	• reconceptualising development around well-being rather than economic growth (Gupta and Pouw, 2017), • rethinking, prevailing values, ethics and behaviour • improving decision-making processes that incorporate diverse values and world views • creating space for negotiating diverse interests and preferences	Gorddard et al., 2016; Aipira et al., 2017; Chung Tiam Fook, 2017; Maor et al., 2017) (O'Brien and Selboe, 2015; Gillard et al., 2016; DeCaro et al., 2017; Harris et al., 2018; Lahn, 2018; Roy et al., 2018) Sections 5.6.1 and 5.5.3.1

[START CROSS-CHAPTER BOX GENDER HERE]

Cross-Chapter Box GENDER: Gender, Climate Justice and Transformative Pathways

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Key Messages

- Gender and other social inequities (e.g., racial, ethnic, age, income, geographic location) compound vulnerability to climate change impacts (*high confidence*). Climate justice initiatives explicitly address these multi-dimensional inequalities as part of a climate change adaptation strategy. [Box 9.2: Vulnerability Synthesis: Differential Vulnerability by Gender and Age in Ch 9]
- Addressing inequities in access to resources, assets, and services as well as participation in decision-making and leadership is essential to achieving gender and climate justice (*high confidence*).
- Intentional long-term policy and program measures and investments to support shifts in social rules, norms, and behaviours are essential to address structural inequalities and support an enabling environment for marginalised groups to effectively adapt to climate change (*very high confidence*). [Equity and Justice box in Ch 17]
- Climate adaptation actions are grounded in local realities so understanding links with SDG 5 is important to ensure that adaptive actions do not worsen existing gender and other inequities within society (e.g., leading to maladaptation practices) *(high confidence).* [17.5.1]
- Adaptation actions do not automatically have positive outcomes for gender equality. Understanding the positive and negative links of adaptation actions with gender equality goals, (i.e., SDG 5), is important to ensure that adaptive actions do not exacerbate existing gender-based and other social inequalities [16.1.4.4]. Efforts are needed to change unequal power dynamics and ´to foster inclusive decision-making for climate adaptation to have a positive impact for gender equality *(high confidence).*
- There are very few examples of successful integration of gender and other social inequities in climate policies to address climate change vulnerabilities and questions of social justice, (*Very high confidence*).

Gender, climate justice, and climate change

This Cross-Chapter Box highlights the intersecting issues of gender, climate change adaptation, climate justice, and transformative pathways. A gender perspective does not centre only on women or men but examines structures, processes, and relationships of power between and among groups of men and women and how gender, particularly in its non-binary form, intersects with other social categories such as race, class, socio-economic status, nationality, or education to create multidimensional inequalities (Hopkins, 2019). A gender transformative approach aims to change structural inequalities. Attention to gender in climate change adaptation is thus central to questions of climate justice that aim for a radically different future (Bhavnani et al., 2019). As a normative concept highlighting the unequal distribution of climate change impacts and opportunities for adaptation and mitigation, climate justice (Wood, 2017; Jafry et al., 2018; Chu and Michael, 2019; Shi, 2020a) calls for transformative pathways for human and ecological wellbeing. These address the concentration of wealth, unsustainable extraction, and distribution of resources (Schipper et al., 2020a; Vander Stichele, 2020) as well as the importance of equitable participation in environmental decision-making for climate justice (Arora-Jonsson, 2019).

Research on gender and climate change demonstrates that an understanding of gendered relations is central to addressing the issue of climate change. This is because gender relations mediate experiences with climate change, whether in relation to water (Köhler et al., 2019) (see also Sections 4.7, 4.3.3; 4.6.4, 5.3), forests (Arora-Jonsson, 2019), agriculture (Carr and Thompson, 2014; Balehey et al., 2018; Garcia et al., 2020) (see also Chapter 4, Section 5.4), marine systems (Mcleod et al., 2018; Garcia et al., 2020) (see also Section 5.9) or urban environments (Reckien et al., 2018; Susan Solomon et al., 2021) (see also Chapter 6). Climate change has direct negative impacts on women's livelihoods due to their unequal control over and access to resources (e.g., land, credit) and because they are often the ones with the least formal protection (Eastin, 2018) (see also Box 9.2 in Ch 9). Women represent 43% of the agricultural labour force globally, but only 15% of agricultural landholders (OECD, 2019b). Gendered and other social inequities also exist with non-land assets and financial services (OECD, 2019b) often due to social norms, local institutions, and inadequate social protection (Collins et al., 2019b). Men may experience different adverse impacts due to gender roles and expectations (Bryant and Garnham, 2015; Gonda, 2017). These impacts can lead to irreversible losses and damages from climate change across vulnerability hotspots (Section 8.3).

Participation in environmental decision-making tends to favour certain social groups of men, whether in local environmental committees, international climate negotiations (Gay-Antaki and Liverman, 2018) or the IPCC (Nhamo and Nhamo, 2018). Addressing climate justice reinforces the importance of considering the legacy of colonialism on developing regional and local adaptation strategies. Scholars have criticized climate programs for setting aside forestland that poor people rely on and appropriating the labor of women in the global South without compensatory social policy or rights; where women are expected to work with Non Timber Forest Products to compensate for the lack of logging and for global climate goals but where their work of social reproduction and care is paid little attention (Westholm and Arora-Jonsson, 2015; Arora-Jonsson et al., 2016). A global ecologically unequal exchange, biopiracy, damage from toxic exports, or the disproportionate use of carbon sinks and reservoirs by high-income countries enhance the negative impacts of climate change, women in LDC's and SIDS also endure the harshest impacts of the debt crisis due to imposed debt measures in their countries (Appiah and Gbeddy, 2018; Fresnillo Sallan, 2020). The austerity measures derived as conditionalities for fiscal consolidation in public services increases gender-based violence (Castañeda Carney et al., 2020) and brings additional burdens for women in the form of increasing unpaid care and domestic work (Bohoslavsky, 2019).

