household did not necessarily match with women's own perceptions of their empowerment, as their care burden increased exponentially when men from their households were away. Many women felt powerless in the face of challenges related to exploitative credit systems, social norms, masculine bureaucracies, or double standards to access public services. Such cases demonstrate the complicated relationships between men and women as well as their deep interdependencies within households. There are a number of effects on unpaid care work in families left behind, such as children missing parental care and grandparents assuming additional responsibility and work (Dolbin-MacNab and Yancura 2018; Lam and Yeoh 2019).

Migration and displacement are especially relevant when looking at the care-climate nexus (Oxfam 2019). Climatic changes are rarely the sole driver of migration, but migration can become a livelihood strategy when climate impacts combine with other reasons (e.g., labor demand, conflict), and changes to household structures and dynamics that result from migration can have a number of effects on care work (cf. Rao et al. 2020; Clement et al. 2019).

2.4 TRANSFORMING UNPAID CARE WORK INEQUALITIES

Analyses of how the feminization of care work sustains inequalities of power, status, and money between women and men have been mainstreamed into social policy at all levels. For example, the UN SDG 5 on gender equality makes the connection between improving the lives of women and girls and addressing their disproportionate responsibility for unpaid care work (UNDP 2015). Policy approaches to addressing this connection can be conservative, in that they seek to make women's care work easier to do and/or a source of empowerment, or they can be transformative, in that they seek to change the patriarchal norms that underpin the devaluation of care and women's disproportionate responsibility for it, thereby aiming for gender justice (cf. Fraser 1997, 2013).

There is a perennial tension within feminist research on care work between the desire to recognize and improve conditions of women's care work and to liberate them from it.[14] This tension is especially acute in contexts where women's role as

[14] This tension is captured in the feminist development literature by the distinction between practical and strategic gender needs (Moser 1989).

caregivers is what gives them status/identity (e.g., as mothers or farmers), is a source of satisfaction and fulfilment, and is what women chose to do even at considerable cost to themselves (Chung et al. 2019). A feminist agenda for transformation is therefore broad and explicitly normative, offering answers to the questions of "who should provide care, for whom, and bearing which costs…and which institutions, economic structures, gender norms and public policies would be conducive" to gender equality (Esquivel 2014, 433–434).

The feminist case for transforming how and by whom unpaid care work is performed in low-income countries is uncontroversial: there is widespread agreement in the literature that heavy unpaid care responsibilities limit women's lives and that transformation is necessary for gender justice. And as Chopra and Zambelli (2017, 39) note, most women who shoulder a disproportionate amount of care work relative to their male counterparts express a desire to change the gender norms that prevent greater sharing.

The most commonly proposed framework for transformation of unpaid care work in the literature is the 3R, 4R, and sometimes 5R framework (see Table 2.3) (Elson 2017; Esquivel 2014; Adatti et al. 2018; Coffey et al. 2020).[15] The 4R version is reproduced in Oxfam backgrounders on unpaid care and domestic work in Africa as recently as 2020 (Mugehera and Parkes 2020) and applied in the WE Care project (Aranas et al. 2020). The ILO provides a concise definition of the 5R framework as:

> a human rights-based and gender-responsive approach to public policy. The framework creates a virtuous circle that mitigates care-related inequalities, addresses the barriers preventing women from entering paid work, and improves the conditions of all care workers and, by extension, the quality of care. (Adatti et al. 2018, xliv)

[15] Elson first coined the 3R framework for analyzing unpaid work in a seminar organized by the United Nations Development Programme (UNDP) in New York, NY in 2009. It was subsequently used by UNDP and has since then been used, albeit with some variations (i.e., 4 and 5R), by a wide range of international organizations including Oxfam (Elson 2017).

Table 2.3 The 5R framework for transforming gendered care work inequalities

Principle	Explanation	Examples
Recognize care work	Acknowledge the nature, extent, and contribution of unpaid care work to human development.	Make care visible in policies; gather qualitative and quantitative data; mainstream care into policies and programs.
Reduce care work	Reduce the amount of time required to carry out care work by making it more convenient, safer, and less physically and temporally demanding.	Provide social and physical infrastructure that reduces demands on individuals to provide care. State-provided health and childcare services. Labor-saving technologies, e.g., electricity and plumbing.
Redistribute care work	Share care work between adult family members (e.g., women and men in heterosexual couple households); challenge norms that make women responsible for care work. Collectivize/socialize care work through state policies, services, and facilities.	Workplace crèches; equal maternity and paternity leave. Media campaigns challenging stereotypes that only women and girls should do care work and promoting care work among men and boys.
Represent care workers	Give care workers a voice in decision-making; gather data that illuminates their lived experiences, concerns, and ideas for change.	Research that centers the lived experiences of women whose lives are dominated by care work; organizations that mobilize and advocate on behalf of carers.
Reward carers for their work	Pay for hitherto unpaid care work through direct cash transfers or tax rebates.	Mother's allowances. Carer's income. Universal basic income.

Remuneration is controversial and not shared by all experts. Although forms of monetary reward for care work (such as in a care income) has academic and activist champions (e.g., James 2021; Dowling 2021; Barca 2020), it seems that only in the ILO report is this fifth R included explicitly in the grey literature we reviewed (Adatti et al. 2018). We have not found it in the literature on care work in low-income agrarian and rural contexts. In fact, the Oxfam WE-Care program uses the 4 R framework, leaving out remuneration (cf. Mugehera and Parkes 2020). We have left it in because, from our perspective, it seems worth considering as a future policy strategy and could be relevant to discussions of climate financing. However, as noted in sections 4 and 5 (p. 50 and p. 64), there

is little academic research (focused on global South contexts) that looks at it in this way.

The important point is that the 4 or 5R framework highlights that interventions, in the form of public policies and services and infrastructural and technological changes, are needed to increase the recognition, reduction, and redistribution of unpaid care work between women and men, as well as between families and the State. There is also support in the ILO report, and in feminist scholarship more widely, for greater representation of the most marginalized caregivers to ensure that they have a voice in the design and delivery of policies, services, and systems that affect their lives (Adatti et al. 2018; Esquivel 2013, 17–18). Representation may enable greater critical scrutiny of programs designed by development non-governmental organizations (NGOs) to achieve "women's economic empowerment" (WEE). As we go on to show later in this report, people involved in unpaid care work may not feel that being "liberated" from their responsibilities in order to be able to take on paid work is their idea of empowerment (cf. Bradshaw 2010). In fact, through their qualitative research in Africa and South Asia, Chopra and Zambelli (2017) found that women were ambivalent about economic empowerment programs that focus on employment without sufficient support to help them balance paid with existing care work responsibilities. It is therefore important to be sensitive to the needs and concerns of carers and to be mindful of imposing assumptions and agenda.

Greater representation can also be an outcome of research methodologies that center the voices of carers and involve them as co-producers of knowledge and in actions that lead to concrete, durable interventions. Participatory methods are used in women's empowerment and climate programs. Beyond representing individual carers, it seems important to conduct research that yields information about care relationships and dynamics in diverse households and how they change over time. IFAD (2016) recommends "household methodologies" (HHM) that involve all household members in discussion of gender inequalities, tensions, and individual and collective goals. As we discuss in section 5 (p. 64), greater participation and representation of givers and receivers of care work appear to be essential to the development of gender-transformative and culturally appropriate responses to inequality.

3 CARE WORK IN A CHANGING CLIMATE

In this section, we synthesize the available evidence to present a comprehensive account of the interactions between climate change and care work in low-income, less-industrialized, and rural contexts. The discussion is organized around the following questions: How are current changes to everyday life in the context of climate change impacts affecting the gender dimensions of care work? How will these impacts affect the amount and distribution of care work as well as the conditions in which care work is performed by women and men?

To answer these questions, we review the literature, first on climate change impacts in general, and then on the gendered impacts of climate change in particular. Grey literature has tended to be more useful for locating macro-level information on impacts than academic journal articles. Our review of major reports, including a report commissioned by the Global Commission on Adaptation (GCA) (Resurrección et al. 2019) and the IPCC's Fifth Assessment Report,[16] found considerable overlap in information sources, with most identifying the same impacts and citing the same publications. We summarize the themes commonly identified in this literature before presenting the findings of our original analysis of how climate change and unpaid care work intersect.

3.1 CLIMATE CHANGE AND EVERYDAY LIFE

The causes and consequences of global climate change are well known and reported on by major institutions, including the UN and the IPCC. Changes to the Earth's climate system, attributed directly or indirectly to human activities, stem from alterations of the atmosphere and are additional to natural climate variability observed over comparable time periods (UNFCCC 2011). Climate change involves long-term changes in the temperature and precipitation, as well as increased intensity and frequency of extreme weather events such as floods, droughts, and storms (Yadav and Lal 2018). Deserts are becoming hotter and

[16] The Intergovernmental Panel on Climate Change (IPCC) was established in 1988. It is the UN body comprising scientists across a range of disciplines charged with assessing the science related to climate change. The IPCC prepares regular assessments on climate change, its causes, and potential impacts as well as response options for policy makers. The Fifth Assessment Report (5AR) in 2014 was the first time that the questions of gender and climate change were taken up in an IPCC report. The 6AR by Working Groups II (impacts, adaptation, and vulnerability) and III (mitigation) is due in 2022.

drier, and agricultural land is becoming less productive (Elsner et al. 2008; Christiano 2014; Gentle et al. 2014). Oceans are warming, leading to melting glaciers and sea level rise (IPCC 2014). Natural habitats are changing, and biodiversity is being lost (IPBES 2018). These and many other climatic and environmental changes are affecting everyday life everywhere, but the impacts are most severe for people in low-income communities and less-industrialized countries of the global South, especially in rural areas of Sub-Saharan Africa, South Asia, and Latin America (Hallegatte et al. 2015). People who depend largely on the extraction and cultivation of natural resources for survival are the most vulnerable and are being affected now and will be increasingly so in the coming years.

Table 3.1 summarizes the most commonly mentioned impacts and livelihood stresses, along with evidence and examples of how the changes affect everyday life in these parts of the world. These impacts are interrelated and interact in complex ways. It is also important to note that many of these impacts are complex. In many cases, it would be wrong to attribute them solely to climate change.

Table 3.1 Summary of major impacts of climate change

Climate change impacts	Examples
Extreme and unpredictable weather	Increasing drought, flooding, and heat waves in regions across much of the global South (IPCC 2014). Increased frequency of storms, cyclones, hurricanes. Wildfires caused by drought.
Food insecurity and scarcity	Agricultural production affected by climate changes. Decreased crop yields, most severe in tropical and semi-arid regions. Livestock, pastureland, and crops destroyed by extreme drought. Increasing numbers of people going hungry; 52 million at risk across Africa (IPCC 2014).
Water insecurity and scarcity	By 2025, 1.8 billion people are expected to be living with absolute water scarcity, and two-thirds of the world's population could be facing water insecurity and stress (UN Water 2018).
Energy insecurity/fuel scarcity	Fuelwood supply reduced and threatened climate change (Wheeler and von Braun 2013).
Poverty	Those already poor made poorer due to loss of livelihood, land and property. Increasing numbers of people living in poverty (Rao, Mishra et al. 2019). Inability to rebuild after disasters due to no savings or insurance.

Health threats	Climate change is “the biggest global health threat of the 21st century” (Costello et al. 2009, 1693). Increased malnutrition and climate-related disease outbreaks (e.g., water- and insect-borne illnesses such as malaria, diarrhea) (IPCC 2014). Heat stress (WB 2013). Deaths and injuries from climate-related disasters. Poor mental health due to trauma, anxiety, and loss (LEG 2015).
Migration and displacement	Climate change will significantly contribute to population displacement (Klepp 2017) and migration (IPCC 2014). Increasing numbers of people displaced by extreme, sudden-onset weather disasters as well as slower-onset changes from long-term drought (e.g., in Horn of Africa) and sea level rise in low-lying and small island states (IDMC 2011). Climate variability and environmental degradation are drivers of migration, in which people are forced to move away from settled places of residence to find water, food, shelter, and work (Sellers 2016). Some family members move, leaving others behind, often with reduced capacity to cope. Males migrate due to loss of resource-based income earning, resulting in increase in female-headed households (Resurrección et al. 2019; Rao, Lawson et al. 2019; Rao et al. 2020) Loss of connection to ancestral lands, loss of community ties (UN 2019). Hardship and stigma, racism towards refugees and migrants.
Conflict	Climate crisis exacerbates social instability, leading to tensions between communities and worsening conditions that lead to conflict (LEG 2015). Conflict within communities and families due to stress; increases in interpersonal violence (Castañeda Camey et al. 2020).

3.2 GENDER AND CLIMATE CHANGE

There is now a sizable body of literature that documents and explains how gender intersects with other differences to intensify vulnerability and exacerbate inequalities. After decades of lobbying and research by gender experts and activists, the Gender Action Plan of the UNFCCC explicitly acknowledges (and aims to redress) the fact that women as a group face greater threats and burdens from the impacts of climate change than men as a group, while being under-represented in climate policy-making. (Until relatively recently, climate change research lacked attention to gender and insensitivity to the complexities of gender relations, and/or a tendency to pay lip service to gender differences remains in much mainstream climate change literature (MacGregor 2010, 2017; Buckingham and Le Masson 2017)). Lau et al. (2021, 190) find that it is an ongoing challenge to build the evidence base of reliable sex- and gender-disaggregated data necessary for understanding the connections between gender equality policies and climate change initiatives.

While some publications include women and men in the discussion of gender-differentiated impacts, vulnerabilities, and responses, much of the research to date has focused on negative impacts on women. An overarching theme in this literature is captured by the concept of a “vicious circle” wherein “the more

women are affected negatively by climate change, the worse the inequalities get. And the worse the inequalities get, the worse the impact becomes" (Panitchpakdi 2008,107, quoted in Eastin 2018, 291).

A report published by the Global Gender and Climate Alliance (GGCA) (Sellers 2016) presents a review of evidence relating to gender and climate change, noting a focus on Sub-Saharan Africa and Asia across the literature. At the time of writing this report, a background paper commissioned by the Global Commission on Adaptation (GCA) (Resurrección et al. 2019) is the most comprehensive review of existing literature and data on the impacts of climate change on the most vulnerable populations, with specific attention given to how these impacts lead to gender inequalities in all regions of the world. The purpose of the GCA report is to show how gender inequalities and intersecting forms of discrimination must be addressed for climate adaptation programs to be successful.

A great deal of research on gender and climate change points out the need to understand structural causes of inequality and intersecting dimensions of power (e.g., Carr and Thompson 2014; Arora-Jonsson 2011). The social, economic, and cultural implications of gender inequality shape how individuals experience and are able to respond to the impacts of climate change. According to the Least Developed Countries Expert Group (LEG), a research body established under the UNFCCC, impacts can be clustered into three areas: resource access, health risks and outcomes, and personal security/violence. In each of these areas, it is claimed that women and girls are disproportionately vulnerable due to their subordinate status, social roles, and, sometimes, their physiological make-up (LEG 2015). However, there is growing recognition of the importance of considering the specific ways in which men are affected and their related coping strategies (cf. Kato-Wallace et al. 2019), as well as where there are no differences along gender lines (Sellers 2016). Several note that there is a need to correct the impression that initiatives on gender and climate change only have to address women (Babugura 2019; Gonda 2017; Gay-Antaki 2020).

Gendered access to livelihood resources

Women and men the world over are negatively affected by climate change because of financial or resource constraints. In low-income rural settings, people are heavily dependent on agriculture and natural resources for subsistence and often do not have access to other means of support (Yadav and Lal 2018; Butt et al. 2020). There are few opportunities for paid employment for women, so they generate income through small-scale production, gathering and foraging (Romero Gonzales et al. 2011). Climatic changes reduce their ability to grow and earn money to purchase food, resulting in food insecurity for their households. In general, many people are vulnerable to climate change impacts because they are heavily dependent on climate-sensitive livelihoods and because there are no social safety nets for them to rely on in times of crisis (Pettengell 2015). Gender

norms, specifically male-dominated land tenure systems, are such that women are less likely than men to have access to, and ownership and inheritance of, land and resources. In many countries, women's rights to claim and protect land assets are limited and/or not guaranteed (Ferrant and Thim 2019). Women tend to have less access to agricultural resources such as extension services, cash/credit, fertilizers, and labor-saving technologies for ploughing and irrigation that they need not only to produce food but also to adapt to climatic variability and change (Arora-Jonsson 2011; FAO 2011; Kakota et al. 2011; Nelson and Stathers 2009; Peterman et al. 2010; Wright and Chandani 2014). Many negative impacts, including water, food, and fuel insecurity, are linked to inequalities in land and resource access, including forests and fishing grounds (Resurrección et al. 2019). In turn, supply insecurity and lack of access to basic necessities intensify the work of provisioning for which women and girls are primarily responsible.