Gendered vulnerability

Land, ecosystem, and urban transitions to climate-resilient development need to address gender and other social inequities to meet sustainability and equity goals, otherwise, marginalised groups may continue to be excluded from climate change adaptation. In the water sector, increasing floods and droughts and diminishing groundwater and runoff have gendered effects on both production systems and domestic use (Sections 4.3.1, 4.3.3, 4.5.3). Climate change is reducing the quantity and quality of safe water available in many regions of the world and increasing domestic water management responsibilities (*high confidence*). In regions with poor drinking water infrastructure, it is forcing, primarily women and girls, to walk long

distances to access water, and limiting time available for other activities, including education and income generation (Eakin et al., 2014; Kookana et al., 2016; Yadav and Lal, 2018). Water insecurity and the lack of water, sanitation, and hygiene (WASH) infrastructure have resulted in psychosocial distress, gender-based violence, as well as poor maternal and child health and nutrition (Collins et al., 2019a; Wilson et al., 2019; Geere and Hunter, 2020; Islam et al., 2020; Mainali et al., 2020) (Sections 4.3.3 and 4.6.4.4) (*high confidence*). Climate-related extreme events also affect women's health – by increasing the risk of maternal and infant mortality, disrupting access to family planning and prevention of mother to child transmission regimens for HIV positive pregnant women (Undrr, 2019) (see also Section 7.2). Women and the elderly are also disproportionately affected by heat events (Section 7.1.7.2.1, 7.1.7.2.3, 13.7.1).

Extreme events impact food prices and reduce food availability and quality, especially affecting vulnerable groups, including low-income urban consumers, wage labourers, and low-income rural households who are net food buyers (Green et al., 2013; Fao, 2016) (Section 5.12). Low-income women, ethnic minorities, and Indigenous communities are often more vulnerable to food insecurity and malnutrition from climate change impacts, as poverty, discrimination, and marginalisation intersect in their cases (Vinyeta et al., 2016; Clay et al., 2018) (Section 5.12). Increased domestic responsibilities of women and youth, due to migration of men, can increase their vulnerability due to their reduced capacity for investment in off-farm activities and reduced access to information (Sugden et al., 2014; O'Neil et al., 2017) (Section 4.3; 4.6) (*high confidence*).

In the forest sector, the increased frequency and severity of drought, fires, pests and diseases, and changes to growing seasons, has led to reduced harvest revenues, fluctuations in timber supply and availability of wood (Lamsal et al., 2017; Fadrique et al., 2018; Esquivel-Muelbert et al., 2019). Climate programs in the global South such as REDD+ have led to greater social insecurity and the conservation of the forests have led to more pressure on women to contribute to household incomes but without enough supporting market access mechanisms or social policy (Westholm and Arora-Jonsson, 2015; Arora-Jonsson et al., 2016). In countries in the global North, reduced harvestable wood and revenues have led to employment restructuring that has important gendered effects and negatively affects community transition opportunities (Reed et al., 2014).

Integrating gender in climate policy and practice

Climate change policies and programs across regions reveal wide variation in the degree and approach to addressing gender inequities (see Table SMCCB GENDER.2). In most regions where there are climate change policies that consider gender, they inadequately address structural inequalities t resulting from climate change impacts, or how gender and other social inequalities can compound risk (*high confidence*). Experiences show that it is more frequent to address specific gender inequality gaps in access to resources. Regionally, Central and South American countries (section 12.5.8) have a range of gender-sensitive or gender-specific policies such as the intersectoral coordination initiative Gender and Climate Change Action Plans (PAGcc), adopted in Perú, Cuba, Costa Rica, and Panamá (Casas Varez, 2017), or the Gender Environmental policy in Guatemala that has a focus on climate change (Bárcena-Martín et al., 2021). However, countries often have limited commitment and capacity to evaluate the impact of such policies (Tramutola, 2019). In North and South America, policies have failed to address how climate change vulnerability is compounded by the intersection of race, ethnicity, and gender (Radcliffe, 2014; Vinyeta et al., 2016) (see also section 14.6.3). gender is rarely discussed in African national policies or programmes beyond the initial consultation stage (Holvoet and Inberg, 2014; Mersha and van Laerhoven, 2019), although there are gender and climate change action strategies in countries such as Liberia, Mozambique, Tanzania, and Zambia (Mozambique and IUCN, 2014; Zambia and IUCN, 2017). European climate change adaptation strategies and policies are weak on gender and other social equity issues (Allwood, 2014; Boeckmann and Zeeb, 2014; Allwood, 2020), while in Australasia, there is a lack of gender-responsive climate change policies. In Asia, there are several countries that recognize gendered vulnerability to climate change (Jafry, 2016; Singh et al., 2021b), but policies tend to be gender-specific, with a focus on targeting women, for example in the national action plan on climate change as in India (Roy et al., 2018) or in national climate change plan as in Malaysia (Susskind et al., 2020).

Potential for Change and Solutions

The sexual division of labour, systemic racism and other social structural inequities lead to increased vulnerabilities and climate change impacts for social groups such as women, youth, Indigenous peoples,

ethnic minorities. Their marginal positions not only affect their lives negatively but their work in maintaining healthy environments is ignored and invisible in policy affecting their ability to work towards sustainable adaptation and aspirations in the SDGs (Arora-Jonsson, 2019). However, attention to the following has the potential to bring about change:

Creation of new, deliberative policy-making spaces that support inclusive decision-making processes and opportunities to (re)negotiate pervasive gender and other social inequalities in the context of climate change for transformation (Tschakert et al., 2016; Harris et al., 2018; Ziervogel, 2019; Garcia et al., 2020). (*high confidence*)

Increased access to reproductive health and family planning services, which contributes to climate change resilience and socio-economic development through improved health and well-being of women and their children, including increased access to education, gender equity, and economic status (Onarheim et al., 2016; Starbird et al., 2016; Lopez-Carr, 2017; Hardee et al., 2018) (Sections 7.4) (*high confidence*).

Engagement with women's collectives is important for sustainable environments and better climate decision-making whether at the global, national, or local levels (Westholm and Arora-Jonsson, 2018; Agarwal, 2020). The work of such collectives in maintaining their societies and environments and in resisting gendered and community violence is unacknowledged (Jenkins, 2017; Arora-Jonsson, 2019) but is indispensable especially when combined with good leadership, community acceptance, and long-term economic sustainability (Chu, 2018; Singh, 2019) (Section 4.6.4). Networking by gender experts in environmental organizations and bureaucracies has also been important for ensuring questions of social justice (Arora-Jonsson and Sijapati, 2018).

Investment in appropriate reliable water supplies, storage techniques, and climate-proofed WASH infrastructure as key adaptation strategies that reduce both burdens and impacts on women and girls (Alam et al., 2011; Woroniecki, 2019) (Sections 4.3.3 and 4.6.44).

Improved gender-sensitive early warning system design and vulnerability assessments to reduce vulnerabilities, prioritising effective adaptation pathways to women and marginalized groups (Mustafa et al., 2019; Tanner et al., 2019; Werners et al., 2021).

Established effective social protection, including both cash and food transfers, such as the universal public distribution system (PDS) for cereals in India, or pensions and social grants in Namibia, that have been demonstrated to contribute towards relieving immediate pressures on survival and support processes at the community level, including climate effects (Kattumuri et al., 2017; Lindoso et al., 2018; Rao et al., 2019a; Carr, 2020).

Strengthened adaptive capacity and resilience through integrated approaches to adaptation that include social protection measures, disaster risk management, and ecosystem-based climate change adaptation (*high confidence*), particularly when undertaken within a gender-transformative framework (Gumucio et al., 2018; Bezner Kerr et al., 2019; Deaconu et al., 2019) (Cross-Chapter Box NATURAL in Chapter 2, Section 5.12, Section 5.14).

For example, gender-transformative and nutrition-sensitive agroecological approaches strengthen adaptive capacities and enable more resilient food systems by increasing leadership for women and their participation in decision-making and a gender-equitable domestic work (*high confidence)* (Gumucio et al., 2018; Bezner Kerr et al., 2019; Deaconu et al., 2019) (Cross-Chapter Box NATURAL in Chapter 2, Section 5.12, Section 5.14)

New initiatives such as the Sahel Adaptive Social Protection Program represent an integrated approach to resilience that promotes coordination among social protection, disaster risk management, and climate change adaptation. Accompanying measures including, health, education, nutrition, family planning, among others (Daron et al., 2021).

Climate change adaptation and SDG 5

Adaptation actions may reinforce social inequities, including gender unless explicit efforts are made to change (Nagoda and Nightingale, 2017; Garcia et al., 2020) (*high evidence and high agreement*). Participation in climate action increases if is inclusive and fair (Huntjens and Zhang, 2016). Roy et al. (2018) assessed links among various SDGs and mitigation options. Adaptation actions are grounded in local realities especially in terms of their impacts so understanding links with the goals of SDG 5 becomes more important to make sure that adaptive actions do not worsen prevalent gender and other social inequities within society (*high evidence, high agreement)*. In the IPCC 1.5°C Special Report, Roy et al. (2018) assessed links between various SDGs and mitigation options, adaptation options were not considered. The current SDG 13 climate action targets do not specifically mention gender as a component for action, which makes it even more imperative to link SDG 5 targets and other gender-related targets to adaptive actions under SDG 13 to ensure that adaptation projects are synergistic rather than maladaptive (16.3.2.6, Table 16.6) (Susan Solomon et al., 2021).

This assessment is based on a systematic rapid review of scientific publications (McCartney et al., 2017; Liem et al., 2020) published on adaptation actions in 9 sectors from 2014 to 2020 (see Table SMCCB GENDER.1) and how they integrated gender perspectives impacting gender equity. The assessment is based on over 17,000 titles and abstracts that were initially found through keyword search and were reviewed. Finally, 319 relevant papers on case studies, regional assessments, and meta-reviews were assessed. Gender impact was classified by various targets under SDG 5. Following the approach taken in Roy et al. (2018) and (Hoegh-Guldberg et al., 2019), the linkages were classified into synergies (positive impacts or co-benefits) and trade-offs (negative impacts) based on the evidence obtained from the literature review which is finally used to develop net impact (positive or negative) scores (See Table Cross-Chapter Box GENDER.1 and Supplementary Material)

Table Cross-Chapter Box GENDER.1: Interrelations between SDG5 (gender equality) and adaptation initiatives in 9 major sectors

Sector	**Adaptation categories**			
	Ecosystem-based	***Technological /infrastructure /information***	***Institutional***	***Behavioural / cultural***
Terrestrial & freshwater ecosystem	□□		□□	
Ocean & coastal ecosystem	□□	□	□□□	
Mountain ecosystem	□	□□	□	□□
Food, fibre & others	□□		□□	□□
Urban water & sanitation	□	□□		□□
Poverty, livelihood & Sustainable Development			□	□□
Cities, settlement & key infrastructure	□□	□□	□□	□□□
Health, well-being, and changing communities' structure	□□□□	□□	□□□	□□
Industrial system transition			□□	□□□

Colour code	Description
	All net positive links
	All net negative links

Confidence levels	Symbol
Very High	□□□□□
High	□□□□

	Number of net positive links > number of net negative links	Medium	□□□
	Number of net negative links > number of net positive links	Low	□□
	no literature/options	Very low	□

Table Notes:
Potential net synergies and trade-offs between a sectoral portfolio of adaptation actions and SDG 5 are shown. Colour codes showing the relative strength of net positive and net negative impacts and confidence levels. The strength of net positive and net negative connections across all adaptation actions within a sector are aggregated to show sector-specific links. The links are only one-sided on how adaptation action is linked to gender equality (SDG5) targets and not vice versa. Adaptation options assessed in Ecosystem-based actions are: 22 in number, options in Technological /infrastructure /information are 10, in Institutional are 17 and in Behavioural/ cultural are 13. The assessment presented here is based on literature presenting impacts on gender equality and equity of various adaptation actions implemented in various local contexts and in regional climate change policies (Table SMCCB GENDER.2).