At the same time, the agricultural practices that women tend to engage in may increase their adaptive capacity in the face of climate changes relative to men's. For example, in many places women tend to keep gardens and small animals such as chicken and goats, which are less likely to be affected by climate impacts and more likely to contribute to long-term food security (Resurrección et al. 2019). Men tend to grow crops and tend animals (e.g., cattle) for the market that are more vulnerable to climate impacts and therefore less reliable for livelihood (Sellers 2016). It is well documented that men are generally more likely than women to migrate (Warner and Afifi 2014), leaving women behind to engage in subsistence gardening and forest product collection (Sellers 2016, 11).

A key theme in the literature on gender and climate change is that women are responsible for resource management, agricultural production, and provisioning yet hold very little decision-making authority. So their workloads increase, but low levels of power in the household and community remain the same (Webb 2015; Babugura 2017; Butt et al. 2020). Women left behind to care for households when men migrate for paid work are sometimes excluded from community decision-making and therefore cannot access support for agricultural production and other provisioning activities (Clement et al. 2019; FAO 2011).[17] Lack of power and voice means gender inequality remains and women's adaptive capacity is held back.

In addition to the abovementioned impacts of climate change on rural livelihoods, which stem from structural and material inequalities, it is important to summarize differences in health risks and individual safety, which are two areas where sex

[17] The evidence on the impacts of increasing women's labor burden on their decision-making power is mixed. For example, there is evidence that when men migrate and women's productive labor burden increases, they enjoy greater decision-making power (See, for example, Kawarazuka et al. 2020).

and gender intersect in multiple ways. These gendered impacts are especially relevant to unpaid care work.

Gender-specific health risks and outcomes

The GGCA (2016) evidence review identifies a number of climate impacts on men's and women's health, noting that there are significant gender-based differences. As the report notes, gendered social, economic, cultural, and political factors shape vulnerability, and poverty is likely the most significant determinant of gendered health risks and vulnerability to climate hazards (Sellers 2016; see also Neumayer and Plümper 2007).

Climate change increases the prevalence of food insecurity, leading to malnourishment and related health problems for women due to their child-bearing role. The GGCA cites studies from such countries as Malawi, Nicaragua, and Bangladesh that find that women reduce the amount of food they eat so that there is more for children and male family members (Sellers 2016, 25–26; see also Goh 2012).[18]

Due to their gendered roles and the care work for which they are responsible, women are at higher risk of contracting infectious diseases. For example, they are involved in caring for infected people, spend time near water sources, and cook outdoors at times when mosquitos are out. Pregnant and postpartum women experience health impacts of climate change due to the many physiological and social changes that occur as a result of pregnancy. They are vulnerable to temperature extremes and to dehydration. Heat stress can lead to adverse birth outcomes and infant mortality (PHI/CCCH 2016).

Mental health is another area discussed in the literature, but less frequently than physical health. Climate change can exacerbate stresses that involve mental health crises: in some contexts, the depression and suicide rates among male farmers has been found to rise when work invested in agricultural production fails to earn income for households (Kennedy and King 2014). Men's mental health is mentioned almost exclusively in relation to their higher rates of suicide compared to women.[19] It is important to note that this was happening well before links were made to climate change impacts (Arora-Jonsson 2011).

[18] There has been criticism of this argument. We note here that the Sellers 2016 report, which is "a closer look at the existing evidence" published by the Global Gender and Climate Alliance, seems to be repeating the usual grey literature claims about women's vulnerability that have been criticized over the years by academics (including Jackson 1996; Arora-Jonsson 2011).

[19] Although building mainly on studies from the global North, Bryant (2020) takes up the question of male farmer suicide across the world. She writes that the focus on male farmer suicides ignores the higher rates of attempted suicide and self-harm among farm women. She argues that the concepts of mental health or mental ill-health are limiting and that the term "distressed sociobodies" better accounts for distress and suicide for those engaged in farming.

Goh notes that there is a lack of research on the psychological impacts of climate change on both women and men in the global South, but cites evidence that the "psychological and emotional toll of climate events appears to be heavier for women as they are unable to carry out their tasks and roles, especially to provide care for their children and other family members" (2012, 11). The GGCA report states that in general women are more likely than men to suffer from stress, anxiety, PTSD, and depression as a result of climate-related impacts (Sellers 2016). Evidence presented from research on a number of disasters around the world (e.g., floods, hurricanes, cyclones, bushfires), as well as slow-onset crises such as food and water scarcity, suggests that there is a strong correlation between climate impacts and poor mental health among women. For example, in their study of the gendered impacts of Hurricanes María and Irma on access to water, sanitation, and hygiene (WASH) in rural communities of Puerto Rico, Smyrilli et al. (2018) found that women were more likely than men to report stress, anxiety, and depression.

Gender-based violence

Pressures on environmental resources exacerbate gender inequality and power imbalances in communities and households, making it difficult to cope with resource scarcity and societal stress and conflict. The IUCN has produced a comprehensive report on the linkages between environmental stresses and gender-based violence (GBV), with a chapter dedicated to the impacts of climate change on GBV (Castañeda Camey et al. 2020). Evidence is presented to show how GBV is used as a form of social control that determines the rights and prospects of people, most often of women and girls, across a range of contexts. In the case of climate impacts, the report details how women living in poverty and who are marginalized because of their race, ethnicity, sexuality, and other factors face increased threats to personal safety and experiences of violence in both intimate relationships and local communities as well as from strangers, employers, and police/military.

Disaster situations, such as extreme weather events and mass crop failures due to drought, have been found to be dangerous times for women; loss of security and other forms of stress can lead to an increase in violent behaviors among men (Sellers 2016).[20] For example, after tropical cyclones in Vanuatu, there was a 300 percent increase in new cases of domestic violence (UN Women Fiji 2014; Castañeda Camey et al. 2020, 139). It is important to remember, however, that while a great deal of violence is contingent and transitory, an increasing amount is institutional and structural: initiated, advocated, and enforced systematically by laws and institutions of the state, corporate organizations, and community or family and can be psychological, sexual, and cultural. Feminists have brought

[20] Increases in male violence in times of environmental stress is a phenomenon found in developed and developing country contexts as gender inequalities persist globally (Alston and Whittenbury 2013).

attention to how violence cuts across places and scales, and how violence in intimate spaces is associated with regional, national, and global processes that may also be related to environmental and development interventions (Arora-Jonsson et al. 2021, 297).

The IUCN report identifies several other types of violence that may result from climate change that have gender-specific traits. Leaving aside cases of war, militarism, and police repression of political protest, the risk of everyday GBV in families and households seems to increase as environmental conditions threaten livelihoods. There are numerous mentions of women being attacked and raped when venturing far from home to fetch water, fuel, and food (e.g., Zaman 2020; Rezwana and Pain 2020). The risks are even higher when women live in refugee camps post-disaster. A report from Eastern Chad found that 91 percent of cases occurred outside refugee camps when women were collecting firewood (WRC 2011); another from South Sudan found high rates of violence, including sexual abuse, beatings, and attempted rape, at water collection points within camps (DRC 2012; Listo 2018).

Human Rights Watch (2015) reports that natural disasters and environmental shocks, which may contribute to conflict and impoverishment, leading in some places to an increase in child marriage as a coping strategy. Child marriage constitutes a form of GBV. For example, the Government of Malawi has identified child marriage as a risk for women and girls resulting from disasters such as floods (Government of Malawi 2015). There is evidence that sexual exploitation and trafficking of women and children may also increase as a result of climate-related disasters, but the IUCN report acknowledges a lack of research on these issues.

Box 3.1 Gender-differentiated impacts of climate change in low-income rural contexts

Resource access: To the extent poor rural women are more involved in and dependent on natural resources than men, have fewer resource rights and entitlements than men, and have less control over decision-making than men, they are more severely affected by climate impacts than men.

Health: As a result of gender roles and physiological differences, women are more likely to experience poor physical and mental health as a result of climate change. Women are also responsible for taking care of others who are adversely affected by climate-related impacts.

Violence: Resource stress due to climate change exacerbates existing tensions between and within social groups and families, resulting in increased levels of violence, in which women are victimized by male violence in interpersonal relationships and in extra-familial settings such as refugee camps and while away from home collecting water, food, and fuel.

All of these gendered impacts (as summarized in Box 3.1) have implications for unpaid care work, even though these implications are not always considered explicitly in the literature. There is in fact a lack of research on and attention to "the care dimension" in climate change policy and programming (Butt et al. 2020, 495). There is a tendency to look more at impacts on individuals than on how impacts affect relationships within families, households, and communities. For example, there are statistics on individual displacement, mortality, suicide, and infection rates, but scant consideration of the lasting impacts of death and illness within families and, in particular, how coping with pain, loss, sadness, and depression as a result of these impacts affects other people. There are few studies, for example, that examine what daily life is like for parents raising distressed children and keeping a family safe in the aftermath of a cyclone or in the context of a refugee camp. Nor have we found any mention of carers' own need for care, either given by others or "self-care," when coping with the emotional effects of loss, damage, and uncertainty. There are few studies, if any, that consider care work as rewarding or unchanged in the face of climate stresses. Potential increases in sharing, cooperation, and solidarity in households and communities experiencing climate stresses have so far not featured in the gender and climate change literature. Whenever unpaid care work is mentioned, the increase in the amount of care work due to climatic changes and naming care roles as a main reason for why women are adversely affected by climate impacts are the central themes.

3.3 IMPACTS OF CLIMATE CHANGE ON UNPAID CARE WORK

We next synthesize key themes in the literature on the impacts of climate change on unpaid care work, looking across three types of unpaid care work and three sites where care work is carried out (listed in Tables 2.1 and 2.2 respectively) in order to develop a holistic, relational account.

It is widely accepted that there is a crisis of care due to gender inequality, lack of government spending on social protection, and the effects of climate change, which are all interlocking pressures affecting the need for, and distribution of, care work, as well as the conditions in which care work is performed (Fraser 2021). The Oxfam backgrounder "Time to care" identifies climate change as a cause of the care crisis, noting but not elaborating that environmental and climate change exacerbates the burdens and inequalities of unpaid care work. As Coffey et al. write: "Existing economic systems have already pushed carers and their dependents to the brink, and now the environmental degradation they promote could tip them over the edge" (2020, 41).

Section 2 (p. 12) provided a detailed discussion of the literature on the conditions of unpaid care work and care inequalities. The focus of this section is to identify the interactions between climate change impacts listed in Table 3.1 and care work, looking first at how climate changes impact the three types of care work we identified in section 2: direct, indirect, and environmental (Table 2.1). We then identify and discuss how these effects on care work can be experienced by individual carers, within families/households and in the wider community and surrounding environments (Table 2.2). These interactions are presented in Tables 3.2 and 3.3 respectively. The tables synthesize a large body of literature and reduce the need for detailed explanatory text, although brief explanations of the impacts-effects nexus are provided below. A short summary discussion of the central findings of these tables is presented at the end of this chapter.

It is important to stress that the purpose of these tables is to capture the range of effects that are mentioned in the literature; they are imperfect and not exhaustive. Because all of these effects are highly contextual, it would be impossible and problematic to present these as universal effects or common experiences. Most of the literature that lists these effects is either based in local/regional case studies (and even then the diversity and fluidity of experiences is usually recognized) or is a synthesis of existing evidence that may reflect a highly generalized picture. Some may contain zombie facts, meaning “well-intentioned but statistically unfounded stylized facts” that should be treated with caution (for a discussion, see Doss et al. 2018; Arora-Jonsson 2011; Cornwall et al. 2007). Therefore, Tables 3.2 and 3.3 represent our efforts to paint an initial picture of the interactions of climate impacts and care work. Nothing like this exists in the literature to date, and further research is needed to correct this gap.

Impacts of climate change on care work

Table 3.2 aims to answer the question of how climate change and related impacts are affecting care work. To do so, it reproduces the general list of climate-related impacts summarized in Table 3.1 and identifies how these impacts affect the types of care work discussed in section 2 (p. 12) (Table 2.1): direct care for people (the well-being of children, elders, other close family members); indirect care/domestic work in households (provisioning resources, maintaining clean and liveable domestic conditions); and environmental care (tending the commons, maintaining livelihoods beyond the private household). While the overarching theme is that all climate impacts make all forms of care work more difficult, it is instructive to disentangle the different intersections of climate impacts and care to gain a more detailed understanding as well as to organize the available evidence found in the literature. This table and Table 3.3 present commonly cited examples of the impacts and includes indicative references to existing research.

Table 3.2 Impacts of climate change on care work

	Effects on care work		
Climate-related impact	**Direct care work**	**Indirect care work**	**Environmental care work**
Extreme weather events (heat waves, droughts, floods, hurricanes)	Family members injured, carers injured. High death rates for low-income women, loss of primary carers (UNHRC 2019). Additional caring responsibilities in aid camps when displacement is necessary (Babugura 2019). Caring for dependents in evacuation centers and temporary settlements/refugee camps (Richards and Bradshaw 2017).	Coping with disaster; cleaning up after disaster. Loss of health infrastructure (UN 2019). In refugee camps, limited access to resources mean women and girls must go outside shelters to collect water, fuel, and food (Babugura 2019). Reduced access to laundry services etc. (UN 2019).	Failed crops and sick animals; loss of crops and animals (IPCC 2014). Loss of possessions, tools (Oxfam 2019). Changes to ecosystems affects traditional knowledge of land (Aguilar et al. 2008).
Food insecurity due to climatic changes	Choosing to ration food (Sellers 2016). Hunger (FAO 2016). Malnutrition during pregnancy, lactation and childbirth (FAO et al. 2017). Increased care burden due to malnourished children (FAO et al. 2017).	Difficulty finding food; stretching/budgeting food (FAO 2016). Increase in price of food decreases ability to pay for other necessities (Oxfam 2020).	Difficult to find fodder for animals (IPCC 2014). Changes to ecosystems affect traditional knowledge of land (Aguilar et al. 2008).
Water scarcity	Rationing water; delegating water collection to children (Otzelberger 2014). Increase in water-borne disease and ill health, leading to increased care burden (Gabrielson and Ramasar 2013). Increased risk of physical/sexual abuse in fuel/water collection (Meyiwa et al. 2014). Psychological impact of more dangerous journeys (UNHRC 2019). Lack of sanitation for care work.	Travel far distances to fetch water (Oxfam 2019). Coping with contaminated water; spend time purifying (Oxfam 2019). Harder to cook and clean (IPCC 2014). Harder to maintain hygiene (Dico-Young et al. 2017). Reduced time for other caring responsibilities (Resurrección et al. 2019). Menstruating girls prevented from attending school (UN Women 2014).	Harder to keep plants and animals alive (FAO 2016); Increase in pests and disease in livestock (Meyiwa et al. 2014). Decreased productivity from livestock, crops, fisheries, foraging (Goh 2012).

	Loss of dignity for menstruating women (Oxfam 2017); lack of water particularly affecting people who are old, sick or pregnant. (PHI/CCCH 2016)		
Energy and fuel shortages	Lack of access to energy means exerting more human energy into productive and reproductive labor, with consequences for caring (Goh 2012). Increased risk of physical/sexual abuse in fuel/water collection (UN Women 2014). Psychological impact of more dangerous journeys (UNHRC 2019).	More difficult to find fuel sources such as firewood (Oxfam 2020). Use of dirty indoor cooking fuels leads to poor health (ENERGIA 2019). Increased time to collect fuel means less time for other caring responsibilities (Resurrección et al. 2019).	Biomass collection, leading to forest degradation (Morrissey 2018).
Poor physical health due to malnutrition and climate-related disease outbreaks	More people requiring care (UNHRC 2019). Fewer people able to provide care (UNFPA 2015).	Direct and indirect caring become impossible for those suffering from poor physical health (UNFPA 2015).	Loss of able-bodied labor to care for land (Slavchevska et al. 2016). Loss of technical knowledge for agricultural management (Aguilar et al. 2015).
Poor mental health/lack of well-being	Feelings of anxiety and loss (FAO 2016). Parenting challenges. Bereaved family members; explaining loss to children. Increases in substance abuse (Aguilar et al. 2015). Increase in suicide, particularly male (Aguilar et al. 2015).	Direct and indirect caring become impossible for those suffering from poor physical health.	Loss of labor to care for land (Sellers 2016). Loss of technical knowledge for agricultural management.

Changes to household structure/ dynamics and social networks	Loss of primary caregivers (Sellers 2016). Increase in female-headed and women-only households in some contexts (Rao 2019). Breakdown of personal networks and support (Oxfam 2020). Increased childcare burden due to lack of other parent; caring for dependents alone (Oxfam 2017). Children left behind (Butt et al. 2020; Lam 2019). Children becoming carers; children raised by older siblings, grandparents (UNFPA 2015).	More work for women carers left behind when family members (mostly men) migrate for paid work (Rao et al. 2020). Loss of income of family members (UNFPA 2015). Increased remittances can help households cope with stresses (Szabo et al. 2018).	Loss of labor to care for land. Breakdown of community-level collective networks used to manage common resources (Rao et al. 2020). Strengthening of social networks to manage resources in times of stress.
Loss of and/or inability to use traditional knowledge due to changing environments	Increased probability of migration to seek new livelihoods (UNFPA 2015).	Decreased ability to provide food/a nutritionally and culturally appropriate diet (FAO et al. 2017). Loss of access to medicinal plants (Sellers 2016).	Loss of traditional knowledge of land (Richards and Bradshaw 2017). Changes in land-use (Carr and Hartl 2008). Loss of technical knowledge for agricultural management (UN 2019).

Implications of climate-related care work impacts for individuals, households, and communities

Table 3.3 extracts what we have identified as the main impacts that climate change stresses are having on care work (from Table 3.2) and further distills the literature to answer the question of how these impacts and stresses are affecting the distribution of care work and the conditions in which care work is performed. It should be read with the key themes of how both impacts and care work are gendered (presented above) in mind. We think this step of disaggregating the different sites and spaces in which climate-related impacts on care work are felt by individuals is a valuable way to maintain a contextual analysis that captures relational dimensions. In addition, it significantly broadens the focus to include increased time poverty and drudgery as one of many themes, rather than being the central theme, as often found in the literature.

Table 3.3 Implications of climate-related care work impacts for individuals, households, and communities

	How impacts are felt in sites/spaces of care work		
Climate-related care work impact	**Individual carers**	**Households/families**	**Community/ environment**
Loss of secure and stable conditions in which to do care work	Caring for others while ignoring own distress (UN 2019). Loss of access to caring resources (Oxfam 2020). Stress from uncertainty.	Loss of family members to migration/death (Richards and Bradshaw 2017). Poor physical and mental health of family members (Ciaconi et al. 2020). Intra-household tension (Aguilar et al. 2015) Gender-based violence (Castañeda Camey et al. 2020).	Breakdown of social networks and support. Changes to ecosystems affects traditional knowledge of land; loss of resources/physical infrastructure to provide care (UN 2019).
Loss of means (income) needed to provide care	Prone to exploitation—trafficking and sex work to earn money (Sellers 2016). Mental distress (UNHRC 2019). Hunger and malnutrition (FAO et al. 2017). Outward migration to earn wages leading to increased workload (Oxfam 2019).	Poor physical and mental health of family members. Food rationing, disproportionately affecting women. Loss of family members to migration/death (Richards and Bradshaw 2017).	Lack of investment, leading to decreased productivity from livestock, crops, fisheries, foraging (FAO 2016). Biomass collection, leading to forest degradation (Morrissey 2018).
Loss of and damage to necessary resources to carry out care work	Hunger and malnutrition (FAO 2017 et al.). Time poverty (Grassi et al. 2015). Increased pressure/higher stakes leading to mental ill health (UNHRC 2019). Risk of violence.	Intra-household tension; gender-based violence (Castañeda Camey et al. 2020).	Lack of time for leisure, education, and civic participation (Adatti et al. 2018). Lack of time for environmental/agricultural labor (Grassi et al. 2015).
Increased "drudgery" and time poverty	Decline in physical health through exhaustion and injury. Lack of time for income-generating activities, leisure, education, and participation (Grassi et al. 2015; Rao et al. 2020).	Poor physical and mental health of family members (Sellers 2016).	Fewer people with time for leisure, education, and participation.

More people requiring care **Fewer people to deliver care**	More time spent on caring activities (UNHRC 2019). Lack of time for income-generating activities, leisure, education, and participation.	Less time to carry out income-generating work, leading to loss of income (Grassi et al. 2015). Children and older adults taking on caregiver roles (Chopra and Zambelli 2017).	Fewer people involved in community-level work, participation, and decision-making. Fewer people with time for environmental or agricultural labor (FAO and CARE 2019).
Caring in temporary shelters and camps	Women and children exposed to sexual and intimate partner violence in and outside of evacuation camps (UNFPA 2015). Coerced transactional sex (UNFPA 2015).	Poor physical and mental health of family members. Intrahousehold tension; gender-based violence.	Lack of necessary resources and infrastructure to provide care.
Decreased well-being/ increased demand for emotional labor	Poor mental health, depression (Quisumbing et al. 2019). Carers lacking time to care for own health and well-being (Olsson et al. 2014; Rao, Mishra et al. 2019).	Poor physical and mental health of family members. Intrahousehold tension; gender-based violence.	Loss of beneficial effects of natural environments on well-being.

3.4 DISCUSSION

Climate change exacerbates existing inequalities and intensifies the work involved in caring for people, animals, plants, and places. The impacts and stresses of a changing and changed climate are placing a further strain on rural livelihoods, reducing the availability and quality of public services that support care work in and for marginalized communities, and directly compounding the existing unfair distribution of care between women and men. The connection between gender inequality and gendered divisions of care work is cyclical (Butt et al. 2020), but, as explained earlier, it is important to avoid creating an impression that climate change impacts affect unpaid care work in new or unique ways. Most of the impacts that are attributed to climate change have been experienced in rural areas in low-income and less-industrialized countries for a very long time. It is also difficult to determine what is and is not attributable to climate change, because people in these areas are affected by multiple, interconnected stressors including poverty, resource insecurity, systemic violence and exploitation, and ill-health (Jerneck 2018). Yet, at the same time as recognizing that these interactions are not novel exogenous pressures, it is undeniable that the rate of change is unprecedented, with more frequently occurring extreme events, loss of

and damage to livelihoods, and intensified environmental challenges in daily life (IPCC 2014).

A substantial amount of literature claims that women are more vulnerable than men to many climate impacts, largely because of their disproportionate responsibility for caring for households and environments. However, caveats are needed when considering the findings presented in this section. First, we noted in section 1 (p. 5) that our collection of grey literature contains several evidence reviews that refer to the same facts and figures about how climate change impacts affect women and men. In presenting the results of our research, we have included some commonly made claims about women's vulnerability and the ways in which they are negatively affected, such as by extreme weather events and food insecurity. However, the evidence for some of these claims is hard to find. Many are based on generalizations that are unlikely to stand up under scrutiny and against empirical research into the complexities on the ground. For example, the oft-cited fact that women are more likely than men to die in disasters has been challenged for lack of evidence (Arora-Jonsson 2011). In addition, claims that women and girls are more likely than men and boys to voluntarily eat less in order to leave more food for the rest of the family, while frequently made, rest on debatable interpretations of the evidence (Jackson 1996). Our point is that when such claims are repeatedly made in the grey literature, with major organizations citing the same studies and/or citing each other, the result is that myths and stereotypes about poor women in the global South are reproduced and sustained. A dangerous outcome is that these myths and "zombie facts" are used to justify the status quo and/or interventions that can contribute to rather than resist the root causes of gender and climate injustice (Arora-Jonsson 2011; Doss et al. 2018). We strongly advise caution and resistance to this trend in the development field (see also Lau et al. 2021).

Second, it is important to avoid the problematic tendency in some gender and development literature to falsely homogenize women's interests and their experiences of care work (Webb 2015). Applying an intersectional lens and being attendant to contextual factors is increasingly regarded as best practice, but there remains a tendency in the grey literature on gender and climate change to use statistics and facts about women-as-a-group for strategic/advocacy-oriented purposes (Lau et al. 2021). Feminist scholars criticize the prevalence of vulnerability discourse in climate change narratives that tend to play into stereotypes of women in very low-income countries as passive, downtrodden victims (Arora-Jonsson 2011; Rao, Lawson et al. 2019; Rao, Mishra et al. 2019; Lau et al. 2021). Moreover, while a significant amount of the research emphasizes the burdens and drudgery of feminized care work and connects care responsibilities with climate vulnerability (Yadav and Lal 2018; Dah-gbeto and Villemore 2016), research with women also finds that some types of care work (especially direct care for people) is a choice that can be rewarding. It also can be economically rational for women to do the bulk of unpaid care work in

households and local communities; they may get status and other forms of nonmonetary reward for doing it. For example, the women interviewed in a recent study by Butt et al. (2020, 493) claimed to regard their unpaid care work "as a privilege rather than a burden," an honorable duty. Drawing on participatory research with women in rural Tanzania, Chung et al. (2019, 1545) argue that unpaid care work is both a burden and a source of "joy, satisfaction and fulfilment." Here it is interesting to note their finding that caring for children and tending to kitchen gardens are identified by women as sources of joy and contentment, even when faced with environmental and other uncertainties or hardships in everyday life. Although seldom reported in the literature, increased solidarity and efficacy by acting collectively with other women (and men) to carry out care work, especially in relation to the environment, has been empowering for women's groups (Arora-Jonsson 2013). There is thus reason to believe that for individual women faced with climate stress, collective care work could provide a space for coping strategies as well as innovative solutions.

As explained in section 2 (p. 12), we argue for including environmental care work in this report, even though it is not a dimension that is studied specifically in the literature we reviewed. However, by including it in an analysis of how climate change impacts affect the amount and distribution of unpaid care work, we need to avoid supporting the flip side of victim narratives, which connect all women with environmental care work in a way that naturalizes their knowledge or turns it into a resource to be "harnessed" in development projects. Feminist scholarship has for decades challenged "women-as-victim-then-as-agent" narratives and argued instead for multi-dimensional explanations of women and men's dispositions, decision-making, and varied use and management of environmental resources that are attentive to "complex and daily realities of resource use, power and negotiation" (Resurrección 2013, 34; Arora-Jonsson 2014; Rao et al. 2020; Lau et al. 2021).

Much of the feminist gender and climate change literature argues against treating gender as synonymous with women and is increasingly addressing the roles and agency of men (cf. Kato-Wallace et al. 2019). In care work research, this means avoiding the impression that, although it is true that women do the majority of it, unpaid care work is not performed by men or that men are uninterested or irresponsible. There is research to complicate standard scenarios by showing deep interdependencies between men and women even within unequal social structures (Clement et al. 2019; Arora-Jonsson 2013). We note here Rewald's comment that local examples of men's subsistence labor, such as fuelwood collection in Madagascar, demonstrate that "gender norms vary from place to place, and any assumptions and generalisations may lead to ineffective projects and policies" (2017, 9–10). Similarly, in her research with smallholder farming families in Nicaragua, Gonda (2017) found examples of men's involvement in (and in some cases primary responsibility for) direct and indirect care work (e.g., childcare and fuelwood collection), while noting that climate adaptation projects

assumed these to be the exclusive domain of the women (more on this point in section 4 (p. 50). More research on how masculinities intersect with other axes of difference to produce men who engage actively with or claim no responsibility for care work is needed in all parts of the world, not just in the global South (Tronto 2013).

Interventions designed to tackle gender inequality while also adapting to or mitigating climate change impacts must be based on a nuanced picture of complex and shifting gender identities and relations to avoid creating greater inequality, or even conflict, between social groups (Webb 2015). It is important to take an holistic and nuanced view of how caring is affected by climate change that is sensitive to dynamics and relations within groups—women and men in relations within households, with dependent children and elders—some of which are not static but change over time while others are difficult to change (Butt et al. 2020). However, it is evident from a review of the literature that few existing climate change interventions take the kind of nuanced and holistic approach that we advocate.

4 EFFECTS OF CLIMATE CHANGE INTERVENTIONS ON CARE WORK

This section reviews the literature that assesses the existing and potential effects of climate change interventions—including policies and projects—on care work. We first discuss the problem of gender insensitivity as it affects the design and implementation of interventions. Then we examine the extent to which prominent types of interventions (see Table 4.1 for explanations and examples), ranging from the gender insensitive to those that specifically target women, affect the amount and distribution of care work, and may potentially reproduce or change existing gender norms and power relations. Climate change policies have sought to respond to climate change impacts primarily through adaptation strategies, while mitigation policies seek to reduce emissions. The various strategies and projects designed to achieve adaptation and mitigation are "exemplars of policy" (Mosse 2004), and so critically examining them is vital for understanding policy-making on climate change.

Climate adaptation refers to efforts to reduce the impact of climate change on well-being. Adaptation strategies aim to help communities reduce their vulnerability to climate change and contribute to sustainable development. Many take the form of rural livelihood projects and community-based activities in a range of areas such as health, ecosystem and water management, and climate-smart agriculture (CSA). Humanitarian aid to help people cope with and adapt to the loss and damage caused by crisis has been shown to have gendered consequences. For example, Bradshaw (2010) shows how women are often targeted as recipients of aid to restore their communities, further exacerbating their burden.[21]

Climate mitigation refers to the policy of reducing the emission of greenhouse gasses into the atmosphere or removing them from the atmosphere. Climate mitigation strategies are designed to aid countries to cut down on greenhouse gas emissions. Mitigation methods promoted in low-income agrarian contexts, such as changing systems of rice intensification (SRI), are typically seen as combining ecological and social benefits (i.e., co-benefits) such as by increasing

[21] It is important to recognize that climate change policy is—or should be—about more than adaptation and mitigation. It is also about addressing the losses and damages that many vulnerable, rural communities are experiencing. We have included issues of loss and damage, and how they may increase the need for direct, indirect, and environmental care, in section 3 (p. 32) but have not integrated it into our examination of climate change interventions.

food security, minimizing water consumption, and reducing greenhouse gas (GHG) emissions (cf. Andrea 2018; Jones 2020). An example that has attracted much social science research is REDD+ (Reducing Emissions from Deforestation and Degradation). REDD+ programs are intended to generate carbon credits by paying rural villagers in low-income countries to preserve forests, and thereby are expected to simultaneously mitigate climate change and reduce poverty (Westholm and Arora-Jonsson 2015; Bee and Sijapati Bassnett 2017).[22]

Table 4.1 Typology of climate change interventions

Policy	Type of intervention	Examples of projects
Climate change mitigation aims at reducing GHG emissions and enhance sinks.	Reduce use of fossil fuels. Rain water harvesting. Forest conservation. Systems of rice intensification (SRI).	Efficient wood stoves, renewable energy (solar cookstoves, biofuels), trombe walls,[23] passive housing. UN REDD+.
Climate change adaptation aims at reducing the vulnerability of natural and human systems against actual or expected climate change effects (Verbruggen 2007).	Climate-smart agriculture (CSA). Flood defenses. Enhancing resilience and capacity. Disaster risk reduction/preparedness.	Substitution of more temperature shock-resistant plants for sensitive ones, irrigation techniques, and other agricultural technologies. Raising river or coastal dykes. Providing climate services (climate and weather information in agrarian contexts). Early warning systems (EWS).

[22] REDD+ is not the only relevant example of UN schemes. But it is a unique case because it was pressured by women's groups to take up gender equality, and in part thanks to the engagement of feminists in bureaucracies and women's organizations (such as Women's Environment and Development Organization (WEDO) and Women Organizing for Change in Agriculture and Natural Resource Management (WOCAN)). REDD+ projects do actually mention gender (unlike the Clean Development Mechanisms, which completely ignored gender). REDD+ has been researched a lot by climate change experts. It therefore occupies a large place in the grey and academic literature on gender and climate action. It is also the example with which we are most familiar.

[23] A trombe wall is a dark painted cement wall, covered with a glass on the outside to provide an insulating air gap between the wall and the glaze. As the air in the air gap is heated by sunlight, its density decreases and it rises upwards, where a small hole in the upper wall allows the heated air to flow into the room. The subsequent pressure drop causes an influx of cooler air from the room through a vent near the bottom of the wall. Additionally, the wall absorbs thermal energy from incident sunlight that passes through the wall into the room. It is usually constructed so that energy from the first rays of sunlight reach the inner room at sunset. This allows the trombe wall to "store" heat, providing a source of energy during the night as well.

4.1 CLIMATE CHANGE INTERVENTIONS

While climate change emerged as, and in many ways continues to be, a policy issue concerned with the biophysical environment to be solved by technical solutions, environmental policy-making has increasingly turned to the question of gender, often to rally support from donors and others for programs already underway (Arora-Jonsson 2014). Gender has been mobilized in a number of ways in climate change policies, and yet these policies have seldom addressed the care work dimension (Arora-Jonsson 2011; Butt et al. 2020). However, policy approaches can play an important part in resisting or reproducing unequal gender relations and divisions of care work, especially when willing to address institutional and social constraints (Pearson 2004; Mínguez 2012; Cook et al. 2019; Arora-Jonsson 2014). While there is relatively little research on care specifically in the literature on climate interventions, and most focuses on the gendered nature of climate change interventions, in this section we reflect on what the findings of this body of work imply for care in relation to the individual, families, communities, and their environments.

The literature on climate programs and gender is overwhelmingly critical of how policies and programs have or have not dealt with the gender-care nexus. The insensitivity to gender has ranged from being gender neutral, where gender is not considered specifically at all, to taking on gender as a category but equating it with women and/or reproducing binary categories (men-women), thereby disregarding the complex and intersecting dimensions of power that organize relationships between men and women. Table 4.2 provides an overview of some of the negative effects of gender-insensitive climate interventions on care work, which we go on to elaborate below.