Adaptation actions being implemented in each sector in different local contexts can have positive (synergies) or negative (trade-offs) effects with SDG5. This can potentially lead to net positive or net negative connections at an aggregate level. How they are finally realized depends on how they are implemented, managed, and combined with various other interventions in particular, place-based circumstances. Ecosystem-based adaptation actions and terrestrial & freshwater ecosystems have higher potential for net positive connections (Roy et al., 2018) (Table Cross-Chapter Box GENDER.1 and Supplementary Material). Adaptation in terrestrial and freshwater ecosystems has the strongest net positive links with all SDG-5 targets (*medium evidence, low agreement*). For example, community-based natural resource management increases the participation of women, especially when they are organised into women's groups (Pineda-López et al., 2015; de la Torre-Castro et al., 2017) (Supplementary Material). For poverty, livelihood and sustainable development sector adaptation actions have generated more net negative scores (*low evidence, low agreement*) (Table Cross-Chapter Box GENDER.1). For example, patriarchal institutions and structural discriminations curtail access to services or economic resources as compared to men, including less control over income, fewer productive assets, lack of property rights, as well as less access to credit, irrigation, climate information, and seeds which devaluate women's farm-related adaptation options (Adzawla et al., 2019; Friedman et al., 2019; Ullah et al., 2019) (Supplementary Material).

Among the adaptation actions, ecosystem-based actions have the strongest net positive links with SDG-5 targets (Table Cross-Chapter Box GENDER.1, Table SMCCB GENDER.1). In the health, well-being and changing communities' sector, this is with *high evidence and medium agreement*, while in all other sectors there is *medium evidence and low agreement*. Net negative links are most prominent in institutional adaptation actions (Table Cross-Chapter Box GENDER.1). For example, in mountain ecosystems, changes in gender roles in response to climatic and socioeconomic stressors is not supported by institutional practices, mechanisms, and policies that remain patriarchal (Goodrich et al., 2019). Additionally, women often have less access to credit for climate change adaptation practices, including post-disaster relief, for example, to deal with salinization of water or flooding impacts (Hossain and Zaman 2018). Lack of coordination among different city authorities can also limit women's contribution in informal settlements towards adaptation. Women are typically underrepresented in decision-making on home construction and planning and home-design decisions in informal settlements, but examples from Bangladesh show they play a significant role in adopting climate-resilient measures (e.g., the use of corrugated metal roofs and partitions which is important in protection from heat) (Jabeen, 2014; Jabeen and Guy, 2015; Araos et al., 2017; Susan Solomon et al., 2021).

Towards climate-resilient, gender-responsive transformative pathways

The climate change adaptation and gender literature call for research and adaptation interventions that are 'gender-sensitive' (Jost et al., 2016; Thompson-Hall et al., 2016; Kristjanson et al., 2017; Pearce et al., 2018a) and "gender-responsive", as established in Article 7 of the Paris Agreement (UNFCCC, 2015). In addition, attention is drawn to the importance of 'mainstreaming' gender in climate/development policy (Alston, 2014; Rochette, 2016; Mcleod et al., 2018; Westholm and Arora-Jonsson, 2018). Many calls have been made to consider gender in policy and practice (Ford et al., 2015; Jost et al., 2016; Rochette, 2016; Thompson-Hall et al., 2016; Kristjanson et al., 2017; Mcleod et al., 2018; Lau et al., 2021; Singh et al., 2021b). Rather than merely emphasising the inclusion of women in patriarchal systems, transforming

systems that perpetuate inequality can help to address broader structural inequalities not only in relation to gender but also other dimensions such as race and ethnicity (Djoudi et al., 2016; Pearse, 2017; Gay-Antaki, 2020). Adaptation researchers and practitioners play a critical role here and can enable gender-transformative processes by creating new, deliberative spaces that foster inclusive decision-making and opportunities for renegotiating inequitable power relations (Tschakert et al., 2016; Ziervogel, 2019; Garcia et al., 2020).

To date, empirical evidence on such transformational change is sparse, although there is some evidence of incremental change (e.g., increasing women's participation in specific adaptation projects, mainstreaming gender in national climate policies). Even when national policies attempt to be more gendered, there is criticism that they use gender-neutral language or include gender analysis without proposing how to alter differential vulnerability (Mersha and van Laerhoven, 2019; Singh et al., 2021b). More importantly, the mere inclusion of women and men in planning does not necessarily translate to substantial gender-transformative action, for example in National Adaptation Programmes of Action across sub-Saharan Africa (Holvoet and Inberg, 2014; Nyasimi et al., 2018) and national and sub-national climate action plans in India (Singh et al., 2021b). Importantly, there is often an overemphasis on the gender binary (and household headship as an entry point), which masks complex ways in which marginalisation and oppression can be augmented due to the interaction of gender with other social factors and intra-household dynamics (Djoudi et al., 2016; Thompson-Hall et al., 2016; Rao et al., 2019a; Lau et al., 2021; Singh et al., 2021b).