Table 4.2 Examples of negative impacts of climate interventions on care work

Policy	Type of intervention	Examples	Negative impacts on care work
Climate mitigation aims at reducing GHG emissions and enhancing sinks.	Reduce use of fossil fuels via renewable energy and biofuels	Renewable energy—solar/low impact cookstoves. Grow biofuel crops to replace petrol/diesel.	Marginal land previously used for subsistence food crops now used for biofuels, with negative impact on women's care work.
	Eco-technologies	Efficient wood stoves, compost bins, water cisterns, dry toilets.	Intended to mitigate and reduce domestic drudgery but women don't use them (not designed with participation of users and attention to context). Users can't afford/incur debt; don't know how to repair and maintain over time.
	Forest conservation	REDD+ projects/non-timber forest products (NTFPs).	Restrictions on men's work in forests creates increased care work for women—compensate for loss of livelihood.
Climate adaptation aims at reducing the vulnerability of natural and human systems against actual or expected climate change effects.	Climate-smart agriculture (CSA)	The substitution of more shock-resistant plants for sensitive ones. Composting and vermiculture.	New tasks are more labor intensive and fall on women. Technologies and strategies designed without end users in mind, leading to CSA that doesn't work for women.
	Climate information services (CIS)	Information and education campaigns.	Interventions ignore the relevant social differences that shape people's livelihoods, reproducing gendered inequalities in care.
	Enhancing resilience and capacity in local communities		Much of the increased labor due to the new techniques falls on women, compounding their work of care. Gendered relations remain the same and no redistribution of care work.
	Economic empowerment	Women sought to be included in national and international markets for NTFP projects as part of climate mitigation policies that restrict men's use of forests.	While women's inclusion in NTFP markets has benefited some, mitigation policies do this in the absence of any social policy that acknowledges the care work already being carried out by women. When projects increase paid work but don't reduce care work, women shoulder double day of work.

Climate interventions have tended to ignore questions of care that underpin the labor of people most affected by climate interventions, especially women. Research indicates that climate change-related stressors exacerbate existing inequalities, but so do climate change interventions that can reproduce, exacerbate, and introduce new inequalities (Westholm and Arora-Jonsson 2015). This is as true of policies that are framed as gender neutral as those that target women specifically. Moreover, an interesting finding of studying the programmatic implications of policies on the ground is that despite gender being addressed in some policies and not in others, the implications of climate interventions on the ground can be very similar. This leads us to advocate (in section 6 (p. 88) the need for a more robust analysis of how gender is addressed in climate change policies but also to argue that all types of interventions need to address underlying structures, relations, and contexts shaping unpaid care work.

4.2 GENDER NEUTRALITY IN CLIMATE CHANGE INTERVENTIONS

Gender-neutral climate interventions ignore gendered differences and tend to take dominant and unequal gender relations as the norm. Conventionally, both mitigation and adaptation have been regarded as biophysical interventions to be achieved by natural science approaches and technical solutions. The social sciences have been secondary (see Deering 2019). Despite increasing attention to the socially differentiated and gendered impacts of climate change, policies have continued to focus on technologies and market mechanisms to enhance ecosystem services or carbon sequestration. This may be seen both in adaptation interventions, such as in CSA approaches, as well as in mitigation, for example, in forest conservation.

Gender-neutral climate policies tend to ignore the increased burden of labor that arises as a result of climate interventions. There are often two important implications of this tendency towards gender-neutral approaches to care work in adaptation strategies. First, considerable research shows that new tasks that are more labor intensive fall on women. These are regarded as an extension of their care work without attention to how climate change interventions increase their burden of work and care, resulting in a low uptake of the programs. This can be seen in research carried out in Uganda, Ghana, and Bangladesh wherein new labor-intensive tasks as part of climate adaptation programs, such as composting and vermiculture, seemed to fall on women (Jost et al. 2016). The women in these settings cited this increased work as a disincentive to changing their agricultural practices. The researchers conclude that changes in agricultural practices seem to occur mainly within existing gender roles, rather than new CSA

practices enabling a reorganization of unequal gender roles. Attention is needed to womens' and girls' use of time, in unpaid domestic work and other activities where they are considered providers of manual labor (Deering 2019, 23).

Secondly, local people, and especially women, who are targeted by projects rarely have a voice in their design. Women also often lack information needed to participate. As Bryan et al. (2018, 424) point out, adaptation strategies that rely on new technologies in order to promote a shift away from fossil fuels tend not to consider the preferences of the end users of a technology during the design and planning stage, in turn affecting the adoption of that technology. Different women have different preferences and needs for adaptation given their gendered roles within the household. Studies based on sex-disaggregated data have shown that when gendered differences are not taken into consideration in the technology design process or when they are introduced to agricultural households, which they often are not, climate-smart technologies do not work well for them (Doss 2001; Beuchelt and Badstue 2013; Bryan et al. 2018, 418; FAO and CARE 2019).

Gender-neutral approaches disregard the gendered nature of climate information services where women often do not have access to information. The lack of access to information and resources can be seen to have important implications for care work. Sandström and Strapasson's (2017) work in Tanzania on the use of climate information services indicated that a link exists between households accessing productive assets and taking action on the basis of climate information. They found that the more members of the household who access information, the more likely it is to be used by the household. This implies that even though women might not be the final decision-making authority in a household on a livelihood-related issue (such as when to plant a particular crop), ensuring that women have information strengthens their role in the bargaining process within the households and leads to the household being more likely to act on the information. The lack of women's access to information as well as their "lack of technology ownership" (Jost et al. 2016) point to the disregard for their contexts as well as the power dynamics in households. This disregard for their contexts makes it unlikely that women will adopt climate strategies that do not also consider their care work.

Similarly, climate mitigation interventions have important implications for care work. Studies of REDD+ programs that seek to preserve forests in order to sequester carbon, for example, show that women have had limited participation in discussions on questions of climate change or REDD+ (Peach-Brown 2011). An international study of 23 REDD+ climate projects found that women's well-being had actually dropped in villages since the introduction of the projects, often because women were not considered stakeholders in the new programs. These projects were creating new inequalities, because the new programs impinged on women's work and access to resources, but women had no insight into these

programs nor were they involved in the decision-making or management (Larson et al. 2015).[24] Much like in the research cited above (e.g., Jost et al. 2016), one could imagine that the disregard for women's contexts, and the sets of power relations that affect the distribution of their productive and care work within the family and for the environment in the programs, constituted a significant part of the problem.

Mitigation efforts often, but not always, rely on market mechanisms and carbon-offset trading. While development plans and projects in low-income countries have always involved a range of actors beyond the state, this involvement has increased significantly with climate programs. International donors and bureaucrats, NGOs (both grassroots and international), and especially private interests have assumed important roles in what Arora-Jonsson et al. (2016) call climate assemblages. For the countries and actors in the global North who finance these interventions, such carbon mitigation projects provide a cost-effective solution for shifting their responsibility to reduce carbon build-up caused by years of industrial development to the global South. Choices made by distant consumers and buyers of carbon credits in the global North affect everyday decisions and resource access for people in low-income countries in the global South. In the case of REDD+, this has entailed cordoning off forests that people depend upon for subsistence. As everyday production and reproduction activities are disrupted, this has negative implications for care work at home, in the community, and in the local environment (Arora-Jonsson et al. 2016).

Studies have shown that the gender neutrality of such projects ignores not only the gendered division of labor including care, but also the deep interrelations and interdependencies between men and women and the various entanglements of their productive and care work. For example, REDD+ climate programs did not consider that policies and programs that have a direct effect on men's work also have immense implications for women's productive and care work. This was clear in Lindi District in Tanzania, where the cordoning off of the forests resulted

[24] The studies carried out focus group interviews with both men and women, and surveys were used to gather secondary data. The women's survey focused on perceptions of participation in community decision-making, as well as on how men and women use the forest. The participants of the women's focus groups were asked to vote on a series of statements regarding their perception of participation and influence in village and household decisions, including forest rule making. They used four conditions to assess well-being and participation before and after the program implementation: 1) that women have a strong voice in village decision-making; 2) that women have a strong role in forest rule making; 3) that women use forest resources as much or more than men; and 4) that initiatives take an explicit gendered approach to REDD+.

in an increased pressure on women to compensate for the loss of men's livelihoods from the forests. There was greater pressure for them to produce food from their small agricultural plots, and some spoke about having to take on work such as starting tea shops on roadsides or at local markets to compensate for the loss of family income. Given their gender-based roles, it was not considered appropriate for men to undertake many such activities, thus significantly increasing pressure on women in relation to both care and productive work (Arora-Jonsson et al. 2016).

Linking back to the 5R framework, since women carry out most of the care work, especially in the home, the lack of recognition of the gendered division of labor in climate policies and the absence of women's representation in design processes and decision-making (combined with their lack of access of information and to technology) means that instead of reducing their care work burdens, this type of project can in fact intensify it. The implicit inequalities of the distribution of care work are sustained rather than transformed in such cases.

4.3 EQUATING GENDER WITH WOMEN AND DISREGARDING GENDERED CARE CONTEXTS

Some climate interventions have sought to include gendered concerns while failing to treat gender as a set of power relationships and/or failing to tackle injustice at its roots. Such moves have particular implications for the ability of these interventions to address care work inequalities or the negative impacts of climate change on the lives and working conditions of carers. We find two types of problems with the way gender appears in these interventions.

The first problem is the practice of equating gender with women, thereby ignoring men and making women the prime targets of interventions while also disregarding diverse care contexts. For example, Westholm and Arora-Jonsson (2015) have pointed to how, even when gender has been a focus in climate policies and women's inclusion in income-generation activities and markets is the cornerstone, women's work of care is ignored, as are the implications of the added care work burdens for women created as a result of the interventions. In addition, adaptation and mitigation strategies tend to disregard interdependencies between men and women, as discussed above.

The second problem is the tendency to treat gender as a binary opposition between men and women, ignoring experiences of gender non-binary and LGBTQI+ people, as well as the many other intersecting dimensions of power that shape community outcomes. Here heteronormative notions of men and women and gendered roles are often reproduced uncritically.

If we take gender to mean the social organization of the relationships of intersecting dimensions of power between groups of men and women, then many climate interventions have a problematic or insensitive understanding of gender (e.g., see Bryan et al. 2018). Many such approaches work towards empowering women through economic activities, which, while crucial, tend to ignore the larger gendered constraints in which women operate and thus magnify their burden, both of care and productive work (Westholm and Arora-Jonsson 2015).

Gender mainstreaming is advocated by most organizations working on climate adaptation and mitigation in the global South. The Global Gender and Climate Alliance (GGCA), which is a body created by the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), and Women's Environment and Development Organization (WEDO), promotes gender mainstreaming in climate change policy- and decision-making and supports countries to adopt this approach (see LEG 2015, 28). However, gender mainstreaming has all too often amounted to targeting women and disregarding gendered care contexts, and climate policies and actions are no exception.

Climate interventions are often centered around eco-technologies[25] and solutions that are aimed at women as a way to achieve a win-win solution: that is, they are seen as redressing climate change and at the same time reducing women's drudgery. But Gay-Antaki's (2020) work shows that carbon mitigation interventions, often devised in the global North with little or no discussion or consultation with the recipients, often tend to be ignored and disregarded. In Mexico, for example, a climate project provided construction materials to build efficient wood stoves, compost bins, water cisterns, dry toilets, and home gardens intended to help women by cutting down the time needed for domestic work. When asked if they liked the technologies, many women replied, "Yes, they are great," but in fact, except for the water cisterns, not a single woman seemed

[25] The term "eco-technologies" has become a buzzword and is used very differently by scholars. However, simply put, eco-technologies may be understood as technological interventions in the form of practices and processes using biological, physical, and chemical processes to minimize harm to the environment and provide services of value to society (for example, see Haddaway et al. 2018).

to be using any of the eco-technologies. Gay-Antaki argues that an inadequate understanding of the women's lives, and the targeting of the women while ignoring the men (who were expected to help install these technologies), contributed to sending skewed messages about the project.

In another example from Kenya, Wang and Corson (2015) found that women's labor was used in projects without full compensation. Women were meant to use efficient cookstoves and create carbon emissions reductions, which then became tradable virtual commodities. A significant problem was women's inconsistent stove adoption and the resulting difficulty in measuring and producing carbon offsets. This was compounded by the fact that the original owner of the emission-reducing technology is usually deemed the owner of the reductions. This meant that once the stove owner bought the stove, the ownership of reductions was transferred to the local NGO, who in turn transferred them to the European developer. The researchers argue that while introducing some improvements in cooking time, smoke level, and labor, the improved cookstoves' carbon offset ultimately constituted an accumulation of wealth for investors in the global North and further marginalized rural Kenyan women (Wang and Corson 2015).

These examples suggest that an understanding of context is vital for understanding everyday factors that may actually transform people's care work burdens (Gay-Antaki 2020). Further, they show how actors beyond those in the local context are implicit in reordering care work in particular contexts, often without much knowledge about the lives of the people they affect. This lack of knowledge and analysis of the care aspects of climate interventions is a serious shortcoming in climate policies.

A related yet different facet of the importance of context is evident in the work of Acosta et al. (2019) who study the uptake of CSA projects by local bureaucracies in Uganda. Their studies show that it is not the lack of knowledge about the context but the reluctance and inability to challenge problematic and unequal relations of gender and care that are problematic (see also Opuko and Glazebrook's (2018) study of agriculture in Ghana and Mersha and Laerhoven's (2016) study of forests in Ethiopia who come to similar conclusions). Acosta et al. (2019) found that policies that emphasized gender mainstreaming in CSA tended to be translated in a way that resonated with international discourses and yet permitted policy-makers and bureaucrats to conform to domestic norms and logics that dictated inequalities in care work. While it was clear that the unequal ownership of assets in the agricultural sector held a central place in women's unequal care work, the prescriptions proposed by local bureaucracies centered largely on sensitization of gender roles to the policy area of education, thereby backgrounding other structural areas and discriminatory patterns. Thus, while policies and projects seemingly embraced a gender mainstreaming discourse, their implementation simultaneously perpetuated gender stereotypes (discussed in the next subsection (p. 64). In these cases, bureaucrats embraced a

“discursive hybridity,” couching gender (and care) in generic terms in policy-making so as to enable governments and development organizations to engage with gender mainstreaming discourse while at the same time maintaining the incumbent local social order. Importantly, Acosta et al.’s (2019) case highlights that, though gender inequality was discussed as a legitimate object of governance, at no level of administration was this language ever sufficiently elaborated.

In a survey of practitioners working on climate adaptation in SSA countries, Bryan et al. (2018) found that targeting women often leads to the marginalization of gender equality initiatives and can prompt resistance to them in some communities. They argue that climate interventions need to have community support before they can try to address gender inequalities by targeting women. They recommend that the community be fully engaged and involved in designing the project, and once there is a consensus on what is to be done, programs must work with both men and women. Carr and Thompson (2014) argue that this will require an expanded, rigorous empirical base of evidence as well as methodological innovations, which are thus far under-addressed in the gender and climate change literature.

The focus on women is equally a feature of mitigation programs. Mitigation programs such as REDD+ advocate forest conservation and limit logging, largely a male occupation. In order to offset the disadvantages of the loss of timber from the forests, national climate policies (such as in REDD+ in Burkina Faso) have directed their attention to women’s involvement in non-timber forest products (NTFP), highlighting win-win prospects for all concerned: offering carbon sequestration, poverty reduction, and women’s empowerment by including them in markets for NTFPs. The attention to gender, and specifically to women’s forest work—which is often of the kind that we would call environmental care—legitimized their program in relation to international donors (Westholm and Arora-Jonsson 2015).

This focus on women’s often informal environmental care work on NTFPs in climate programs has led to pressure on them to join markets that link up to international commodity chains. As research has shown, this can leave them with less control over their time, work, and resources, and can lead to greater social differentiation in the communities as the poorest are unable to benefit from the trade (Elias and Arora-Jonsson 2017; Elias and Saussey 2013). Efforts to bring women and their labor into local and global markets for NTFPs in climate programs are accompanied by decision-making about their environments and their trade moving not only to the national but also to the global level. In the absence of social policy that recognizes women’s roles and contexts, the responsibilities of productive and reproductive care work in the forests, as well as in the community and home, are reinscribed in gendered and negative ways (Westholm and Arora-Jonsson 2015).

As feminist economists have shown, women's economic participation and increased incomes do not necessarily translate into empowerment within the household or reductions in their burden of care. They have pointed out how market-based models, on which many mitigation and income-generation policies and projects are based, fail to take into account the embedded nature of markets; that is, that "roles within market systems are structured by non-market criteria" such as social norms on gender, class, caste, ethnicity, age, seniority (Harriss-White 1998, 201).

Gender stereotypes and binary approaches: reinforcing gendered care inequalities

Critical researchers claim that climate policies, as well as some academic literature on gender and climate adaptation in rural contexts, are replete with simplified framings of women as a group that often reproduce myths and assumptions and miss women's different, place-specific needs, vulnerabilities, and opportunities (see, e.g., Carr and Thompson 2014; Carr et al. 2016; Arora-Jonsson 2011; Nelson and Stathers 2009; Onta and Resurreccion 2011; Doss et al. 2018). This literature highlights that women are not themselves a unitary category, but that the experience of being a woman is shaped by the intersection of gender with other categories (such as class, caste, age, seniority, ethnicity, sexuality, place of residence, etc.) and can shift in different contexts and in relation to different activities. This body of literature also debunks the stereotype of women as essentially more caring and pro-environmental than men, which, when used to justify the targeting of women for climate actions, stands in the way of gender equality (Lau et al. 2021).

Carr et al. (2016), who examine climate services (i.e., providing climate and weather information to women in rural contexts) and their differential effects in Senegal, conclude that the design and implementation of effective gender-sensitive climate services are crucial for equality as well as for the ability of different groups to adapt to climate change. They write that even a cursory consideration of gendered perceptions of the shocks and stresses impacting human well-being in the community demonstrates that there are differentiated assemblages of vulnerability, not only between men and women, but also among women. They write that of particular interest is the fact that junior women keeping animals without equipment have much higher rates of food insecurity than senior women in the same asset situation.

The binary approach to gender roles in the design of climate information services as part of adaptation programs ignores the relevant social differences that shape people's livelihoods decisions and outcomes—including but not limited to gender (Carr et al. 2016). For example, in rural Tanzania, van Aelst and Holvoet (2016) found that marital status (divorced, married, widow, single) was vital in women's ability to access adaptation strategies in a way it was not for men. They stress

the need to recognize diversity within the category of “women” and women’s differential interests in relation to adaptation.

While much of the work cited above does not take up the question of care per se, it does indicate that these different concerns would have a direct impact on the care work carried out by these different women and indeed that the burden of care clearly differs between women. Not only do different women have different roles and responsibilities in relation to care, but, as Gonda (2017) shows in her studies of climate policies and projects in Nicaragua, the assumption that all care is carried out by women can reproduce gendered inequalities in care. She brings attention to how women were framed as vulnerable and deserving of attention in climate policies, ignoring the fact that men too carried out a great deal of care work. Thus, much like the gender-neutral interventions discussed above, climate programs that target women also tend to ignore the interdependencies between men and women and between different types of work.

Alongside the tendency to assume a strict division of labor between men (production) and women (reproduction/care), it is also important to acknowledge the deeply entrenched heteronormativity, and corresponding silence on LGBTQI+ people’s experiences, in development policy and practice (Mason 2018; Weerawardhana 2018). There is a recognized need to question the implications of taking the heterosexual couple family to be the norm in policy initiatives: “What happens to the people who don’t follow those familial narratives?” (Butler 2017, 271). Gaard (2019) notes the lack of research on the impacts of climate change on LGBTQI+ populations, arguing that climate interventions will not be gender transformative if they fail to redress homophobia and transphobia or to explicitly embed LGBTQI+ rights. In our review of the literature, we did not find any discussions of the needs and experiences of care work that are specific to LGBTQI+ people living in low-income rural communities in the global South. Academic feminist research on the gendered impacts of climate change appears to be as silent on this topic as climate policy-makers and practitioners (see, e.g., Lau et al. 2021).

4.4 SUMMARY

The problems and challenges identified in this section are not new. Climate interventions are reproducing problems that have plagued development strategies in the past, such as binary approaches to gender, exclusive decision-making processes, and institutional and bureaucratic barriers that limit women’s access to information. As Chant (2008) has observed, women are more often made to work for development than development works for them. When climate interventions involve the mobilization of women’s work in ways that are intended

to solve climate change but do not improve women's lives, the pattern is repeated.

Adopting a gendered approach has been daunting for many project officials tasked with mainstreaming gender in climate interventions (Acosta et al. 2019). As we have discussed, gender-insensitive climate projects have ranged from the idea of being neutral and ignoring gender differences altogether to investing in women's economic activities without simultaneous attention to their everyday lives and unpaid care work. Recognition of the value of care work and representation of care workers' concerns in climate programs is largely absent. When they are recognized, focusing on their economic empowerment without a corresponding understanding of their daily responsibilities for unpaid care work can exacerbate their marginalization.

As the literature indicates, climate projects might well increase women's work without compensation and reduce whatever decision-making rights they might have over their resources. Further, echoing an insight from years of development research, while it may be the case that eco-technologies intended to reduce women's care work are needed, it is also clear that without an understanding of their lives and ensuring their involvement in project design, these strategies are unlikely to succeed.

5 GENDER-JUST AND CARE-SENSITIVE CLIMATE ACTION

There is growing commitment to making climate change interventions more responsive to gender inequalities, which mostly means making them more attentive to women's concerns (see, for example, UN SDG 5: Gender Equality). Care work is mentioned in the scholarly literature connected to this goal, but the explicit recognition of its value, or making interventions more attentive to the needs of carers or reducing care work inequality, is rarely the focus. Instead, the emphasis tends to be placed on increasing women's empowerment through income generation and active participation. In the context of climate change interventions, the empowerment of women is regarded as instrumental to the development of resilient and sustainable human settlements. Seen through the lens of gender justice, it is questionable whether dominant empowerment strategies will lead to the reinforcement or transformation of the root causes of women's subordination, including gendered care work inequalities (Tovar-Restrepo 2017; Chant 2016; Elson 2015).

In this section, we begin by discussing what feminist organizations consider to be "gender-just climate solutions:" "just" in that they aim to be transformative of existing unjust (i.e., patriarchal) structures that disadvantage women and girls. We then distill from this literature a set of themes and examples of interventions that seem to hold promise for reducing negative impacts of climate change on care work inequalities in general and women's disproportionate responsibility for care work in particular. This distillation is achieved by applying the 5R Framework for transforming care work inequalities (presented in Table 2.3) and enables us to explain in more detail what we mean by a care-sensitive approach to climate change action.

5.1 "GENDER-JUST CLIMATE SOLUTIONS"

In the international climate policy sphere, there is much debate over how tackling the climate emergency can be made to work in concert with efforts to tackle other major crises, such as deepening income disparities or the global financial and health crises caused by the coronavirus pandemic. The IPCC (e.g., in the Fifth Assessment Report (5AR) 2014) and various UN agencies use the concept of "co-benefits" to refer to the positive effects of mitigating climate change via the reduction of GHGs. For example, the mass adoption of electric cars to reduce CO_2 emissions has the co-benefit of reducing the high number of deaths caused by air pollution. Or as in the Burkina Faso REDD+ program, the empowerment of

women was seen as a co-benefit of engaging them into global markets for their NTFPs (Westholm and Arora-Jonsson 2015). In the gender and climate change field, UN Women (2016) sets out a strategy for "leveraging development co-benefits between gender equality and climate change management." Their report identifies potential co-benefits of "harnessing gender equality" to deliver on Paris Agreement goals and suggests that finding ways to "optimise synergies...will be an active field of research in coming years" (UN Women 2016, 17). For them, climate programs are considered to be gender responsive when they generate social and economic benefits for women, notably in the areas of participation in income-generating agro-forestry and reduced drudgery from access to labor-saving and energy technologies (UN Women 2016).

As reviewed in section 4 (p. 50), feminist research has criticized the lack of appropriate gender sensitivity in interventions that aim at mitigating and/or adapting to climate change in low-income, rural areas of the global South. There is also a degree of skepticism of the concept of co-benefits in feminist climate change scholarship. This stems from criticism of the tendency to instrumentalize gender equality, to frame it as a means of achieving the efficiency and efficacy in climate actions, rather than as an end in itself. Bringing women into formal markets and making use of their work with NTFPs have been portrayed in policy documents as increasing their reach and modernizing a traditional division of labor where women are marginalized due to their isolation from markets. But little notice is taken of their reproductive work outside of markets (Westholm and Arora-Jonsson 2015, 195). There exists a similar degree of skepticism of, or perhaps more accurately disappointment in, the ability of climate interventions to "safeguard" the interests of marginalized women. Since the 2010 Cancun Agreement, governments are expected to protect vulnerable groups from negative effects of market-driven policy activities. These safeguards, such as those associated with REDD+, have, among other things, been used to ensure that gender equality and the participation of women are built into interventions. However, as Bee and Sijapati Basnett (2017) argue, in most REDD+ interventions, gender equality is treated as a technical issue and a "bureaucratic obligation" to be reported on, rather than a meaningful or lasting outcome on the ground. Others echo this point when claiming that even those interventions that purport to be transformative of existing economic structures fail explicitly to include gender inequality as a variable that needs to be tackled at its roots (Deering 2019; Acosta et al. 2019).

Such critical analyses of existing practice, combined with accumulated empirical evidence from local communities, have informed the development of principles for making climate interventions more "gender just" or "gender transformative." It is not sufficient for interventions to be gender "responsive" or even gender "sensitive" if that means "adding women and stirring" or carrying on with gender-as-usual (Bee and Sijapati Bassnett 2017). Rather, it implies radically changing

(Westholm and Arora-Jonsson, 2018) the material, political, and socio-cultural causes of gender inequality.

Reporting on her work at the Women's Environment and Development Organization (WEDO), Tovar-Restrepo offers this definition of "gender transformative:" "by recognising gender as a central dimension to achieve positive development incomes; by transforming unequal gender relations, promoting shared power and control of resources; and guaranteeing gender-balanced participation in decision-making that supports women's empowerment" (2017, 417–18). WEDO and similar NGOs seek to put these ideas into practice in their climate change planning and policy-related activities, such as those developed as part of REDD+ (CARE 2010; Westholm and Arora-Jonsson 2018). A report for CARE draws on similar principles to set out recommendations for how to develop "gender transformative climate adaptation" projects that fundamentally change "unequal gender relations and power structures" (Deering 2019, 4).

One of the most significant articulations of a set of principles (or criteria) of gender-just policy-making in the context of climate politics has been offered by the Women's and Gender Constituency (WGC), which is a stakeholder group of the UNFCCC made up of around 30 women's and environmental organizations (representing over 60 countries; including WEDO). The WGC's main goal is to promote changes at the UN level that will make gender equality and women's rights central to climate action. Since 2015 the WGC has collected case studies of local climate change initiatives and has given awards each year for "gender just climate solutions" (GJCS)—i.e., what they deem to be best practice interventions that have positive climate and gender impacts—in three categories: technical, non-technical, and transformational climate solutions. Box 5.1 presents the criteria used to adjudicate the applications received for the GJCS Award.

Box 5.1 The WGC's criteria for judging climate solutions to be "gender just"

i. Provides equal access to benefits for women, men, and youth.

ii. Aims to alleviate and/or does not add additional burden to women's workload (such as via additional natural resource management or care responsibilities without compensation).

iii. Empowers women through better mobility/accessibility, enhanced livelihood security, enhanced food security, improved health, access to safe water, etc. (as many benefits as possible).[26]

[26] We would add access to information to this list.

iv. Promotes women's democratic rights and participation by ensuring decision-making by local women, men, women's groups, cooperatives, and communities.

v. Locally led and/or locally driven (decentralized and appropriate).

vi. Ensures self-sufficiency and a low input of resources (safe, affordable, and sustainable).

vii. Contributes to climate change mitigation, emissions reduction, and/or climate adaptation (the project is sustainable).

viii. Results can be shared, spread, and scaled up (replicable elsewhere, not just benefiting one individual).

ix. Shows interlinkages to cross-cutting issues, such as (including, but not restricted to) peace-building, natural resources management, food security and/or health, water and sanitation.

Source: WGC 2020.

These criteria promote women's interests while also calling for gender equality and greater democratization in all aspects of climate action. This combination is noteworthy because it responds to the gender-specific impacts of climate change reviewed in section 3 (p. 32) and criticisms of gender-insensitive climate interventions we summarized in section 4 (p. 50). There is recognition, in criterion iii, that women are particularly disadvantaged by lack of access to services and resources and therefore need targeted projects to empower them via improved access. Criteria iv and v respond to awareness that top-down approaches tend to reproduce existing power relations. Calling for enhanced local control and decision-making, with added mention of women's agency and right to participate, underscores the view that climate interventions must not become tools of neo-colonialism (see Westholm and Arora-Jonsson 2015; Arora-Jonsson et al. 2016; Bee and Sijapati Bassnett 2017; Resurrección et al. 2019).

Only criterion ii specifically addresses care work and does so via a concern for women's "workloads," suggesting that the amount of work that women do should be reduced or at least not increased. This framing is interesting in light of the more nuanced discussion of care work that we have presented in this report. It suggests that there is a narrow understanding of care work as a problem for women (i.e., care = drudgery) and possibly a lack of multi-dimensional, contextual, and intersectional analyses of care work and its interactions with the impacts of climate change. This is not surprising: even though feminist climate research includes analyses of social reproduction and the care economy, there are few specific and sustained examinations of care as a form of work in the grey literature on gender and climate change interventions; it is either absent or mentioned as one aspect of women's plight. For example, in their "Strengthening gender considerations in adaptation planning and implementation in the least developed countries" report, the LEG (2015) does not discuss care work at all. In

CARE's review of case studies, there is a discussion of three common features that they consider to be successful adaptation interventions as viewed through a feminist lens: building agency, changing relations, and transforming structures (Deering 2019). However, the report does not take a close look at care work. The IUCN's review of "gender-responsive adaptation across sectors" only refers to care work in relation to health (Aguilar et al. 2015). Resurrección et al.'s (2019) background paper on gender-transformative climate change adaptation discusses care work primarily in relation to women's time poverty and overburdening.

These are a few examples, but our review of the literature that zeroes in on the gender inequality-climate change nexus confirms that care work is rarely singled out for close, critical, and multidimensional examination. It is also instructive to note that in a survey of the WGC GJCS Awardees that asks about project outcomes and gender impacts, the criterion "reduce workload of women, especially of unpaid care work" is one of the least commonly mentioned out of 11 impacts, tied for last place with "creating new legislation and increasing the number of women in elected office" (WGC 2020).

In order to provide a discussion of the extent to which, and in what ways, gender-just climate solutions focus on improving the conditions under which people do care work and on transforming care work inequalities, we reviewed the WGC's summaries of award-winning GJCSs over a five-year period (2015–2020), along with key reports by CARE and Women Organizing for Change in Agriculture and Natural Resource Management (WOCAN). We looked for examples of interventions that seem to respond to one or more of the 5 Rs. This review yielded not only a set of examples of what might be called "win-win" solutions—in that they simultaneously respond effectively to climate change and care work inequality concerns—but also some reflections on potential pathways for transformation that have not yet been discussed in the literature.

5.2 CARE-SENSITIVE CLIMATE ACTION: APPLYING THE 5R FRAMEWORK

Feminist research that considers how to combine strategies for achieving gender equality and climate change adaptation or mitigation tends to advocate the adoption of a gender-transformative approach (cf. Tovar-Restrepo 2017). Echoing this claim, we argue that being gender "sensitive" in responses to climate change only takes us so far: to be gender transformative, interventions should be care sensitive so that they make care work possible and rewarding for everyone and integral to climate mitigation/adaptation strategies rather than being confined to the "gender and climate change" box. Evidence suggests that care-sensitive approaches may be more likely to be accepted by local people if

the benefits to the whole community is made evident, thereby avoiding the pitfalls of approaches that only target women (see Bryan et al. 2018). This means that there is a need for more research and learning on how to center care work in various forms of climate action (Butt et al. 2020); thus far care work is taken into account largely as an aspect (and cause) of women's vulnerability. Our view is that care work and gender inequality should be treated as related rather than conflated.

Moreover, our argument for care sensitivity stems from the observation that most climate solutions are only deemed gender just and/or transformative when they are bottom up and participatory. Almost without exception, the expectation is that women will be actively involved in the co-creation of projects, engaged in leadership and decision-making, and given many opportunities for training and other forms of enrichment. Income-generating activities are of course also part of the picture. But, while supportive of all of these features, we also note that seldom is the question of how these opportunities are to be juggled by individuals alongside already existing care work responsibilities addressed. For example, promoting training programs for women, such as in coastal monitoring or solar engineering, may be a celebrated feature in national Climate Change and Gender Action Plans (ccGAP), but, as discussed in section 4 (p. 50), technical and/or economic priorities may overshadow the implications for care work if there is no explicit or systematic analysis of care embedded into policy-making. As Resurrección et al. (2019) argue, a feminist approach demands that involvement in and responsibility for climate change mitigation/adaptation programs must not be added to women's already disproportionate (i.e., unfair) share of daily activities.

The 4 or 5R framework for transforming care inequalities by recognizing, reducing, redistributing, representing, and sometimes rewarding care work is the approach taken by feminist scholars as well as institutions such as the ILO, UN Women, and Oxfam. Drawing on the literature discussed in the previous sections, here we identify interventions that scholars believe are important for limiting the negative impacts of climate change, as well as the impacts of gender-insensitive climate change interventions, on women's disproportionate responsibility for unpaid care work.

In order to develop care-sensitive and gender-just interventions, the changes captured by the 5R framework are needed. As explained in section 2.4 (p. 28), this framework has been adopted widely in the grey and academic literature on care work inequalities in the global North and South. It is therefore useful to apply this framework to a discussion of climate change interventions, and to use it to identify pathways and possibilities for climate solutions that improve the distribution and conditions of care in low-income rural contexts. We are not aware of any other publication in which this approach has been taken.