Climate justice and gender transformative adaptation can provide multiple beneficial impacts that align with sustainable development. Addressing poverty (SDG 1), energy poverty (SDG 7), WaSH (SDG 6), health (SDG 3), education (SDG 4) and hunger (SDG 2) —along with inequalities (SDG 5 and SDG 10) - improves resilience to climate impacts for those groups that are disproportionately affected (women, low-income and marginalised groups). Inclusive and fair decision-making can enhance resilience (SDG 16; Section 13.4.4), although adaptation measures may also lead to resource conflicts (SDG 16; Section 13.7). Nature-based solutions attentive to gender equity also support ecosystem health (SDGs 14 and 15) (Dzebo et al., 2019). Gender and climate justice will be achieved when the root causes of global and structural issues are addressed, challenging unethical and unacceptable use of power for the benefit of the powerful and elites (MacGregor, 2014; Wijsman and Feagan, 2019; Vander Stichele, 2020). Justice and equality need to be at the centre of climate adaptation decision-making processes. A transformative pathway needs to include the voice of the disenfranchised (MacGregor, 2020; Schipper et al., 2020a).

[END CROSS-CHAPTER BOX GENDER HERE]

18.3.2 Accelerating Transitions

Successfully implementing climate actions and managing trade-offs between mitigation, adaptation and sustainable development (18.2.4) has important time considerations that imply significant urgency, making substantive progress in system transitions critical for CRD. Both the SDGs and the Sendai Framework, for example, have target dates of 2030. Meanwhile, the Paris Agreement sets specific time horizons for NDCs and the SR1.5 indicated that limiting warming to 1.5°C would similarly require substantial climate action by 2030 (IPCC, 2018a). While the literature is unambiguous regarding the need for significant system transitions to achieve CRD (Section 18.1.3), the current pace of global emissions reductions, poverty alleviation, and development of equitable systems of governance is incommensurate with these policy time tables (Rogelj et al., 2010; Burke et al., 2016; Oleribe and Taylor-Robinson, 2016; Kriegler et al., 2018; Frank et al., 2019; Sadoff et al., 2020). As noted previously in the AR5, "*delaying action in the present may reduce options for climate-resilient pathways in the future*" (Denton et al., 2014: 1123). Accordingly, significant acceleration in the pace of system transitions is necessary to enable the implementation of mitigation, adaptation, and sustainable development initiatives consistent with CRD *(very high confidence*).

Studies since the AR5 directly address the issue of how to accelerate transitions within the broader system transitions, sustainability transitions, and socio-technical transitions literature (Frantzeskaki et al., 2017; Gliedt et al., 2018; Gorissen et al., 2018; Johnstone and Newell, 2018; Kuokkanen et al., 2019; Markard et al., 2020). Such literature explores several core themes to facilitate acceleration, which are aligned with the discussion later in this chapter on arenas of engagement for CRD (Section 18.4.3). One dominant theme is

Cross-Chapter Box GENDER: Gender, Climate Justice and Transformative Pathways Supplementary Material

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Table SMCCB GENDER.1: Interrelations between SDG5 (gender equality) and adaptation initiatives in 9 major sectors

Sector	*SDG 5 (net impact)*	*Main messages*
Terrestrial	**+ (enabling)**	+Community-based natural resource management increases the participation of women, most likely if they are organised into women groups. +National forest conservation/reforestation programs (e.g through CDM and REDD+) and forest sequestration programs can improve the family and social status of women and the creation of women's group in forest conservation programs can create more income for women and new connections which increases women's leadership and power in the local context. -However, too restricted rules of REDD+ that do not include traditional uses from local communities can hamper women and girls' traditional activities. - Payment for ecosystem services in the 'forest protection' category based on property size reduce women income as compared to men because women tend to have smaller size of the property ±Engagement in aquaculture has the potential to bring respect and popularity to women, if they succeed which depends on the gendered approach in introducing any technology otherwise the gender gap can increase, despite the many potential benefits of such technology.
Ocean	**- (counteracting)**	-Marine Protected Areas tend to reproduce existing gender disparities in relation to leadership and power. Research on MPAs in Kenya, Tanzania, Madagascar, Indonesia and the Philippines has concluded that women are less likely to participate in MPA governance and activities because MPAs restrict fishing and women have to find other sources of income to support their families. - Decision-making in relation to a mangrove restoration project: women's participation was low as they were not informed of focus group discussion. Also, in some places, men were culturally deterred from participating in mangrove restoration activities due to the low associated pay which was felt to be more suitable for women. +Workshops conducted in the Pacific highlighted how women are taking the lead in a range of local-scale adaptation actions that innovate as well as build on traditional knowledge. ±In sustainable aquaculture practices, gender roles are clearly defined. Women are not directly involved in commercial activities and almost all those involved in subsistence aquaculture are female due to the perceived lack of immediate economic gains. However, aquaculture provides opportunities for income diversification for both women and men
Mountain	**+ (enabling)**	+Being pushed into new roles, domains and spaces, women's skills and capacities have increased. Strategies adopted to address domestic water scarcity