In Table 5.1 we review the existing evidence from literature on “gender just climate solutions” (WGC 2020) against the five R verbs in the feminist framework (revisiting Table 2.3). We also identify how the 5Rs themselves might be modified to include greater recognition of the climate crisis-care crisis nexus (our modifications are presented column 2). It is important to note that the framework, as conventionally constructed, does not include an ecological/climate dimension, which highlights the fact that the topic of care work inequalities has rarely been analyzed in connection with questions of environmental quality or long-term sustainability—including by feminists.

In the sub-sections following this table, we explain and elaborate how the 5 Rs apply to climate actions. The Rs are organized in two groups: i) recognize, reward, and represent; and ii) reduce and redistribute. We give examples of the types of interventions that could help to respond to these goals, as well as examples of existing projects and policies where possible.

Table 5.1 The 5R framework applied to climate interventions

	Climate-related modification	Interventions	Existing examples
Recognize *Make care visible in policies; gather qualitative and quantitative data; mainstream care into policies and programs.* *Acknowledge the nature, extent, and contribution of unpaid care work to human development.*	Make care inequalities visible so that they are not inadvertently exacerbated by climate change interventions that require additional responsibility, work, and time by carers (e.g., increased participation in other types of work, training programs, or decision-making processes). Recognize the role of care work in moving to a decarbonized, climate-just economy (care jobs as green jobs). Recognize the knowledge that comes from environmental care work. Recognize the role of carers and the work they do to enable households to cope in crisis/disaster situations and with everyday environmental stresses.	Challenge existing policies and plans that focus on technological fixes and masculinized production-focused jobs to the exclusion of feminized care-focused jobs (e.g., in "Green New Deals"). Ensure notions of climate justice used in advocacy campaigns include data to give evidence of the contribution of care work to a decarbonized economy and sustainable society.	The feminist Green New Deal campaign in the USA (Daniel and Dolan 2020; Palladino and Gunn-Wright 2021) and UK (Cohen and MacGregor 2021). Feminist economists, working in the US-based Times Up Foundation and UK Women's Budget Group, have calculated the benefits to job creation and carbon reduction strategies that could come from government investment in the care sector and its workforce (Palladino and Mabud 2021; de Henau and Himmelweit 2020). FUNDAECO works with Indigenous forest communities in Guatemala to integrate climate adaptation and reproductive health care. It officially recognizes midwives as community service providers (WGC 2019, 18). Colombian women recyclers recognized as environmental change agents and public service providers (WGC 2020, 9). A CSA project in East Godavari, India recognized Adivasi women's traditional knowledge of herbal remedies, learned through care for chickens, in disease prevention, leading to increased livelihood security (FAO and CARE 2019, 72). "Seeds for hope" in Northern India recognizes women's roles as owners of knowledge, conservation actors, and distributors of seeds as valuable to local climate adaptation (WGC 2017, 30)

Reduce *Reduce the amount of time required to carry out care work by making it more convenient, safer, and less physically demanding.* *Provide social and physical infrastructure that takes the onus off individuals to provide care.*	Provide labor-saving domestic and agricultural technologies that simultaneously mitigate climate change and reduce time and effort of care work tasks. Increase access to climate information services that make it easier for carers to anticipate and plan for climate events in order to minimize negative effects on households.	Solar-powered lighting in homes makes care work easier. Solar cookers: women's workload is significantly reduced as they spend fewer hours on firewood collection and cooking (WGC 2020). Improved water technologies/infrastructure can reduce workload and lessen environmental impacts. Building innovations that reduce energy use and individual care work such as trombe walls and co-housing. CSA projects that improve food security in a climate-friendly way will reduce women's work to provision food for households. Use of information and communication technologies (ICT) for climate information services should be accessible to carers spatially (i.e., close to home) and during different times in the day.	WGC showcases a number of projects and cooperatives involving domestic labor-saving technologies such as solar cookers and dryers, which will reduce GHG emissions, reduce care work, and enhance food and energy security for households. Oxfam's WE-Care project in the Philippines, Uganda, and Zimbabwe found that improved water sources could reduce women's average workload by one to four hours each day (Oxfam 2018). Fog water collection projects studied by Lucier and Qadir (2018). Trombe wall projects in Ladakh (Arora-Jonsson 2020). Also see, for example: Green Living Movement promotes argro-ecology and solar stoves across Zambia (WGC 2020, 16); The Union of Women Cooperatives for Argan Oil project to disseminate solar cookers across southern Morocco (WGC 2016, 9); Little Earth clean domestic energy projects in Tajikistan (WGC 2019, 10); The Great Green Wall Project in Nigeria—energy-efficient cookstoves (WGC 2016, 16). Gumucio et al. (2020, 245) report case study research that yields evidence that "women's capacity to access agro-meteorological advisories and weather and climate information is enhanced when services and information sources are located within the village, where women's childcare and household responsibilities tend to take place." NB: we could not find examples of specific projects.
Redistribute *Sharing of care work between adult family members (women and*	Interventions should address assumptions about men/boy's and women/girl's roles in households and families in ways that lead to greater	Ensure campaigns about "pro-environmental behaviors" that target households are explicitly gender inclusive rather than feminized or targeted at women.	FANRPAN ATONU project in Tanzania and Ethiopia involving women rearing indigenous chickens for income, with emphasis on men supporting through taking on increased domestic work and ensuring increases in women's resting time (Deering 2019, 11).

men in heterosexual couple households). *Collectivize/socialize care work through state policies, services, and facilities. Challenge norms that make care work a feminized activity.*	sharing of care work in households. Deliver state-provided health and child care services; embed these care services in national climate policies. Promote the benefits of care collectivization (in households and via community co-ops) for gender equality and climate mitigation goals.	Climate adaptation projects with measures to increase "labor burden sharing" between men and women. Work with men in ways that get them to do more domestic and care work (this means them taking responsibility as opposed to "helping out" with women's chores). Assessments of women's participation in productive work and decision-making should always be accompanied by assessments of men's participation in care work (Folbre 2018, 26). Provide childcare service for women participating in climate projects and related activities, whether research, decision-making, or training. Social protection and care services can enhance gender equality if the state commits to such goals, gives sufficient financial resources, and develops effective regulations (Staab and Gerhard 2011).	The GRAD (Graduation with Resilience to Achieve Sustainable Development) project uses village economic savings associations (VESA) that work with men and women to build gender-aware adaptation strategies. The project has resulted in empowering women with income-generating work and reducing their domestic workload by redistributing work to husbands (Deering 2019). Participatory processes to develop climate resilience that focus on gender division of labor and encourages men to share more of the load (e.g., Enda Graf Sahel in Saloum Delta, WGC 2020, 17). Oxfam's Living with Floods Information, Education and Communication Clubs "resulted in shared responsibilities between women and men…and modified stereotypes" (Resurrección et al. 2019, 11). Oxfam's WE-Care project finds that when men participate in activities that promote the valuing and sharing of unpaid care work, they report taking more responsibility and spending more time doing it than they have in the past (León-Himmelstine and Salomon 2020). The SISAM project, which disseminates solar irrigation technologies in Benin, Burkina Faso, and Togo, provides childcare services to women involved in meetings and training (WGC 2018, 17). NB: it is the only project in the GJCS Awards reports that mentions this. The Sahel Adaptive Social Protection Program (Béné et al. 2018).

Represent *Give care workers a voice in decision-making; gather data that illuminate their lived experiences, concerns, and ideas for change.*	Include carers in climate action planning so that their care-specific concerns and needs can be embedded from the start. Conduct participatory research with carers to amplify their voices in climate change interventions and lobbying.	Use of household methodologies (HHM) and other participatory processes that enable the needs, experiences, knowledge, and rights of carers to be mainstreamed into planning and policy-making for climate action. Include carers in community-level decision-making processes regarding climate action. Ensure their participation is not restricted by caring responsibilities by making childcare services available and scheduling meetings around peak care times in venues close to home.	IFAD (2016) provides a useful discussion of HHM and gives examples of projects in SSA where these have been used as a way to amplify women's voices in projects aimed at reducing care work burdens through labor-saving technologies (see also Bishop-Sambrook 2014). While the participation of women is a major theme in the WGC reports on GJCS, there seems to be no explicit mention of the participation or representation of carers of any gender.
Reward/ remunerate *Pay for hitherto unpaid care work through direct cash transfers or tax.*	Integrate cash transfers (and other financial mechanisms) that remunerate care work into climate finance schemes such as carbon trading programs.	Carer's income. Findings from Argentina, Bolivia, Brazil, and Chile indicate that non-contributory pension funds can be a key measure to reduce gender gaps in benefits at old age (Arza 2017). Findings from a multi-country cash-transfer program in sub-Saharan Africa suggest that promoting cash programs can positively affect livelihoods as well as agricultural productivity, provided there is coordination with other sectoral development programs and attention to local contexts (Asfaw 2016).	Campaign for a care income, promoted by the Global Women's Strike (GWS) and Women of Color GWS Movements (https://globalwomenstrike.net/careincomenow/). WOCAN's W+ program that ensures women's empowerment objectives as part of carbon trading programs (Westholm and Arora-Jonsson 2018).

Recognizing care work and representing carers in climate interventions

As discussed in section 2.4 (p. 28), the 5R framework for transforming care work inequalities calls first for them to be recognized. Recognition entails acknowledging the value of care work to the economy and of carer's knowledge. In the context of climate interventions, both recognition of care and including the voices of those involved in care work would appear to be urgently needed solutions to the problems identified in section 4 (p. 50).

Two arguments found in the academic literature are worth summarizing here. The first is that care work should be seen as both foundational to society and low carbon, which presents a direct challenge to the mainstream climate change literature, where it is invisibilized. This argument has been developed by feminist ecological economists (Bauhardt 2014; Nelson and Power 2018) and has recently led activists in the UK and USA to adopt the slogan "care jobs are green jobs" (Cohen and MacGregor 2020, 2021; Daniel and Dolan 2020; Palladino and Gunn-Wright 2021). While gaining traction in the context of debates about a just transition in global North countries, this slogan could—in theory—be applied to low-income global South contexts. But given the porous boundaries and deep interconnections between the care work and productive work carried out by women and men in the global South, we would need to develop a contextualized and reflective approach.

In WGC's gender-just climate solutions awards, they acknowledge as commendable several projects that specifically recognize and celebrate the value of women's unpaid care work (see Table 5.1). For example, Colombian women recyclers have been recognized as "environmental change agents and public service providers" for doing the mundane, unpaid work of waste picking that could be seen as a form of environmental care (WGC 2020, 9). Acknowledging this work that women have been doing for decades without recognition, and giving it social, political, and economic value could contribute to successful campaigns for the fifth "R"—reward/remuneration of care work via a care income or other state social policy. While there are feminist campaigns for care incomes in Europe and North America (see James 2021), as far as we are aware, this type of intervention has not yet been debated in the literature on gender and climate change in the global South.

The second argument related to "recognize" is that knowledge gained via environmental care work is valuable and essential for the development of successful climate interventions. In many of their best practice examples, the WGC highlights the importance of building on the customary and ancestral knowledge of women and Indigenous people in the search for appropriate adaptation strategies. In forestry and agricultural projects involving locally adapted seeds, small livestock species, and ancestral uses of plants, for example, knowledge is treated as central to both empowerment and transformation (WGC 2019, 2020). These interventions integrate the benefits of

local knowledge for mitigating and coping with climate impacts with the benefits for communities and individual women of treating women as experts with environmental skills and knowledge.

Recognizing and valuing the work of caring, which often involves holding families and communities together in times of crisis, as well as giving women credit for doing this essential work, offers a counternarrative to the dominant positioning of poor women in the global South as vulnerable victims of climate change (Arora-Jonsson 2011, 2013; UN Women 2016; Huyer and Gumucio 2020).

The 5R framework calls for representation of care workers so that their experiences and needs are integrated into strategies for change. Representation often takes the form of political organizations advocating for better conditions and pay, but it can also be enabled via consultation and participation using innovative research methods, and even co-production of interventions by carers. Because women's voices are often missing from policy decisions, and because women are more likely than men to be care workers, methods of increasing representation of women are relevant to both researchers and practitioners who are committed to care-sensitive climate action.

Increasing the representation of carers and enabling their active participation and leadership is an important strategy for redressing the use of simplistic narratives and rehearsal of "zombie facts" (noted in section 3 (p. 32)). At the same time, "it is important to ensure that increased meaningful participation in governance spaces does not add to the care burden faced by girls or women" (Deering 2019, 23). Several academic articles make the point that increasing the participation of women in climate actions (such as those associated with REDD+) is liable to exploit their care work at the same time as ignoring their domestic responsibilities "and as a consequence risk burdening their labor demands and perpetuating the already uneven distribution of labor between men and women" (Bee and Sijapati Bassnett 2017, 795).

Feminist scholars have argued that sex- and gender-disaggregated research is necessary to improve representation of women and to support the implementation of gender-sensitive adaptation (Bryan et al. 2018; Lau et al. 2021). Several have argued that greater collaboration across different types of organizations in order to share knowledge and best practices and strengthen the integration of participatory research into adaptation programs is crucial for climate adaptation as well as to address the care work done by women and men (Bryan et al. 2018; Arora-Jonsson et al. 2019). Household surveys (see, e.g., Oxfam 2018) and other forms of household-based and context-specific research (see, e.g., the household methodology toolkit prepared by IFAD (2016) that involve all household members in discussion of gender inequalities, tensions, and individual and collective goals are increasingly used in investigations of the dynamics of care work. However, coordination and integration of interventions

from the point of view of recipients of projects and programs has been an acknowledged need in the field of development for many years but has proven to be difficult for agencies and government organizations to operationalize (Arora-Jonsson et al. 2019).

5.3 REDUCING AND REDISTRIBUTING CARE WORK AS PART OF CLIMATE INTERVENTIONS

As discussed earlier, many feminist climate experts agree that climate interventions should be designed to benefit carers by valuing their work and knowledge and to avoid instrumentally mobilizing their already scarce time and energy. The question to consider next is what are the types of interventions that go further to reduce and redistribute care work so that it is not disproportionately and detrimentally shouldered by women and girls. As established in section 3 (p. 32), climate impacts such as drought, deforestation, and related resource scarcity are expected to significantly increase amounts of unpaid care work.

In searching for pathways for linking gender equality and climate change solutions, both the grey and academic literature place emphasis on interventions that reduce, or at very least that do not add to, the burdens shouldered by carers. As an outcome of their extensive literature survey, Resurrección et al. (2019, 34) recommend “invest[ment] in basic social services and infrastructure - particularly health care, water, sanitation, childcare and labor-saving technologies - that reduce women’s workloads and build resilience without further curtailing their time and self-determination.” They go on to advocate strategies for redistributing care work, including through education and awareness raising, so that patriarchal ideas about how care for people and environments ought to be done can be challenged (Resurrección et al. 2019). It is important to build on these recommendations by looking more closely at how these care work reductions and redistributions can be achieved in climate interventions. Relating back to material in earlier sections, we organize the discussion into three types of interventions where evidence of (or potential for) reduction and redistribution of care work has been recognized in the literature: labor-saving infrastructure and technologies; social infrastructure and support mechanisms; and encouraging the sharing of care work in households.

Labor-saving infrastructure and technologies

Infrastructural and technological changes are needed, not only for mitigation and adaptation, but also for people to survive life-threatening loss and damage caused by climate change. A significant amount of climate intervention work focuses on developing resilient infrastructure, such as energy and water/sanitation, and distributing labor-saving equipment to places where these are currently lacking. This is an area where synergies between climate action

and gender equality have been identified and could be achieved through the provision of care-related infrastructure and new technologies that reduce the amount of time and energy that individuals need to spend doing care work.

Technical interventions can directly address the intersection of climate change and care work by reducing the impacts of adverse climate conditions on activities relating to indirect care such as collecting water and fuel, and provisioning food for households. Among the examples given to demonstrate positive impacts are the time reductions that result from ensuring easier access to water and energy sources, such as from drilling boreholes and planting trees in woodlots, as well as rural electrification programs (see LEG 2015, 24; Deering 2019). Research conducted as part of Oxfam's WE-Care project in the Philippines, Uganda, and Zimbabwe found that improved water sources could reduce women's average workload by one to four hours each day (Oxfam 2018).

Agricultural technologies have been shown to reduce workloads while increasing food production and reducing negative impacts on health, which result in women having more time for other activities such as education (Huyer and Gumucio 2020). Climate-smart agricultural technologies and practices such as using machines to sow seeds, planting zero-tillage crop varieties, green manuring, and laser land levelling have been found, in studies conducted in Nepal for example, to reduce women's drudgery in agricultural work (Khatri-Chhetri et al. 2019; FAO and CARE 2019) and potentially in their work of care.