		by conserving and recycling water are strengthening women's role in the community. +Women are engaged and recognized for such preparatory measures in advance of floods to stock up on essential items such as grains, oil and kerosene, as well as drying fish and vegetables for future use +Investment in education systems, programmes on women empowerment, pro-poor policies on access to affordable credit facilities, social protection schemes for the vulnerable and access to markets especially for livestock are likely to enhance both men and women adaptation. -Changes in gender roles to respond to climatic and socioeconomic stressors is not supported by institutional practices, mechanisms and policies that remain patriarchal. -Adaptation strategies adopted do not change or exacerbate the incidences of violence against women and children, which remain as the root cause of increased vulnerabilities. -Female-headed households are more vulnerable as they are less likely to adopt technologies because female heads have less access to information and other resources (including financial) due to traditional barriers.
Food	**+ (enabling)**	+Women's power to participate in intrahousehold adaptation decision-making is significantly correlated with their livelihood diversification through non-farm income earnings. +Women have reported that by implementing Best Management Practices (BMPs), changes were experienced in multiple domains, such as financial and physical capital, better nutrition (more food available to eat) and improved health care, as well as gaining more social and human capital. +Agroecological training in farming communities seems to increase gender-related sensitivity increasing girls schooling opportunities. +Access to ICT facilities enhances the resilience of women households by connecting them to new opportunities by increasing agricultural production incomes. + With well-organized water collection management, women and marginalized groups have equitable access to water springs, which was timesaving for them. -But the water infrastructure (micro-watershed) did not take the safety aspect for women and children into account to minimize accident risk. -Mobile phones are critical for access to Climate Information System but women perceive limited impact as they face some challenges that prevent them from accessing mobile phones like low-income levels, lack of training, inability to interpret climate information and convert it into actions, limited access to mobile phones (mostly by women), and inability to afford to call credits. Therefore, the design and delivery of climate information services need to be both relevant to the specific context and gender-sensitive in content
Water	**+ (enabling)**	+ Women experienced enhanced respect and trust through a hygiene and sanitation transformation approach, where the participatory programmes included men, women, and girls. + Improved water and sanitation facilities have shown to increase enrolment as well as reduce repetition and dropout rates for girls in school and higher education of women is shown to be correlated with reduced incidence of diarrhoea. + Infrastructure that is developed to respond to natural disasters and take into account gender-specific needs, such as sanitation facilities, can create security and safety for women and girls and provide a place to gather for support and foster empowerment + In developing countries, women are responding to water scarcity through collection adaptations, such as small rainwater harvesting systems and storage tanks, greywater recycling systems, fog water collection. These adaptation measures reduce physical burden and time commitment spent on collecting water, therefore increasing time to be spent on other activities such as school + Women play a significant role in response to natural disasters and when they are involved in pre-disaster planning, space is created to address women's-specific needs, such as building sanitation facilities above the flood line + In adapting to climate variability, women use unique storage practices to manage water resources; this includes storing water in cool, dark areas, using plastic containers or rooftops and underground tanks. Also, fog harvesting is an

		innovative water storage technique that alleviates the physical and social burden of water collection on women and girls - When women travel further distances to collect water it puts their safety at risk including exposure to violence and sexual assault. - Lack of access to adequate hygiene and sanitation facilities often restricts women and girls from fully participating in the job place or regularly attending school
Poverty	**- (constraining)**	+ Women are experimenting and driving innovative adaptation options such as homestay-based ecotourism and fruit farming present promising adaptation strategies that are being taken up by others in the community -But patriarchal institutions and structural discriminations result in less access to services, economic resources as compared to men, including less control over income, fewer productive assets, lack of property rights, less access to credit and less access to irrigation, climate information, seeds, and lead to devaluation of women's farm-related adaptation options. - Continued exclusion of women's ideas and views from policy processes will inhibit adaptation and may lead to discriminatory outcomes - Female care workers from the global south entering global care chains, leave a care gap in the places they are migrating from, adding additional care burdens to those [women and girls] who remain behind - A feminist political economy view of disaster recovery across four empirical case studies (United States, Thailand, Philippines, and New Zealand) shows that processes of enclosure, exclusion, encroachment, and entrenchment can distort disaster-relief supports and safety nets, to preserve or exacerbate gender, class, and ethnic disparities Formalizing women's land registration and adopting equitable business models and policies are needed. Prompt attention is needed to address structural social inequalities and gendered power relations during disaster recovery.
Cities	**+ (enabling)**	+Urban agriculture has positively impacted women's participation by improving their wellbeing, food security, and income by increasing their social capital and also allows women to more efficiently and successfully perform their gender roles and responsibilities and gain social and economic empowerment +Well-designed transit-oriented development have positive impacts on gender equality including women's freedom of movement and security +ICT programs that explicitly target women address their specific vulnerabilities have shown to have positive impacts on women's livelihoods and wellbeing, expanding their socio-economic, physical and political space -In houses poorly adapted to heat, women experience higher impacts of extreme heat because culturally, women have limited mobility outside the home and effective techniques to reduce indoor temperatures are not available (except air-conditioning at night and low-cost techniques at daytime for some people) -Current urban policies around climate resilience do not recognise address structural barriers to gender participation such as inadequate recognition of women's unpaid work, inadequate participation, and leadership in decision-making -Relocation can also force women into lowly paid jobs or informal economy, creating a vicious circle where women's time poverty further reduces their social capital and opportunities for self-development in terms of education or formal employment
Industry	**- (constraining)**	-Male workers had a significant increase in overall claims during moderate-severity heatwaves, while no significant change was observed for female workers. -Women find it difficult to carry out the strenuous physical activity during menstruation and unequal wages distribution creates additional threats to cope with their health problems. ±There should be a separate neat and clean toilet for the women workers in workplaces. Wherever possible the eligible women workers should be given maternity benefits in industrial and organised sectors. Exhaustive and comprehensive legislation is urgently needed for regulating working conditions, wage structure, welfare measures of the women workers. Communication through self-help groups of women and NGOs is needed for the receptivity among workers and employers.