Alternative fuel and cooking technologies for women have been on national and international development agendas since the 1980s (Agarwal 1986). New, improved cookstoves are seen as making existing care work less dangerous by reducing indoor smoke from fires and reducing the time needed to prepare food (Clancy et al. 2012; Lindgren 2020). Some researchers see this technology as a potential win-win intervention (WGC 2018, 2020).

Although they are now also seen as an important strategy for climate mitigation, there has been little uptake of low-impact cookstoves. Addressing this problem over several decades, Khandelwal et al. (2017) write that published research has shown that poor women do not rank cookstoves as one of the most urgent means of improving their lives. They have tended to be much more vocal about their desire for improved drinking water, irrigation systems, electrification, and access to land. However, these demands often require capital-intensive investment, and increased access to land requires taking on powerful interests responsible for the over-exploitation of resources. As Khandelwal et al. write, responding to such demands by women is difficult by definition. In fact, as we can see from the REDD+ projects described above, women are expected to give up access to land and resources and are made responsible for carbon

sequestration. Providing cookstoves then becomes a much simpler alternative.[27] Khandelwal et al. raise the ethical question of scholars and activists in the global North focusing so much attention on changing the behavior of poor women in rural areas of low-income countries. It becomes easy for "us" to think that we know what is in the interests of non-literate rural women and that it is their responsibility to change their behavior, rather than the responsibility of those of us living in the high-consuming urban societies to change ours (Khandelwal et al. 2017).

Further, improvements in water and sanitation infrastructure, such as the provisioning of water through plumbing and pumps, are necessary for reducing the time and effort required for direct, indirect, and environmental care work. But as with other types of technology, reducing effort does not automatically result from the uptake of water technologies, and nor is redistribution of the work a necessary outcome (Jerneck 2018; León-Himmelstine and Salomon 2020). For example, the Pacific Gender and Climate Change Toolkit (2015) presents as gender responsive a climate solution that involves installing a community cistern with solar pumps.[28] The intervention is expected to increase water access but could have a range of effects on gendered care work, because those most likely to use the technologies were not represented: without incorporating an analysis of gendered roles and relations, women might benefit from greater flexibility but have increased workload, whereas men's workload might be reduced because women are able to do more of the water-related work (UN Women 2016, 55).

Lucier and Qadir (2018), who study fog water collection in places where access to water is unreliable (for example in South and Central America, the Caribbean, Africa, and Southern Europe), illustrate that it can reduce the amount of time spent on water collection while also ensuring less pressure on the water table that might contribute to climate change. This has clear implications for women's care work and health outcomes as well as perceptions of self and welfare of the community. Fog water collection is a passive, low maintenance, and sustainable option that can supply fresh drinking water to communities where fog events are common. However, social infrastructure such as supportive policies, functional

[27] Khandelwal et al. do not suggest that the cookstoves issue is simple. On the contrary, they recognize that there is considerable debate over the benefits and challenges of implementing solar and biomass cookstoves in rural communities. They are an intervention that is potentially cheap and effective, yet in 50 years of effort there has been very low uptake for a variety of reasons. One may be that the focus has been on supply more than demand, with insufficient attention to design and use by those doing the cooking—a point that resonates with the discussion we presented in section 4 (p. 50).
[28] However, evidence suggests that the growing solar system market promoted by funders is leading to debt, using technologies that people do not know how to fix and abandon in the long term. See https://nextbillion.net/an-impact-investor-urges-caution-on-the-energy-access-hype-cycle/.

local institutions, expert communities, and gender equality are essential for it to work (Lucier and Qadir 2018).

Many climate projects have sought to work with labor-saving technologies in order to reduce the time required for care and to free up time for women to engage in more remunerative, income-generation activities as well as leisure and community participation. In development work, labor-saving technologies have long been seen as being instrumental in achieving gender equality and women's empowerment (see, e.g., IFAD 2016; FAO and CARE 2019). However, as we discussed in section 4 (p. 50), in the absence of attention to context and lack of awareness of users' needs and habits, some eco-technologies tend to be ignored by the people on the receiving end (Gay-Antaki 2020; Wang and Corson 2015). As a result, the literature on gender-transformative adaptation indicates that it is important to ensure that perceptions of performance or service-level improvements are shared by both the project designers and beneficiaries from the outset, keeping in mind the intersecting dimensions of power among men and women (Doss 2001; Beuchelt and Badstue 2013; Bryan et al. 2018; Carr et al. 2016).

The appropriateness of the technologies in daily life, and how the workload might shift as a result of these technologies (and what that would imply for gender relations), are important questions to consider. Further, a broader community approach is indispensable for many such interventions. For example, Arora-Jonsson (2020) found that the building of trombe walls in passive solar houses in mountain villages in Ladakh in the Himalayas by a local NGO freed up time for women from poor households (i.e., time normally spent doing care work, gathering/ buying fuelwood to heat their homes and tending to the stove) to undertake activities outside the house. One woman related that it enabled her to get employment outside the home as she no longer needed to tend to the stove to generate heat and ensure that there were no fire hazards for her elderly mother who was at home during the day. However, trombe walls require direct sunlight from the south, and their effectiveness would be jeopardized if another house blocks their access to sunlight. Thus a community planning approach that includes everyone in the neighborhood is vital in these interventions (Arora-Jonsson 2020).

Finally, information and communication technologies (ICT) are mentioned in a number of reports and articles that assess gender-sensitive climate intervention (e.g., Gumucio et al. 2020; Mittal 2016; Carr et al. 2016; Deering 2019). Climate information services (CIS), such as weather forecasts and early warnings, are recognized as important in climate adaptation and building resilience in rural and agrarian settings. There is some evidence, discussed by Gumucio et al. (2020) in their review of the literature, that mobile phones and other ICT have potential to reduce care burdens by increasing access to CIS that make it easier for carers to anticipate and plan for climate events in order to minimize negative effects on

households. Moreover, CSA projects with women in India found that ICT-based agro-advisories, weather forecasts, and CIS can contribute to care work reduction by enabling women farmers to learn new practices (Chanana et al. 2018; Deering 2019). Gumucio et al. (2020, 245) further note that women's access to CIS is hugely dependent on contextual factors (including access to mobile phones, networks, and energy infrastructure) but that access can be improved by locating them close to where childcare and domestic work tends to take place. They also suggest that care work may reduce the amount of time available for accessing climate information, such as listening to radio programs. This means that for ICT-delivered CIS to contribute to reducing care burdens, they need to incorporate both time-sensitive and time-saving features in their design and delivery (Gumicio et al. 2020; see also USAID 2012).

It is important to note, however, that a review of the literature indicates that structural and sociocultural factors, including poverty, illiteracy, and gender norms and practices, as well as gender biases in technology dissemination, can limit women's access to ICT and other technologies, with resulting impacts on their empowerment and agricultural productivity (Arora-Jonsson et al. 2019). Masika and Bailur (2015) argue that ICT should be understood not as automatic sources of women's empowerment, but as a site of contestation where women carefully calibrate gender relations in complex ways.

Social infrastructure and support mechanisms

It is clear from a great deal of research, and especially from disaster studies, that infrastructural and technological support provided in the wake of climate disasters such as water, sanitation and health (WASH) programs, are wholly insufficient when they do not also pay attention to the need for supporting the social infrastructure and include the end users in the design and delivery of such systems (Geere and Hunter 2020; Collins et al. 2019). As explained in section 2 (p. 12), social infrastructure refers to the public, state-provided services and support/protection systems required to meet local needs and contribute towards a good quality of life for the population. It is a concept favored by feminist economists because it implies these care-related services are as foundational to the economy as bricks, mortar, and fiber-optic cables, thereby challenging the gendered "hard versus soft" binary that is commonly used in mainstream policy literatures (Elson 2016; de Henau and Himmelweit 2020).

The importance of social protection (SP) policies has been recognized by key agencies such as the World Bank, ILO, and UNICEF. Over the years, it has taken a central place in the development agenda (Razavi 2007). The links between SP, public services, and climate change are less recognized, but as we can see from emerging literature on climate adaptation and mitigation, they are central to the question of how care work and climate change are connected (Mugehera and Parkes 2020). Safeguarding gendered concerns and care work in climate programs as well as assuming automatic co-benefits from women's

inclusion in markets, advocated by some climate programs, have been considered inadequate in actually considering the work of care. Researchers have argued for the need for social policy that centers care as an essential complement to climate policies and programs (Westholm and Arora-Jonsson 2015).

Given the increasingly complex and interlinked array of risks that poor and vulnerable people face, Arnall et al. (2010) argue that SP, disaster risk reduction (DRR), and climate change adaptation (CCA) initiatives are unlikely to be sufficient if applied in isolation from each other. In recognition of this challenge, they develop the concept of Adaptive Social Protection (ASP) to refer to a series of measures that build resilience of the poorest and most vulnerable people into climate change responses by combining elements of SP, DRR, and CCA in programs and projects. A new initiative, the Sahel Adaptive Social Protection Program, represents such an integrated approach. Accompanying measures include health, education, nutrition, family planning, among others (WB 2019; Béné et al. 2018). The concept of SP has evolved from a relatively narrow focus on safety nets in the 1980s and 1990s to present-day definitions that include interventions to reduce the effect of climate shocks as well as considering longer-term mechanisms designed to combat chronic poverty. Arnall et al. (2010) cite the National Rural Employment Guarantee Schemes (NREGS) Program in India that guarantees employment for 100 days per rural household per year at a minimum agricultural wage as well as Practical Action projects in Bangladesh as important interventions that combine protection and promotion measures. Of these, the NREGS in India is further grounded in a rights-based approach, important for questions of care and informal labor. Relying on 124 agricultural programs implemented in five countries in Asia, Davies et al. (2013) state that full integration of SP, DRR, and CCA is still relatively limited but that, when it occurs, it helps to shift the time horizon beyond short-term interventions aimed at supporting peoples' coping strategies and/or objectives towards longer-term interventions that can help promote transformation towards climate and disaster-resilient livelihood options.

Other core interventions have included cash and asset transfers as well as micro-insurance schemes. The explicit focus on asset protection and promotion have the potential to address gendered entitlements and capabilities, gendered norms and division of labor, and gendered perceptions of risk and climate change (Bee et al. 2013). At present, however, the trend is more towards market-based strategies and women's economic empowerment than lobbying for this kind of policy change. The LEG, for example, calls for "family friendly policies to increase the labor force participation of women" (2015, 15) rather than to reduce gendered divisions of care work within families.

State intervention in the form of safety nets (e.g., pensions in old age and grants for living with disabilities) and socialized care services that reduce the

individualization of care work should be factored into climate interventions if they are to be considered gender transformative (i.e., to succeed in addressing the 5Rs—reduction and redistribution specifically). This could include state-provided health services to alleviate the burdens placed on family caregivers, which are intensified by climate impacts. The IUCN calls for gender-responsive climate solutions that involve the health sector, such as developing climate and health early warning systems to prevent severe outbreaks and disease occurrence, ensuring equal access to coping and recovery resources, and enhancing education and employment in health care fields (Aguilar et. al 2015, 9). It would be fruitful to examine research on the ability of state provision of childcare and adult social care services to give carers more time for the income-generating, educational, and leisure activities for insights into how, if promoted in climate mitigation and adaptation strategies, socialized care services could contribute to gender-transformative change.

There has been very little debate on the need for care and gendered concerns in climate finance funds. One exception is the W+ standard conceived by WOCAN that has attempted to use climate finance to generate income for women but also to remunerate care work. The W+ Standard, a certification label, endorses climate projects that create increased social and economic benefits for women participating in economic development or environmental and climate projects, including those that provide renewable energy technologies, time and labor-saving devices, forest and agriculture activities, and employment opportunities.[29] The W+ is meant to complement the carbon certification schemes operationalized through carbon markets and be a certification that development projects could apply for. For example, four projects, located in Asia, have been certified according to the W+ Standard: one working with improved cookstoves (Cambodia), two biogas projects (Indonesia and Nepal), and one project on financial literacy (Vietnam). The W+ Standard allows projects to certify the co-benefits relating to gender, and to monetize them in the same way that the Climate, Community and Biodiversity Standards (CCB) Standards certify community and biodiversity co-benefits. No less than 20 percent of the price of a W+ unit has to be paid to the women beneficiaries or women's groups. Although these initiatives are seen as controversial by some for wanting to work within unequal markets, their attempts may also be seen as "rewarding" women for the care work they already do and redistributing the benefits from climate programs (Westholm and Arora-Jonsson 2018). In an activist-academic conversation on the W+, Arora-Jonsson and the founder of W+, Jeanette Gurung, write that while W+ Standard can be seen as engaging with a current unequal system, it is also a practical approach in a time when all kinds of efforts are needed for transformation. The W+ Standard seeks to ensure that gender and power are

[29] For information on the W+ Standard, see https://www.wocan.org/what-we-do/wstandarde.

part of the discourse within existing systems and can thereby open space for discussions of inequality, thus slowly transforming business as usual (Arora-Jonsson and Gurung, 2021). Rewarding the women for their care work through the W+ could potentially pave the way to transformation as advocated by the 5R framework. As pointed out by feminist economists, addressing the larger gendered constraints embedded in markets is essential to achieving this outcome.

Sharing and collectivizing care work in households and communities

Social support systems exist at multiple scales, and, in very low-income rural contexts, they more often function informally at household, kinship, and community levels than they are provided by the state. In their research on climate adaptation in India and African countries, for example, Rao et al. (2020, 9) found that "community-based support systems are crucial for survival, as public services are not easily available." They go on to point out that "when the state is dysfunctional or absent, men and women in the community have no choice but to support each other" (Rao et al. 2020, 11).

There is a small amount of evidence in the grey literature on gender-just climate solutions that it is possible for interventions to achieve collectivization and/or sharing of care work in the household at the same time as delivering on adaptation and/or mitigation goals. In the WGC award reports, there are a few examples of this integration of goals. Among the best examples is the FUNDAECO project in Guatemala that combines forest conservation with the establishment of community maternal and sexual health care services (serving 50,000 people) run by Indigenous midwives (WGC 2020). Others are more modest in that they provide childcare to enable women's participation, such as that mentioned in the SISAM solar irrigation project in West Africa (WGC 2018).

In addition to collectivizing care work at the community level, some researchers and organizations explicitly mention the importance of increasing "labor-burden sharing" between men and women (Deering 2019, 21). Some CSA projects aim to be gender transformative by "engaging men" to accept and support women's empowerment (FAO and CARE 2019). These do not go as far as projects that specifically work with men in ways that encourage them to reconsider gender norms and to take on a larger load of domestic work (i.e., to actually do the work because it is their responsibility). A key finding of Oxfam's WE-Care project is that when men participate in activities that promote the valuing and sharing of unpaid care work, they report taking more responsibility and spending more time doing it than they have in the past (León-Himmelstine and Salomon 2020). Deering (2019) discusses projects that establish that all household members should be involved in livelihood activities, including food, water, and fuel provisioning, which are part of projects to increase resilience to climate change. In some projects, greater sharing means that men take on an increased load of care work so that the women in the household have greater time to engage in

income-generating activities or even have more rest time. The Enda Graf Sahel project in Saloum Delta involves participatory processes to develop climate resilience that focus on gender divisions of labor that encourage men to share more of the load (WGC 2020). A project aiming to build capacity for more resilient agricultural practices in Kenya had the added impact of fostering more equitable sharing of income among household members (including young people), which is reported to have led to increased harmony (Deering 2019, 10). There are few mentions in the climate adaptation literature of redistributing care work from women to men and even less so from girls to boys, however; we note that there is room for more research on this aspect of gender transformation through challenging gender roles and divisions of care work within heterosexual couples and their families.

By placing a stronger focus on promising practices already shaping gender relations and care in specific places, change is possible (Njuki et al. 2016; León-Himmelstine and Salomon 2020). Development programs spearheaded by the CGIAR institutions have pioneered household approaches through which people can come together and challenge norms or cross boundaries of traditional gender roles or conduct. Such approaches often comprise a set of participatory methodologies for encouraging equitable intra-household relations and decision-making processes, encouraging all household members to realize that working together is a solution that benefits everyone (Njuki et al. 2016). The division of care work can be expected to be central to such discussions. For example, Evans (2014) documents that, in Zambia, women without exposure to men performing care work often expressed resentment and were more resigned to their fate than women who had grown up sharing care work with brothers and were more optimistic about social change. Hillenbrand et al. (2015) suggest that better monitoring and evaluation of gender-transformative programs and prioritizing policy action on context-specific gender issues are needed for successfully countering unequal distributions of care work. Support for women's groups and their rights, although these entail complex gendered negotiations, have also made it possible for women to challenge gendered inequalities in the home (Arora-Jonsson 2013).

5.4 REFLECTIONS ON TRADE-OFFS AND KNOWLEDGE GAPS

As explained in section 4 (p. 50), most climate interventions have not been devised with care work in mind, and nor do they succeed in reducing or redistributing the work of care that shapes the everyday lives of women, girls, boys, and men in diverse ways. There are many examples of climate interventions that claim to be gender responsive yet do not include specific measures to redress unfair, unhealthy, or unsustainable burdens of care work

that are shouldered primarily by women and girls in low-income rural contexts. When referring to mitigation programs such as REDD+, Westholm and Arora-Jonsson (2015) have argued for the need to go beyond the "safeguards" or "co-benefits" written into climate policies to consider the social policy-making that would specifically address the question of care in relation to climate concerns. They argue that there is a need for care work to be addressed as a question in its own right in the development climate projects. In other words, there is a case to be made for care-sensitive climate solutions.