		±There are many women groups and NGOs which work with migrant populations in the unorganised sector. Empowering these groups with the relevant latest IEC materials would enable them to fight the heatwave
Health	**+ (enabling)**	+Village savings and loans and other microcredit programs that focus on women can increase their access to credit, income, social networks, adaptive capacity and improve women's overall well-being. +Some climate change adaptation policies explicitly address violence against women and girls that can increase during disasters or drought +Maternal education can significantly reduce the risk of child malnutrition in a post-flooding event or post-drought. +Climate change policies which address mitigation and adaptation can improve women's well-being and mental health, through mechanisms such as increased access to green spaces, reduced air pollution, increased use of bicycles and walking as transport. +Engaging men and boys in addressing gender inequity through educational methods can be effective and help build household and community cohesion and adaptive capacity. -During recovery efforts from hurricanes, floods and other extreme climate events, expecting women to participate in rebuilding can be hard for them due to competing childcare and other household responsibilities, and communal living during the recovery period can create additional dangers for sexual and physical violence for women and girls' post-recovery. -In low-resource settings women have reduced agency to make healthcare decisions, the impacts of disease and disability are likely to be further magnified. - Some indigenous cultural beliefs affect women and girls, compelling them to eat less food as a form of intra-household adaptation to climate change. -Some disaster risk management programs exclude women from income-generating activities, or leadership roles in the program, and only consider their caregiving role. -Women often have less access to credit for climate change adaptation practices, including post-disaster relief, for example, to deal with salinization of water or flooding impacts -Some ecosystem-based adaptation initiatives do not take gender inequities into account and can reinforce gender and other social inequities in terms of discrimination. Development and climate programmes have to be redesigned to accommodate more context-specific policies instead of one-size-fits-all packages that will effectively address women's (and men's) differential needs and unequal relations and circumstances. Limited research and policy initiatives which consider climate change impacts on women's health and childcare and nutrition, particularly for vulnerable groups.

Table SMCCB GENDER.2: Gender integration in regional climate change policies.

Countries	**How is gender considered in climate policy?**	**Illustrative examples**	**Barriers to gender integration**
Central and South America			
Regional assessment of Central & South America	Gender-sensitive; gender-specific (varies by policy)	NDCs (Argentina, Brazil, Chile, Costa Rica, Paraguay and Uruguay) (Tramutola, 2019); National Plans and Programs of the IUCN (2012) for Costa Rica and Panamá; MIMP (2015) for Perú; and UICN (2014) for Cuba.	Insufficient commitment and capacities of actors involved; few relevant tools in both the design and implementation phases; scarce specialists, resources, disaggregated data, documented cases in the region added to the difficulty in generating

		International and Ibero-American Foundation of Administration and Public Policies (FIIAPP): Regional approach promoting learning and exchange of experiences between local actors and decision-makers in the 3 countries. Intersectoral coordination initiative Gender and Climate Change Action Plans (PAGcc), adopted in some Latin American and Caribbean countries (Casas Varez, 2017).	significant indicators (Tramutola, 2019). The vulnerability and resilience of women are dependent on household income diversification (Andersen et al., 2017) and household type.
Cuba. Guatemala Ecuador Perú, Costa Rica, Panamá Colombia	Gender-specific	(Cuba) Gender-based research in an integrated coastal zone management program (Montero et al., 2015).	(Cuba) Gender inequality in the integrated coastal zone management program.
		(Guatemala) Gender environmental policy is mainly linked to climate change adaptation (Bárcena Ibarra et al., 2020).	
		*(*Ecuador*)* *Sumak Kawsay* or Buen Vivir is a concept included in the Constitution of Ecuador in 2008 (Cáceres-Arteaga et al., 2020). Food Security and Gender Considerations (FORECCSA) policy uses a bottom-up approach, managed through community-based adaptation (Bárcena Ibarra et al., 2020).	*(*Ecuador*)* Indigenous women remain invisible in land tenure discussions (Radcliffe, 2014).
		(Perú, Cuba, Costa Rica, Panamá) Intersectoral coordination initiative Gender and Climate Change Action Plans (PAGcc).	
Colombia, Ecuador, Perú Chile	Gender-sensitive	(Colombia, Ecuador, Perú) International and Ibero-American Foundation of Administration and Public Policies (FIIAPP): Regional Approach promoting learning and exchange of experiences between local actors and decision-makers in the 3 countries.	(Columbia and Chile) Discrimination in land tenure for women (Tafur et al., 2015).
North America			
USA	Gender-specific	Declaration for Climate, Justice and Peace proposed by a movement Earth Democracy and a non-profit organisation Women's International League for Peace and Freedom (Price, 2014).	Differentiated economic interest conflict with addressing climate change and the gender gap (Tranter and Booth, 2015). Policies often have a homogenized cultural vision that erases Indigenous people's autonomy (Gay-Antaki, 2020) and fails to address the intersection of race, ethnicity, and gender for vulnerability to climate change (Vinyeta et al., 2016).

Canada, Mexico	Gender-sensitive	(Canada) New Feminist International Assistance Policy aims to incorporate the empowerment of women and girls, including policies addressing climate change (Sellers, 2018) Relevance of gendered climate adaptation emphasizing traditional food systems (Burch et al., 2014; Sellers, 2018; Williams, 2018) (Mexico) Mexican Nationally Determined Contribution (NDC) states gender equality and human rights as cross-cutting principles both for mitigation and adaptation. Legal reforms on water management (Silva Rodríguez de San Miguel, 2018).	(Canada) Research to support gender-sensitive policies (Natcher et al., 2020). Policies often have a homogenized cultural vision that erases Indigenous people's autonomy (Gay-Antaki, 2020). (Mexico) Discrimination in land tenure; gender division of labour; salary gap and barriers to job placement (Griffin Cohen, 2014), and the unequal distribution of benefits (Vázquez García, 2015).
Africa			
Africa regional assessment	Gender-neutral	A gender lens is rarely applied in national policies or programmes (e.g., Ethiopia's Climate Resilience Green Economy policy (Mersha and van Laerhoven, 2019), beyond the initial consultation stage (Holvoet and Inberg, 2014). Some gender and climate change action strategies and/or plans in several countries, including Liberia, Mozambique, Tanzania and Zambia (Ghana, 2012; Mozambique and IUCN, 2014; Zambia and IUCN, 2017)	Practical constraints such as lack of staff capacity on gender, and lack of funding to support gender integration in policy (Kristjanson et al., 2017); other forms of resistance which lead to inaction (Acosta et al., 2019); poor integration of women in decision-making processes. In African contexts, local institutions do not value fair access to production resources, such as land and financial capital, which increase the vulnerability of marginalized groups, including women and youth, under climate change conditions (Van Wijk et al., 2018; Edward, 2020) (see also Box 9.2 in Ch 9)
Europe			
European Union, Russian Federation. Norway, Sweden Russian Federation Turkey	Gender-sensitive Gender weak	Gender equality is integrated into Constitutions, special laws on women's rights and the implementation of the Convention on the Elimination of All Forms of Discrimination against Women. There are no examples of direct gender mention from National adaptation plan). Sweden adopted the SDGs as local goals and the County's Comprehensive Plan is evaluated on these, e.g., considering gender in the use, access and safety of public spaces, and emphasizing development that facilitates climate-resilient lifestyles (Leander et al., 2021). Despite progress over the recent decade, gender differences are still a challenge, and are frequently wider among	European climate change adaptation strategies and national policies are generally weak on gender, LGBTQI, and other social equity issues (Boeckmann and Zeeb, 2014; Allwood, 2020) Turkey Country Gender Assessment 2018 (Bank, 2018)

		vulnerable groups. Girls from lower-income backgrounds have significantly lower school enrollment rates than boys, while among the higher-income bracket gender parity has been achieved (Bank, 2018).	
Asia			
Malaysia	Gender-specific	Engagement of civil society, especially youth, in the development of the 2050 National Transformation Plan, a policy planning document outlining economic, social and environmental targets (Susskind et al., 2020) NGO advocacy for climate change actions studied impacts on sexual and reproductive health and rights among indigenous communities (Penita, 2015). The National Policy on Climate Change includes specific mention of women, children, youth, indigenous peoples, and their communities, as "Major Groups" and "Stakeholders" in addressing climate change, with a focus on effective participation (MNRE, 2010)	Despite national initiatives to increase women's participation in the workforce to provide them with social support (Lim, 2019) and to empower them (Baqutayan, 2020), gender mainstreaming, in general, is hampered by lack of full comprehension of gender issues (Ismail and Zakuan, 2014).
India Nepal	Gender-sensitive	Recognition of gendered vulnerability and need for targeting women in NAPCC (Roy et al., 2018). Gendered vulnerability is recognised across national and state climate action planning (Jafry, 2016; Singh et al., 2021). Skill enhancement programs in agriculture and fisheries to increase and diversify livelihood opportunities (Ministry of Agriculture, 2015; Stacey et al., 2019) The NAPA and the CCADRMA recognise the gender-differentiated impacts of climate change in agriculture (Paudyal et al., 2019; Khatri-Chhetri et al., 2020) Localised action for climate change adaptation and disaster risk reduction (Bhattarai et al., 2015; Ojha et al., 2016; Vij et al., 2019)	Underlying structural inequalities around workforce participation, inadequate diverse gender representation in decision-making bodies and processes. Women are less represented in local decision-making committees in almost all Asian countries. Organised community collectives such as women self-help groups have had a mixed experience in gaining rights and benefits for women with positive impacts such as improved incomes (Salas et al., 2017) and somewhat negative impacts on women's participation in local adaptation decisions (Singh, 2019). The continuing failure of development policy and practices to address structural inequalities such as land ownership and access to gender-sensitive agrobiodiversity management services and technologies and forests (Bhattarai et al., 2015; Khadka et al., 2015).
The small Island States			

Pacific Island Countries (eg: Fiji & Vanuatu)	Gender-specific / Gender-sensitive	Gender considerations are included in National Climate Change and Disaster Risk Reduction policies and frameworks (Community, 2015; Sawer et al., 2020) The inclusion of gender considerations strengthens national planning (Community, 2015; International Federation of Red Cross and Red Crescent, 2020). Pacific island countries are beginning to integrate gender into their climate change initiatives using a toolkit designed to support climate change practitioners in the region to integrate gender into their programmes and projects (South Pacific Regional Environment, 2014).	Barriers include financing to implement gender considerations in national policies (Mcleod et al., 2018; Kleiber et al., 2019).
Australasia			
Australia	Gender-neutral / Gender-specific	Across all levels of government, there is minimal consideration of gender in climate change policy that may increase vulnerability and social exclusion and affect adaptive capacity and resilience (Alston, 2017). Scant attention to gender in policies for emergency management and disaster response. National gender and emergency management guidelines were drafted in 2017 in Australia (Parkinson et al., 2017), but these have not been endorsed or adopted by any Australian government. The only literature located on climate and gender in Australia examined the different effects of drought on rural men and women (Pearce et al., 2018).	Lack of consideration of gender may be partially due to a lack of diverse gender representation in decision-making processes (Parkinson et al., 2017).
Aotearoa-New Zealand	Gender-sensitive	Recent Government-commissioned climate change risk assessments explicitly identify gender as one of the limiting factors for equitable resources in response to climate-related risks, including housing, employment, childcare, and safety (Environment, 2020) New Zealand-based Pacific Islander women have already demonstrated leadership roles in mobilising to respond to climate-related disasters and collaborations on their ancestral islands, demonstrating their abilities and networks of use in climate change adaptation and planning (Masaki, 2015).	No action is yet released by the Government that details how vulnerability will be reduced (Environment, 2020). A lack of gender-responsive design and implementation overlooks the growing evidence of the gendered experience of the impacts and projected risks of climate change and disasters, as well as the gendered nature of emergency management, in Australasia. This research identified gendered impacts on physical and mental health (Zara et al., 2016), as well as gender-based violence (Parkinson et al., 2017; Rees and Wells, 2020) and discrimination (Dominey-Howes et al., 2016; Gorman-Murray et al., 2017).

Table Notes:

Climate policies span from the gender-blind (implicitly men-biased, excluding women) to gender-transformative/ redistributive (interventions that intend to transform the existing distribution of resources and responsibilities to create more equitable gender relations). Along this continuum, policies can also take varied approaches such as gender-neutral