As this section has shown, there are examples and experience accumulated from years of environmental and development research and practice to support the idea that pathways can be found for integrating climate interventions and strategies for transforming care work inequalities. Such "win-win" pathways, we conclude, will be paved by a more focused and gender-just approach that mobilizes insights from the 5R framework for transforming the relations and conditions that shape care work. They must also be developed and assessed with contextual factors in mind, as well as sensitivity to continuous processes of change, both in environmental resources and the societies and communities in which interventions are made. Recognizing interdependencies at the household and community level, and being aware of and responding to gendered impacts of climate interventions, are essential, not only to reduce the impact of climate change on care work, but also to ensure that interventions do not exacerbate gendered inequalities and produce new ones.

The availability of labor-saving infrastructure and technologies, social support mechanisms, and intra-household cooperation is indispensable for enabling people to withstand climate-related impacts (e.g., Haeffner et al. 2018), as well as having a direct bearing on the work of care in its many sites and types. While existing research highlights these intersections, future research will need to consider the trade-offs and tensions between climate mitigation/adaptation, transforming gender inequalities, and greater sensitivity to the place of care work in these fields of policy and practice. There might also be tensions between the Rs that require further investigation. Our review has highlighted considerable tension between increasing representation and participation of carers in climate interventions and the need to reduce the time women spend in unpaid caring for people and environments. Moreover, alongside the desire to be more sensitive to women's care burdens, especially to alleviate the drudgery exacerbated by climate impacts, there is a strange silence on the rewarding and positive aspects of care work, which should be preserved and enhanced by gender-just climate solutions. Although there is growing attention to the benefits of valuing ancestral and customary knowledge and skills gained from environmental care, it seems important to monitor the extent to which this results in transformations of gender-coded and labor-intensive work. And finally research that gains insights into the emotional and psychological aspects of the care-climate change nexus is needed

to inform the identification of pathways for transformational change at the level of individuals and kin relationships.

6 CONCLUSIONS

Although it has received only minor attention in research and policy circles, climate change is having significant impacts on the amount, distribution, and conditions of care work that people perform every day in rural communities of the global South. As caregivers, heads of households, and community leaders, women in particular experience an increase in and intensification of unpaid and under-paid care work as a result of the impacts of climate change and their related livelihood stresses. In addition to increased time spent in care work, climate impacts can also cause increases in interpersonal conflict and violence, greater demands on emotional labor, and higher levels of mental ill health (Tovar-Restrepo 2017; Osei-Agyemang 2007). To address these intersections of care work and climate change, we argue for a gender-transformative approach that is care sensitive and alert to the intertwined types of care work (i.e., direct, indirect, and environmental) carried out primarily by women and girls in households and communities in contexts shaped by a range of factors (economic, social, cultural, political). This final section of the report summarizes the main findings of the literature review and suggests what, in light of these findings, we think may be promising pathways for mitigating the negative, and enhancing the potential for the positive, impacts of climate change interventions on care work.

6.1 CLIMATE CHANGE INTENSIFIES GENDER-UNJUST CARE WORK INEQUALITIES

The existing evidence found in the corpus of grey and academic literature that we reviewed supports the conclusion that the impacts of climate change make the existing burdens of care work more difficult for rural people living in low-income, less-industrialized countries. These burdens are felt acutely by women whose livelihoods depend on natural resources and who lack access to the other forms of resources, such as land, income, infrastructure, technologies, and support services that facilitate unpaid care work in families and communities. Gender and power imbalances shape how women and men, and girls and boys, respond to climate stresses as well as to the increased and intensified care work burdens that arise due to these threats and stresses.

While there is a high degree of difference between the various countries and communities that have been studied, the literature identifies common patterns that are discussed in most, if not all, the major evidence reviews of gender and climate change research (e.g., Goh 2012; Sellers 2016; Resurrección et al.

2019). These patterns have shaped assumptions in the gender and climate change field, and are important to consider when developing and evaluating climate interventions. Most of the literature that lists these patterns is either based in local/regional case studies (and even then the diversity and fluidity of experiences is usually recognized) or is a synthesis of existing evidence that may reflect a highly generalized picture and may contain “zombie facts.” We have therefore suggested (in section 3.4 (p. 46) that generalizations about how climate change affects unpaid care work should be treated cautiously in order to avoid perpetuating problematic myths and stereotypes. Our survey of the literature suggests that, even though research on gender and climate change has exploded over the past decade, evidence of impacts on different groups, as well as of how the intersecting axes of social difference create vulnerabilities in specific parts of the world, remains “limited, patchy, varied and highly contextual” (Goh 2012; see also Carr and Thompson 2014; Jerneck 2018, 3). The same point should be made about the evidence presented to support claims about the impacts of climate change on care work. Our report offers an initial picture (by no means comprehensive) of the interactions of climate impacts and care work, which should inform future investigation.

6.2 THE IMPORTANCE OF CARE-SENSITIVE ANALYSIS

The literature we reviewed demonstrates that it is essential to understand how care forms the underlying basis for most other economic activities and that it is difficult to disentangle unpaid care work from other forms of work in rural contexts. As we discuss in section 2 (p. 12), a multi-dimensional and multi-level approach enables a comprehensive analysis of care work as part of a care economy involving individual carers, families and households, local communities, and environments (see Table 2.2). Development practice has often focused on the question of care as something that happens between individuals and within the household, and sometimes extended to the community. In response to the limitations of the literature, we have stressed the need for contextual and relational understandings of care and have suggested that the work of caring for the local environment be included in both analyses and interventions. A focus on the material conditions in which care work is performed is especially important in the context of climate change-induced impacts, which have a range of effects discussed in section 3 (p. 32).

Environmental care work has long been discussed separately as natural resource management by feminist environmental and development scholars who have tried to make space for the “ethic of care” in environmental governance (Arora-Jonsson 2013). In this report, we emphasize the opposite: the need to

make space for the “quiet politics of environmental care” (Arora-Jonsson et al. 2021) in discussions of care work within both climate and development policy. Climate change creates new challenges by intensifying the burden of care that stems from poverty and inequalities. It is important to understand how this changes the nature of the environmental care carried out by women and men as well as its effects on care at different levels—for individuals, the household, and communities. At present, there is a lack of attention to environmental work as care work in the literature; to the extent that it is included, it is often instrumentalized and feminized in problematic ways. However, as discussed in section 5 (p. 64), valuing this work as connected to local knowledge and expertise as well as part of global flows and interrelationships offers a potential strategy for more gender-transformative climate action.

A central take-away message from this report is that the care work-climate change nexus should be tackled as a standalone topic rather than as a sub-theme of a gender (or women) and climate change discussion. Climate policies may have transitioned from being completely gender insensitive to more gender responsive, but there is still a long way to go to become gender transformative, largely because of the enduring assumption that care is a feature of gender relations rather than a collective necessity, as foundational to economies and human survival as agriculture (Mugehera and Parkes 2020). Gender-transformative policies are those that redress the underlying causes of gender inequality, one of which is the feminization and invisibilization of care work. Focusing only on women’s economic empowerment or the consequences of gender inequality will not automatically lead to changes in these deeply rooted problems (Deering 2019). Recognizing care work and the care economy to be as central to livelihoods as agriculture or forestry means that it will be possible to include care workers of all genders in the analysis, thereby breaking the entrenched link between women and care. It may also be possible to acknowledge that not all women are involved in care work. Of course, in many societies, the coding of care work as feminine is “utterly resistant” to change (Jerneck 2018), so we think calling for its re-coding as a shared human activity requires patience and a commitment to feminism as a global social movement (Resurrección n.d.).

Important for this project of re-coding and rethinking care is to keep in mind the psychological and emotional dimensions of care and in particular of environmental care in the face of climate breakdown. Currently there is a disproportionate focus on the physical aspects of care work, and freeing people’s time to do paid work, without considering how the environment is important for people’s well-being or how its destruction can lead to mental ill health. A more care-sensitive approach would include an analysis of how people’s worries, fears, and hopes in the face of environmental disaster, displacements, and other climate impacts affect their everyday lives.

We conclude that interventions should strive to be care sensitive and that an analysis of care is mainstreamed into the planning, implementation, and evaluation of programs and projects in order to not further disadvantage the givers and receivers of care. At the same time, efforts should be made to go beyond mainstreaming care into climate actions to developing both standalone social policies on care work and care infrastructures. Lessons from gender-responsive planning (as seen with REDD+, for example) suggest that unless there is sustained and targeted attention to redressing the negative impacts of climate stresses on care work, there is a risk of these concerns being subsumed into/eclipsed by dominant interests (e.g., the market).

6.3 GENDER-JUST AND CARE-SENSITIVE CLIMATE ACTION: POTENTIAL PATHWAYS

The availability of labor-saving infrastructure, technologies, and social protection services, encouraging greater household sharing, and the use of participatory methodologies can all play a role in reducing the unequal distribution of care work between men and women. These measures appear to be equally important for dealing with the impacts of climate change on care work and when designing climate interventions and strategies.

There are several implications for policy and research that flow from the literature we have reviewed. We have attempted to identify what may be the most promising pathways for mitigating the negative and accentuating the positive impacts of the interactions between climate change and care work inequalities. We relate our suggestions to the 5R framework for transforming care work inequalities (see Table 5.1). In particular, we consider how unpaid care work is recognized, how unpaid care work might be better reduced and redistributed, and how carers' voices might be heard and their needs represented in climate interventions. Table 6.1 presents a simplified version of the care-sensitive and gender-just climate solutions that we discussed in section 5 (p. 64) (see Table 5.1); these are our recommendations for bringing together the twin goals of gender justice and greater sensitivity to care work in climate change policy and action.

Table 6.1 Strategies for moving towards gender-just and care-sensitive climate action

5R framework	Gender-just AND care-sensitive climate action
Recognize care work	Recognize and value care work as foundational to a decarbonized, climate-just society. Recognize and value the role of carers and the work they do to enable households to cope in crisis/disaster situations and with everyday environmental stresses. Recognize and value the knowledge that comes from environmental care work to climate mitigation, adaptation, and resilience.
Reduce care work	Provide labor-saving domestic and agricultural technologies that simultaneously mitigate/adapt to climate change and reduce the time and effort required to carry out daily care work tasks. Increase access to climate information services that make it easier for carers to anticipate and plan for climate events in order to minimize negative effects on households.
Redistribute care work	Embed state-provided care services (e.g., childcare, elder care) in national and international climate policies. Promote and facilitate equal responsibility for and hands-on delivery of care work among men/boys and women/girls.
Represent carers	Include carers in debates and decision-making processes regarding climate action (e.g., through voluntary organizations and unions). Ensure that the participation of carers in debates and decisions about climate action is not restricted by their caring responsibilities (e.g., provide childcare services).
Reward carers	Include funding for training and job creation in formal care sectors in climate finance programs. Include a care income and living wages for care workers in comprehensive packages for a just transition (e.g., Green New Deal).

While not included in Table 6.1, we have suggested two additional Rs by calling for more research on care-climate intersections in addition to taking a more relational approach to care work as always embedded in relationships with others (Esquivel 2014), whether immediate and extended family members, people in a community, or with other living non-human beings, such as animals and plants. Our relational approach takes care work inequalities to be shaped by gender as a product of intersecting axes of difference and a social relation, which means we resist the tendency in much of the literature to approach women and men's roles in a binary or asymmetrical manner.

Policy-related arguments and recommendations

Our suggestions for influencing policy and conducting future research are as follows:

- At a very basic level, the argument should be made that climate interventions will not be socially just unless the value of care work and the needs, experiences, and knowledge of carers are included at all stages and unless they are developed with both the 5Rs and an intersectional-relational understanding of gender in mind. These points are compatible with existing strategies that connect the need to transform the unfair gendered division of care work with women's human rights and the SDGs that have emerged from Oxfam's WE-Care initiative (Fooks 2018; Oxfam 2020; León-Himmelstine and Salomon 2020).

- Policies should avoid a simplistic women-men binary, heteronormative assumptions, and stereotypes about vulnerable women, and instead recognize a diversity of household arrangements and changing gender relations, thereby making space for more sensitive, intersectional analyses of gender relations within interventions aiming to be win-win solutions. In that respect, care-sensitive strategies could avoid some of the pitfalls of gender-responsive approaches that treat gender in problematic ways, even when trying to be intersectional.

- Social policies that deliver care as a collective social good are needed that make it possible to reduce the care burden shouldered by individuals. Climate interventions (both adaptation and mitigation strategies) have in some cases increased the care burden by being gender neutral and by ignoring the gendered practices and norms involved in their implementation on the ground. Critical attention to how gender shapes the politics of technologies and infrastructure, and in whose interests and by whom they are designed and distributed, is essential.

- The most gender-transformative way to redistribute care work is through provision of care-supporting social services. It is clear in the literature that simply providing physical infrastructure and technologies is not enough: there needs to be increased state investment in social policies and public services that collectivize the work of social reproduction. This should include increasing childcare, adult social care, and health care services, while also taking an holistic and intersectional approach to the provision of social, care-related infrastructure. Long-term transformation of care inequalities will not be achieved unless the cost and the responsibility for care work are redistributed between women and men in heterosexual couple households as well as between households and the state and employers. We have acknowledged that more research is needed into how social protection policies can contribute to more care-sensitive climate interventions.

- Having said that, we have also found that physical infrastructure and labor-saving technologies that are co-designed with, and compatible with the needs and practices of, their users and that facilitate daily care work—such as

solutions for water access, low-impact cookstoves, and mobile/radio climate information services—can make a positive difference and are essential for meeting the challenges presented by climate change impacts when they succeed at reducing the time demands and drudgery of care work.

- The representation/participation of carers in climate interventions is likely to work best when the larger community as well as other household members are also engaged. Attention to relationships and contextual factors is imperative and requires wider collaboration on the part of development agencies with each other and with government authorities.

- Coordination and integration of interventions has been an acknowledged need in the field of development for many years. The urgent need for integrating communities of practice around disaster risk reduction, social protection, and climate adaptation, which has been called for by many, has so far not been very successful. Integration of interventions has the potential to reduce the care work required by women and men in coordination with different actors in their everyday lives as well as helping to redistribute it.

- It is important to understand that reality is messy and complex: a contextual and collaborative approach to analyzing care work can enable unexpected insights and tensions to be revealed, such as carers' mixed emotions or enjoyment of some aspects of care work in spite of the drudgery. Easy binaries of men and women also need to be challenged or at least approached with caution in participatory interventions. In such cases, starting from a care-sensitive analysis rather than a gender-sensitive analysis might be useful. By this we mean addressing people as carers first, and women or men second. Moreover, a relational approach to care work, which avoids an over-emphasis on individuals and enables more collaborative and dynamic methodologies and interventions (e.g., household methodologies) is essential.

Research gaps to be filled

Our review has identified a number of research gaps that will need to be filled if the intersections of care work inequalities and climate change impacts are to be addressed effectively in the future. They include:

- Funding and capacity building are needed for carrying out research that gathers contextualized and gender-disaggregated evidence of the impacts of climate change on the amount, conditions, and distribution of care work in low-income rural settings in the global South. Support for this claim can be enhanced by making the argument that gender-sensitive research does not necessarily lead (and has not thus far led) to adequate knowledge of the specificities of the care-climate nexus. That researching women or gender is not the same as researching care is a key message we wish to convey in this report.

- The 4 or 5R framework is about transforming gendered care work inequalities, but it demonstrates little concern for the implications of the Rs—the synergies as well as tensions and trade-offs between them—for sustainable development or for tackling the climate emergency. This report has identified and reflected on some potential “win-win” pathways, where climate solutions can simultaneously contribute to gender-transformative change. While ecofeminist scholars have been theorizing about these intersections for decades, more research is needed to develop interdisciplinary, evidence-based, and contextual analyses of these potential pathways.

- Research in this field should continue to use innovative participatory, household, and community-based methods that can: amplify the voices of carers—especially those of women and girls who are marginalized due to intersecting axes of inequality and oppression; capture evidence of the valuable knowledge and expertise they hold for developing climate solutions; and involve men and boys as equal partners in care work as well as in achieving gender-just climate solutions that allow all people to live well in a changing climate.

- There are gaps in the existing literature on care work resulting from a tendency to focus on women and/or heterosexual couple households whenever care work inequalities are studied. We recommend more research on the role and practices of men and boys in care work. In addition, as in the field of development studies and policy more generally, gender-based analyses of the care-climate nexus should challenge cis-gender and hetero-normative biases by researching how sexual orientation, gender identity/expression, and structural discrimination and violence against LGBT+ people affect the experience of caring in a changing climate.

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